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Published in:
Journal of Human Nutrition and Dietetics

DOI:
[10.1111/jhn.12283](https://doi.org/10.1111/jhn.12283)

Publication date:
2016

Document Version
Peer reviewed version

[Link to publication in Discovery Research Portal](#)

Citation for published version (APA):
Mackison, D., Mooney, J., Macleod, M., & Anderson, A. S. (2016). Lessons learnt from a feasibility study on price incentivised healthy eating promotions in workplace catering establishments. *Journal of Human Nutrition and Dietetics*, 29(1), 86-94. [12283]. <https://doi.org/10.1111/jhn.12283>

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1 **Lessons learnt from a feasibility study on price incentivised healthy eating promotions in**
2 **workplace catering establishments**

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15 Short title – Healthy eating intervention in workplace canteens

16 Keywords – Price incentive, healthy eating, workplace nutrition, catering

17 Source of funding - The study was funded by the MRC and CSO funded Scottish Collaboration for Public
18 Health Research and Policy (SCPHRP)

19 Conflicts of interest – JM was Career Development Fellow at the SCPHRP when the application for
20 funding was made.

21 Author contribution – DM, ASA and JM designed the feasibility study. DM, JM and ASA conducted
22 formative work. DM designed study tools and implemented intervention. DM and MM collected and
23 analysed data. ASA, DM, MM interpreted results and planned the manuscript. DM drafted the
24 manuscript. All authors discussed the results and implications and commented on the manuscript at all
25 stages.

26

27 Ethical consideration – Ethical approval was provided by the University of Dundee Research Ethics
28 Committee.

"This is the peer reviewed version of the following article: Mackison D., Mooney J., Macleod M., Anderson A.S. (2016) Lessons learnt from a feasibility study on price incentivised healthy eating promotions in workplace catering establishments. *J Hum Nutr Diet.* 29,86–94, which has been published in final form at doi: 10.1111/jhn.12283. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Self-Archiving."

29 **Abstract**

30 **Background** It is recognised that the worksite catering sector is likely to play a pivotal role in influencing
31 dietary intake in adults of working age. This study aimed to assess the feasibility of engaging worksites
32 in a healthy eating intervention, implementing a price incentivised main meal intervention and measuring
33 indicative intervention responses in order to inform the design of a future trial.

34 **Methods** Workplaces registered with the Scottish Healthy Living Award were invited to participate. The
35 EatSMART intervention (a reduced price, healthy meal combination plus promotions) was implemented
36 for 10 weeks in two worksites. Implementation was assessed by observation and sales data. Indicative
37 effects on food habits were measured using online pre- and post-intervention questionnaires. Focus
38 group discussions and interviews were used to ascertain catering staff and consumer acceptability.

39 **Results** Thirty-seven worksites were invited to participate and four worksites responded positively.
40 Two sites (with 1600 and 500 employees respectively) participated. Both required significant
41 implementation support. Estimated sales data indicated that uptake of promoted items varied by week
42 (range 60 to 187 items) and by site. A poor response rate for questionnaires limited the evaluation of
43 intervention impact. Consumers reported improved value for money and quality. Both sites reported an
44 intention to continue the intervention delivery.

45 **Conclusion** Significant efforts are required to engage worksite catering teams and implement healthy
46 eating interventions. Evaluation methods require further development in order to improve data collection.
47 Responses from consumers and catering staff suggest further work in this area would be welcomed.

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56 **Introduction**

57 Rapidly rising levels of overweight and obesity in recent decades have been especially evident in
58 Scotland with an adult prevalence rate for obesity of 27.1%, globally third only to Mexico (30.0%) and
59 the United States (34.5%) (OECD, 2010). Obesity is now well established as a contributory factor to
60 many conditions including diabetes, cardiovascular disease, certain cancers and arthritis. The overall
61 costs of obesity in Scotland are estimated to be more than £342 million per year (Scottish Government,
62 2010). In a rapid review of potential policy options for obesity prevention and control in Scotland, one of
63 the most promising settings identified for effective interventions in adults was the workplace environment
64 (Mooney et al, 2011).

