

**FIVE YEAR REVIEW
OF THE HEALTH STAR RATING (HSR) SYSTEM**

HSR TECHNICAL ADVISORY GROUP (TAG)

Sodium

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Summary

Sodium intake is largely derived from dietary consumption of sodium chloride (salt). Australian and New Zealand dietary guidance recommends limiting salt intake, with processed products high in added salt being the major source of sodium intake in Western-type diets. However, sodium intake in Australian and New Zealand adults is exceeding the recommended Upper Level of Intake, thus increasing the risk of developing chronic disease including hypertension (high blood pressure).

The treatment of sodium in the HSR system has been raised as an issue by stakeholders to the five year review. Concerns revolve around one major theme: that the current weighting for sodium in the HSR algorithm does not effectively differentiate between products that have significantly different sodium levels. There is further concern that the current lack of differentiation may be a disincentive for manufacturers to reformulate where large and possibly unrealistic reductions in sodium are required before an increase in the HSR is achieved.

TAG has considered this issue and investigated three options, in addition to the status quo, for the treatment of sodium in the HSR system:

1. Status quo
- 2a. Applying the current HSR Category 3 maximum number of baseline points for sodium of 2700 mg per 100 g to HSR Category 1 and 2 foods
- 2b. As per 2a but applying the maximum number of baseline points for sodium of 2000 mg per 100 g
3. Restricting products with high sodium content to a maximum HSR (“capping”).

HSR Category 3 foods were not included in this analysis because they are either Five Food Group (FFG) foods and/or not significant sources of sodium in the diet. Reducing the maximum number of baseline points for sodium in HSR Categories 1 and 2 from the current 8106 mg/100 g to either 2000 or 2700 mg is expected to improve sodium sensitivity by reducing the level of sodium required to gain each baseline point i.e. products incur negative sodium points faster.

Options 2a and 2b were modelled using the TAG database and assessed using a set of key food products in HSR Category 1 and 2. These foods consisted of the main sources of sodium in the Australian diet, foods noted to be of concern for sodium by respondents to the HSR review and/or high salt outliers identified in the TAG paper that looked at the alignment of the HSR with dietary guidelines. They included: salty snacks, gravy mixes, recipe and sauce mixes, processed meat and salted/unsalted products such as nuts. In order to align with the original Nutrient Profiling Scoring Criterion (NPSC) tables that allocated up to 10 baseline points for a sodium content of up to 900 mg/100 g, modelling only considered the impact of changing baseline points 11-30 for a sodium content of >900 mg and up to 2000 or 2700 mg/100 g. In other words, in order to ensure consistency with the original NPSC, the modelling undertaken will only impact foods with a sodium content of 900 mg/100 g or more.

Reducing the application of maximum sodium baseline points (30 points) for HSR Category 1 and 2 foods to a sodium level 2000 or 2700 mg has a strong rationale: the TAG database identified only 49 products with a sodium level above 2700 mg/100 g. These products are mostly salts, stocks and seasoning and savoury sauces that would continue to obtain the maximum 30 points using a 2000 mg or 2700 mg sodium level. Given the HSR is designed to represent the main sodium values of foods available in the food supply, 2000 mg or 2700 mg may be a more appropriate upper limit than 8106 mg.

Overall, there is no change in HSRs for the majority of product categories using options 2a and 2b but some individual products in the key food categories are impacted. These include

some processed meats and savoury biscuits, sauces, condiments and seasonings. The majority of high sodium products already receive minimum ratings.

Modelling showed that:

- Under Options 2a and 2b, there is no change in HSRs for the vast majority of product categories. Less than 1% of products are impacted by Option 2a and only 1.8% by Option 2b. This is because these options only impact products with a sodium level above 900 mg/100 g and most products have a sodium level below this, including some products in the key food categories identified below, as well as all cereal products such as bread, soups, seafood and salted/unsalted nuts.
- Some individual products in the key food categories are impacted because their sodium content is >900mg; the HSR of some processed meats, stock cubes and seasonings and savoury sauces, salty snacks and vegetable pickles decreases, with more products impacted at 2000 mg than 2700 mg. HSRs in these products decrease by 0.5-1.0 as the majority of high sodium products already receive minimum ratings.
- The HSR of salty discretionary foods with a HSR ≥ 3.0 is also not decreased because these foods have a sodium level <900 mg.
- The majority of products affected by Options 2a and 2b will likely incentivise reformulation to reduce sodium content for products containing >900 to 2000 or 2700 mg/100 g, as the reduction required to improve ratings is smaller. However, products with sodium content considerably above the new maximum may not be encouraged to reduce sodium levels.

