

Healthy Food Vending in Schools

Findings from a pilot project in secondary schools
in Pembrokeshire

Acknowledgements

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Introduction

The aim of this report is to establish how healthy food vending can be made attractive to pupils and become a useful and financially viable element of the whole school food service.

The report deals with refrigerated food and drink vending controlled by the school and managed by the school caterers, rather than the use of commercial vending machines.

Aims

- To investigate the feasibility of providing healthy food vending in secondary schools in Wales in terms of time and financial viability;
- To identify the types of food that can be vended, with appropriate costs;
- To identify potential problems in use of healthy vending machines; and
- To make recommendations for good practice in the use of healthy vending machines.

Process

- A review of current best practice and literature discovered little relevant work;
- Three pilot schools, all of which had more than 900 pupils, agreed to take part. One of these schools was replaced by a fourth school during the project. Working groups were set up in each school with school management, pupil, and catering representation;
- Assessment with each school was undertaken. The issues discussed and agreed were finance, staffing, product mixture and sourcing, sustainability, data collection and evaluation;
- Three refrigerated carousel vending machines were ordered and the contract included 12 months' service and maintenance;



- The programme for collecting data including the timing and frequency was agreed and standard pro-forma planned (see Appendix 5);
- Initial product mix was agreed with each school and a guide menu of appropriate products prepared. All schools carried at least two trays of drinks, usually fruit juice and a milk product;
- The location of the machines was discussed and agreed;
- Machines were delivered and training given to catering staff at the end of February and a trading start date was agreed with each school.

Executive summary

Findings

Vending should not be looked at in isolation, but as part of the planning for the whole school food service. That service should reflect the objectives of the school 'food and nutrition policy'. At the heart of that school policy must be the health and welfare of pupils.

- Sales data showed that of the three machines, two made a sound profit, one machine operated for half of the time in each of two schools and lost money - (see Appendix 2).Wastage was a factor in all the schools and better planning could have reduced the losses;
- Despite having data on sales from other vending and over-the-counter sales it was not possible to determine the impact on these sales figures of the healthy vending machine as data were not available for the period before commencement of the project;
- Baguettes were the most popular single product by volume, followed by sandwiches and organic milkshakes;
- Overall gross profit margin on sales was approximately 40 per cent on food and drinks. However, the potential for waste was much greater for the freshly prepared items such as baguettes and sandwiches;
- Product was relatively easy to source as most was already sold over the counter and a good deal freshly prepared on site;
- Packaging and labelling presented challenges as the machines gave poor product vision; caterers did their best but this was never wholly overcome;

- Pricing of freshly prepared products caused an unexpected problem. Caterers had never researched the individual preparation cost of items such as sandwiches. This had to be quickly done so profit margins could be calculated;
- Communications throughout the project were generally good with considerable telephone and email dialogue between schools, caterers, the Public Health Officer – children and young people, and the project contractor;
- Commitment varied between schools both in the senior management of the school and the catering staff and was a major factor in the success of the project;
- Key to a successful outcome was maintaining and filling the machine to ensure continuous service;
- Data collection was carefully planned and there were few gaps. The overall result gave a detailed and accurate picture of sales and product data and distribution was well managed centrally through the good offices of the local authority;
- Sales data showed interesting differences in sales and product popularity, with one school selling more drinks overall than food;
- Two schools found that in gathering together key players to discuss the vending machine project, they moved on to look more broadly at the food service as a whole and its organisation, and were able to make alterations and improvements.

Recommendations for healthy food and drinks vending

These recommendations are based on this project and the FSA drinks vending research which involved Welsh schools.

Vending should not be looked at in isolation, but as part of the planning for the whole school food service. That service should reflect the objectives of the school food and nutrition policy. Healthy vending can help:

- to develop the service at pinch points and out of hours;
- to alleviate the problems of queuing;
- to offer a grab-and-go opportunity to busy pupils and staff; and
- to give a healthier balance and variety than the traditional vending offer.