65 The role of workplace canteens has been recognised in numerous countries in the provision of
66 employee's daily meals, and thus the catering sector has the potential to play a pivotal role in the energy
67 and nutrient intake in adults of working age (Roos et al, 2004; Wanjek, 2005; WHO, 2008; Bandoni et
68 al, 2011). A systematic review of workplace interventions in Europe reported limited to moderate
69 evidence for positive effects of nutrition interventions implemented at worksites, with 18 to 30 studies
70 showing positive effects on dietary behaviour (Maes et al, 2012). Similar conclusions were reported
71 recently by Schroer et al (2014). It is notable however, that many programmes have focussed more on
72 employee education than a combination of education and changes to worksite environments (e.g.
73 increased provision of healthy options). Ni Mhurchu et al, 2010 suggest that intervention is needed at
74 multiple levels within the worksite environment and Mooney and colleagues (2013) comment that
75 interventions have stopped short of any meaningful incentives other than the prospect of "future health".

76 French (2003) highlighted the influence of local pricing incentives in workplace canteens and vending
77 machines as a means of increasing uptake of healthier food options. In addition, worksite schemes
78 offering free fruit can result in increased consumption of fruit and decreased consumption of added
79 sugar (Alinia et al, 2011) and this approach has also been demonstrated to result in positive dietary
80 change for "blue collar" workplaces (Larsen et al, 2011).

81 A review by Hawkes (2009) on financial incentives and disincentives to promote healthier eating has
82 highlighted that financial incentive schemes are "most effective when implemented as part of an
83 integrated package of mutually re-enforcing strategies, such as education/marketing". Thus it would be
84 appropriate to view financial incentives such as price promotions as a tool to help stimulate healthy
85 eating as part of a broader package of activities.

86 Ni Murchi et al (2010) suggest that "workplace canteens which frequently include a degree of food
87 subsidisation provide an ideal environment in which to test the potential of economic incentives to
88 change food purchasing behaviour" but to date there has been a dearth of work in this arena within the

89 UK. In Scotland there is a unique opportunity to test the effect of promoting healthier eating in the
90 workplace given that the Healthy Living Award (HLA) scheme (2014) and the Healthy Working Life
91 (HWL) Programme (2014) lay the foundation for increasing access and provide a platform to add
92 financial incentives and marketing approaches. Against this backdrop, the current study aimed to assess
93 the feasibility of engaging worksites in a healthy eating intervention, implementing a price incentivised
94 main meal intervention and measuring indicative intervention responses (including catering consumer
95 acceptance) in order to inform the design of a future randomised control trial.

96

97 **Methods**

98 **Worksite engagement**

99 Recruitment was undertaken in conjunction with the HLA and HWL teams. Workplace canteens and
100 contract caterers with workplace restaurants throughout Scotland were invited to participate in the short
101 term (10 to 12 weeks) intervention study which included an incentive of £1000 per site to cover personnel
102 time, training and related costs.

103 **Intervention development and implementation**

104 The format of the final intervention delivery was informed by semi-structured interviews and informal
105 discussions with catering staff at participating sites. The intervention aimed to combine price incentives,
106 healthy choices and a marketing strategy using the following key principles:

- 107 • price incentives should be focused on consumer and caterers suggestions, experiences and
108 preferences for “healthy meal deals”
- 109 • a 10-20% cost reduction should be achieved
- 110 • meal deals should have a nutrient composition consistent with the FSA traffic light (TL) grading
111 low (or maximum of one medium) for fat, saturated fat, sugar and salt (Food Standards Agency,
112 2007).

113 Due to recent EU Regulation, individual items could not be labelled as “healthy” but were labelled with
114 value for money symbols (Department of Health, 2011). Marketing focused on a value strategy by
115 promoting reduced prices, products and key placing of targeted items within the canteen setting.

