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**Title: Identifying foods with good nutritional quality and price for the Opticourses interventional research project**

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**Short title:** Foods with good nutritional quality and price

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**Authorship:** ND and CD designed the study. ND provided databases essential for the research. ND provided methodological support for data analyses. CD and MT analyzed data, performed statistical analysis and wrote the first draft of the manuscript. All authors had full access to data and revised and approved the manuscript for publication. ND and CD have primary responsibility for final content.

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was obtained from all participants at enrolment and the trial was registered at clinicaltrials.gov as NCT02383875.

## 1 **ABSTRACT**

2 **Objective:** People on a limited budget want to know the “good price” of foods. Here we  
3 report the methodology used to produce an educational tool designed to help recognize foods  
4 with good nutritional quality and price, and assess the validity and relevancy of the tool.

5 **Design:** A ‘Good Price Booklet’ presenting a list of foods with good nutritional quality and  
6 price was constructed. The validity of the in-booklet prices was assessed by comparing them  
7 to prices actually paid by households from the Opticourses project. The relevancy of the  
8 booklet tool was assessed by semi-structured interviews with Opticourses participants.

9 **Setting:** Socioeconomically disadvantaged neighbourhoods of Marseille, France.

10 **Subjects:** 91 participants collected household food-purchase receipts over a 1-mo period.

11 **Results:** Based on the French food database, foods with higher-than-median nutritional  
12 quality were identified. After grouping similar foods, a list of one hundred foods were  
13 selected and their corresponding in-booklet prices were derived based on the distribution of  
14 average national prices by food group. Household food purchases data revealed that of the  
15 2386 purchases of foods listed in the booklet, 67.1% were bought at prices lower than the in-  
16 booklet prices. Nineteen semi-structured interviews showed that participants understood the  
17 tool and most continued using it more than a month after the intervention.

18 **Conclusions:** A method was developed to ease the identification of foods with good  
19 nutritional quality and price. The Good Price Booklet is an effective tool to help guide people  
20 shopping on a low budget.

21

22 **Keywords:** food, food budget, food prices, good nutritional quality and price, intervention  
23 research

24 **Abbreviations:** Nutritional Quality for Price (NQP); month (mo); Recommended Daily  
25 Intake (RDI).

## 26 INTRODUCTION

27 Studies suggest that the cost of food helps explain social inequalities in nutrition<sup>(1-3)</sup>, partly  
28 due to the direct relationship between diet quality and diet cost<sup>(4;5)</sup>. Energy-dense nutrient-  
29 poor foods are often the cheapest sources of calories<sup>(6)</sup>, making it more difficult for a person  
30 with a very limited budget to get a balanced diet<sup>(7;8)</sup>. However, healthy eating at low cost is  
31 achievable by making nutritionally optimal choices that target affordable nutrient-rich foods<sup>(9-  
32 13)</sup>. Diet modelling approaches on French data showed that it is possible to get a balanced food  
33 basket with a modest budget of at least €3.50 per day per person<sup>(8;14)</sup> on condition that foods  
34 with good nutritional quality for price (NQP)—assessed as the relationship between nutrient  
35 profile and average national price—are selected<sup>(12)</sup>. In short, getting a balanced diet on a small  
36 budget is difficult but not impossible, but is it realistic, and how do we translate theory into  
37 practice? To find out, the Opticourses intervention ([www.opticourses.fr](http://www.opticourses.fr)) was launched in  
38 2012 in the northern neighbourhoods of Marseille (France) following two pilot actions  
39 conducted in 2010 and 2011. Within the framework of a multi-partner, territorial-community  
40 participative approach, the Opticourses project features supply-side and demand-side strands,  
41 both aimed at increasing purchases of good-NQP foods by financially struggling households.  
42 The demand side of the intervention involved workshops on diet and budget attended on a  
43 voluntary basis by local inhabitants responsible for their household's food purchases<sup>(15)</sup>. The  
44 supply side was based on a social marketing intervention that aimed to make good-NQP foods  
45 accessible, visible and attractive in shops in the target neighbourhoods<sup>(16)</sup>.

46 Consistent with the existing literature, early exploration of the factors driving food purchases  
47 in the Opticourses population revealed that price was a major concern<sup>(16)</sup>, and that participants  
48 expressed a strong desire to know “the good price” for foods. This popular notion referred to  
49 an affordable price given a low food budget, within the range of market prices<sup>(17)</sup>. The  
50 research team thus made it its goal to operationalize this popular notion by co-constructing an  
51 educational tool called the ‘Good Price Booklet’, designed to help participants make sound  
52 combined nutritional and budgetary choices at the time of purchase.

53 The aim of this article is to describe the methodology used to produce the Good Price Booklet  
54 and to provide quantitative and qualitative assessments of its applicability, perception and use  
55 by the target public.

