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Evaluation of Australian soup manufacturer compliance with national sodium reduction targets

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Abstract

Aim: Packaged foods dominate Australia's food supply and are important contributors to nutrition-related disease. To help address this problem, the Food and Health Dialogue (FHD) was launched in 2009, setting voluntary sodium reduction targets for various categories of packaged foods. The aim of this study was to examine the food industry's progress and compliance with the FHD sodium reduction targets for soup products.

Methods: Nutritional information was collected from product labels of all soup products available from four major Australian supermarkets annually between 2011 and 2014. Products were assigned to categories in line with those in the FHD. The proportion of soup products meeting sodium reduction targets was examined by (i) soup category; (ii) FHD participant status; and (iii) manufacturer.

Results: A 6% reduction in sodium levels in soups overall was found from 2011 to 2014 ($P = 0.002$). Significant reductions were observed for FHD participants ($P < 0.05$ for all) but not for non-participants. In 2014, 67% dry soups and 76% of wet soups met national sodium reduction targets.

Conclusions: Despite the majority of soup products meeting the sodium reduction targets specified by the FHD, re-evaluation of the targets may be required to further reduce sodium levels in soups. Manufacturers participating in the FHD are likely to be driving sodium reductions in the Australian soup market, further highlighting the need for continued government leadership in this area to ensure all manufacturers are actively involved in the process.

Disciplines

Medicine and Health Sciences

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20 government leadership in this area to ensure all manufacturers are actively involved in the
21 process.

22 **Keywords:** Salt reduction, reformulation, sodium intake, soup

1 Introduction

2 The current food environment is dominated by processed foods¹, resulting in a food supply abundant
3 with highly refined ingredients.^{2,3} Foods of this nature are typically higher in risk-associated nutrients
4 such as saturated fat, salt and sugar,^{4,5} favouring an undesirable energy-dense nutrient-poor
5 compositional profile.⁶⁻⁸ With more than half of the foods sold in Australia being packaged items,
6 these foods are dominating the average Australian's diet⁹ and are likely leading to overconsumption
7 of risk-associated nutrients, in turn driving the burden of non-communicable diseases (NCDs).¹⁰ In
8 Australia, cardiovascular disease remains the leading cause of death for both males and females,
9 accounting for 23% of all deaths.¹¹

10 One in five Australians suffer from high blood pressure which is an important cause of cardiovascular
11 disease¹² and there is clear evidence showing excess dietary salt intake is a major risk factor for high
12 blood pressure.¹³ The average daily salt intake in Australia is nine grams,¹⁴ more than double the
13 Australian government's suggested dietary target of four grams per day.¹⁵ Packaged foods provide
14 approximately three quarters of the average Australian's salt intake,¹⁶ lending support for the
15 implementation of a cost-effective policy-based approach to improve Australia's food supply.¹⁷⁻²⁰

16 In an attempt to address the growing burden of NCD's in Australia, the Federal Government launched
17 the Food and Health Dialogue (FHD) initiative in 2009 in partnership with food industry.²¹ The
18 primary goal of the FHD was to act on food innovation through a voluntary reformulation program on
19 packaged foods, aiming to reduce the saturated fat, added sugar, sodium and energy content, and
20 increase the fruit, vegetable, fibre and wholegrain content of foods in order to make 'healthier' food
21 choices more accessible to Australians.²¹ Predominantly targeting sodium, the FHD identified nine
22 commonly consumed food categories to target for reformulation (Bread, Ready-to-Eat breakfast
23 Cereals, Simmer Sauce, Processed Meat, Soups, Savoury Pies, Potato/Corn/Extruded Snacks, Savoury
24 Crackers and Cheese).²² Previous research has been published showing the extent to which the FHD
25 has been delivering upon its goals for sodium reduction for bread, breakfast cereals and processed
26 meats, which were the first three categories with targets established through the FHD.²³

1 The soup category was the next category to have sodium reduction targets set, with industry
2 scheduled to comply with these targets by December 2014.²⁴ Therefore, the primary aim of this study
3 was to examine the food industry's progress and compliance with the FHD sodium reduction targets
4 for soup products.

1 **Methods**

2 A cross-sectional longitudinal study design was employed. The main aim was to evaluate whether
3 participants in the FHD met the December 2014 sodium targets set within the soup food category.
4 Secondary objectives were to compare FHD participants to non-FHD participants, as well examine
5 changes at the manufacturer level for FHD participants.