Option 3 would cap HSRs for products with “high” sodium content that would otherwise receive “high” HSRs, clearly addressing much of the negative perception regarding sodium. However, incentives to reformulate are limited and thresholds and caps would need to be determined. This option also deviates from the intention of the algorithm to provide a summary of the combination of nutrient content rather than a single focus on sodium.

A key limitation of this analysis is the relatively small number of products in the TAG database. Further work on a larger and more representative food database (e.g. FoodTrack™) would be required to confirm the results presented here and determine the most appropriate level for attracting the maximum points and whether option 2a or 2b is the preferred option.

A key issue to be considered for this paper relates to whether maintaining consistency with the original NPSC sodium tables is required. Modelling undertaken was unable to consider changes to sodium tables up to 900 mg/100 g in order to maintain the original NPSC tables. However the majority of key foods assessed have lower sodium levels < 900 mg/100 g. Addressing the sodium content of these products will therefore require a policy decision from HSRAC to change the original NPSC.

Problem definition

Salt in processed foods is the major source of sodium in Western diets¹ but sodium is also found naturally in foods such as milk, cream, eggs, meat and shellfish as well as added as table salt in cooking and to the end meal. Sodium is added to foods to enhance flavours and act as a preservative and as part of some food additives.

The 2013 Australian Dietary Guidelines (ADG)² reported that the evidence for the relationship between reducing sodium intake and reducing blood pressure, in people classified as having normal blood pressure in addition to hypertensive adults, had strengthened. Evidence has also become available for reducing sodium intake and decreased risk of mortality, stroke and heart disease in people with hypertension.

Sodium in the HSR algorithm

The HSR algorithm currently uses two different sodium tables, as shown in Table 1.

- **HSR Categories 1 and 2:** sodium content thresholds applicable to categories 1 (non-dairy beverages), 1D (dairy beverages), 2 (all other foods) and 2D (FFG dairy – yoghurt, soft cheese) are set from ≤ 90 to >8106 mg/100 g with baseline point increments starting at 90 mg per baseline point and increasing to 844 mg per baseline point.
- **HSR Category 3:** sodium thresholds for HSR Categories 3 (fats and oils) and 3D (FFG dairy – hard cheese) ranges from ≤ 90 to >2700 mg/100 g, with baseline point increments of around 90 mg throughout.

For HSR Categories 1 and 2, as the HSR algorithm was developed to reflect the range of sodium levels in the food supply from <90 to >8106 mg/100 g, the differences in sodium between the cut-offs for baseline points are large. This lack of differentiation may be a disincentive for manufacturers to reformulate because large and possibly unrealistic reductions in sodium are required before an increase in the HSR is achieved.

The HSR algorithm is derived from the Nutrient Profiling Scoring Criterion (NPSC), a nutrient profiling system developed by Food Standards Australia New Zealand (FSANZ) for the regulation of health claims in Australia and New Zealand. However, the purpose of the HSR system is different from that of the NPSC: the NPSC is concerned with eligibility to apply health claims while the HSR aims to provide a comparison of all products in the food supply along a continuum. The baseline points table of the NPSC dealt with lower levels of nutrient content only (categories 1 & 2, maximum 10 points, >900 mg/100 g; category 3, maximum 30 points, $>2,700$ mg/100 g).³

As can be seen in Figures 1-3:

- In the HSR system and the NPSC, sodium is “penalised” at >90 mg/100 g content. For HSR Category 3 the original NPSC table remains, wherein the relationship between content and penalty is linear and increases in 90 mg/100 g increments (Figure 1).
- For HSR Categories 1 & 2, the NPSC tables were extended to cover the entire food supply up to maximum sodium of 8106 mg/100 g. As with HSR Category 3, the original table maintained a linear relationship between content and penalty, with 90 mg/100 g increments up to 900 mg/100 g. Beyond this, the relationship is curvilinear with a maximum of 30 points for >8105 mg/100 g. Sodium increments for each

¹ National Health and Medical Research Council, 2013, Australian Dietary Guidelines, p. 73, available at <https://www.nhmrc.gov.au/guidelines-publications/n55>

² National Health and Medical Research Council, 2013, Australian Dietary Guidelines, p. 67

³ Food Standards Australia New Zealand, 2017, Australia New Zealand Food Standards Code - Schedule 5 – Nutrient Profiling Scoring Method, available at <https://www.legislation.gov.au/Series/F2015L00475>

baseline point increase up to 844 mg/100 g for the final content threshold. That is, for HSR Categories 1 & 2 the accumulation of “negative” points slows for higher content levels (Figure 2).