Pupil involvement

Involve pupils in discussions as part of a whole school approach to issues relating to food and nutrition. This should be part of an organised consultation process, ideally through the School Council.

Pupil usage and access

Consider with the planning group how to ensure maximum access to the vending machine without compromising the usual practices and administration of the school. If access is heavily constrained usage will be too, and this will have an impact on the machine's usefulness and thus its viability.

Commitment

- Adopt a whole-school approach and consult with all interested parties including pupils and teaching and catering staff;
- Ensure a senior member of staff has responsibility for giving projects such as this appropriate priority and support;
- Encourage catering staff to see vending as an organic part of their overall service and so devote time to planning for its success, training particular staff to maintain, fill and empty the machines and monitor sales;
- Liaise with and gain support from health promotion, nutrition and dietetics departments;
- Recognise that there are substantial benefits to be gained from healthy vending.

Marketing and promotion

Discuss and agree a marketing and promotion strategy to popularise the scheme prior to, and during, its running and ensure that pupils are involved in this process.

Selection of machines

Take care to ensure compatibility between the machine and the products to be sold through it. As healthy vending replaces traditional vending in schools, new machines new products and new service solutions will arrive to meet the growing demand. At this time a standard refrigerated 'carousel' machine is the best option for vending a product mix including fresh food. Check regularly on the websites of key players such as AVA, FSA and The Health Education Trust (see Appendix 7).

Location of machines and size

Ideally they should be in the dining area or a place very close by to make filling/maintaining/ supervising as easy as possible to ensure service continuity. Machines placed away from the dining area may increase access but will require increased diligence to maintain.

Product mix and price

Take time to plan the product mix with pupils and catering staff to ensure the product mix meets the requirements of healthy eating, the tastes of the customers, offers opportunity to local suppliers/producers and is affordable.

Machine management and administration

- Nominate and train key personnel to take responsibility for duties specifically related to vending machines;
- Establish a comprehensive maintenance and repair contract for the machine(s);
- Ensure that common or recurring problems are understood and addressed to prevent a lack of confidence in the machine by users;

Litter

Provide large, secure, attractive litter bins for each vending machine. Encourage appropriate pupil behaviour through the existing school policy and personal and social education in the curriculum.

Monitoring, Evaluation and Review

Nominate and train specific personnel to collect and collate data in order to monitor the use and commercial success of the machine – use or adapt the pro-forma supplied.

Feasibility

While it is clear that healthy vending can offer great benefits to caterer and pupils alike, it requires careful planning and good management. This is especially so when vending fresh food with short shelf life. Consequently it is essential to check that this style of vending will enhance both the overall quality of the school's catering service and its accessibility to its customers.

The Report of the Welsh Schools Healthy Vending Project

Introduction

The aim of the Healthier Vending Machines project is to improve the nutritional quality of food and drinks provided in vending machines in schools. Building on current good practice, the Healthier Vending Machine Project challenges schools and the vending industry to make healthy options available in school vending machines. Success and sustainability of the project will rely on establishing compatibility and balance between what pupils select, what industry can provide and what will cover costs and potentially generate income for the school.

Schools, especially secondary schools, are increasingly seeking convenient, quick and easy access to food in a way that fits in with other commitments in the life of the school, often through vending machines. Profits from vending sales can provide schools that have a number of machines with an income that they are loath to forgo. This reflects the fact that currently vending machines offer products that appeal to the appetites of young people, e.g., chocolate bars, crisps and carbonated drinks that are high in fat and sugar and low in other nutrients. As an occasional choice, this is not unhealthy. But where pupils choose this as their main source of food during the school day, this contributes towards an unhealthy diet.

Aims

- To investigate the feasibility of providing healthy food vending in secondary schools in Wales in terms of time, financial viability, change in sales of healthy options and change in sales of traditionally vended items;

- To identify the types of food that can be vended, with appropriate costs;
- To identify potential problems in use of healthy vending machines; and
- To make recommendations for good practice in the use of healthy vending machines.

