

# School food standards in the UK: implementation and evaluation

Ashley Adamson<sup>1</sup>, Suzanne Spence<sup>1</sup>, Lowri Reed<sup>2</sup>, Ruth Conway<sup>2</sup>, Alison Palmer<sup>3</sup>, Eve Stewart<sup>4</sup>, Jennifer McBratney<sup>5</sup>, Lynne Carter<sup>6</sup>, Shirley Beattie<sup>7</sup> and Michael Nelson<sup>8,\*</sup>

<sup>1</sup>Institute of Health & Society and Human Nutrition Research Centre, Newcastle University, Newcastle upon Tyne, England: <sup>2</sup>Pupil Wellbeing Branch, Support for Learners Division, Welsh Government, Cardiff, Wales:

<sup>3</sup>Welsh Local Government Association, Cardiff, Wales: <sup>4</sup>Department of Education, Bangor, Northern Ireland:

<sup>5</sup>Public Health Agency, Lisburn, Northern Ireland: <sup>6</sup>Learning Directorate, Scottish Government, Edinburgh, Scotland: <sup>7</sup>Education Scotland, Livingston, Scotland: <sup>8</sup>Children's Food Trust, 3rd Floor, 1 East Parade, Sheffield S1 2ET, England

Submitted 17 May 2012: Final revision received 29 January 2013: Accepted 5 February 2013: First published online 11 April 2013

## Abstract

*Objective:* To outline the evolution of school food standards and their implementation and evaluation in each of the four countries of the UK since 2000.

*Design:* Review of relevant policies, surveys and evaluations, including country-specific surveys and regional evaluations.

*Setting:* UK: England, Wales, Scotland and Northern Ireland.

*Subjects:* Primary and secondary schools and schoolchildren.

*Results:* By September 2013 standards will have been introduced in all primary and secondary schools in the UK. Evaluations have varied in their scope and timing, relating to government forward planning, appropriate baselines and funding. Where standards have been implemented, the quality and nutritional value of food provided have improved. Emerging evidence shows improved overall diet and nutrient intake by school-aged children as a result.

*Conclusions:* The re-introduction of school food standards in the UK has not been centrally coordinated, but by September 2013 will be compulsory across all four countries in the UK, except in England where academies are now exempt. Provision of improved school food has had a demonstrable impact on diet and nutrition beyond the school dining room and the school gate, benefiting children from all socio-economic groups. Improved school food and dining environments are associated with higher levels of school lunch take up. Implementation of school food standards requires investment. It is critical to policy development that the value of this investment is measured and protected using planned, appropriate, robust and timely evaluations. Where appropriate, evaluations should be carried out across government departments and between countries.

## Keywords

School food  
School food standards  
School food policy  
Primary school  
Secondary school  
UK  
England  
Wales  
Scotland  
Northern Ireland

The UK consists of four countries: England, Scotland, Wales and Northern Ireland. Each country has its own law-making body (Parliament, Executive, Assembly and Government, respectively) and powers have been devolving gradually from the English Parliament in Westminster to the constituent governing bodies.

School food in the UK was deregulated in 1980. Since 2000, however, each country has re-introduced standards for school food on either a voluntary or compulsory basis. All four countries have food-based standards for lunch and for food provision other than lunch. England, Scotland and Wales also have nutrient-based standards for lunch. These vary in content, timetable for implementation, and whether or not they are compulsory for schools

to follow. The details of the standards for each country, along with supporting resources, are available for all four countries and are outlined in the sections below. Approaches to evaluation in each country are reviewed. Conclusions relating to implementation, monitoring and evaluation of policy impact are discussed.

The overall purpose of the paper is to understand how the standards for school food were re-introduced across the UK: the timing; how the re-introduction of standards was complemented by studies to evaluate the impact of the implementation; and to what extent those studies informed further policy development. They illustrate some good practice and provide models for future implementation.

\*Corresponding author: Email Michael.Nelson@childrensfoodtrust.org.uk

## The standards and the evaluation of school food policy

School food standards across all four countries have been summarised by the Children's Food Trust<sup>(1)</sup>. The comparison shows substantial commonality, but there are differences in the details and in the timing of introduction from country to country.

Evaluation of the impact of the introduction of new standards for school food has been accompanied in the four countries by a range of assessments and analyses. These have included measures of:

- Changes in take up of school lunch.
- Factors relating to catering practices.
- Compliance with the school food standards.
- Relationships between food and drink consumption inside and outside school.
- Economic cost–benefit analysis.
- Collateral benefits relating to education and health outcomes.
- Factors influencing pupil priorities and choices at lunchtime.

The analyses have varied in their scope and timing, due in part to forward planning by government, the establishment of appropriate baselines and the funding for evaluation. Table 1 shows the range of measurements made in all four countries.

## England

### Standards

In 2001, the Department for Education and Employment (now the Department for Education) re-introduced a set of statutory (i.e. compulsory) guidelines after a gap of 21 years. They were intended to ensure that schools provided 'healthy' options every day (e.g. availability of fruit and vegetables, carbohydrates not cooked in oil) so that children had access to healthy choices at lunchtime. The 2001 regulations did not, however, limit the availability of less healthy items high in fat, sugar or salt such as chips, crisps and savoury snacks, confectionery and soft drinks<sup>(2)</sup>. The Department of Health White Paper entitled *Choosing Health: Making Healthy Choices Easier*<sup>(3)</sup> was published in November 2004. This highlighted the Government's commitment to improving school food, i.e. reducing the consumption of fat, salt and sugar and increasing the consumption of fruit and vegetables.

In March 2005, following a series of broadcasts by the celebrity chef Jamie Oliver which highlighted the poor quality of some school food provision in England, the Secretary of State for Education announced the formation of the School Meals Review Panel (SMRP) to review nutritional standards and the school meals service. The Panel's report, *Turning the Tables*<sup>(4)</sup>, made thirty-five

recommendations to Government, including the introduction of compulsory food- and nutrient-based standards for school lunches and other food provided at school. In the same year, the School Food Trust (SFT; now the Children's Food Trust) was set up to advise Government, develop standards, and provide independent support and advice to caterers, schools and parents on the improvement of the standards of school meals. The following year (2006), the Department for Education announced new standards for school food. These were based on the recommendations of the SMRP and the SFT. They improved the previous guidelines (which had only required 'healthy' food options to be available) by requiring a healthy balance of food and drink across all of the food provided and, in particular, banned some foods altogether (e.g. confectionery, crisps, soft drinks); and introduced a nutrient framework based on age- and sex-specific nutrient and energy requirements specified by the Department of Health<sup>(5)</sup>. Together, these standards covered all food provided in schools: breakfast, mid-morning break, lunch and after-school clubs, tuck shops and vending machines. As provided in legislation from previous decades, children from poorer backgrounds were eligible for free school meals, but only if their parents or guardians had registered their child for free school meals.

The standards were phased in over three years. In September 2006, mandatory interim food-based standards for school lunches came into force<sup>(6)</sup>. In September 2007, mandatory food-based standards for food other than lunch were introduced<sup>(7)</sup>, with the final food-based and nutrient-based standards for school lunches<sup>(8)</sup> to be fully implemented in primary schools by September 2008 and in secondary schools by September 2009. Minor technical changes were made to the Regulations, which came into force in September 2008<sup>(9)</sup>. Further modifications were introduced in 2011<sup>(10,11)</sup>. Although the most recent legislation clarified one or two ambiguities about school food provision (e.g. what to do about children attending state boarding schools), it specifically exempted academies from the standards. This was in effect a deregulation of school food (the majority of secondary schools and many primary schools have adopted academy status). It also raises issues regarding monitoring and evaluation if some schools are required to follow the standards, but not others.