116 Workplaces were provided with substantial support for implementation during the intervention period
117 including:

- 118 • Promotional materials including stickers, posters, weekly and daily point of sale menus, content
119 for electronic bulletins etc.

- 120 • Practical catering resources including nutrient analysed recipes, shopping lists and daily/weekly
121 menu rotations.
- 122 • On-call researcher support (mobile telephone and email details provided to ensure constant
123 support and quick clarification of queries).

124 Observational measures were taken at two site visits during the implementation period to check fidelity
125 of intervention implementation and promotions.

126 **Measuring indicative effects**

127 At site level, sales data on uptake of the intervention were provided by worksites. At Site A the till was
128 programmed to record intervention meal deals however it was not possible to keep records of the uptake
129 of individual intervention component sales other than the soup (which was intervention specific) which
130 could be estimated using preparation and wastage (left over portions). At Site B, catering staff manually
131 recorded and reported individual component item sales.

132 At individual level, a pre- and post-intervention questionnaire was delivered online to all employees at
133 both sites via the intranet and by adopting a **word of mouth strategy (i.e. passing information about the**
134 **questionnaire survey from person to person by oral communications)**. A prize draw was offered as an
135 incentive for participation at Site A (not permitted at Site B). The questionnaire collected data on socio-
136 demographic details, self-reported height and weight, food habits, key dietary intake indicators,
137 knowledge of five a day messages, canteen perspectives and purchasing behaviour at the canteen.

138 Post-intervention qualitative work (focus group discussions and individual interviews) explored
139 perceptions, acceptability, marketing and perceived benefits of the intervention with catering staff and
140 employees at each site.

141 Ethical approval was obtained from the University of Dundee Research Ethics Committee.

142 **Results**

143 **Worksite engagement**

144 From the initial contact by the HLA team (37 worksite canteens and 18 contract caterers) four worksites
145 responded positively but then declined to participate (Figure 1). Further recruitment, involving personal
146 contact and follow-up telephone calls by the HLA team, also failed to identify interested sites. Further
147 work by the HWL team identified 4 worksites, two of whom completed the study (Site A and Site B).

148 Site A was a private call centre employing approximately 1600 employees and Site B was a government
149 call centre with approximately 550 employees.

150 **Intervention development and implementation**

151 The format of the final intervention delivery was informed by 3 semi-structured interviews with catering
152 staff and informal discussions with other catering personnel at each site. Key issues arising were:

- 153 • Convenience for consumers (e.g. “grab n go” preferred)
- 154 • Preparation time (for caterers) and eating time (consumers)
- 155 • Pricing of produce in line with other items on sale and consideration of sales margins
- 156 • Need to continue to offer “less healthy” items to maintain sales

157
158 At both sites, consumer focus groups comprised 8 consumers (6 men and 2 women at Site A and 1
159 man and 7 women in Site B). Key issues arising were:

- 160 • Price reductions were considered an incentive to all consumers
- 161 • General negative perception of existing menu choice, quality, price and portion size
- 162 • Concern that price reductions may equate to reduced food quality or smaller portion sizes
- 163 • Concern over food consumption time (break times short) so targeted items should be readily
164 accessible and consumable quickly
- 165 • Need for foods to be portable

166
167 Of possible options considered (loyalty schemes, free fruit, free vegetables/ salad, daily specials) the
168 favoured response emerged as a meal deal comprising either a soup and a sandwich or soup, salad
169 and brown roll at Site A and soup and sandwich or soup, sandwich and fruit at Site B with meal
170 combinations offering a 10 to 20% price reduction.

171 The final format of a meal deal was tailored to the preference of each site which was incentivised by
172 price reduction and promotional material (marketed as EatSMART) (See Figure 2).

173 Site observations reported that the intervention meal combination deal was available at the agreed
174 price and marketing approaches were in position (although the availability of the meal deal appeared
175 limited).

