

A case study of sodium reduction in breakfast cereals and the impact of the *Pick the Tick* food information program in Australia

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SUMMARY

In 1997, one of Australia's largest food companies undertook a program of salt reduction in 12 breakfast cereals. The National Heart Foundation's *Pick the Tick* program criterion (<400 mg sodium per 100 g) was used as a target value where possible. Twelve products were reformulated, with reductions ranging from 85 to 479 mg sodium per 100 g

and an average reduction of 40% (12–88%). As a result, 235 tonnes of salt were removed annually from the Australian food supply and five more products were able to carry the tick logo. The impact of the *Pick the Tick* program in changing the food supply extends beyond those products that are part of the food approval program.

Key words: food industry; food labels; food supply; salt

INTRODUCTION

A recent evaluation of the effect of the National Heart Foundation (NHF) *Pick the Tick* food information program on the salt content of food in New Zealand estimated that the program influenced manufacturers to exclude ~33 tonnes of salt from food sold over a 1 year period to June 1999 (Young and Swinbourne, 2001). Impressive as this finding is, it may significantly underestimate the total impact of the program. The authors restricted their analysis only to those foods that were formally accredited as part of the *Pick the Tick* program. However, the experience of one major manufacturer of breakfast cereals suggests that there could have been flow-on effects to other products as well.

In Australia, a comprehensive government report recommending lower levels of sodium

intake for the general population was published in 1982 (National Health and Medical Research Council, 1982). It also recommended that food manufacturers be requested to reduce the sodium added to foods during manufacture and processing. Advice to moderate sodium intake was included in the first national dietary guidelines for Australians when they were released in 1979 (Commonwealth Department of Health, 1981) and has been maintained in later revisions since then (National Health and Medical Research Council, 1992; National Health and Medical Research Council, 1999). In response, there have been significant changes to the Australian food supply. There are many more salt-free and salt-reduced products now on the market, and it has been calculated that the average sodium content of processed foods in Australia reduced by 10% in the period 1980–1995 (Wills and Duvernet, 1996). However, it was still estimated that in 1995

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only 6% of men and 36% of women in Australia were meeting the national sodium target of 100 mmol/day (Beard *et al.*, 1997).

In 1997, an article on the nutritional content of ready-to-eat breakfast cereals (RTEC) was published in *Choice* magazine, a publication of the Australian Consumers Association (ACA, 1997). The article was critical of the salt content of a number of popular breakfast cereals, including Kellogg's All-Bran, which then had a sodium content of 849 mg/100 g, above the maximum level of 800 mg/100 g that ACA recommended.

Kellogg (Aust) Pty Ltd employed four qualified dietitian-nutritionists in 1997, whose roles included developing overall nutrition policies for the company, identifying opportunities for product development (including reformulation), and managing nutrition communications about products to consumers and health professionals. The nutritionists' input was an integral part of the company's annual planning process and they were asked to develop a response to the ACA article.

At that time, 10 out of the total range of 26 RTEC products produced by Kellogg were low in salt as defined by the Australian Food Standards Code, i.e. they contained ≤ 120 mg sodium/100 g (Australia New Zealand Food Authority, 1999). Furthermore, there had already been changes to reduce the sodium content of some key brands; for example, there had been an 11% reduction in the salt content of Kellogg's Corn Flakes 1 year earlier. However, in order to continue to improve consumer confidence in the nutrition credentials of all the Kellogg cereals and to support public health priorities, the company nutritionists recommended a strategy of product reformulation across a wide range of RTEC products to reduce salt levels to as low as possible, consistent with maintenance of consumer taste appeal. This strategy was accepted by the company for implementation over the 6 months to the end of December 1997.

In this paper, as dietitians working within a large food company, we report our experiences of the influence the *Pick the Tick* program had on decisions regarding sodium levels in food formulations, and provide estimates of the resulting total salt content of the products.

METHODS

Descriptions of some of the background issues influencing the decisions in reformulating sodium

levels are based on information available to us as employees at the time, and have been approved by Kellogg (Aust) Pty Ltd. Chemical analyses of the nutritional content of Kellogg products in Australia are carried out bi-annually to monitor quality assurance processes and to verify nutrient content claims on labels. Records of these analyses and the approved values that were included in the nutrient information panels on product labels were used to compare the sodium content of products before and after the reformulations made throughout 1997. Sales volume data for these products for the year 1997 were obtained from Kellogg. The reduction in sodium content was multiplied by the volume of product sold in the 12 month period to estimate the impact over 1 year. Sodium was converted into salt using the conversion factor 1 g sodium (Na) = 2.5 g salt (NaCl).