6 The George Institute (TGI) Branded Food Composition Database was utilised for analysis. This
7 database holds extensive food product information for the Australian packaged food supply from 2011
8 to present. Each year the data are collected between August and December from the same four
9 grocery retail stores (Coles, Woolworths, ALDI, and IGA) in Sydney, Australia by a team of trained
10 researchers. Data are collected using a smartphone application which links product barcodes with
11 three photos of the product (front of pack, nutrition information panel (NIP) and ingredients list).
12 Product information is then entered, reviewed and categorised within the database following an
13 established quality assurance protocol.^{25,26}

14 Nutrient data were extracted from TGI Branded Food Composition database for all relevant 2011-14
15 soup sub-categories (Powdered dry soups, Canned soups and Chilled soups). These sub-categories
16 were further grouped into two parent categories to match the FHD target category definitions; 'dry
17 soups' and 'wet-and-condensed soups' whereby soup is considered to be a liquid dish, typically
18 savoury and made by boiling meat, fish, or vegetables etc. in stock or water. From the extracted
19 products, all products that displayed NIP values per 100g "as sold" were excluded from the analysis
20 (n=27). These values were for the unprepared (powdered) form of soup and therefore comparisons
21 were unable to be made to the majority of soups that displayed their NIP data "as consumed"
22 (prepared).

23 Food category action plans from the FHD website²⁸ were examined to identify the sodium reduction
24 targets for the soup category. Food manufacturers that had volunteered their commitment to the FHD
25 targets were considered as the FHD 'participants'. This participant group were known by the FHD to
26 have represented the majority of the market share in Australia at the time the FHD targets were

1 formulated, producing approximately 90% of soup products available for purchase.²⁴ The ‘FHD non-
2 participants’ were also included and were considered to be the remaining manufacturers and grocery
3 retailers not listed as being committed to the targets on the FHD website.²⁷

4 For each year the mean, median, range and standard deviation of sodium content for all soups was
5 calculated overall, by FHD category (wet-and-condensed and dry soups), by FHD participant status
6 (FHD participants and FHD non-participants) and by individual food manufacturer (for FHD
7 participants only). The change in mean sodium value (mg/100g) between 2011 and 2014 was also
8 compared within each FHD soup category and by participant status. Independent t-tests were used to
9 examine differences in mean sodium content. Equal variance was assumed for all tests as the data
10 were normally distributed. A p-value of <0.05 was considered significant. The number and
11 proportion of “dry” soup products with sodium content below the maximum FHD sodium target of
12 290mg/100g and “wet-and-condensed” products with sodium below the maximum sodium target
13 300mg/100g were calculated for each year, comparing FHD participants to FHD non-participants and
14 at the manufacturer level for FHD participants. To account for the change in availability of products
15 in-store, proportions were analysed according to whether they were ‘matched’ or ‘unmatched’.
16 ‘Matched’ meaning that they first appeared in-store (i.e. first scanned in the database) at a time in
17 between 2011-2013 and were also available in-store in 2014, whilst ‘unmatched’ were present only in
18 one year, at any time between 2011 and 2014. Pearson’s Chi-squared analyses were used to determine
19 whether there was a difference in the proportion of products meeting FHD targets between 2011 and
20 2014 for unmatched products, and standardised residuals were run for all tests showing statistical
21 significance. Fisher’s exact test was used in cases where there was a cell count below five.
22 McNemar’s test was used for matched products. Results were once again considered statistically
23 significant if a p-value <0.05 was obtained. All above statistical analyses were conducted using *SPSS*
24 *Statistics for Windows* (Version 22.0. Armonk, NY: IBM Corp).

1 **Results**

2 A total of 1,153 soup products were included in the analysis; 31% of products were in the dry soup
3 category and 69% of products in the wet-and-condensed soup category. Just over 2/3 of products
4 (70%) were from manufacturers participating in the FHD. Refer to *Table 1* for further breakdown of
5 the number and proportion of soup products that were included in this analysis. Mean sodium content
6 of soup products decreased between 2011 and 2014 (from 295mg/100g to 276mg/100g; $p<0.05$),
7 representing a 6% (-19mg/100g) overall reduction. When examining changes by type of soup
8 category, sodium content decreased over time in the dry soup category, from 317mg/100g in 2011 to
9 294mg/100g in 2014 ($p=0.02$) and in the wet-and condensed soup category from 287mg/100g in 2011
10 to 269mg/100g in 2014 ($p=0.02$). The four box-plots in *Figures 1 and 2*, show the distribution of the
11 mean sodium values (mg/100g) over the years for FHD participants and FHD non-participants
12 respectively in each soup category. The figures also show that for both soup categories, there was a
13 greater proportion of products below the target for FHD participants compared to FHD non-
14 participants.