176 Substantial support from the research team was required to initiate and develop these programmes
177 and overcome caterer’s barriers. The time required by the research team to provide support was
178 notable (Table 1).

179 **Indicative effects**

180 Till data (Table 2) indicated that the uptake of promoted items varied by week (range 60 to 187 items)
181 and by site, but during all weeks there was greater uptake of intervention soup (range 44 to 138)

182 compared to the price incentivised intervention meal deal (range 4 to 31) suggesting that consumers
183 were more influenced by the availability of individual new options rather than the price incentive meal
184 deal option. More detailed records were kept in Site B and illustrated that the intervention soups provided
185 significant proportion of all soups (37% - 82%). Total snack sales during the intervention period remained
186 buoyant. Analysis of till receipt data was particularly time-consuming and did not enable the identification
187 of individual level consumption data.

188 Data on individual level variables was obtained from pre- and post-intervention questionnaires. At Site
189 A, 46 questionnaires were returned pre-intervention (2.9% of workforce) and 28 post-intervention
190 (1.6% of workforce). At Site B 84 questionnaires were returned pre-intervention (15% of workforce)
191 and 53 post-intervention (9.6% of workforce). Twenty two respondents completed the questionnaires
192 at both time points but again this number was too low to make reliable comparisons. Baseline data for
193 demographic and estimates of Body Mass Index (based on self-reported heights and weight) show
194 that respondents were largely from areas of higher deprivation, educated to high school level with high
195 (> 50%) levels of obesity (BMI >30 kg/m²) at each site (Table 3). **Reported food intake in the last 24**
196 **hour period at pre- and post-intervention, for both sites, are presented in Table 4. The results suggest**
197 **participants consume a high intake of fruit and vegetables at both time points (around 5 a day) have**
198 **daily consumption snack foods (crisps, chocolate) and daily sugary drinks but sub optimal frequency**
199 **of breakfast cereals. Results on knowledge for fruit and vegetables show that at both sites and both**
200 **time points, over 85% of respondents knew the recommendation for fruits and vegetable intake.**

201 **Catering staff perceptions**

202 Post-intervention interviews with catering staff were carried out at each site. Staff reported additional,
203 initial workload to familiarise themselves with the new recipes and modify the menu to reduce waste.
204 There were also difficulties in sourcing some ingredients (e.g. low salt stock cubes), due to limitations
205 in existing purchasing contracts. These difficulties were resolved by cash purchasing but this would be
206 unsustainable in the longer term. In addition, caterers reported that tracking of sales was challenging.

207 **With respect to the support provided by the research team both sites spontaneously requested supplies**
208 **of promotional materials (mostly stickers) for continued work. Although sites also commented that**
209 **posters are not considered a good way to engage customers and that the intranet was likely to reach**
210 **more people. One catering staff member noted that EATSMART promotions compete with other**
211 **campaigns (issued by the caterer).**

212
213 ***"We've got specific promotions that we run, which sometimes works against the healthy option, because***
214 ***some of it was like, chocolate bars, in line with the Olympics....Regarding the company promotions, we***
215 ***run five or six promotions every month anyway"***

216

217 The continuation of the intervention was perceived as feasible at Site A without research team support
218 but potentially challenging from a financial perspective. At Site B the caterer could not be seen to offer
219 a price incentive at only one of their sites but aspects of it could be continued (possibly on one day a
220 week). Caterers also reported that recipes may need to be modified to suit customer tastes (e.g. soup
221 consistency) although this may have an impact on the nutrient profile. Caterers also reported the
222 importance of meeting customer preference through maintaining current selections (e.g. pies,
223 confectionery and crisps) and maintaining current sales figures.

224

225 **Consumer perceptions**

226 The post intervention focus groups consisted of 4 participants at Site A and 6 participants at Site B. In
227 the focus group discussions the target foods were considered to be “tastier” and “healthier” and it was
228 reported that there was more salad on the sandwiches and an improvement in overall quality.
229 However, respondents didn’t always perceive the intervention items to be healthy.