Review of current best practice

- West Dunbartonshire Healthy Vending project was set up under their Food Action Network, a multi-agency collaboration. The literature suggests it was set up to operate in a very similar way to the methodology we are adopting – as one facet of a whole school approach and a ‘one stop shop’ with both food and drinks in the product mix. Machines are supplied on a lease basis and the school, working with the caterer, agrees the machine content. Figures on the commercial success of the operation are not currently available. On a visit made in October 2003, catering managers at the two sites confirmed the following:
 - The machines were very popular with pupils;
 - They made sound profits although detailed data were not available;
 - The machines were robust and had broken down only rarely;
 - Machines had been in service for approximately three years;
 - Vending machines were seen as an additional arm to the catering service.

There seemed little pupil involvement but the product mix was appropriate. The West Dunbartonshire project also faced its fair share of barriers; eg. the fear of sustainability and financial viability.

A Food Standards Agency drinks vending project has been run in 12 secondary schools in the UK working on a whole school approach. Machines were owned and operated by the school in partnership with the caterer with a product mix of waters, fruit juices and milks. There was careful consultation with pupils and the results show that children are happy to use the machines, welcome the choice they provide and thus ensure they are commercially viable. However, there is a lack of infrastructure to supply products appropriate to machines. Some machines are also inappropriate for certain types of products and therefore lack flexibility in terms of product mix.

A Guide for Schools on Healthy Drinks Vending, which derived from a research project involving Welsh schools, has been published. It can be downloaded, along with the full report, from the FSA and Health Education Trust websites (see Appendix 7).

Review of literature

There has been much publicity and many newspaper articles about healthy foods in vending machines but not much research has been published. A US study examined the effects of pricing and promotion strategies on purchases of low-fat snacks from vending machines. It concluded that reducing relative prices on low-fat snacks was effective in promoting their purchases from vending machines in both adult and adolescent populations.¹

¹ Simone et al. (2001) Pricing and Promotion Effects on Low-fat Vending Snack Purchases: The CHIPS Study. American Journal of Public Health 91:112-117.

Pilot area

Secondary schools in Pembrokeshire were chosen to pilot the food vending project as they were previously involved in the Food Standards Agency drinks vending project (see below). A very high percentage of schools in Pembrokeshire are part of the Pembrokeshire Health Promoting School Scheme and as a result of this and the work of the Pembrokeshire Food and Health Group, partnership working was well developed. A sound infrastructure was in place with good working relationships between health, education and the school catering service. The schools chosen represented a mix of rural and urban schools, large and medium-sized schools and included a school within a Communities First area. The project data were collected from the three machines for a period of between 17 and 20 weeks. Results in one of the schools were unsuccessful and the machine was transferred to another school nearby.

Product mix

The product mix that was used varied for each school but was based on the guidance shown in Appendix 4. The discussions in the working groups were based on this outline and a variety of other factors:

- What items were already sourced by the caterer and selling across the counter?
- What new items were being suggested; could they be sourced; were they in the broadly acceptable price range?
- Were the products appropriate in terms of the balance in the machine?
- Did any items need to be modified to meet the dietetic requirements of the project?

The principle being followed was to source as much as possible from existing counter product to avoid additional work for the caterer and the difficulty/poor economics of ordering or preparing small quantities. It followed that where healthier products were already popular then pupils would want the vending machine to become another service point for those products when counters were closed or busy.

There were, of course, changes, deletions and additions as the trial went on.

Pricing policy

As noted above, in all schools the majority of the items in the vending machine were also available over the counter. It therefore seemed important that prices in the machines and over the counter for these items were the same. There was some debate over this, as some held that there were additional costs arising from the packaging and labelling of certain fresh products such as sandwiches, and the filling of the machine with the prepared items, and this should be reflected in the price. Finally the equal pricing option was universally agreed.