15 The proportion of dry soup products meeting the FHD maximum sodium target increased from 38%
16 in 2011 to 67% in 2014. No significant difference was seen in the proportion of unmatched dry soups
17 ($p=0.12$) meeting the targets between 2011 and 2014, however significant results were observed for
18 the matched dry soups ($P<0.0001$) when comparing 2011 to 2014. More importantly, the proportion
19 of dry soups from FHD participants meeting the FHD sodium target in 2014 was significantly greater
20 than the proportion meeting the target when they first appeared ($p<0.0001$). *Table 1* show the
21 consistent increase in the proportion of FHD-participating dry soup products meeting the FHD sodium
22 target between 2011 and 2014.

23 The proportion of wet-and-condensed soup products meeting the FHD maximum sodium target did
24 not increase as greatly as the dry soup category, however there was still an increase from 70% in 2011
25 to 76% in 2014. There was no significant change in the proportion of manufacturers meeting the

- 1 target when comparing 2011 to 2014 overall (matched, $p=0.35$ and unmatched, $p=0.74$) and FHD
- 2 participants (matched, $p=0.32$) (Table 1).

1 Discussion

2 This is the first independent scientific publication examining the progress of the Australian
3 government's FHD sodium reduction targets for soups. Results showed there was significant progress
4 made overall by Australian soup manufacturers to reduce the sodium content of their products
5 between 2011 and 2014, with a 6% decrease in overall sodium content. The proportion of products
6 meeting the sodium reduction target also increased over the study period for both soup categories. An
7 internal analysis from the FHD itself has recently been published and shows similar results of a mean
8 reduction in sodium across both soup categories and an increase in the proportion of products meeting
9 the maximum targets.²⁸ However this FHD internal analysis only examined change in sodium over
10 time and only examined products from participants of the FHD.

11 A notable observation in the current analysis was that significant sodium reductions over the four year
12 period overall were only achieved for those manufacturers who were actively involved in the FHD.
13 The non-participating soup manufacturers also achieved a sodium reduction, however results were not
14 significant. This suggests that the FHD participating manufacturers were likely driving this overall
15 reduction in sodium in the Australian food supply and also suggests FHD non-participants in the soup
16 category are not receiving indirect influencing effects of engagement with major food manufacturers
17 and grocery retailers through the FHD. This is in contrast to a previous paper that evaluated breakfast
18 cereals, breads and processed meats²³ which showed that non-participating companies *were*
19 influenced through the FHD program.

20 Results from this study suggest that the FHD targets may have been set too conservatively for the wet-
21 and-condensed category, with a large proportion of products already compliant with the targets at
22 baseline. From a nutrition policy perspective, this raises concerns about whether the targets might not
23 be challenging enough to achieve the public health goals of the FHD. The reasons for the conservative
24 nature of these targets are beyond the scope of this analysis, but suggest that transparency about the
25 FHD target-setting process itself is needed to better understand how the targets aim to improve
26 population health.

1 The United Kingdom (UK) salt reduction program is a leading example of the success of a voluntary
2 reformulation scheme in food industry.^{29,30} The UK targets have been re-evaluated over time to make
3 them even more challenging to the food industry. In 2006 both ‘dried’ and ‘wet’ soups had an average
4 reformulation target of 250mg sodium/100g for soup products.³¹ This target was reduced to
5 230mg/100g in 2012.³¹ Comparison of UK soup category targets to the FHD shows that there is likely
6 room to make the average reformulation target in Australia (currently 290mg/100g soup for FHD)²⁴
7 more challenging to achieve the same impact as the UK.