230 **Discussion**

231 It is recognised that the catering sector has significant potential to influence dietary intake, with the
232 potential to impact on obesity prevention. In Scotland, the Healthy Living Award (HLA) is designed to
233 encourage caterers to increase the availability of healthier options but often these are offered alongside
234 a range of high fat, sugar and salt options. Increasing opportunities and incentives for nutrient dense
235 food choices provide a unique opportunity for impacting on public health. Previous work on price
236 reduction in worksite settings has largely been undertaken in college or hospital settings where health
237 promotion programmes may be more evident (Epstein et al, 2012). The demographic characteristics and
238 weight category of respondents in the current work lend support to the potential of worksites to reach
239 nutritionally vulnerable populations.

240 The extent to which culturally popular food selections (pies, fries, crisps and confectionery), catering
241 promotions (e.g. chocolate promotions) and general concerns about the impact of “healthy eating”
242 options on sale margins may have contributed to the poor response from caterers to participate in the
243 study warrants further exploration. It is unclear why financial imbursement (£1000 token of appreciation
244 for participating) helped to initiate discussions with some caterers but was insufficient to persuade
245 dialogue with others.

246 Intervention components were tailored to consumer preferences and catering practicalities and although
247 largely operationalized as planned, consumer feedback suggested some limited availability, possibly
248 reflecting caution in preparation exerted by caterers anticipating waste. The catering staff involved in
249 the study invested substantial time and energy contacting suppliers, organising and preparing new

250 menus, accessing ingredients and testing new recipes, highlighting the commitment needed for such
251 interventions which involved freshly prepared foods in contrast to fast, ultra processed items.
252 Researchers designing studies in this area should not underestimate the amount of time, resource and
253 support that is required to enable caterers to engage in research studies. Nurturing, supporting and
254 understanding perceived and actual challenges faced by enthusiastic individuals in the catering industry
255 who want to engage with “healthy eating” options is essential if intervention implementation is to be
256 achieved.

257 The uptake of price incentivised “meal deals” was modest and the uptake of healthier component parts
258 without the price reduction was encouraging, indicating consumer acceptance of items with modified
259 nutrient composition (notably salt). The intervention period was short (ten weeks) with considerable
260 variation in uptake indicating that a longer period is needed to establish sustainability and to build on
261 this single intervention. Whilst the research team were disappointed not to be able to provide promotions
262 based on health, work by Horgen and Brownell (2002) suggest that health messages may compromise
263 effects of pricing and the current focus on value highlighting the financial (value) gain may have been
264 more appropriate. Response from caterers suggests that poster marketing is unlikely to be effective and
265 intranet/electronic communications and point of purchase marketing (as undertaken for chocolate
266 promotions) may be more engaging.

267 The impact of price reductions on a range of single items which meet desirable nutrient composition
268 was not undertaken within the current study because of consumer preference for the meal deal approach
269 but deserves further exploration given previous success in the vending setting (French et al, 2010). In
270 addition, the potential for meal deals which may increase usual meal spend may be impractical and
271 unfeasible for many low income workers.

272 A recent review by An (2013) on 20 field experiments of subsidies in food purchasing report that all but
273 one study showed that subsidies on healthier food resulted in increased purchase and consumption of
274 promoted products. However a review on the experimental research on the relationship between food
275 pricing changes and purchasing reported that whilst price changes modify purchases of targeted foods,
276 the impact on the overall quality of purchases is mixed because of substitution effect (Epstein et al,
277 2012). These findings raise the issue of how we address the challenge of the abundance of energy
278 dense foods sold in catering establishments and how we shift the overall balance towards purchase of
279 greater quantities of healthier items with a positive effect on overall dietary quality.