## 56 MATERIAL AND METHODS

### 57 Study design and population

58 Details and characteristics of the “Opticourses” nutrition intervention (2012–2014) have been  
59 described elsewhere<sup>(15)</sup>. Participants facing financial problems and willing to participate in the  
60 “Demand” strand of the intervention were asked to provide a detailed record of foods entering  
61 their household over a 1-mo period. In-depth interviews were also conducted to understand  
62 the factors driving food purchases in this population<sup>(16)</sup>.

63

### 64 Methodology to create the Good Price Booklet

#### 65 *Food composition and price databases*

66 The INCA2 food composition table covering 1,343 foods declared as having been consumed  
67 over one week by a representative sample of 2,624 adults who participated in the French  
68 national INCA2 survey in 2006–2007 was used. In addition to energy content and around 30  
69 nutritional components, the composition table included two variables obtained during a  
70 previous study<sup>(18)</sup>: one column for added sugars and one column for average national prices  
71 (calculated on the basis of purchases made by the 2006 Kantar consumer panel). The food  
72 composition table gives nutritional values for foods as consumed, and average national prices  
73 are expressed in €for 100g as consumed. However, here we needed to determine the price of  
74 foods as purchased, as this is the only relevant information to communicate to participants.  
75 We therefore used correction coefficients enabling us to move from price of food consumed  
76 to price of purchase (e.g. the average price of 100g of cooked pasta was multiplied by a  
77 coefficient of 3 to obtain the average price of 100g of raw pasta).

78

#### 79 *SAIN and LIM calculations*

80 SAIN and LIM are indicators that estimate foods’ positive and negative aspects,  
81 respectively<sup>(19)</sup>. SAIN estimates the adequacy, for 100kcal of food, for recommended daily  
82 intake (RDI) of protein, vitamin C, fibre, calcium and iron. LIM estimates the average excess,  
83 for 100g of food, of sodium, saturated fatty acids and added simple sugars. The SAIN/LIM  
84 ratio give a single indicator of nutritional quality: the higher the ratio of a food, the better its  
85 nutritional quality<sup>(12)</sup>. In the specific case of a food having a LIM of less than 1, we consider  
86 that the SAIN/LIM ratio is equal to the food’s SAIN. SAIN/LIM ratio was calculated for all  
87 the foods in the INCA2 composition table.

88

89 *Definition of foods with good nutritional quality*

90 The next stage of the analysis was carried out on a reduced composition table covering all the  
91 foods of the INCA2 table including fortified foods and foods described as “generic” (e.g.  
92 “non-specified fruit” or “non-specified cheese”) but excluding ready-made meals (due to their  
93 huge variability in composition), alcoholic beverages and zero-calorie beverages. Foods  
94 whose SAIN/LIM ratio was higher than the median calculated in this reduced table were  
95 considered to be of good nutritional quality

96

97 *Determination of the good prices for foods of good nutritional quality*

98 Each food of good nutritional quality was then attributed a good price, defined as the price  
99 below which the food can be considered as relatively inexpensive. To determine this price,  
100 two variables were used: the average national price of the food as purchased, and its “limit  
101 price” defined as equal to the value of the first price tertile of the group to which it belongs.  
102 For each food, the average national price was then compared against the limit price, and the  
103 following rule was applied: when average national price was below limit price, then average  
104 national price was selected as the good price; if not, limit price was chosen instead.

105

106 *Selection and grouping of foods of good nutritional quality and price for the Good Price*

107 *Booklet*

108 Based on the calculations described above, a list of foods with good nutritional quality and  
109 price was established to be communicated to workshop participants in the form of an  
110 educational tool called the ‘Good Price Booklet’. To avoid communicating prices that were  
111 unrealistic as too low with regard to marketplace reality, it was decided to present only those  
112 foods whose average national price was no more than 2.5 times higher than the limit price.  
113 The ratio of 2.5 was chosen because it is the average ratio observed between the price of  
114 “brand-name” foods and the price of the cheapest foods sold under the same name<sup>(9;10)</sup>.

115 The list of foods was appraised by an expert to avoid potential repetitions in the composition  
116 table (e.g. baked potato and boiled or steamed potato) and to group together similar foods  
117 under a single designation in accordance with their purchased form (e.g. potato). In that case,  
118 the good price indicated in the booklet was the average of good prices of the different foods  
119 that have been grouped together.

120 The selected foods were classified according to supermarket shelves. For some foods, booklet  
121 price was calculated by unit as sold in stores (e.g. for one grapefruit or one lettuce).

122

123 **Assessment**

124 *Quantitative assesement of the in-booklet prices*

125 Opticourses participants (n=91) were asked to collect all food-purchase receipts for their  
126 household over a 1-mo period. Purchase-receipt protocol training and data collection were  
127 previously described by Marty *et al.*<sup>(15)</sup>. For each food item, information from receipts (i.e.  
128 date of purchase, corresponding INCA2 food name and code, quantity and price) were entered  
129 into a food purchases database. The validity of the food prices listed in the booklet was  
130 assessed by quantifying the percentage of purchases bought at a price lower than in-booklet  
131 price, by supermarket shelf category, and for the whole food list.