### Monitoring and evaluation

The National Diet and Nutrition Survey of 4–18-year-olds conducted in 1997<sup>(12)</sup> provided nationally representative data on food and drink consumption at school and outside school, suggesting that average school meals were high in fat, salt and sugar and lacking in fruit and vegetables. The data focused on individual consumption, however, and were not planned specifically to evaluate changes in consumption relating to the introduction of school food standards. There were no data collected

**Table 1** Monitoring and evaluations relating to school lunch undertaken in the four countries in the UK, 2000–2012

Type of evaluation or research	England			Scotland			Wales			Northern Ireland		
	Survey	Date	Funder	Survey	Date	Funder	Survey	Date	Funder	Survey	Date	Funder
Changes in take up of school lunch	Annual Survey*	2005–2012	DfE	Annual survey		SG				Annual survey		DENI
Factors relating to catering practices	Annual Survey*	2005–2012	DfE							Top Marks survey 2008 and 2012	2008/2012	PHA/DE/DHSSPS
	Newcastle study†	2005–2010	PHRC									
Compliance with the school food standards	Annual Survey*	2005–2012	DfE	School inspection reporting	2004–2012	Education Scotland (previously HMIE)	Appetite for Life Action Research Project	2008–2010	Welsh Assembly Government	Top marks survey 2008 and 2012	2008/2012	PHA/DE/DHSSPS
	Primary school food survey*	2009	DfE	Implementation progress reports	2005, 2008	Education Scotland (previously HMIE)				NI Audit report	2011	NI Government
	Ofsted Food in Schools report	2010	Ofsted/DfE									
	Secondary school food survey*	2011	DfE							Education and Inspectorate report	2006–2010	DE
	Newcastle study†	2005–2010	PHRC									
Relationship between food and drink consumption inside and outside of school	NDNS*	2001–2011	DoH†							Top marks survey 2008 and 2012	2008/2012	
	Newcastle study†	2005–2010	PHRC							NI Audit report	2011	NI Government
Economic cost–benefit analysis	Analysis of existing data	2009	DfE				Survey on the cost of producing school meals	2009–2010	Welsh Assembly Government	Education and Inspectorate report	2006–2010	DE
Collateral benefits relating to education and health outcomes	School lunch and behaviour†	2010, 2011	DfE				Food and Fitness in schools	2008	Estyn			
	Breakfast clubs and attainment†	2007	DfE				Evaluation of the PSFBI	2004–2007	Welsh Assembly Government	Top marks survey 2008 and 2012	2008/2012	
Factors influencing pupil priorities and choices at lunchtime	Teenager insight†	2011	DfE							Top marks survey 2008 and 2012	2008/2012	

NDNS, National Diet and Nutrition Survey; DfE, Department for Education; PHRC, Public Health Research Consortium; DoH, Department of Health; SG, Scottish Government; HMIE, Her Majesty's Inspectorate of Education; PSFBI, Primary School Free Breakfast Initiative; NI, Northern Ireland; DENI, Department of Education Northern Ireland; PHA, Public Health Agency; DE, Department of Education; DHSSPS, Department of Health, Social Services and Public Safety.

\*National survey.

†Regional survey with national implications.

relating to school catering practices, for example, or their impact on lunchtime food choices.

Following the introduction of legislation in 2001, the Department for Education and Skills funded two surveys of school food provision and consumption in nationally representative samples of primary and secondary schools in 2005 and 2004, respectively. While the 2001 legislation was intended to ensure that catering services in schools provided healthy options for children, sales of foods high in fat, salt and sugar were not restricted, there was little support for school caterers to prepare healthier options and healthier options were not promoted or marketed in a coordinated way. Comparisons of school food consumption in 2004–05<sup>(13,14)</sup> with 1997<sup>(15)</sup> showed that the increased availability of healthy options at lunchtime had had little or no impact on children's eating habits in school<sup>(16)</sup>.

A three-year programme grant from the Department for Children, Schools and Families to the SFT in 2005, renewed for a further three years in 2008, provided the opportunity to establish a monitoring and research programme to evaluate in a more systematic way how the introduction of school food standards impacted on take up, provision, consumption and other factors likely to influence pupil choices and consumption, as well as to understand the impact of healthier school food on children's health and behaviour.

The first monitoring task was to assess how the introduction of the standards had impacted school lunch take up. After the negative publicity in 2005, many parents stopped paying for their children to have school lunches, and take up decreased. Between 2006 and 2011, the SFT worked closely with the Local Authority Caterers Association to standardise the method of calculating school lunch take up, carrying out annual surveys of school food catering practices, measuring take up nationally, and assessing which factors were associated with increases or decreases in take up. Net take up increased year-on-year between 2008–09 and 2011–12, from 39.3% to 46.3% in the primary sector and from 35.0% to 39.8% in the secondary sector<sup>(17)</sup>.

Evidence from national surveys in primary schools<sup>(18,19)</sup> in 2009 and in secondary schools<sup>(20)</sup> in 2011 showed clear nutritional benefits to children's consumption following the introduction of the standards (compared with 2004–05<sup>(13,14)</sup>). These and other surveys<sup>(21,22)</sup> also explored which factors were associated with better engagement with the standards and pupil preferences. Two small studies suggested that better school food eaten in improved dining environments may have a positive impact on learning behaviours in the classroom<sup>(23,24)</sup>.

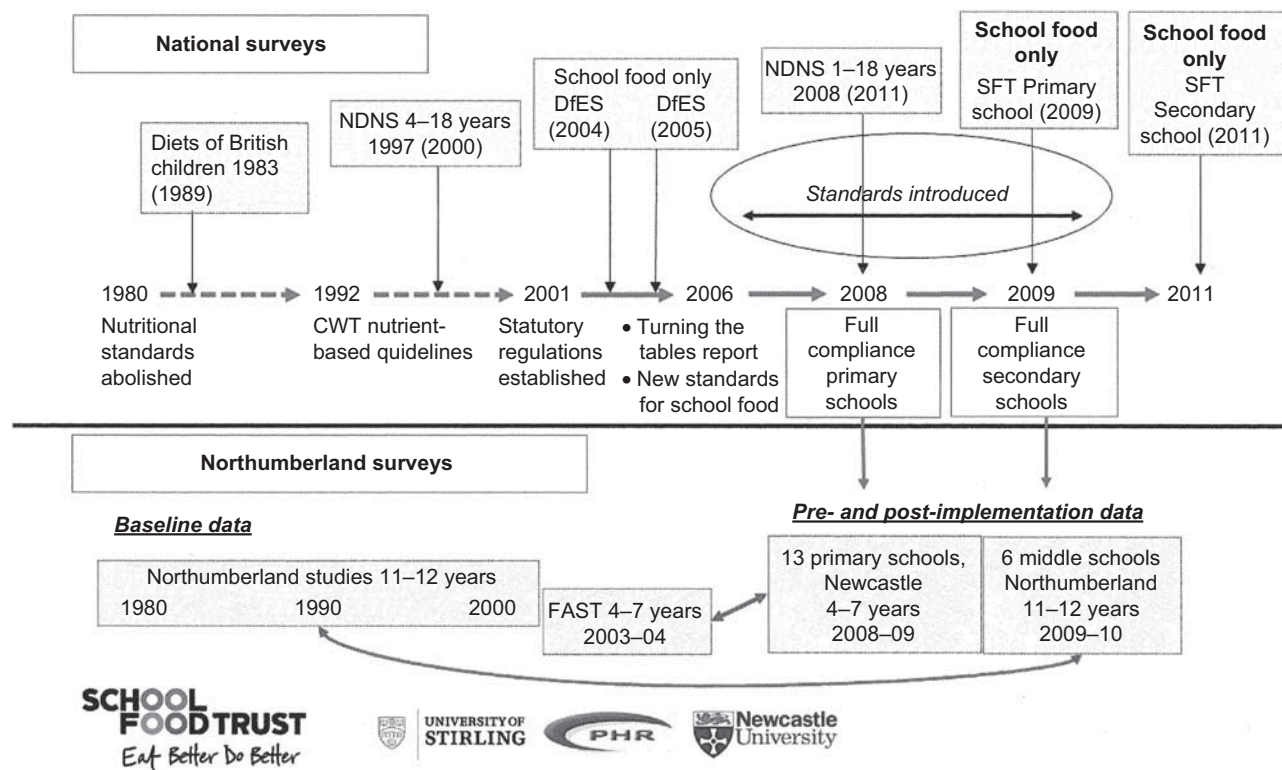
During the same period (2007–2011), the Public Health Research Consortium, funded by the Department of Health's Policy Research Programme, initiated a project to assess the impact of the change in school food policy on food and nutrient intake both in and outside school.