There was, however, a much more difficult issue to overcome relating to the assessment of the preparation cost of freshly prepared product traditionally sold over the counter such as sandwiches, baguettes and filled rolls. Specific product cost analysis had not been undertaken by the caterers and so it was necessary to do this in each case in order to establish the individual product profit margins.

Location of machines

Location of the machines was a matter for individual discussion by each school with the key issue being accessibility. However, accessibility for pupils to use is not necessarily the same as accessibility for caterers to fill, maintain and supervise.

So among the questions asked were:

- Where will it offer to pupils a quick service and a chance to avoid queues?

- Where can it go to give service if/or when the dining room is closed or not serving food?
- Will it be accessible for evening and weekend use?
- Where offers the caterer the fastest, most convenient daily filling and maintenance operation?
- Will its location allow for satisfactory supervision to avoid vandalism and to spot breakdowns quickly?

The project contractor strongly recommended that machines be located in, or as close as possible to, the dining hall. This recommendation was based on the learning from the Food Standards Agency (FSA) Drinks Vending Project. Results indicated that machines placed away from the immediate environment of the dining room were more liable to mischief. These machines could not be filled or monitored for breakdown as efficiently and when there were busy times or staff shortages in the dining room, 'out of sight' tended to become 'out of mind'.

Litter bins

One of the major concerns that most schools have about all food service outlets is the damaging effect litter from them can have on the reputation of the school in the neighbourhood. Vending in particular is seen as a culprit and the subject was raised in every project school working group discussion at one time or another. Litter bins were therefore provided to schools as part of the project.

School support activities

School working groups were encouraged to link the project into the whole school approach, to raise the consciousness of the project as widely as possible. The extent to which this happened varied depending on the level of engagement and enthusiasm of the lead member on the working group from the school senior management team. Senior teaching staff were generally comfortable with the strong anecdotal evidence that there were clear benefits to be had in terms of behaviour and classroom performance if children were well fed and well hydrated.

The following actions were used in the schools to promote the project:

- Materials developed to launch the project/raise awareness in the dining hall and in classrooms;
- The project was used to provide a practical focus in subjects such as PSE and food technology;
- Assemblies on the subject of food and nutrition linked to the new project and the machine's expected arrival;
- School councils organised questionnaires to get feedback from pupils and form groups;
- Newsletter items were sent to parents and governors.

Data collection

Sales data collection sheets were devised for the collection of weekly sales data. Each product sold through the machine would be entered, indicating the cost price, sale price, and profit margin. The main body of the sheet gave room for the totals of that product sold during the week, the number wasted, and the gross profit assigned to that product. The second sheet was devised to try to compare the net profits of the Healthier Vending Machines with all Dining Hall sales and with other vending machines.

In order to complete the data sheet, it was necessary to give details of the 'preparation' or 'cost' price of an item and its selling price – the difference between the two gives the profit margin. After adding up all the profits and taking away waste, labour and machine costs it is possible to give a clear picture of the machine's financial performance. It became clear at this stage that there was a difficulty in the schools over the understanding of the preparation cost of fresh food.

It appeared that it was not usual practice to undertake a cost analysis of individual items freshly prepared in school kitchens; calculation was done more on a broad-brush approach set around overall labour and ingredients costs. However, for the purpose of the project which included a substantial percentage of freshly prepared product, it was essential that these calculations be made.

Operational outcomes

Machines

Carousel machines were used in the project because they are flexible enough to accommodate most size and shape of product, do not 'drop' product to a collection bay and are refrigerated to allow for the sale of freshly prepared product. They have a track record that we were aware of in a project in five West Dunbartonshire schools over the previous five or six years and are widely used in office and factory settings across the UK. It was interesting to discover how they stood up to day-to-day wear and tear in our schools.