132

133 *Qualitative assesement of the Good Price Booklet*

134 As part of the effort to evaluate the Opticourses intervention, 19 semi-structured interviews  
135 were conducted with participants after the workshops by an external evaluator. The interview  
136 guide contained questions on the tools used during the workshops, in particular the Good  
137 Price Booklet.

## 138 RESULTS

### 139 Opticourses households: descriptive characteristics

140 Sociodemographic characteristics of the Opticourses households are given in Table 1.  
141 Average household size was 3.41 (range: 1–8) including 2 children on average (range: 0–6).  
142 Almost half of the households (48.2%) were in a precarious financial situation, and one third  
143 (36.5%) declared severe financial difficulties. Each household shopped an average of 5  
144 different stores while collecting receipts, and price was reported as the most important  
145 determinant of food purchases.

### 146 List of foods featuring in the Good Price Booklet

147 The different stages in the process of identifying the foods with good nutritional quality and  
148 price are summarized in Figure 1. The reduced INCA2 table with ready-made meals and  
149 alcoholic and zero-calorie beverages pre-eliminated contained 1,054 foods. The median  
150 SAIN/LIM ratio was then calculated on this reduced table, and foods with a SAIN/LIM ratio  
151 lower than this median were discarded, resulting in a list of 527 foods of high nutritional  
152 quality. Then foods with an average national price 2.5 times greater than their limit price were  
153 eliminated (mostly expensive foods such as shellfish, game meat, berries or nuts). Among the  
154 remaining foods (n=404), similar items were then grouped together under the same  
155 designation, resulting in 153 foods classified according to supermarket shelf. Table 2 presents  
156 the list of foods with good nutritional quality and price selected and included in the booklet.  
157 For example, for generic foods, the in-booklet price is €1.94/kg for fresh vegetables, €2.42/kg  
158 for tinned or frozen vegetables, €1.80/kg for fresh fruits, €2.35/kg for pasta and rice, €4.34/kg  
159 for legumes, €2.07/kg for dairy products, and €9.56/kg for meat and fish (Table 2).

160

### 161 Creation of the Good Price Booklet

162 The Good Price Booklet was created in collaboration with a graphic designer (Figure 2). This  
163 educational tool is presented in the form of a small brochure in payment-card format. It was  
164 distributed to participants during the Opticourses intervention workshops to help them spot  
165 foods and their corresponding good price when shopping for groceries.

166 The flyleaf of the booklet carries the slogan “*Good for my health and good for my wallet*”.  
167 The second page carries the statement “*All these foods are of good nutritional quality. If you  
168 find them cheaper than the price indicated, it’s a bargain for eating healthily and cheaply. If  
169 you find them at a price higher than the price indicated, you can buy them anyway as they are  
170 all of good nutritional quality*”. Olive oil and walnuts are present in the booklet given their



171 widely-established health benefits<sup>(20)</sup>, even though they were not strictly foods of good  
172 nutritional quality and price (olive oil has a SAIN/LIM ratio lower than the median of the  
173 SAIN/LIM table median and walnuts have an average price over 2.5 times higher than the  
174 limit price of their group). Therefore, for these two foods, the booklet did not give a price but  
175 instead stated “*Although expensive, moderate consumption is good for your health*”. It was  
176 not possible to include foods specific to certain culinary cultures in the booklet (e.g. plantain,  
177 sorghum, etc..) as average national prices in mainland France are often high. It was noted at  
178 the end of the booklet that “*Traditional basic foods from your culture are usually of good*  
179 *nutritional quality, and you probably know where to buy them at a good price*”.

180

### 181 **Quantitative assessment of the relevance of in-booklet price**

182 Several trials were conducted and compared to test the suitability of the proposed method. It  
183 emerged that the choice of the median SAIN:LIM ratio to identify food of good nutritional  
184 quality in the table, and the choice of the price tertile of each group to estimate in-booklet  
185 prices was the most suitable method to have a sufficient number of foods in each group as  
186 well as a realistic price value with regard to prices observed on supermarket shelves. The tool  
187 was tested by the team and workshop participants. During the Opticourses intervention, 2386  
188 purchases of foods with good nutritional quality and price were registered, of which 67.1%  
189 were bought at a price lower than the in-booklet price (Table 3). When separately analyzing  
190 foods as categorized by supermarket shelf, over half of the purchases made were below prices  
191 displayed in the booklet, except for processed meats (46.5%), breads (8.3%) and oils & fats  
192 (25.3%). Note however that the booklet only counted a few foods in these 3 categories (due to  
193 their relatively low nutritional quality), resulting in few related purchases. None of the  
194 breakfast cereals listed in the booklet were purchased by the participants, and so we could not  
195 assess the relevance of the in-booklet price for this category. Percentages of purchases below  
196 prices displayed in the booklet were higher for foods for which the booklet prices were based  
197 on average national price rather than on limit price (i.e. up to 2.5 times cheaper than the  
198 average national price), suggesting that it was easier to find the former than the latter.