The Research Advisory Board included a broad cross-section of experts with an interest in evaluating the impact of school food policy, including staff from the SFT. This collaborative project measured changes both in school food and in the total dietary intake of children from thirteen primary schools (children aged 4–6 years) and six middle schools (children aged 11–12 years) in North East England. Although the Public Health Research Consortium study began in 2007, it had value as a measure of policy impact (and in part was implemented) because, adventitiously, data on children's consumption in these same schools had been collected previously, in 2000 (middle schools) and in 2004 (primary schools), i.e. prior to the introduction of the school food standards. These two studies therefore provided appropriate baseline measures. The Public Health Research Consortium results<sup>(25)</sup> provided evidence of a positive impact of the introduction of school food standards in England on consumption both inside and outside school in primary-school children aged 4–7 years. Although there were improvements in packed lunches over the same period, those children having school lunch had total dietary intakes more in line with dietary recommendations than those children having packed lunch. There was limited impact in older children.

Figure 1 summarises the timing of the data collections outlined above. England has been fortunate in that numerous assessments of child nutrition in general and school food in particular have had sufficient overlap to develop a sense of the impact of policy changes, even where that has not been their specific aim. Equally, it is clear that there has not been a coordinated programme of school food policy evaluation that has extended beyond five years.

In contrast to the other countries in the UK, England is now effectively deregulating school food, as the standards are no longer compulsory in academies (which now represent over half of secondary schools). There are no planned government-funded evaluations of child nutrition, growth and educational outcomes that are linked specifically to school food policy. Ofsted inspections (which previously included an element of evaluation relating to school food provision)<sup>(21)</sup> will henceforth be limited strictly to educational influences and outcomes, excluding many of the previous elements relating to child well-being<sup>(26)</sup> (in contrast to Education Scotland's inspections that include nutritionists (see below)).

In summary, the successful introduction of comprehensive, statutory, food-based and nutrient-based standards for school lunches and food-based standards for food other than lunch in schools in England since 2006 has resulted in improved food provision, leading to improved food and nutrient intakes among school-children taking school lunches, as well as an apparent impact on total diet. These standards were introduced following recommendations made by a multidisciplinary expert panel. The introduction of standards in 2001 simply



**Fig. 1** Timing and scope of national and Northumberland surveys of child food consumption (total diet or school food only) in relation to changes in school food policy, 1980–2011 (NDNS, National Diet and Nutrition Survey; DfES, Department for Education and Skills; SFT, School Food Trust; CWT, Caroline Walker Trust; FAST, Food Assessment in Schools Tool)

to promote healthy options rather than to restrict less healthy items (typically high in fat, salt and sugar), and applicable only at lunchtime and not other times of the school day, was not effective. A coordinated programme to support the transformation of school food (including ring-fenced funding to support schools and caterers and to keep the price of meals down, and the setting up of the SFT to help implement the changes and to establish a monitoring and research programme) resulted in an increase in the take up of school lunches, meaning that more pupils are having healthier food at lunchtime.

## Scotland

### Standards

In 2002, the Scottish Government established an Expert Panel on school meals to determine standards for the nutritional content of school meals. Its report, *Hungry for Success*<sup>(27)</sup>, set nutrient-based standards for school lunches in Scotland for the first time. Schools were set target dates for the implementation: primary schools by December 2004 and secondary schools by December 2006. These standards were based on the 1992 guidelines of the Caroline Walker Trust<sup>(28)</sup>.

In October 2006, a consultation began to revise the nutrient standards set out within *Hungry for Success*

and also to set standards for the first time for food provided other than lunch. The Schools (Health Promotion and Nutrition) (Scotland) Act<sup>(29)</sup> passed in 2007 built on the work of health promotion in schools and *Hungry for Success*. The Act required all school food and drink to meet the revised nutrient standards, and that schools had a duty to promote the take up of school lunches – in particular, the take up of free school lunches. Local Authorities were also able to provide healthy snacks and drinks, and to consider issues related to sustainability.

In June 2008, the Nutritional Requirements for Food and Drink in Schools (Scotland) Regulations 2008<sup>(30)</sup> act set out food-based standards in addition to the nutrient-based standards, and covered all food and drink provided in schools. The updated regulations came into force in primary schools in August 2008 and in secondary schools in August 2009. *Healthy Eating in Schools: A Guide to Implementing the Nutritional Requirements for Food and Drink in Schools (Scotland) Regulations 2008*<sup>(31)</sup> was published by the Scottish Government in September 2008, to help those responsible for providing food and drink in schools implement the nutritional standards and to give guidance on other practical aspects of food provision. A nutritional analysis manual<sup>(32)</sup> was published in October 2008, including guidance on how to perform nutrient analysis of school menus in Scotland, to ensure a consistent

approach across all schools. Eligibility for free school meals is dependent on family income.

As part of a drive to improve the nation's health and encourage good eating habits from a young age, the Scottish Government commissioned a trial to provide free school meals to P1 to P3 pupils (first three years of school) from October 2007 to June 2008 in five Local Authorities in Scotland selected to include areas of both urban and rural deprivation. This was undertaken at a time when the standards were codified but not compulsory. The trial explored the change in take up of school meals; processes and practical issues for Local Authorities and schools; the range of potential health benefits; the impact of the trial on costs of provision; and unexpected impacts and barriers to roll-out in other Local Authorities. The largely positive results from the trial were published in October 2008<sup>(33)</sup>. Legislation was passed in November 2008 giving Local Authorities the power to provide free school lunches to all P1 to P3 pupils from August 2010. The majority of the funding local government has received from the Scottish Government, including the funding for providing free school meals, was provided by means of a block grant. Each Local Authority was then responsible for the allocation of the total financial resources available to it on the basis of local needs and priorities, having first fulfilled its statutory obligations and the jointly agreed set of national and local priorities. A number of Local Authorities utilised this power and delivered free school meals either to all or to selected children in these year groups through various local initiatives. The trial suggested that the standards were deliverable across virtually all primary-school settings.

A further element of testing the feasibility of implementation of the standards was undertaken by Glasgow City Council, an example of a Local Authority finding local solutions to local problems. The City Council worked closely with the Glasgow Centre of Population Health to report on the impacts of school-based provision of healthy food and drinks in 2007<sup>(34,35)</sup>. In August 2009, Glasgow City Council Education Services, in collaboration with other stakeholders in the education sector, implemented a year-long pilot project – Glasgow's Big Eat In – in secondary schools in Glasgow. The aim was to encourage pupils in the first year of secondary school (S1; aged 11–12 years) to stay within the school grounds at lunchtime, to eat a healthy lunch and participate in a lunchtime activity. Eight secondary schools located in different areas of Glasgow volunteered to participate. Findings indicated that S1 school meal take up rates across the eight schools remained consistently higher during the pilot year than during the previous academic year and were also higher than take up rates in other year groups. The general consensus from those who participated in the pilot project (including pupils, parents/carers, staff and volunteers) was that the Big Eat In had been very successful, should continue and should be extended to other schools in Glasgow and across Scotland.

The Scottish Government recognised the impact of the environment outside school on the eating habits of young people. A group was established to explore how Local Authorities responded to the challenges posed by out-of-school food provision – 'Beyond the School Gates'. Evidence from Education Scotland's school inspections supported progress in this area.

Finally, the standards were supported in schools by Curriculum for Excellence, the curriculum in Scotland which applies to all children aged 3–18 years<sup>(36)</sup> and which acknowledges the strong connections between effective, successful learning and health and provides a framework to enable children and young people to develop skills, knowledge and understanding in all aspects of health including food and health. The Curriculum for Excellence Management Board has overall responsibility for ensuring that the programme of curriculum change is delivered.