The operation of carousel machines does lend itself to more mistakes and mischief than a traditional can and bottle vender in the following ways:

- The visual guidance on where to stop the machine in order to obtain a particular product is open to misunderstanding and frustration. In order to avoid too painful a learning curve, schools were encouraged to have a senior pupil or a member of the catering staff on hand to help younger pupils and to referee on whether a refund was justified. Some schools did this and used it as another way to give responsibility to pupils;
- Once or twice the timer that opens and then closes the food compartment was a little brisk. Pupils only had to be a little hesitant and they found that their healthy snack was locked away again or they had their fingers pinched as the gate closed. Adjustments were made to the timers and pupils learned the pace of the gates;
- If something opens so a product can be taken out, it follows that something else can be put in its place. In the early days of the project, this caused some problems but these subsided as the novelty wore off.

The opening six weeks of operation in each school was a bumpy ride as pupils and caterers learned to operate, and the pupils tried to subvert, the vending machines. The weaknesses showed quickly as had been expected. The response time from the service maintenance contractor was rarely more than 24 hours and the attitude was always friendly and helpful. This was a significant factor in keeping the machines operational.

As the project moved into the second half of the project period, the maintenance problems and the mischief diminished sharply and there were few operational interruptions. Pupils and caterers alike grew more accustomed to the machines and they became part of the furniture.

The other problem encountered was that despite the machine having the flexibility to vend most sizes and shapes of product, it did not display products well. This is not just a marketing issue, it also can lead to customer error or confusion – see below under ‘Product’.

Product

Product was not difficult to source because the majority of it was already on sale over the counter in each school. Where new product was required it could generally be obtained through the usual suppliers to the catering contractor. The challenges lay in the packaging and labelling of freshly prepared product.

- Packaging was not a problem for breaded product such as sandwiches and baguettes because these already require packaging to meet food hygiene regulations when they are sold across the counter. However, as can be seen in the school product sales profiles, school working groups asked for individual pots of pasta mixes, salads, and fruit salad for the vending machine. so new packaging

needed to be sourced and the relationship between portion size and selling price calculated.

- Labelling was a greater challenge. Not only is it obviously necessary to show a price on each product but it is also vital that the customer has a clear description of ingredients. That a product is a sandwich is relatively easy to discern through the glass of a vending machine; that it is chicken salad rather than ham and tomato is not. This difficulty of making the label easy to read for the customer is complicated both by the shape of the product and its packaging, and by the structure of carousel machines which do not offer the best display opportunities. This is particularly so for the top shelving (small children) and the lowest shelves (everybody).

Difficulty in reading labels and getting the wrong product remained a customer complaint throughout the project, despite the best efforts of the catering staff to offset the inherent shortcomings of this sort of machine.

Communications

Any project that involves working with different organisations, people and disciplines relies on effective communications to achieve good results. It was a tribute to the commitment and professionalism of all involved that this was the case. At the sharp end were the catering staff responsible for the day to day supply of the food services within the pilot schools. Always under pressure, sometimes short staffed, this project could have seemed at times a distraction from doing an already difficult job. The key support of the project was often shared between the two area managers. They agreed the programme helped source the product mix and took on the trouble-shooting/problem-

solving role. Alongside them was the school catering manager who was the most important single figure in the relative success or failure of the trial. It was she who was responsible for the day-to-day operations, ordering or preparing product, filling, checking and cleaning the machine, and avoiding waste by taking items near their sell by date to sell over the counter. The collection of data, its recording and dispatch was also the responsibility of the school catering managers and this must have been especially difficult when it was clear with one machine that sales were low and the machine little used.

It was clearly much easier to justify the time and energy where the vending operation was seen as an opportunity, and an integral part of the whole food service where it can help:

- to develop the service at pinch points and out of hours;
- to alleviate the problems of queuing;
- to offer a 'grab and go' opportunity to busy pupils and staff; and
- to give a healthier balance and variety than that offered by traditional vending; and comparable to that given over the counter.

Data collection

Given the pressures on catering staff described above, and the difficulty of achieving a consistent flow of accurate data from schools, care was taken to establish the proforma for data collection – see Appendix 5. The first pro-forma allows for detailed weekly data collection on a single machine and the second for summarising sales where more than one machine is operating.