199

### 200 **Applicability of the Good Price Booklet within the framework of the Opticourses** 201 **intervention**

202 One of the workshop’s aims was to share experiences for buying food at lower prices.  
203 Participants exchanged useful tips, with some of them knowing where to buy at unbeatable  
204 prices (flea markets, stock clearance stores, the fish market at the end of the morning, etc.).

205 These discussions gave contributors the opportunity to highlight several strategies as  
206 substitutions between different food groups (e.g. purchasing less meat and more vegetables),  
207 intra-group substitutions (e.g. purchasing cheaper meats of higher nutritional quality), or  
208 ‘price hunting’ (e.g. for a given food, preferring low-cost foods over their brand-name  
209 equivalents). Thanks to the Good Price Booklet, the notion of “Good Price” was no longer  
210 theoretical. As the Good Price Booklet was designed to be easily transportable in a handbag,  
211 it can be used directly in purchase situations: if the price displayed in the shop is below the  
212 booklet price for a given food, it is a bargain!

213

### 214 **Qualitative assessment of the Good Price Booklet**

215 All the participants appreciated the quality of the discussions during the workshops. This was  
216 facilitated by the insight it gave into participants’ concerns about the relationship between  
217 nutritional quality and food budget. The Good Price Booklet was praised by all the  
218 participants interviewed (with the exception of one person with reading difficulties), as well  
219 as by professionals. The tool, co-constructed with the workshop participants, was greatly  
220 appreciated and continues to be used more than a month after the workshops. Verbatim  
221 accounts recorded during interviews one month after the workshops include, for example:

222 *“I use this tool (Good Price Booklet) when I go shopping, it’s always in my bag. I buy*  
223 *products when they’re cheaper than the price listed here. I mostly use it for vegetables when I*  
224 *go to Noailles (a popular fresh foods market, in the centre of Marseille) at the end of the*  
225 *market, as it’s cheaper.”*

226 *“I do my shopping with the keyring (Good Price Booklet) and I buy when it’s below the price*  
227 *listed, otherwise I buy something else.”*

228 *“I use this tool, it’s handy. I buy a lot of bargains.”*

229 *“This month my husband had more time for shopping, so this tool helped him a bit.”*

230 *“I compare purchases with the Good Price Booklet, and I manage to find shops with cheaper*  
231 *prices. But I’ve always looked at prices—now I’ve got this tool, it motivates me to shop*  
232 *better.”*

233 One participant did not use the booklet but explained that her financial constraints were less  
234 limiting. *“I prefer quality to a good price now that there are only two of us at home. The*  
235 *children don’t live with us anymore so it’s different, we can afford to choose quality.”*

## 236 DISCUSSION

237 The Good Price Booklet, designed to help recognize foods with good nutritional quality and  
238 price when grocery shopping, resulted from a co-construction using the desire of people with  
239 financial difficulties to have information on “the good price” for foods, and the theoretical  
240 work of the research team on the notion of foods with a good NQP<sup>(12)</sup>.

241  
242 Two indicators—SAIN and LIM—were used to appreciate the nutritional quality of foods  
243 based on a limited number of nutrients (5 qualifying nutrients and 3 disqualifying nutrients).  
244 This selection reflected a balance between the need to include nutrients that are of importance  
245 to public health and nutrient markers of other essential nutrients<sup>(21)</sup>. When implemented, the  
246 SAIN,LIM system was found to adequately discriminate foods according to their contribution  
247 to nutritionally-adequate diets<sup>(19,22)</sup>. Several studies show that price is a major criterion in  
248 terms of food choices, and this is particularly true for people with a limited budget<sup>(23;24)</sup>.  
249 Managing a small food budget effectively requires a sound understanding of food choices. It  
250 is true that the foods we are advised to consume more of to protect our health, such as fruit,  
251 vegetable and fish, are more expensive sources of calories, whereas carbohydrates and high-  
252 fat and high-sugar foods are cheap sources of calories<sup>(3)</sup>. Nevertheless, while studies on the  
253 cost of a balanced diet unequivocally show that it is more difficult to get a balanced diet with  
254 a small budget<sup>(7;25)</sup>, they also show that it is not impossible on condition that food groups and  
255 good-NQP foods are chosen<sup>(12)</sup>. The nutritional quality of foods correlates positively with  
256 food prices (expressed in €100kcal based on average national prices)<sup>(26)</sup>. This indicates that  
257 price structure is generally negative for nutritional balance, because the most expensive foods  
258 are often the most nutrient-dense. However, there is strong dispersion around this correlation  
259 line, which shows the existence of foods with higher NQP than others: for the same price, one  
260 can find foods of high and lower nutritional quality. In particular, legumes, vegetable oils,  
261 wholemeal cereal products, milk, plain yoghurt, eggs, poultry and some seafood (e.g. tinned  
262 sardines) have a higher NQP “in absolute terms”. Conversely, other animal products and most  
263 fruits and vegetables (with exceptions, such as carrots, orange juice, etc.) emerge as too  
264 expensive to have a good NQP<sup>(6;11;12)</sup>. Giving priority to foods with a good NQP “in absolute  
265 terms” makes it possible to create a nutritionally optimal diet for €3.50 per day<sup>(12)</sup>.