8 The UK salt reduction program is an example of a successful public private partnership (PPP)
9 between government, industry and public health groups, with each group working together to lower
10 population salt intake.^{29,32} Key elements to the success of the UK program were setting sodium
11 reduction targets and encouraging gradual sodium reformulation, while also including consumer
12 campaigns and threatening regulation if substantial changes were not made. As a result, the UK has
13 achieved a sodium reduction of up to 70% in some food categories, which is the largest decrease in
14 sodium ever seen in processed foods in a developed country.²⁹ The FHD was closely based on the UK
15 approach to salt reduction, and results from this study along with previous category analyses²³
16 contribute to the ongoing monitoring and examination of the FHD program in Australia. Two
17 countries have now implemented mandatory sodium reduction targets; South Africa and
18 Argentina.^{33,34} It will be useful to see whether over time the implementation of mandatory sodium
19 reduction targets has a greater effect on sodium levels of processed foods than existing voluntary
20 targets such as the UK and FHD approaches.

21 A key strength of this research is the sequential annual collection of supermarket data allowed for the
22 tracking of products present in more than one year as well as the assessment of newly launched
23 products. The TGI database is known to cover approximately 90% of all packaged food items sold in
24 supermarkets. In addition, evaluation of data entry procedures has consistently found an error rate of
25 less than 1%. A limitation of this research was the lack of market share data available to understand
26 what influence these results would have on actual consumer purchases, these data are not readily
27 available for public health research. However, recent food consumption data from the Australian

1 population has indicated that although prepared dry soups contribute 0.6% and condensed soups
2 provide 0% of reported dietary sodium intakes, the homemade soup category provides 3.0% of
3 sodium to intakes of persons aged over 2 years. This warrants further investigation though would
4 require alignment of the food groups used in this research and those of the Australian Health Survey
5 analyses. Future research in this area looking at consumption levels of soup products along with the
6 nutritional content would be able to better assess how reformulation in soup products can impact
7 population sodium intake and may target the homemade soup category as well. It will also be
8 important for future research in this area to examine whether products that are decreasing in levels of
9 sodium are not offsetting this with increases in other adverse nutrients such as sugar and saturated fat.

10 Significant progress has been made by FHD participating manufacturers to reduce the sodium content
11 in Australian soup products. By 2014, the majority of soup manufacturers were found to be compliant
12 with national sodium reformulation targets. However the seemingly conservative nature of the FHD
13 targets may be too lenient to achieve the public health goals of the FHD. By the year 2020 it is
14 estimated that the burden of NCDs will increase to 57%, more than half of this being due to
15 cardiovascular disease.³⁵ Improvements in the levels of saturated fat, sugar and salt in processed foods
16 will likely have a large impact on relieving this health burden. Evidence from this study will be
17 essential in informing the government's FHD program. Effective national salt reduction strategies
18 have been projected to save millions of lives each year worldwide.^{13,36}

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1 **Table 1: Numbers and proportion of products included for the dry soup (A) and the wet-and-condensed**
 2 **soup (B) categories for all FHD participants, all FHD non-participants and individual FHD participant**
 3 **companies.**

4

(A) Dry soup category	2011	2012	2013	2014
FHD participants total products, n (%)	59 (87%)	79 (86%)	111 (90%)	68 (77%)
Unilever Australia	29	47	51	44
Nestlé Australia	15	16	16	12
Woolworths	-*	1	11	7
FHD non-participants total products, n (%)	9 (13%)	13 (14%)	11 (10%)	20 (23%)
(B) Wet-and- condensed category	2011	2012	2013	2014
FHD participants total products, n (%)	124 (66%)	123 (71%)	131 (61%)	125 (59%)
Campbell Arnott's	53	54	52	42
Heinz Australia	42	39	33	36
Woolworths	5	4	18	23
Coles	12	14	11	14
Aldi	12	12	17	10
FHD non-participants total products, n (%)	65 (34%)	55 (29%)	84 (39%)	87 (41%)

5 **= no products were available for that manufacturer in that year*

6

1 **Figure legends**

2 **Figure 1: Distribution of sodium values (mg/100g) from 2011 to 2014 based on participant status**
3 **category; (A) FHD-participant group and (B) FHD non-participant group.**

4

5 The horizontal line represents the maximum sodium target for the dry soup category (290mg/100g
6 soup).The box plots display the median value marked as the line in the middle of the box, and the
7 interquartile range. The vertical lines above and below the box indicate the most extreme value within
8 the 75th percentile + 1.5x (interquartile range) and the 25th percentile – 1.5x (interquartile range).

9 Additional values outside the range are marked with either a circle for outliers or a star for extreme
10 outliers.

11

12 **Figure 2: Distribution of sodium values (mg/100g) from 2011 to 2014 based on participant status**
13 **in the wet-and-condensed soup category; (A) FHD-participant group and (B) FHD non-**
14 **participant group.**

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16