The pattern of returns from schools was generally excellent and there are few gaps in the review of sales and product both by individual school and overall.

The summary table of school results in Appendix 2 shows sales by volume and, via the various deductions, moves down to total net profit. It enables a clear view to be had of the costs incurred in school based management of fresh food vending, and the sorts of volumes and margins necessary to make it financially viable.

Details of the ten most popular products are shown in Appendix 3 and a typical analysis of product sales in a school is shown in Appendix 4.

Food vending, and fresh food vending in particular, is known to be a difficult process to make successful, not least because of the fragility of the products vended – good food goes bad!

Active and efficient management of the machine is needed to keep waste figures low.

Appendix 1 – Timetable

November 2003:	Identification of secondary schools
December 2003:	Visit schools to plan implementation with key staff, caterers and School Council
January 2004:	Commission vending machines
February 2004:	Ministerial visit to launch the initiative
March 2004:	Update visit to schools
May/June 2004:	Final visit to schools
October 2004:	Report on 6-month trial
December 2004:	Receive written updates from schools
January 2005:	Brief report on 3rd term trial

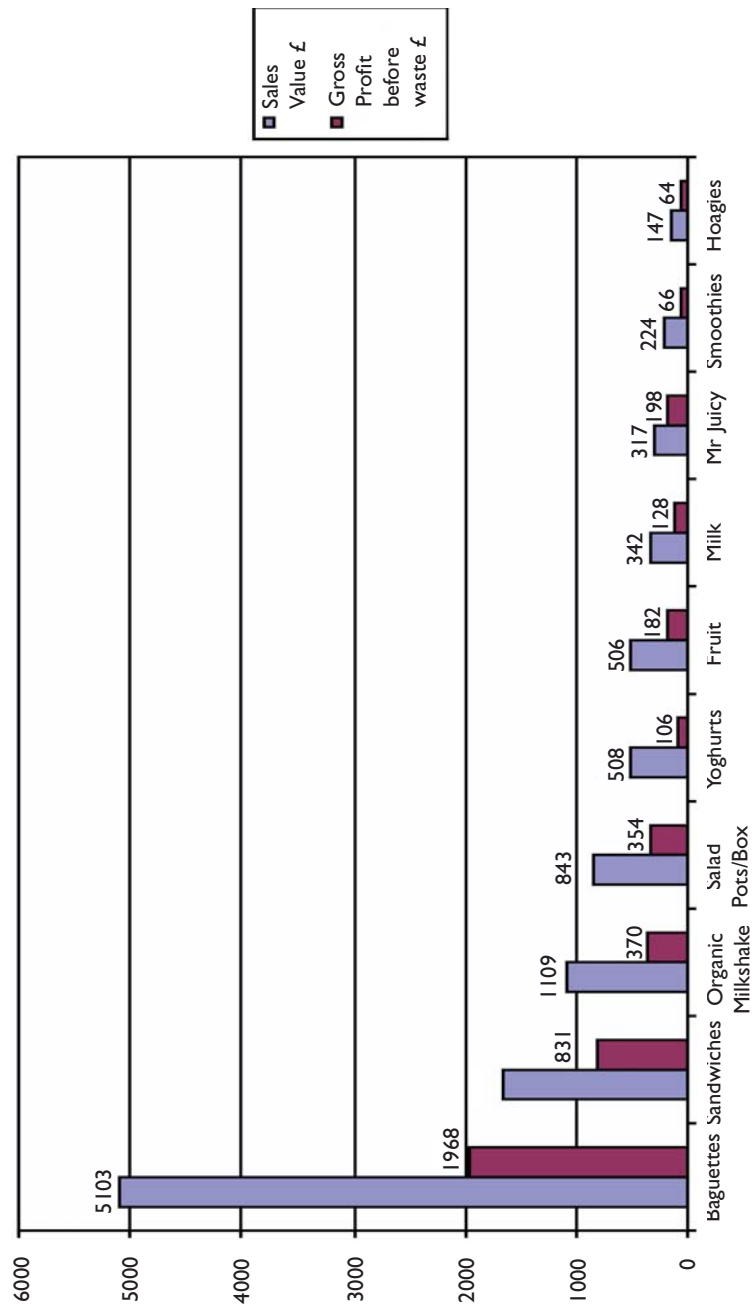
Appendix 2 – Summary table of results

Machine	1	2	3
Machine Location	Dining Area	Dining Area	Dining Area
Operational Period (Wks)	20	17	16
Gross Profit for Period £	1916	2143	596
Profit for Period (net of Labour) £	1398	1550	356
Net Profit for Period (Net of Labour and machine cost) £	798	950	-119
Waste £	294	474	380
Net Profit for Period £	504	476	-499
Ave. Total Wkly Net Profit £	25	28	-31

**Extrapolated Profits for 40wk school year
(Based on results from feasibility study above)**

Annual Projected Net Profit £	1008	1120	-1248
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Appendix 3 – Summary table of top-selling products



Appendix 4 – Typical school product sales analysis