### **Monitoring and evaluation**

In Scotland, Local Authorities were given the flexibility and freedom to decide how best to use their resources in order to meet their statutory responsibilities, local priorities and needs regarding school food. The Scottish Government undertook some research and evaluation centrally; however, Local Authorities were expected to develop local solutions and innovative approaches which work for them rather than dictating a central approach.

The School Meals Survey<sup>(37,38)</sup>, an annual survey, has been undertaken in February each year for all publicly funded schools in Scotland. The survey collects information on the take up of school meals, free and paid for, and the registration for and take up of free school meals. Up until 2010, information on anonymised payment systems, free fruit, drinking water and breakfast clubs was collected as part of the survey, but from 2011 the survey was reduced in scope to reduce the burden on schools and Local Authorities. The 2011 survey showed that take up of school meals overall (primary, secondary and special schools in total) increased year-on-year for three years (2008–09, 48.9%; 2009–10, 50.4%; 2010–11, 51.9%), including the secondary sector also (2008–09, 39.1%; 2009–10, 39.6%; 2010–11, 41.6%). Two policies, one amending free school meal eligibility at a national level and one enabling Local Authorities to provide free school meals to pupils in P1 to P3, as described below, increased free school meal eligibility.

The Schools (Health Promotion and Nutrition) (Scotland) Act 2007 ('the Act') placed a burden on Local Authorities to undertake internal monitoring and evaluation to demonstrate compliance with the Act. This was complemented by external evaluation through Education Scotland's (formerly Her Majesty's Inspectorate of Education) inspection activities. In a proportion of inspections, a Health and Nutrition Inspector evaluated and reported on a school's progress in implementing specific duties, including those in the Act related to school meals, and compliance with nutritional regulations. School catering

services provided nutritional analysis data based on food provision. Health and Nutrition Inspectors also reported on progress with other aspects of health and well-being in line with the Curriculum for Excellence to Scottish Ministers and for public accountability. Again, standards and curriculum were seen as complementary.

Finally, the Scottish Health Survey provided information on the health and health-related behaviours of people in Scotland living in private households. The 2008–2011 surveys had two samples: a general population (main) sample in which all adults and up to two children were interviewed in each selected household; and a child boost sample in which up to two children were interviewed. The survey estimated the prevalence of a range of health conditions and behaviours and monitored progress towards key Scottish Government health targets. Like the National Diet and Nutrition Survey in England, the Scottish survey provided broad background information on nutrition and health, but not a perspective exclusive to school food policy.

In summary, initial recommendations made by an expert panel for the implementation of nutrient-based standards were further enhanced following consultation to add food-based standards and to cover all food and drink across the day in schools in Scotland. These comprehensive statutory food-based and nutrient-based standards for school lunch and the wider school day were successfully implemented in Scotland, although no assessment has yet been made of their impact on children's diets. Standards for school food and the inclusion of healthy eating in the curriculum were seen as complementary, and a health and well-being element was included in the Curriculum for Excellence. Funding was provided to Local Authorities to develop local solutions and innovative approaches, and Local Authorities were required by legislation to monitor and evaluate progress in implementing the standards and increasing take up, in addition to external monitoring carried out by Education Scotland's inspection activities. Monitoring the take up of school meals was considered important as a measure of the work being done to promote healthy eating and improved nutritional standards in children and young people, and findings from the School Meals Survey showed an increase in overall school meal take up between 2008–09 and 2010–11. Funding was provided for a trial to provide free school meals to P1 to P3 pupils, and following an evaluation which showed that it was considered to be overwhelmingly positive by parents, teachers, Local Authority staff and catering staff, legislation was introduced giving Local Authorities the power to provide free school lunches to all P1–P3 pupils.

## Wales

### Standards

In 2001, the Welsh Assembly Government issued the Education (Nutritional Standards for School Lunches – Wales)

Regulations<sup>(39)</sup> to all schools and Local Authorities setting out minimum nutritional standards for school lunches, specifying that a range of food and drink must be available but, like the legislation in England in the same year, not limiting other food and drink that might be available. In July 2005, an independent Food in Schools Working Group was established and issued the consultation document *Appetite for Life*<sup>(40)</sup> in June 2006, which recommended that the Caroline Walker Trust 2005<sup>(28)</sup> nutrient standards should apply to all food served at lunch time. It also recommended introducing standards for food and drink provided at other times during the school day, e.g. morning break. The Appetite for Life Action Plan<sup>(41)</sup> was launched in November 2007, setting out the strategic direction and actions required to improve the nutritional standards of food and drink provided in schools in Wales. Its development was informed by responses to the consultation exercise (which included children's and young people's views), lessons learnt from other parts of the UK, and detailed discussions with the Local Authority Caterers Association.

As part of the iterative process that informed policy development, a two-year action research project was implemented in September 2008 to provide a picture of the issues facing schools and Local Authorities in introducing change. The project worked intensively with nine schools in four Local Authorities to develop and test the guidelines for implementing the food and nutritional standards proposed within the Appetite for Life Action Plan and to inform wider application across all maintained schools in Wales. The Appetite for Life Action Research Project report<sup>(42)</sup> was published in December 2010.

Draft guidelines<sup>(43)</sup> to support stakeholders in implementing the standards in the Appetite for Life Action Plan were published by the Welsh Government. Like those in England and Scotland, the guidelines provided practical advice and support on how to implement the changes to the provision of food and drink. The Healthy Eating in Schools (Wales) Measure 2009<sup>(44)</sup> was passed by the National Assembly for Wales in July 2009 and received Royal Approval in 2009. The Measure required Local Authorities and governing bodies to promote healthy eating and drinking by pupils in maintained schools in Wales and to provide for the regulation of food and drink provided in those schools. At the time of its introduction, it was widely acknowledged that the Measure gave a further legislative foundation to the approach that the Welsh Government was already taking forward via Appetite for Life. The regulations apply to primary schools, secondary schools, special schools and pupil referral units from 2013. A final version of the guidelines will be published to coincide with the introduction of statutory standards in 2013.

Funding was made available, via a specific grant scheme (since 2008–09), to support, across all authorities, those schools not involved in the action research project

who wished to progress to the new standards proposed in the Appetite for Life Action Plan. This grant funding will be made available in 2012–13, after which funding will be transferred to Local Authorities' revenue support grant, to support the delivery of the regulations on food and drink provided in schools.

Like the other countries in the UK, Wales has a scheme to provide free school lunches for pupils from poorer backgrounds. This was complemented by the Primary School Free Breakfast Initiative (PSFBI), introduced to support the Welsh Government's whole-school approach to improving nutrition in schools and encouraging healthy eating embodied in the Appetite for Life Action Plan. The PSFBI provided funding for all children in maintained primary schools in Wales to have the opportunity of receiving a free healthy breakfast at school. The PSFBI was introduced incrementally on a pilot basis, first in Communities First and then non-Communities First areas. The national roll out was accompanied by an independent evaluation of its implementation and impact on school pupils<sup>(45)</sup>.

### **Monitoring and evaluation**

The Appetite for Life Action Research Project report<sup>(42)</sup> explored the issues raised in moving towards the standards proposed in Appetite for Life and made recommendations for Welsh Government, Local Authorities and schools. The report identified the various preoccupations around food and drink provided in schools for the different stakeholders, and summarised key learning points.

While the findings were used to inform the development of the Appetite for Life Guidelines, they did not constitute a baseline measure of provision or practice. Instead, as part of the wider work being undertaken on Appetite for Life, the Wales Audit Office was commissioned to examine the cost of producing a school meal, in order to support the delivery of the Appetite for Life Action Plan. The Wales Audit Office used a model to capture the baseline information for 2007–08 from eighteen of the twenty-two Local Authorities about the cost of school meals.

The Wales Audit Office report<sup>(46)</sup> indicated that the total annual cost of the school meal service in 2007–08 was more than £90 million, showing considerable variation in cost and take up between authorities (although no clear correlation between the two aspects). The report also found that while the financial model to identify local authority expenditure on school meals was useful, it was not yet sufficiently refined or owned by the authorities to serve as a robust and comprehensive management tool. The Wales Audit Office made recommendations for the Welsh Government and Local Authorities to consider for taking forward this work.