280 The current study has highlighted numerous challenges in data collection methodology at catering and
281 individual level. Future studies should explore utilising technological advances in the catering arena to
282 reduce the data collection burden experienced. For example, using cashless systems to collate sales

283 information and link purchases to individual level data or study surveys warrant further exploration.
284 Smartphone technology (such as apps, multi-media/text messages or instant messaging) to record
285 purchasing behaviour or communicate with consumers may also improve study methodologies.
286 However, it is important not to avoid investigations in smaller and less affluent establishments where
287 these technologies may not be available.

288 Response rates could be improved with incentives for data return (e.g. entry to prize draw) but the
289 current study has shown this approach is not acceptable in all workplaces and further consideration
290 should be given to innovative routes to improve response.

291 **Conclusion** Whilst the worksite environment has significant potential to improve health and well-being
292 significant efforts are required to engage worksite catering teams and implement healthy eating
293 interventions. Evaluation methods require further development in order to improve data collection.
294 Responses from consumers and catering staff suggest that further work in this area would be welcomed.

295 **Acknowledgements**

296 The authors are grateful for funding from the Scottish Collaboration for Public Health Research and
297 Policy. The authors would like to thank Ms Lyndsay Watkins and Mrs Karen Barton for providing
298 research assistance throughout the duration of the study, Ms Clare Doogan for her help designing the
299 marketing strategy and Simon Martin (HWL team) and Dr Clare Brown (HLA team) for their help with
300 catering site recruitment. They also thank the worksites, caterers and staff who took the time to
301 participate in qualitative research and assist with the study.

302

303

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Table 1 Site details including recruitment response

Site Description	Recruitment Strategy	No of contact (approx)			Outcome
		Email/ Mail	Phone Calls	Person Visits	
Financial Services	Primary *	8	4	1(x1 personnel) 1(x2 personnel)	Unsuitable: Site anticipated 12% increase in sales & limited capacity with staff involved in London Olympics
Oil Refinery	Primary	6	8	1(x2 personnel)	Un-responsive: Site stopped returning calls
Insurance Company	Primary	4	1	0	Un-responsive
Local authority	Primary	13	12	1 (x1 personnel) 2 (x2 personnel)	Withdraw: Due to uncertain future
Energy company	Secondary**	2	2	0	Withdraw: Caterer unwilling to participate
Call centre (Brewers)	Secondary	2	2	0	Un-responsive
Local authority	Secondary	2	3	0	Un-responsive
Contract caterers	Secondary	5	4	1(x1 personnel)	Un-responsive
Energy Company customer service centre	Secondary	3	2	0	Interested initially but then no further contact
Call Centre	Secondary	1	0	1	Not interested
Call centre	Secondary	49	9	7(x1 personnel) 6(x2 personnel) 1(x3 personnel)	Intervention completed
Call centre	Secondary***	9	2	1(x1 personnel)	Un-responsive
Government call centre	Secondary	47	9	3(x1 personnel) 6(x2 personnel) 1(x3 personnel)	Intervention completed
		151	58	53 person visits	

384 **Table 2 Intervention Uptake**

385

	Site A n=1600 [#]					Site B n=550					
	Combo	Estimated Intervention Soup ¹	Salads	Sandwiches*	Snacks (crisps, chocolate sweets)	Combo	Soup		Sandwiches		Snacks (crisps, chocolate, sweets)
							Intervention	% total soup sales	Intervention	% total sandwich sales	
Week 1	17	62	16	70	206	27	44	43	8	34	454
Week 2	7	85	20	55	193	23	55	45	1	28	517
Week 3	4	45	29	72	169	31	49	54	0	31	566
Week 4	10	59	13	70	129	27	52	63	0	33	531
Week 5	29	138	20	130	159	21	94	82	0	38	430
Week 6	8	68	2	76	161	8	52	37	0	13	540
Week 7	17	57	13	52	114	7	55	37	0	9	560
Week 8	24	118	17	81	236	22	58	50	0	41	612
Week 9	9	92	18	95	293	9	71	57	1	27	553
Week 10	17	95	18	74	242	12	72	45	1	27	493