266  
267 Many studies have jointly addressed the notions of diet cost and diet quality<sup>(3)</sup>. Some have  
268 found that healthy eating does not necessarily cost more when foods with higher nutritional  
269 quality for their price are selected<sup>(8;12)</sup>. Above all, they highlight that achieving higher-

270 quality diets does not entail major changes in habitual dietary patterns but rather optimal  
271 choices in each food group (e.g. by preferring low-cost foods to their brand-name equivalent,  
272 or canned products to fresh ones)<sup>(9;10)</sup>. However, any effort to encourage a balanced diet for  
273 underprivileged populations mainly by promoting foods with good NQP “in absolute terms”  
274 is potentially contentious: not only because many of them are rarely consumed and therefore  
275 not socially acceptable for everyone (as is the case for tinned sardines and giblets, for  
276 example)<sup>(27)</sup> but also because, given the variability of prices, it is highly theoretical to claim  
277 categorically that a food has higher nutritional quality for its price in absolute terms. In this  
278 regard, during the Opticourses workshops, the theoretical list of foods with good NQP “in  
279 absolute terms” quickly proved ill-adapted to the reality in the field. For example, participants  
280 challenged the relevance of the list because peppers were not included. The average national  
281 price of bell pepper is too high for it to qualify as a food with good NQP “in absolute terms”,  
282 but the fact is that many participants managed to find this highly nutritious food far cheaper  
283 than the average national price. Basing their work on these observations and discussions over  
284 food prices, the research team was able to develop the notion of a food’s good price.

285

286 The Good Price Booklet was produced in a dynamic two-way interaction between research  
287 and fieldwork. Co-construction is recognized as a factor for success in actions to promote  
288 health<sup>(28;29)</sup>. When they are developed in interaction with the public for which they are  
289 designed, educational tools have a better chance of being adapted to people’s real situation  
290 and thus getting used. This is the case for the Good Price Booklet, since the qualitative  
291 assessment showed that the tool was appropriated by participants who knew how to use it.  
292 Most participants appreciated the tool and continued to use it more than a month after the  
293 interventions, thus demonstrating that the tool meets participants’ expectation to find foods of  
294 good nutritional quality at an affordable price relative to their food budget. Considering the  
295 socioeconomically disadvantaged situation of the study population, these results suggest that  
296 prices displayed in the booklet may remain appropriate for any other population,  
297 notwithstanding the fact that ‘good price’ is a budget-dependent concept. Scaling up effective  
298 implementation of this education tools requires adapting the methodology to the target  
299 population. The booklet must notably integrate specific food patterns and dietary habits which  
300 may vary according to population or country considered. In particular, the Opticourses  
301 intervention targeted a financially-struggling population with diverse cultural backgrounds,  
302 which may have resulted in specific dietary habits. Booklet prices must also be adapted to  
303 domestic food prices and currency.