The PSFBI was rolled out alongside an independent evaluation of its implementation and impact on school pupils. All primary schools in nine local education authorities in Wales were invited to participate in the evaluation.

Data were collected at each of three time points: baseline, 4 month and 12 month follow-up. The final evaluation<sup>(47)</sup> concluded that the PSFBI represented a potentially effective approach for addressing population dietary behaviour in the long term, given that many of the intrinsic rewards and habitual behaviours associated with consumption develop at this age. The evaluation concluded that the breakfast initiative was effective in promoting positive attitudes to breakfasts, which represent important mediating targets for dietary interventions aimed at children, consistent with the standards in schools generally.

In summary, statutory standards introduced in Wales in 2001 promoted healthy options but did not restrict less healthy items (high in fat, salt and sugar). In 2005 an expert panel recommended the implementation in schools of nutrient-based standards at lunchtime and standards at other times of the day. As a result of an iterative process involving consultation and an action research project to understand the process of implementation of school food standards, an Action Plan was introduced in 2007 and standards supported by legislation must be implemented in schools in Wales by 2013 (a longer implementation period than in England or Scotland). Funding to support the implementation of standards was provided to schools initially and from 2013–14 will be provided to Local Authorities. Evaluation to date has related mainly to trialling the implementation of school food standards and the cost of producing school meals. Findings from the PSFBI evaluation suggest that it was effective in promoting positive attitudes to breakfasts. Data from the Wales Audit Office for 2007–08 will form a baseline against which the impact of the introduction of the statutory standards can be assessed.

## **Northern Ireland**

### **Standards**

In December 2001, the Northern Ireland Department of Education released the consultation document *Catering for Healthier Lifestyles – compulsory nutritional standards for school meals*<sup>(48)</sup>. Following this, it was agreed to set up a working group to pilot the standards. Around 100 schools took part in the pilot which ran in 2004–05. An independent evaluation of the pilot was commissioned and published<sup>(49)</sup>. The pilot was deemed successful and a review of the content of school meals by the Department of Education and the Health Promotion Agency (now the Public Health Agency) began in 2005. In May 2006, the Department of Education, in association with the Education and Library Boards, other school authorities and the Public Health Agency, announced the introduction of new nutritional standards for school lunches. These were intended to reflect findings from the consultation document *Catering for Healthier Lifestyles*, as well as the work being done in both England and Scotland. Updated food-based standards were issued to schools in



June 2007 and came into effect in September 2007<sup>(50)</sup>. In 2008, they were extended to include all food and drinks provided in schools, including tuck shops, vending machines and breakfast clubs<sup>(51)</sup>.

In 2008, the School Food: Top Marks initiative was launched by the Department of Education, the Department of Health, Social Services and Public Safety and the Public Health Agency. The aim of this programme was to ensure that all food and drinks provided throughout the school setting made a significant contribution to childhood nutrition and schools were supported in the development of the knowledge and skills necessary for children and young people to make healthier choices.

The next step involved the Department of Education working with the Department of Health, Social Services and Public Safety to develop an overarching Food in Schools policy which drew together the range of strategies and plans being put in place to deliver improved nutrition for school children, including School Food: Top Marks. It advocated a whole-school approach to all food provided and consumed in schools. The draft policy was refined to take account of the comments received through a public consultation in 2009 and subject to Ministerial and Executive agreement, the Department hopes to introduce the compulsory policy in the 2012–13 school year.

The two Departments also established a Food in Schools Forum to provide strategic leadership and guidance on the policy and, in particular, to ensure support for schools in the implementation of the nutritional standards, marketing and promotion of the policy and mapping/targeting resources.

The Education and Library Boards appointed Nutritional Standards Coordinators to support schools in compliance with nutritional standards. The two Departments jointly funded the post of regional Food in Schools Coordinator. The post holder was a registered dietitian based at the Public Health Agency. Her role was to provide expert advice and support to the various Departments on nutrition and health for schools as well as to provide practical support to the school catering service and schools. These posts are currently being reassessed as part of a wider review of the support network required for the Food in Schools programme, including the nutritional standards initiative.

As in the other countries of the UK, free school meals are available to children from poorer families.

### **Monitoring and evaluation**

Research was carried out by the Public Health Agency which looked at challenges and barriers that schools experience in implementing the nutrition standards. Questionnaires were sent to over 3000 pupils, 1200 parents and nearly 500 teachers. The report, published in 2010, outlined a number of recommendations for the implementation of the School Food: Top Marks programme<sup>(52)</sup>.

Between December 2006 and March 2011, the Education and Training Inspectorate employed two Nutritional Associates to evaluate the progress made in the implementation of the nutritional standards and schools' general approaches to promoting healthy eating. During this period the Nutritional Associates visited 394 schools – around a third of all the schools in Northern Ireland. Two reports of their findings were published<sup>(53,54)</sup>. The reports indicated schools were demonstrating that very good progress was being made in the implementation of the food-based nutritional standards and the general approaches to promoting healthy eating.

The annual School Meals Census provided information on various aspects of the school meals service including the number of children taking school meals either paid or free; those taking traditional meals or food from the cash cafeteria; and those making other lunch arrangements. The data were collected in October each year for all grant-aided schools in Northern Ireland. Information from the October 2011 School Meals Census<sup>(55)</sup> showed that about 56% of those pupils present on the census day took a school meal and that 23% of the total school roll was entitled to free school meals.

In March 2011, the Northern Ireland Audit Office report, *Promoting Good Nutrition Through Healthy School Meals*<sup>(56)</sup>, looked at a number of interrelated issues including how well the nutritional standards are being met, barriers faced in serving nutritious food and encouraging pupils to make healthy choices, whole-school approaches to healthy eating and the adequacy of measures put in place to increase school meal take up, in particular free school meal take up. The report made a number of recommendations which are currently being considered by the Department of Education<sup>(52)</sup>.

### **Monitoring and evaluation of School Food: Top Marks**

As part of the evaluation, baseline research for the School Food: Top Marks was conducted in 2008 and was due to be repeated in 2012. The evaluation focused on mainly quantitative methodology supplemented with qualitative data for smaller target groups. Seven main target groups were included within the evaluation: (i) principals; (ii) school governors; (iii) teachers; (iv) parents; (v) pupils, primary; (vi) pupils, post primary; and (vii) catering staff within schools and Education and Library Boards. The evaluation was intended to assess how, and if, knowledge, attitudes and a limited number of behaviours determined at baseline have changed since the introduction of the School Food: Top Marks programme. Due to the scale of work involved, it was not feasible to extend the evaluation to examine detailed dietary changes within children. The evaluation will also be supported by routinely collected data including the school meal census to measure take up of school meals and free school meals.

One of the commitments within the cross-departmental Food in Schools policy is to support nutrition research in

schools that will inform the direction of the policy and future initiatives within Northern Ireland. As part of this commitment, researchers from the Centre for Public Health at Queen's University Belfast have been working with the Public Health Agency to investigate the feasibility of setting up specific nutrition interventions within schools and plan to seek external funding to support the development and implementation of these interventions.

In summary, consultation on compulsory nutritional standards for schools resulted in the introduction in 2007 of statutory food-based standards for school lunch following an implementation pilot in 2004–05. In 2008 the standards were extended to all food and drink provided in schools. Standards have been implemented alongside a programme of support (including a Food in Schools Forum and expert advice and support on nutrition and health). In addition, the School Food: Top Marks initiative was introduced in 2008 to support schools to meet the standards. The Education and Training Inspectorate employed Nutritional Associates between 2006 and 2011 to monitor the standards in schools, and a Food in Schools policy is under development and is planned to be compulsory in schools from 2012–13. Evaluation in Northern Ireland has focused on informing the successful implementation of school food standards, and the School Meals Census monitors take up of school meals. The follow-up phase of School Food: Top Marks, due to have been completed in 2012, will provide information on how, and if, knowledge, attitudes and behaviours have changed since the introduction of the programme, although dietary data will not be collected. In addition, plans are being considered for specific nutrition interventions in schools.