386 [#] Only ~800 employees on the premises at any one time

387 ¹ estimated from production and waste

*Included non-intervention items

388 **Table 3 Online questionnaire survey respondent demographics**

	Site A		Site B	
	Pre-intervention n=46	Post-intervention n=28	Pre-intervention n=84	Post-intervention n=53
Male (%)	24(52)	19(68)	24(29)	14(27)
Age (years) Mean (range)	36(20 – 64)	31(21 – 41)	43(23 – 72)	42(23 – 65)
SIMD 1-5* (%)	29(74)	15(75)	39(65)	25(63)
Highest educational achievement –school level qualification (%)	14(30)	5(18)	37(46)	24(45)
Highest educational achievement – post school certificates (%)	14(30)	16(57)	28(35)	18(34)
Highest educational achievement – degree (%)	15(33)	6(21)	14(18)	9(17)
Gross annual household income < 15000 (%)	9(27)	7(30)	12(20)	7(20)
Gross annual household income 15000 - 40000 (%)	19(58)	11(49)	30(50)	17(49)
Gross annual household income >40000 (%)	5(15)	5(22)	18(30)	11(31)
Ethnicity – white (%)	43(94)	27(96)	76(95)	51(96)
Smoker (%)	13(30)	7(26)	8(10)	11(21)
Live with other adults (%)	36(86)	15(56)	72(88)	44(86)
Children in household (%)	18(39)	12(44)	34(42)	19(37)
Part-time working (%)	8(17)	5(17)	16(19)	10(20)
Full-time working (%)	38(83)	23(83)	64(81)	40(80)
BMI >30kg/m2	27(61)	11(41)	40(54)	12(27)

389 All percentages reported are valid percentages *Scottish Index of Multiple Deprivation deciles 1-5 = most deprived areas

390 **Figure 1 Summary of recruitment process**

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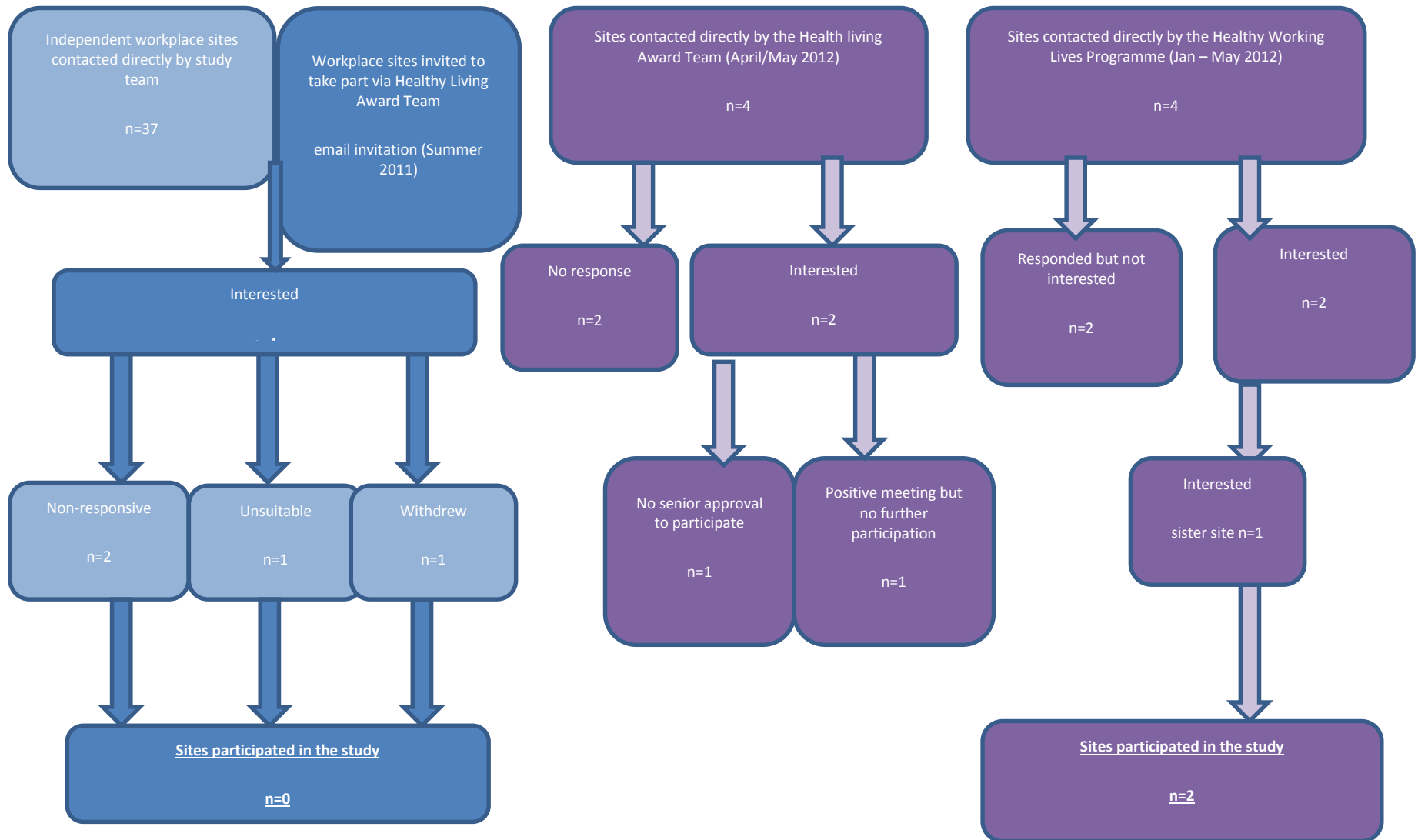