304

305 This tool has several limitations. First, it uses average national prices dating from 2006, well  
306 before the Opticourses intervention began. It would be desirable to frequently update the in-  
307 booklet prices. However, collecting robust average national prices of foods is still a  
308 challenge<sup>(16)</sup>. In France, average national prices were estimated by researchers to be matched  
309 with consumption data from the two national dietary surveys, i.e. INCA1 (1998–99) and  
310 INCA2 (2006–07). Furthermore, previous analyses carried out as part of the Opticourses  
311 intervention showed that participants purchased food at prices significantly lower than the  
312 2006 average national prices<sup>(15)</sup>, which thus remain relevant within the framework of our  
313 intervention. Second, national prices may not directly reflect local prices which are influenced  
314 by many factors such as local markets or policies<sup>(16)</sup>. Third, exposure to food contaminants, a  
315 growing health concern<sup>(30)</sup>, is not captured by the SAIN,LIM calculation. Fourth, the  
316 definition of good nutritional quality in this study—based on the median of foods’ SAIN/LIM  
317 ratios—is relative and depends on the number and type of foods included in the table. If the  
318 composition table contained more fruit and vegetables, for example, then the value of the  
319 median SAIN/LIM ratio would increase and thus modify the foods of good nutritional quality  
320 selected. Groups of foods high in fat and/or sugar would be less represented. An analysis  
321 based on the medians of the SAIN/LIM ratio of each group would allow for the selection of  
322 more foods in certain groups, but this choice was rejected here as since median values were  
323 hugely disparate depending on the group, some foods with high nutritional quality would be  
324 eliminated (e.g. certain fruits and vegetables) while others with lower nutritional quality  
325 would be selected (e.g. foods high in fats and sugars) due to the differences in nutritional  
326 quality of the groups to which they belong. To overcome these problems, one solution would  
327 be to adopt a non-relative definition of nutritional quality, such as its classification within the  
328 SAIN,LIM nutrient profiling system, which depends exclusively on the nutritional  
329 composition of each food, independent of the food group to which it belongs<sup>(19)</sup>. A final  
330 limitation concerns the methodology used to produce the booklet’s prices, which could itself  
331 be considered arbitrary. However, several trials were conducted to test the realism of the  
332 findings obtained by means of the method adopted, and they confirmed the possibility of  
333 finding the foods presented in the booklet at a price cheaper than listed. The method  
334 developed here needs to be validated more thoroughly to assess the sensitivity of results to  
335 spatial and temporal variation in food databases and average national prices.

336

337 Various actors (departmental health education committees, family allowance offices, health  
338 insurance companies, dieticians, social workers, etc.) require adapted tools to address the  
339 issue of shopping and eating healthily on a low budget. The Opticourses Good Price Booklet  
340 enables them to move from theory to practice on purchasing food for a balanced diet on a low  
341 budget, and is an example of an educational tool produced through co-construction. The  
342 transferability of the Opticourses approach is currently being studied as part of a broader  
343 project in France. This will provide an opportunity to test the acceptability and benefits of  
344 Opticourses protocols and tools in different contexts in terms of target populations,  
345 organizations, areas, etc.

346 Health logos, nutritional information and even subsidies can give rise to unwanted effects and  
347 may be liable to increase social inequalities with regard to nutrition<sup>(31)</sup>. A positive nutritional  
348 logo exclusively indicating foods with a good NQP (by making them available, visible and  
349 attractive in shops) was found to direct purchases towards these foods<sup>(16)</sup> and would be a  
350 concrete way to help consumers identify foods that enable them to reconcile nutrition and  
351 budget when they shop for food. Further research is now needed to investigate the effect on  
352 nutritional status of a positive logo scheme promoting good-NQP foods.

353

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**Table 1.** Sociodemographic characteristics of Opticourses households (n=91)

	<b>Mean (SD)</b>
Respondent age, y	48.1 (10.1)
Household members, n	3.41 (1.97)
Children, n	1.70 (1.68)
Stores frequented, n	4.85 (3.22)
Female respondents, %	75.8
Food aid recipients, %	11.0
Financial situation, %	
Stable	15.3
Precarious	48.2
Severe difficulties	36.5

**Table 2.** List of foods with good nutritional quality presented in the booklet with their ‘good price’ (€/kg or €/article)