## Discussion

School food policy and the re-introduction of school food standards have been part of the public health agenda in each of the four constituent countries of the UK since 2001. The evidence base suggested that voluntary standards or guidelines were not sufficient to bring about the desired changes in children's eating habits. Evidence relating to the impact of introducing compulsory standards has been used to focus policy development specific to each country. Although the interpretation of the evidence and the timing of implementation has varied from country to country, by September 2013 compulsory standards will be in place in all primary and secondary schools in the UK (with the exception of academies in England). Even in England, where the recent changes in school food policy have been made without reference to the evidence available, a review of school food standards and policy in England is currently being undertaken by the Department for Education. There have also been collateral benefits across the UK relating to the teaching of food and nutrition in schools that link specifically to the standards being introduced.

The devolvement of powers to the constituent countries of the UK and different timescales of introduction mean there has been a lack of central coordination of common aims, in particular the themes, practices and approaches to evaluation. While it could be argued that this has allowed for the introduction of standards in timeframes more suited to the individual countries and culturally appropriate, it has inevitably been more costly in terms of replication of effort and lack of production of comparable measures of impact. An advantage of the different timescales and approaches, however, has been to allow testing of innovative approaches and possible solutions, for example the Glasgow Big Eat In which was successful in increasing school meal take up in secondary schools. But this is only an advantage if examples of good practice can be adopted more widely across the UK, and these practices and innovations are shared on a regular basis.

There is diversity in the drivers of change and the motivation to conduct evaluation of the introduction of policies relating to school food across the UK. England has clearly devoted substantial sums of money through dedicated programme and research grants, more so than in the other countries of the UK. Moreover, the evaluations (including baseline measures) have been timed to coincide with the introduction of policy, although this has not always been fully planned and is not the case in every country. In England, for example, school meal guidelines for caterers were re-introduced (after a lapse of 20 years). There was no plan at the time to undertake evaluation of the impact of the policy, although nationally representative surveys were commissioned in secondary and primary schools in 2004 and 2005, respectively, because government had an interest in evaluation of policy impact. But it is highly unlikely that the government would have been moved in 2005 to set up the SMRP and the SFT had it not been for the Jamie Oliver broadcasts and associated 'feed me better' campaign. Its subsequent funding of and support for change was generous, and was arguably highly cost-effective<sup>(57)</sup>.

Finally, it is significant that most, but not all, of the drivers to undertake the evaluations of policy implementation have come from the departments of education rather than departments of health or welfare. While this may be a consequence of the point of intervention being schools, there has been a notable lack of integration of assessment in relation to health, educational and social outcomes. Evaluations have therefore tended to be piecemeal and often not easily compared between countries. Policy evaluation could have yielded more insights and been more cost-effective if they had been better coordinated across government departments and between countries to capture more fully the impact of the introduction of school food standards on children's health, education and well-being.

There are commonalities and differences in the approaches taken by countries in the UK to introducing

school food standards. A summary may be useful for others who are considering similar actions.

### **Commonalities**

- An expert multidisciplinary panel to make recommendations to government. This helps to ensure there is buy-in across a wide range of stakeholders by: (i) reducing initial resistance to the introduction of standards among those who are affected directly by them (e.g. caterers, pupils, parents, wholesalers); and (ii) helping stakeholders to see that their interests have been represented in discussion.
- School food standards:
  - Written in legislation and compulsory for schools to follow. This promotes a level playing field and minimises ambiguity regarding which elements need to be followed and which standards need to be met.
  - That apply to school lunches and to other food across the day. By capturing all serving opportunities, nutrition is improved and teaching around healthy lifestyle consolidated.
  - That promote healthy options and restrict less healthy items (typically high in fat, sugar or salt). This was in response to previous (largely ineffective) attempts to promote healthier eating simply by making healthier options available but doing nothing to restrict access to less healthy choices.
- Guidance, both written and as advice or support. This is an essential element to support caterers in making change and to help pupils, parents and other stakeholders understand the need for and the nature of the changes being introduced.
- Research and evaluation. The factors that support or hinder the successful introduction of standards vary from place to place and are not necessarily self-evident. It is important to undertake robust evaluation to underpin the introduction of standards by understanding their impact on take up and eating habits, and potentially more widely on growth, behaviour and attainment.
- Funding. Core funding from government to support the development, testing, introduction, maintenance and impact evaluation of standards is essential if their introduction is to be effective. Piecemeal approaches tend to lead to patchy implementation and less effective change.

All of the elements mentioned above varied to some degree between the four countries. The need for guidance and support led, for example, to the creation of a comprehensively tasked and funded change management body in England (the SFT) and to new positions specifically to support implementation (such as nutritional standards coordinators in Northern Ireland, local authority school food officers in England, and nutritionist inspectors in Scotland). Research and evaluation have been related to the process of implementation in all four

countries, but the most comprehensive research programme to assess the impact of the introduction of school food standards on pupils' take up, nutrient intake (at school and outside of school) and on the wider impact of healthier eating at school took place in England by virtue of a programme grant to support a research team dedicated to school food issues.

There were numerous differences between the countries that are worth noting.

- Implementation timescales and process. The stages and depth of development and intervention have varied between countries. A more overtly coordinated approach would have saved time, effort and duplication, but was not always politically acceptable, and might to some extent have made appropriate regional variations more difficult to implement.
- Food-based standards, nutrient-based standards or both. The findings from the SMRP were widely disseminated across the UK, but different countries interpreted the evidence in different ways. Again, this had some merits, but it would have been helpful in the development stages to have addressed in a more coordinated fashion some of the (very valid) issues raised.
- Monitoring and inspection. In order for standards to be taken seriously, it is important to answer the question 'What if I fail to or choose not to follow the standards?' The inspection process varied considerably across the four countries, as did the consequences of not following the standards (from 'no impact' to poorer marks in school inspections). A coherent approach, or indeed one which involved conditional cash transfers, would be likely to provide more rapid and even implementation.
- Links with the curriculum. This was seen in most countries as desirable, but the extent to which it was explicit and fully implemented varied. Decisions at the outset made with departments for education, health, media and transport would help to establish a better supported introduction, implementation and impact evaluation of standards.
- Partnership working. Again, there were variations in the extent to which all stakeholders were engaged in the decision-making processes around the development, introduction and monitoring of the standards. Anecdotal evidence suggests that the more widespread the engagement, the more effectively the standards were implemented and followed.

Standards were introduced more quickly and have undergone fewer iterations in England compared with other countries. Both Wales and Northern Ireland have taken into account feedback from the implementation of standards in England and Scotland to inform their actions, and have piloted or evaluated implementation prior to

finalising their actions. School food has been part of the education inspection process especially in Scotland and Northern Ireland, and local authorities in Scotland have a duty to monitor and evaluate compliance with legislative requirements. In the Curriculum for Excellence in Scotland, school food standards (and healthy eating) and the curriculum are seen as complementary, and in Northern Ireland the overarching Food in Schools policy currently under development includes compulsory Home Economics within the curriculum as one element of 'Developing knowledge and skills'. Nutritional standards are usually implemented by education departments within government, with the level of interaction with other departments such as health varying widely.

### Acknowledgements

*Sources of funding:* The work was funded by the School Food Trust and in kind by the contributing authors' respective institutions. *Conflicts of interest:* There are no conflicts of interest on the part of any authors. *Ethics:* Ethical approval was not required. *Authors' contributions:* M.N. and A.A. prepared the original draft and final submitted version of the paper. S.S., L.R., R.C., A.P., E.S., J.M., L.C. and S.B. contributed text relating to their respective country's school food programmes and evaluation and the country-specific headings in Table 1. *Acknowledgements:* The authors would like to thank WHO-Europe for its contribution to the workshop for which the original manuscript was prepared.