Figure 2 Summary of EatSMART tailored intervention and marketing package

	Site A	Site B
Intervention	Combination deal	Combination deal
Specifics	Alternate weeks Soup & Sandwich Soup, Salad & Brown roll	Two options: Soup & Sandwich Soup, Sandwich & Fruit
Price	£1.80	£2.50 or £3.00
Marketing Strategy	<p>Product</p> <ul style="list-style-type: none"> • New reduced price combination deal • Combination is healthy and complies with TL nutrient profiling system <p>Price</p> <ul style="list-style-type: none"> • Reduced price for the 10 week intervention period • 10-20% reduction price • Following qualitative research price to be below £2 mark (actual £1.80) <p>Place</p> <ul style="list-style-type: none"> • Site A Canteen <p>Promotion</p> <ul style="list-style-type: none"> • Desk awareness strategy (3B's) • Visualisation Strategy • Catering staff communication strategy 	<p>Product</p> <ul style="list-style-type: none"> • New reduced price combination deal • Combination is healthy and complies with TL nutrient profiling system <p>Price</p> <ul style="list-style-type: none"> • Reduced price for the 10 week intervention period • 10-20% reduction price (actually may be more given current price range of sandwiches) • Following qualitative research price to be (actual £2.50 for soup and sandwich and £3 for soup, sandwich & fruit) <p>Place</p> <ul style="list-style-type: none"> • Site B Canteen <p>Promotion</p> <ul style="list-style-type: none"> • Site B company intranet (new) • Visualisation Strategy in canteen only (paperless site) • Catering staff communication strategy (small team all on board and aware of intervention – all active players)
Nutrient criteria	Comply with green TL* nutrient criteria for 3 out of 4 nutrients below: <ul style="list-style-type: none"> • Fat • Saturated Fat • Salt • Sugar 	
Visualisation Strategy	Aimed to promote the EatSMART brand at various locations (e.g. canteen, staffroom, call centre floor, toilets etc) using multiple mediums (e.g. posters, leaflets, electronic communications etc) across each site	

*TL Traffic Light Labelling