Product	Sales Value £	Gross Profit £	Gross Profit after Waste £	Gross Profit as a % of sales
Baquettes – £1.15	1674	605	490	36
Baquettes – £1.00	1148	486	419	42
Organic Milkshake	741	247	247	33
Sandwich – 85p	581	325	273	56
Small Milk	271	98	94	36
Salad Pots/Fruit	81	34	15	42
Peach/Cherry Yogurt	55	12	11	22
Strawberry Yoghurt	50	6	2	11
Cold Rice Dessert	49	14	8	29
Mixed Salad Box	39	17	9	43
Fruit Bags	38	14	11	38
Piece of Fruit	32	9	6	30
Yogurt	27	13	10	47
Hoagies	20	9	6	43
Water	14	8	7	60
Loaf Cake	11	3	3	27
Wraps – 95p	10	4	2	35
Sandwiches – 95p	10	5	2	48
1/2 Baguettes – 58p	5	2	2	41
1/2 Baguettes – 50p	3	1	1	39
Ploughman's	3	2	2	44
Dried peaches	3	2	2	51
Melon slices	2	1	1	68
Total	4869	1916	1621	39

Appendix 6 – Product suggestion list

(Used as a starter for discussion with the school based working group)

- Fresh fruit, prepared fruit salads.
- Filled rolls, sandwiches, baps, baguettes etc.
- Salads.
- Pasta mixes.
- Cereals.
- Yoghurts, fromage frais.
- Meal deals.
- Milk – semi-skimmed plain or flavoured/drinking yoghurts – if schools want a row of drinks to allow a one-stop shop.

This list is not exhaustive but gives a framework for pupil/staff/caterer consultation.

Cereals were not used as the pre-packaged were too expensive and loose required separate milk portion and a spoon.

Meal deals were considered to take up too much space and were better supplied over the counter.

Appendix 7 – Key organisations

Food Standards Agency Wales
www.food.gov.uk
11th Floor
Southgate House
Wood St
Cardiff
CF10 1EW

Automatic Vending Association
www.ava-vending.org
Automatic Vending Association,
1 Villiers Court
40 Upper Mulgrave Road
Cheam
Surrey SM2 7AJ
Telephone: 0208 661112

Local Authority Caterers
Association (LACA)
www.laca.co.uk
Local Authority Caterers
Association
Bourne House
Horzell Park
Woking
Surrey GU21 4LY
Telephone: 01438 766777
Welsh region contact
Tel. 01443 735410

The Dairy Council
www.milk.co.uk
164 Shaftesbury Avenue
London WC2H 8HL
Telephone: 0207 3954030

Health Education Trust
www.healthedtrust.com
18 High Street
Broom
Alcester
Warwickshire B50 4HJ

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in Pembrokeshire