### References

- School Food Trust (2012) A comparison of standards for school food in England, Wales, Scotland and Northern Ireland. <http://www.childrensfoodtrust.org.uk/resources/ukstandards> (accessed March 2013).
- Department of Education and Employment (2001) Statutory Instrument 2000 No. 1777. The Education (Nutritional Standards for School Lunches) (England) Regulations 2000. <http://www.legislation.gov.uk/uksi/2000/1777/contents/made> (accessed February 2013).
- Department of Health (2004) Choosing health: Making healthy choices easier. Public Health White Paper. [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_4094550](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4094550) (accessed February 2013).
- School Meals Review Panel (2005) Turning the Tables: Transforming School Food. A report on the development and implementation of nutritional standards for school lunches. [http://www.childrensfoodtrust.org.uk/assets/research-reports/Turning\\_The\\_Tables.pdf](http://www.childrensfoodtrust.org.uk/assets/research-reports/Turning_The_Tables.pdf) (accessed February 2013).
- Department of Health (1991) *Dietary Reference Values for Food Energy and Nutrients for the United Kingdom*. London: HMSO.
- Department of Education and Employment (2007) Statutory Instrument 2007 No. 2359. The Education (Nutritional Standards and Requirements for School Food) (England) Regulations (2007). [http://www.opsi.gov.uk/si/si2007/uksi\\_20072359\\_en\\_1](http://www.opsi.gov.uk/si/si2007/uksi_20072359_en_1) (accessed February 2013).
- School Food Trust (2007) A guide to the new food-based standards for food other than lunches. <http://www.childrensfoodtrust.org.uk/resources/other-than-lunch> (accessed March 2013).
- School Food Trust (2008) A guide to introducing the Government's food-based and nutrient-based standards for school lunches. [http://www.childrensfoodtrust.org.uk/assets/sft\\_nutrition\\_guide.pdf](http://www.childrensfoodtrust.org.uk/assets/sft_nutrition_guide.pdf) (accessed February 2013).
- Department of Education and Employment (2008) Statutory Instrument 2008 No.1800. The Education (Nutritional Standards and Requirements for School Food) (England) (Amendment) Regulations. [http://www.opsi.gov.uk/si/si2008/uksi\\_20081800\\_en\\_1](http://www.opsi.gov.uk/si/si2008/uksi_20081800_en_1) (accessed February 2013)
- Department for Education (2011) Statutory Instrument 2011 No. 1190. The Education (Nutritional Standards and Requirements for School Food) (England) (Amendment) Regulations. <http://legislation.gov.uk/uksi/2011/1190/contents/made> (accessed February 2013).
- Department for Education (2012) Departmental advice for school food in England: Exemptions to the school food regulations. <http://www.education.gov.uk/aboutdfe/advice/f00197541/departamental-advice-for-school-food-in-england/exemptions-to-the-school-food-regulations> (accessed February 2013).
- Gregory J & Lowe S (2000) *National Diet and Nutrition Survey: Young People Aged 4 to 18 Years*. London: HMSO.
- Nelson M, Bradbury J, Poulter J *et al.* (2004) School Meals in Secondary Schools in England. Research Report RR557. <http://www.education.gov.uk/publications/RSG/publication/Detail/Page1/RR557> (accessed February 2013).
- Nelson M, Nicholas J, Suleiman S *et al.* (2006) School Meals in Primary Schools in England. Research Report RR753. <http://www.education.gov.uk/publications/RSG/publication/Detail/Page1/RR753> (accessed February 2013).
- Food Standards Agency (2006) *National Diet and Nutrition Survey: Young People Aged 4 to 18 Years: Revised Consumption Data for Some Food Groups*. London: The Stationery Office; available at <http://www.food.gov.uk/science/dietarysurveys/ndnsdocuments/ndnspreviousurveyreports/ndnssurvey4to18>
- Nelson M, Lowes K & Hwang V; Members of the Nutrition Group Panel, School Meals Review Panel and Department for Education and Skills (2007) The contribution of school meals to food consumption and nutrient intakes of young people aged 4–18 years in England. *Public Health Nutr* **10**, 652–662.
- Nelson M, Nicholas J, Riley K *et al.* (2012) *Seventh Annual Survey of Take Up of School Lunches in England 2010–2011*. Sheffield: Children's Food Trust; available at [http://www.childrensfoodtrust.org.uk/assets/research-reports/seventh\\_annual\\_survey2011-2012\\_full\\_report.pdf](http://www.childrensfoodtrust.org.uk/assets/research-reports/seventh_annual_survey2011-2012_full_report.pdf)
- Haroun D, Harper C, Wood L *et al.* (2010) The impact of the food-based and nutrient-based standards on lunchtime food and drink provision and consumption in primary schools in England. *Public Health Nutr* **14**, 209–218.
- Pearce J, Harper C, Haroun D *et al.* (2011) Key differences between school lunches and packed lunches in primary schools in England in 2009. *Public Health Nutr* **14**, 1507–1510.
- Nicholas J, Wood L & Nelson M (2012) *Secondary School Food Survey 2011. 1. School Lunch: Provision, Selection and Consumption*. Sheffield: Children's Food Trust; available at <http://www.childrensfoodtrust.org.uk/research/schoolfoodstandardsresearch/secondarieschoolfoodsurvey/secondary-school-food-provision-and-consumption-2011>
- Office for Standards in Education, Children's Services and Skills (2010) *Food in Schools: Progress in Implementing the New School Food Standards*. Manchester: Ofsted; available at <http://www.ofsted.gov.uk/node/2453>