RESULTS

Two target levels for sodium reduction were established: ≤ 120 mg/100 g (for a low salt claim) and < 400 mg/100 g, the level required to meet the nutrient criteria of the NHF's *Pick the Tick* program (National Heart Foundation, 1999), although it was recognized that not all products would be able to achieve these goals and continue to maintain acceptable consumer taste appeal. Seven major products were identified for the first stage of the reformulation program carried out in 1997, which affected the sodium content of 12 products overall (see Table 1), accounting for approximately two-thirds of the total Kellogg RTEC sales volume. For example, once Kellogg's Rice Bubbles were reformulated, the lower sodium level also reduced the sodium level in Kellogg's Coco Pops, which has Rice Bubbles as one of the ingredients. Only three products with

Table 1: Kellogg's breakfast cereals reformulated to reduce sodium

Reformulated core cereals	Cereals based on core cereal
Corn Flakes	Crunchy Nut Corn Flakes, Frosties
Rice Bubbles	Coco Pops
All-Bran	All-Bran Fruit 'n' Oats
Bran Flakes	Sultana Bran
Special K	
Just Right	
Honey Smacks	

sodium levels above the NHF target were not included in the reformulation program. One of these was imported and the formulation could not be altered. The other two were extruded products which required more complex reformulation, and they were not included in the first stage of the program.

Commercial imperatives required that the changes should not lead to any significant reduction in consumer taste appeal, and two different manufacturing strategies were identified to effect the changes: a simple reduction in the amount of salt added, or changes in the proportion of salt added to the cooked grain or to the added flavor ingredients. No other changes were made to the product formulations and no attempt was made to use salt substitutes. All reformulated products were evaluated for acceptability at various levels of salt reduction by consumer sensory testing with regular RTEC eaters. This involved ~100 consumers being recruited to consume the products at home for a period of 5 days, and rate the food on overall liking, purchase intent and various relevant product attributes on a series of line scales. In order for the reformulated food to be acceptable for launch into the market, it had to perform at parity to existing food for overall liking, purchase intent and key product attributes scores.

In relatively plain products, such as Corn Flakes and Rice Bubbles where there are no flavors aside from the base grain and a small amount of added sugar and malt, the salt added to the cooking grain is a major element of the

flavor experience and it was difficult to reduce the salt levels further without a significant decline in consumer satisfaction. In other products, such as bran-based cereals, where there are other stronger flavor characteristics, it was possible to reduce salt levels to a greater extent without affecting consumer preference. In one major brand, Kellogg's Just Right (a light, fruit-added muesli-type cereal), a simple change in how the salt was added during production enabled a substantial reduction in total salt content (83%; 235 mg/100 g) without affecting consumer acceptance.

Table 2 shows the changes achieved in the sodium content of the breakfast cereals. Reformulation of the 12 products resulted in a mean sodium reduction of just over 40%, varying from 12% to 88% (85–479 mg/100 g) in different products. The largest percentage reductions were in products with lower initial levels of added sodium. In total, an estimated 235 tonnes of salt per year were removed from the Australian food supply as a result of these changes, or an average of 85 mg sodium per serving. On a total population basis (18.4 million in 1997), this amounts to a reduction of 13 g of salt per person per year. However, only ~40% of Australians (7.05 million in 1997) were regular consumers of Kellogg cereals, and assuming that all of the change in salt levels benefited those regular eaters, the reduction in salt consumption among this group would be closer to 33 g per year, or 90 mg salt per day.

Only five of the 12 products were eligible to carry the *Pick the Tick* logo after the reformulation program, and these products accounted for

Table 2: Effect of reformulation of breakfast cereals on sodium content in 1997

Product	Sodium content before reformulation (mg/100 g)	Sodium content after reformulation (mg/100 g)	Sodium difference (mg/100 g)	Sodium difference (%)	Volume of product sold (kg)	Sodium not added to food (kg)	Salt not added to food (kg)
All-Bran ^a	849	380	469	55	3 499 449	16 412	41 031
All-Bran Fruit 'n' Oats ^a	391	190	201	51	217 860	438	1095
Bran Flakes ^a	874	395	479	55	596 889	2859	7148
Corn Flakes	1020	900	120	12	11 407 845	13 689	34 224
Coco Pops	751	564	187	25	5 774 150	10 798	26 994
Crunchy Nut Corn Flakes	746	658	88	12	1 947 735	1714	4285
Frosties	718	633	85	12	250 766	213	533
Honey Smacks	146	17	129	88	184 799	238	596
Just Right ^a	284	49	235	83	4 646 130	10 918	27 296
Rice Bubbles	1032	720	312	30	3 570 868	11 141	27 853
Special K	699	536	163	23	3 924 257	6397	15 991
Sultana Bran ^a	663	335	328	49	5 845 428	19 173	47 933
Total overall					41 866 176	93 991	234 978

^aProduct included in the *Pick the Tick* program after reformulation.