SHELF	FOOD	GOOD PRICE (€/kg)	SHELF	FOOD	GOOD PRICE (€/kg)
VEGETABLES			GRAINS		
	<b>Aubergine</b>	<b>1.76</b>		<b>Wheat</b>	<b>2.35</b>
	<b>Avocado</b>	<b>0.44*</b>		<b>Couscous</b>	<b>2.15</b>
	<b>Beetroot</b>	<b>2.06</b>		Pasta	2.09
	<b>Chard</b>	<b>1.99</b>		<b>Wholemeal pasta</b>	<b>2.35</b>
	<b>Broccoli</b>	<b>2.18</b>		Polenta/cornmeal	2.25
	Carrot	1.12		<b>Rice</b>	<b>2.31</b>
	<b>Celery/celeriac</b>	<b>1.70</b>		<b>Wholemeal rice</b>	<b>2.35</b>
	Mushroom	1.70	POTATO		
	<b>Cabbage<sup>a</sup></b>	<b>1.74</b>		Potato	1.28
	Cucumber	0.49*		Dried mashed potato	1.66
	Courgette	1.78		<b>Potato gnocchi</b>	<b>2.35</b>
	Chicory	1.81	LEGUMES		
	<b>Spinach</b>	<b>1.74</b>		Dry kidney/white beans	5.19
	<b>Corn on the cob</b>	<b>0.40*</b>		Dry lentils	3.85
	Turnip	1.47		Dry split peas	3.48
	Onion	2.07		Dry chickpeas	4.83
	<b>Leek</b>	<b>1.70</b>	TINNED VEGETABLES		
	<b>Pepper</b>	<b>2.06</b>		<b>Carrots</b>	<b>2.42</b>
	<b>Pumpkin</b>	<b>1.70</b>		<b>Celery/celeriac</b>	<b>2.42</b>
	<b>Radish (bunch)</b>	<b>0.72*</b>		<b>Mushrooms</b>	<b>2.42</b>
	<b>Lettuce<sup>b</sup></b>	<b>0.86*</b>		<b>Sauerkraut without garnish</b>	<b>2.42</b>
	<b>Tomato</b>	<b>2.18</b>		<b>Green beans</b>	<b>2.42</b>
FRUITS				<b>Diced mixed veg.</b>	<b>2.19</b>
	<b>Apricot</b>	<b>2.18</b>		<b>Sweetcorn</b>	<b>2.42</b>
	Pineapple	1.89*		<b>Peas with or without carrots</b>	<b>2.42</b>
	Banana	1.39		<b>Ratatouille</b>	<b>2.42</b>
	<b>Lemon</b>	<b>2.18</b>	TINNED TOMATOES		
	Clementine/mandarin	1.70		Tomato concentrate	1.77
	<b>Dried fruit<sup>c</sup></b>	<b>3.90</b>		<b>Tomato sauce</b>	<b>3.01</b>
	<b>Kiwi</b>	<b>0.16*</b>		Tomatoes	1.89
	<b>Melon</b>	<b>1.70*</b>	TINNED LEGUMES		
	<b>Plum</b>	<b>2.18</b>		Kidney/white beans	2.67
	<b>Nectarine/peach</b>	<b>2.18</b>		Lentils	1.79
	Walnut <sup>d</sup>	-		Chickpeas	1.97
	Orange	1.23	TINNED FISH		
	Grapefruit	0.64*		<b>Cod liver</b>	<b>9.56</b>
	Watermelon	0.73		Mackerel	8.74
	Pear	2.06		Sardine	7.94

	Apple	1.52		Tuna	8.36
	<b>Greengage plum</b>	<b>2.18</b>	<b>SOUP</b>	Carton of veg. soup	2.20
	<b>Grape</b>	<b>2.30</b>		Powdered veg. soup	1.28
<b>FISH</b>			<b>JUICE</b>		
	<b>Anchovy</b>	<b>6.69</b>		Pure fruit juice	1.20
	<b>Sea bream</b>	<b>6.69</b>	<b>OILS &amp; FATS</b>		
	<b>Haddock/smoked haddock</b>	<b>9.56</b>		Rapeseed oil	1.42
	<b>Pollock, coley, hake</b>	<b>6.69</b>		<b>Walnut oil</b>	<b>3.01</b>
	<b>Mackerel</b>	<b>6.85</b>		Olive oil <sup>d</sup>	-
	<b>Mullet</b>	<b>7.64</b>		Sunflower oil	1.22
	<b>Perch</b>	<b>7.17</b>		Blended oil	2.18
	<b>Rock salmon</b>	<b>8.60</b>		<b>Margarine</b>	<b>3.01</b>
	<b>Sardine</b>	<b>5.73</b>	<b>BREAKFAST CEREALS</b>		
	<b>Salmon</b>	<b>8.60</b>		Oat flakes	3.60
	<b>Cuttlefish</b>	<b>7.64</b>		<b>Muesli</b>	<b>2.35</b>
	<b>Tuna</b>	<b>8.60</b>	<b>SWEET PRODUCTS</b>		
	<b>Rainbow trout</b>	<b>7.17</b>		<b>Fruit compote</b>	<b>2.42</b>
<b>MEAT</b>				<b>Fruit salad</b>	<b>1.94</b>
	Offal (poultry, beef, pork)	5.71		Custard	2.74
	<b>Chicken breast</b>	<b>9.56</b>		Chocolate/vanilla pudding <sup>i</sup>	3.38
	Chicken thigh	4.96		Rice pudding	3.87
	Turkey cutlet	9.24		<b>Gingerbread</b>	<b>3.90</b>
	<b>Rabbit (whole)</b>	<b>6.69</b>	<b>FROZEN VEG</b>		
	Chicken (whole)	5.09		<b>Courgette</b>	<b>2.42</b>
	<b>Ground beef—5% fat</b>	<b>9.56</b>		<b>Spinach</b>	<b>2.42</b>
	Ground beef—10% fat	8.74		Green beans	1.88
	<b>Beef, high quality cuts <sup>e</sup></b>	<b>9.15</b>		<b>Ratatouille</b>	<b>2.42</b>
	Beef, , other cuts <sup>f</sup>	6.11	<b>FROZEN POTATO</b>		
	Turkey	7.80		Potato	1.76
	Pork (lean tenderloin, joint)	8.49	<b>FROZEN FISH</b>		
	Veal <sup>g</sup>	9.56		<b>Seafood cocktail</b>	<b>9.56</b>
<b>PROCESSED MEAT</b>				<b>Pollock, coley, hake</b>	<b>6.69</b>
	Black sausage	7.25		<b>Salmon</b>	<b>8.60</b>
	<b>Cooked ham</b>	<b>9.27</b>	<b>FROZEN MEAT</b>		
<b>EGGS</b>				Chicken thigh	4.96
	Egg	0.16*		<b>Ground beef—5% fat</b>	<b>9.56</b>
<b>DAIRY</b>				Ground beef—10% fat	8.74
	Milk	0.95		Turkey	7.80
	Flavoured milk	1.63		Pork (lean tenderloin, joint)	8.49
	Flavoured milk	1.63	<b>GENERIC</b>		
	Fermented milk drink	1.72		Fresh veg.	1.94
	Fromage blanc	2.72		Fresh fruit	1.80
	Petits suisses	2.47		Tinned veg.	2.42
	Flavoured yoghurt	2.38		Frozen veg.	2.42
	Fruit yoghurt	2.38		Fish	9.56
	Plain yoghurt	1.97			
<b>BREAD</b>					