22. Ashfield-Watt PAL, Dow B, Abbott R *et al.* (2013) Improving adolescent nutrition: a qualitative investigation of influences on the take-up of school food in secondary schools. *Public Health Nutr* (submitted).
23. Golley R, Baines E, Bassett P *et al.* (2010) School lunch and learning behaviour in primary schools: an intervention study. *Eur J Clin Nutr* **64**, 1280–1288.
24. Storey C, Pearce J, Ashfield-Watt P *et al.* (2011) A randomised controlled trial of the effect of school food and dining room modifications on classroom behaviour in secondary school children. *Eur J Clin Nutr* **65**, 32–38.
25. Adamson A, White M, Stead M (2011) *The Process and Impact of Change in School Food Policy on Food and Nutrient Intake both In and Outside of School; A mixed methods approach*. Newcastle upon Tyne and Stirling: Public Health Research Consortium; available at [http://phrc.lshtm.ac.uk/papers/PHRC\\_B5-07\\_Final\\_Report.pdf](http://phrc.lshtm.ac.uk/papers/PHRC_B5-07_Final_Report.pdf)
26. Office for Standards in Education, Children's Services and Skills (2011) *The Annual Report of Her Majesty's Chief Inspector of Education, Children's Services and Skills 2010/11*. London: The Stationery Office; available at <http://www.ofsted.gov.uk/resources/annualreport1011>
27. The Scottish Government (2003) Hungry for Success – A Whole School Approach to School Meals in Scotland. <http://www.scotland.gov.uk/Publications/2003/02/16273/17578> (accessed February 2013).
28. Caroline Walker Trust & The National Heart Forum (2005) Nutrient-based standards for school food. <http://www.cwt.org.uk/publications.html> (accessed February 2013).
29. The Scottish Government (2007) The Schools (Health Promotion and Nutrition) (Scotland) Act 2007. <http://www.scotland.gov.uk/Topics/Education/Schools/HLivi/foodnutrition> (accessed February 2013).
30. The Scottish Parliament (2008) The Nutritional Requirements for Food and Drink in Schools (Scotland) Regulations 2008. <http://www.scotland.gov.uk/Resource/Doc/91982/0060568.pdf> (accessed February 2013).
31. The Scottish Government (2008) Healthy Eating in Schools: A Guide to Implementing the Nutritional Requirements for Food and Drink in Schools (Scotland) Regulations 2008. <http://www.scotland.gov.uk/Publications/2008/09/12090355/0> (accessed February 2013).
32. The Scottish Government (2008) Nutritional Analysis Guidance Manual. <http://www.scotland.gov.uk/Topics/Education/Schools/HLivi/foodnutrition/analysisguidance> (accessed February 2013).
33. The Scottish Government (2008) Evaluation of the Free School Meals Trial for P1 to P3 Pupils. <http://www.scotland.gov.uk/Publications/2008/08/29114033/0> (accessed February 2013).
34. MacGregor A (2007) Healthy food provision and promotion in schools. Final Report. [http://www.gcph.co.uk/assets/0000/0455/FiS\\_Stage2\\_FinalReport.pdf](http://www.gcph.co.uk/assets/0000/0455/FiS_Stage2_FinalReport.pdf) (accessed February 2013).
35. Crawford F (2007) Healthy Food Provision and Promotion in Elmvale Primary School. [http://www.gcph.co.uk/publications/150\\_healthy\\_food\\_provision\\_and\\_promotion\\_in\\_elmvale\\_primary\\_school?aq=promotion&date\\_from%5Bmonth%5D=1&date\\_from%5Byear%5D=2006&date\\_to%5Bmonth%5D=12&date\\_to%5Byear%5D=2007](http://www.gcph.co.uk/publications/150_healthy_food_provision_and_promotion_in_elmvale_primary_school?aq=promotion&date_from%5Bmonth%5D=1&date_from%5Byear%5D=2006&date_to%5Bmonth%5D=12&date_to%5Byear%5D=2007) (accessed February 2013).
36. Education Scotland (2013) What is Curriculum for Excellence? <http://www.ltscotland.org.uk/understandingthecurriculum/whatiscurriculumforexcellence/index.asp> (accessed February 2013).
37. The Scottish Government (2011) Summary statistics for attainment, leaver destinations and school meals, No. 1: 2011 Edition. <http://www.scotland.gov.uk/Publications/2011/06/24142721/0> (accessed February 2013).
38. The Scottish Government (2011) School Meals, Supplementary Data. <http://www.scotland.gov.uk/Topics/Statistics/Browse/School-Education/MealsSD> (accessed February 2013).
39. National Assembly for Wales (2006) Statutory Instrument 2011 No. 1784 (W. 126). Education (Nutritional Standards for School Lunches – Wales) Regulations 2001. <http://www.opsi.gov.uk/legislation/wales/wsi2001/20011784e.htm> (accessed February 2013).
40. Welsh Assembly Government (2006) Appetite for Life Consultation Document. <http://wales.gov.uk/docrepos/40382/4038232/403829/Consultations/2006/appetite-for-life-final-e.pdf?lang=en> (accessed February 2013).
41. Welsh Assembly Government (2008) Appetite for Life Action Plan. [http://wales.gov.uk/dcells/publications/info\\_for\\_learning\\_providers/schools/foodanddrink/appetiteforlife/appetiteforlifeactionplan.pdf](http://wales.gov.uk/dcells/publications/info_for_learning_providers/schools/foodanddrink/appetiteforlife/appetiteforlifeactionplan.pdf) (accessed February 2013).
42. Welsh Assembly Government (2010) Appetite For Life Action Research Project 2008–2010. Research Report. <http://wales.gov.uk/about/aboutresearch/social/latestresearch/appetiteforlife/?lang=en> (accessed February 2013).
43. Welsh Local Government Association (2012) Appetite for Life Guidelines. <http://wales.gov.uk/topics/educationandskills/schoolshome/foodanddrink/appetiteforlife/supportingdocuments/?lang=en> (accessed February 2013).
44. National Assembly for Wales (2009) Healthy Eating in Schools (Wales) Measure 2009. <http://www.legislation.gov.uk/mwa/2009/3/contents> (accessed February 2013).
45. Murphy S, Moore G, Tapper K *et al.* (2007) Evaluation of the Welsh Assembly Governments Primary School Free Breakfast Initiative. <http://wales.gov.uk/topics/educationandskills/schoolshome/foodanddrink/breakfast/evaluation/?lang=en> (accessed February 2013).
46. Holownia J & Harries R (2010) *Cost of Producing School Meals in Wales. A Report Commissioned From the Wales Audit Office by the Welsh Assembly Government. Ref 522A2010*. Cardiff: Wales Audit Office; available at [http://www.wao.gov.uk/assets/englishdocuments/school\\_meals\\_report.pdf](http://www.wao.gov.uk/assets/englishdocuments/school_meals_report.pdf)
47. Murphy S, Moore G, Tapper K *et al.* (2011) Free healthy breakfasts in primary schools: a cluster randomised controlled trial of a policy intervention in Wales, UK. *Public Health Nutr* **14**, 219–226.
48. Department of Education Northern Ireland (2012) Catering for healthier lifestyles – compulsory nutritional standards for school meals. [http://www.deni.gov.uk/catering\\_for\\_healthier\\_lifestyles-2.pdf](http://www.deni.gov.uk/catering_for_healthier_lifestyles-2.pdf) (accessed March 2013).
49. PricewaterhouseCoopers (2005) Evaluation of the pilot of the 'Catering for Healthier Lifestyles standards' in Northern Ireland. [http://www.deni.gov.uk/nutritional\\_standards\\_pilot\\_scheme\\_final\\_report-3.pdf](http://www.deni.gov.uk/nutritional_standards_pilot_scheme_final_report-3.pdf) (accessed February 2013).
50. Public Health Agency (2010) Nutritional standards for school lunches – A guide for implementation. [http://www.publichealth.hscni.net/sites/default/files/Nutritional%20standards%20for%20school%20lunches%20-%20a%20guide%20for%20implementation%2009\\_10.pdf](http://www.publichealth.hscni.net/sites/default/files/Nutritional%20standards%20for%20school%20lunches%20-%20a%20guide%20for%20implementation%2009_10.pdf) (accessed February 2013).
51. Public Health Agency (2010) Nutritional standards for other food and drinks in schools – A guide for implementation. [http://www.publichealth.hscni.net/sites/default/files/Nutritional%20standards%20other%20food%20drinks%20single%2009\\_10\\_0.pdf](http://www.publichealth.hscni.net/sites/default/files/Nutritional%20standards%20other%20food%20drinks%20single%2009_10_0.pdf) (accessed February 2013).
52. Gilmore G, Gossrau-Breen D, MacDonald L *et al.* (2010) *School Food: Top Marks. A summary report on food in schools research in Northern Ireland*. Belfast: Public Health Agency; available at <http://www.publichealth.hscni.net/publications/school-food-top-marks-summary-report-food-schools-research-northern-ireland>
53. Education and Training Inspectorate (2007) Progress Made in the Implementation of Catering for Healthier Lifestyles and

- General Approaches to Promoting Healthy Eating in Schools in Northern Ireland. Executive Summary. <http://www.etini.gov.uk/index/surveys-evaluations/surveys-evaluations-primary/surveys-evaluations-primary-2007/general-approaches-to-promoting-healthy-eating-in-schools-in-northern-ireland-executive-summary.pdf> (accessed February 2013).
54. Education and Training Inspectorate (2009) Evaluation of the Progress Made in the Implementation of the Food-based Nutritional Standards (School Food: Top Marks) and General Approaches to Promoting Healthy Eating in Schools in Northern Ireland. Executive Summary. <http://www.etini.gov.uk/index/surveys-evaluations/surveys-evaluations-post-primary/surveys-evaluations-post-primary-2010/evaluation-of-the-progress-made-in-the-implementation-of-the-food-based-nutritional-standards-school-food-top-marks-post-primary.htm> (accessed April 2013).
55. Department of Education Northern Ireland (2012) Statistical Press Release: School Meals in Northern Ireland 2011/12. [http://www.deni.gov.uk/school\\_meals\\_census\\_201112\\_v2.pdf](http://www.deni.gov.uk/school_meals_census_201112_v2.pdf) (accessed April 2013).
56. Northern Ireland Audit Office (2011) Promoting Good Nutrition through Healthy School Meals. Report, 16 March 2011. [http://www.niauditoffice.gov.uk/a-to-z.htm/report\\_promote\\_good\\_nutrition](http://www.niauditoffice.gov.uk/a-to-z.htm/report_promote_good_nutrition) (accessed March 2013).
57. Nelson M (2012) School food cost–benefits: England. *Public Health Nutr* (Epublication ahead of print version).