53% of the total salt reduction. An almost equal contribution to the total salt reduction came from the other seven products that did not carry the logo (see Table 2).

DISCUSSION

In 1999–2000, almost 3 million adult Australians had high blood pressure, placing a burden of over \$800 million on health care expenditure (Australian Institute of Health and Welfare, 2001). Recent decades have produced an international consensus that a modest dietary sodium reduction for people with normal and raised blood pressure has a large enough effect on blood pressure (and therefore health benefit) to justify a guideline advising restraint for the entire population (WHO Expert Committee, 1986; Kuller, 1997; Morgan, 1999; Kaplan, 2000). This has now been strongly supported by large and well-conducted randomized controlled trials (Law *et al.*, 1991; Cutler *et al.*, 1997).

The large changes in salt utilization described in this paper are still modest at a population level, but could have a useful impact on individual sodium intake levels. It has been estimated that a reduction in dietary salt by an average of 50 mmol sodium (2.9 g salt) per day in a whole Western population would reduce age-specific stroke mortality by ~22%, and ischemic heart disease mortality by ~16% (Law *et al.*, 1991; Law, 1997), although even smaller reductions are also likely to have positive health benefits (Cutler *et al.*, 1997). The reduction described here among regular cereal consumers (90 mg salt per day) amounts to only 3% of that required to have a significant impact on cardiovascular health. The Australian Guide to Healthy Eating recommends seven to 12 servings per day of cereal-based foods (including also breads, grains and pasta) for an adult male (Smith *et al.*, 1998), so if a similar level of reduction were achieved across all cereal-based foods, the total reduction could produce a reduction of up to one-third of that needed for substantial public health benefits. However, salt is a commonly used food additive, and in Western countries it is estimated that 75–85% of dietary sodium comes from processed foods (James *et al.*, 1987; Sanchez-Castillo *et al.*, 1987). Thus, it is clear that the sodium content of other non-cereal foods also needs to be addressed to have a substantial impact on the total national sodium intake.

For consumers of breakfast cereals, nutrition is one of the key drivers impacting upon purchase decisions. While the use of the *Pick the Tick* logo is recognized by consumers as a useful tool to highlight nutritional strengths (Noakes and Crawford, 1991), the program's nutrient criteria are also uniquely valuable to companies seeking to set appropriate target levels for product formulation. Although the initial concern was that All-Bran had a sodium content greater than 800 mg/100 g, it was decided to adopt the more stringent target level of the Tick program for sodium reduction, because of the credibility of the *Pick the Tick* program with consumers and the perceived marketing value of the logo. However, it is also clear that many useful changes can occur without achieving the levels needed for inclusion in the Tick program. Our experience in this case is that the immediate stimulus to seek the Tick for one product led to a wide-ranging program of sodium reduction that had a broad impact on many other products. The total salt reduction was twice that achieved just in the products reformulated sufficiently to achieve Tick approval.

In Australia, Kellogg has a history of innovation to provide products in line with emerging nutritional recommendations: two examples are the development and testing of a psyllium-based cereal which can reduce cholesterol absorption (Roberts *et al.*, 1994), and folate addition to all fortified RTEC products in response to new evidence of its role in prevention of neural tube defects (Truswell, 1996). In the project described here, it was possible to find ways to reformulate products that did not affect consumer food appeal, while making nutrient changes that supported public health objectives. However, the results were only achieved within the constraints of local taste acceptance and would not necessarily be applicable in other countries.

The fact that there was a major program to reduce sodium levels was not directly communicated to consumers, although it was described to health professionals at meetings organized by the NHF and through Salt Skip News, a national newsletter especially for people seeking information on lower sodium products. Other food companies similarly have made progressive but unannounced changes to reduce the sodium levels in their products, thereby enabling local palates to adjust over time. This is consistent with public health recommendations to food processors to gradually reduce the amount of added sodium,

in the knowledge that the preference for sodium is quickly reduced when less sodium is ingested (Kaplan, 2000). For example, since the program described here, the sodium content of Corn Flakes, Crunchy Nut Corn Flakes and Frosties has been reduced even further.

Dietitians working in the food industry generally see one of their roles as encouraging food supply changes to make healthier choices easier (Tapsell and De Groot, 1999). They are ideally placed to promote partnerships between food companies and professional organizations (Tobin *et al.*, 1992), and to highlight the value of independent, authoritative nutrition benchmarks, such as those in the *Pick the Tick* food approval program, when establishing policies within food companies.

In conclusion, *Pick the Tick* was an effective catalyst for a substantial reduction in the salt content of a major food category, with an impact nearly twice that seen in the foods reformulated to meet the requirements of the Tick program itself.

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