<b>Rusk or toasted bread</b> <sup>h</sup>	<b>2.35</b>	Meat	9.56
<b>Wholemeal bread</b>	<b>2.35</b>	Dairy <sup>j</sup>	2.07
<b>Rye bread, wholegrain bread</b>	<b>2.35</b>	Pasta, rice	2.35
		Legumes	4.34

In bold are foods whose 'good price' is based on the limit price rather than average national price.

\* Good price/unit (€/article)

<sup>a</sup> green, white, brussels sprout, red, cauliflower

<sup>b</sup> lettuce, escarole, lamb's lettuce, curly endive

<sup>c</sup> apricot, banana, date, prune, fig

<sup>d</sup> "Although expensive, moderate consumption is good for your health"

<sup>e</sup> joint, beefsteak

<sup>f</sup> for bourguignon, stews or braising

<sup>g</sup> chunks for braising, cutlet, joint

<sup>h</sup> wholemeal or wholegrain

<sup>i</sup> tinned or fresh

<sup>j</sup> yoghurts, fromage blanc, petits suisses

**Table 3.** Proportion, by supermarket-shelf category, of purchases of the booklet's foods bought by Opticourses participants at a price below the booklet's price

	<b>Median (IQR) price, (€/kg)</b>	<b>Total, N</b>	<b>Price below the booklet's price, N</b>	<b>Price below the booklet's price, %</b>
Vegetables (fresh or frozen)	1.5 (1.0–2.0)	425	263	61.9%
Fruit	1.5 (1.0–2.0)	373	219	58.7%
Fish (fresh or frozen)	5.9 (4.0–12.0)	11	6	54.5%
Meat (fresh or frozen)	6.8 (4.0–8.8)	163	93	57.1%
Processed meat	9.8 (7.4–13.3)	28	13	46.4%
Eggs	1.9 (1.9–2.8)	130	97	74.6%
Dairy	0.9 (0.6–1.5)	319	276	86.5%
Bread	3.8 (2.5–4.5)	12	1	8.3%
Grains	1.2 (0.8–2.0)	209	164	78.5%
Potato	1.0 (0.6–1.7)	126	84	66.7%
Legumes	2.0 (1.3–2.7)	37	27	73.0%
Tinned vegetables	2.2 (1.7–2.8)	87	51	58.6%
Tinned tomatoes	1.6 (0.6–2.1)	100	73	73.0%
Tinned legumes	1.8 (1.2–2.7)	27	18	66.7%
Tinned fish	7.4 (5.8–9.2)	39	24	61.5%
Soup	1.4 (1.0–2.0)	6	4	66.7%
Juice	0.9 (0.7–1.1)	141	116	82.3%
Oils & fats	1.5 (1.4–1.6)	95	24	25.3%
Breakfast cereals*	-	-	-	-
Sweet products	2.5 (1.8–4.6)	9	5	55.6%
Frozen potato	1.1 (0.8–1.4)	49	42	85.7%

\* Not purchased by Opticourses participants

## Figures

**Figure 1. Flowchart showing how foods were selected for the Good Price Booklet**

**Figure 2. Good Price Booklet distributed during Opticourses\* workshops**

Note: \*photo credits: Cédric Dubois

INCA2 table of the composition of foods (n=1,343)

*Elimination of ready-made meals, alcoholic beverages and zero-calorie beverages*

Reduced INCA2 table of the composition of foods (n=1,054)

*Elimination of foods with a SAIN/LIM ratio < median  
Calculation of limit price for each food*

Foods of good nutritional quality (n=527)

*Elimination of foods whose average national price is 2.5 times higher than the limit price (except for olive oil and walnuts)*

Foods of good nutritional quality and price (n=404)

*Grouping together similar foods under a single designation  
Dividing into categories depending on supermarket shelves*

Good Price Booklet (n=153)

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