- Risk associated (‘negative’) components such as sodium (and energy, saturated fat and total sugars) carry more weight in the HSR system than the beneficial (‘positive’) components. Hence sodium should have a greater impact on the final star rating than offsetting components. Figure 3 demonstrates the effect of a one standard deviation (SD) change to all HSR components. A one SD increase in sodium would lower the HSR by an amount equivalent to approximately one third of a Star Point.
- Similar to saturated fat, sodium baseline points continue up to 30 points in HSR Categories 1 and 2 while they only go up to 22 points for sugar. However the incremental increases in saturated fat and sugar required for baseline points is 1 g for saturated fat and 5 g for sugar which is more feasible to achieve with reformulation than the >100 mg increases required for sodium.

Table 1: Sodium points tables, NPSC and current HSR algorithm

Points	Categories 1 & 2, NPSC	Categories 1 & 2, HSR	Category 3, NPSC & HSR
	Sodium content (mg/100 g)		
0	≤90	≤90	≤90
1	>90	>90	>90
2	>180	>180	>180
3	>270	>270	>270
4	>360	>360	>360
5	>450	>450	>450
6	>540	>540	>540
7	>630	>630	>630
8	>720	>720	>720
9	>810	>810	>810
10	>900	>900	>900
11		>1005	>990
12		>1121	>1080
13		>1251	>1170
14		>1397	>1260
15		>1559	>1350
16		>1740	>1440
17		>1942	>1530
18		>2168	>1620
19		>2420	>1710
20		>2701	>1800
21		>3015	>1890
22		>3365	>1980
23		>3756	>2070
24		>4192	>2160
25		>4679	>2250
26		>5223	>2340
27		>5829	>2430
28		>6506	>2520
29		>7262	>2610
30		>8106	>2700

Note:

Sodium point tables for the NPSC and HSR are the same for the first 10 baseline points. At sodium levels >900 mg, points continue up to a maximum 30 points. Sodium levels per baseline points for HSR Categories 1 and 2 are large and increase up to 30 baseline points.

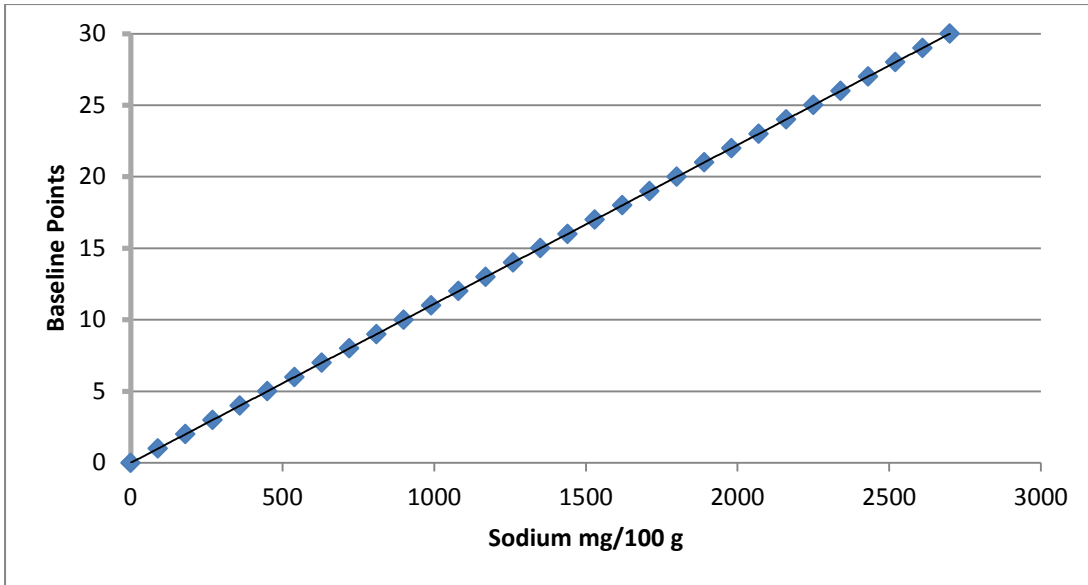


Figure 1: Sodium points, HSR Category 3

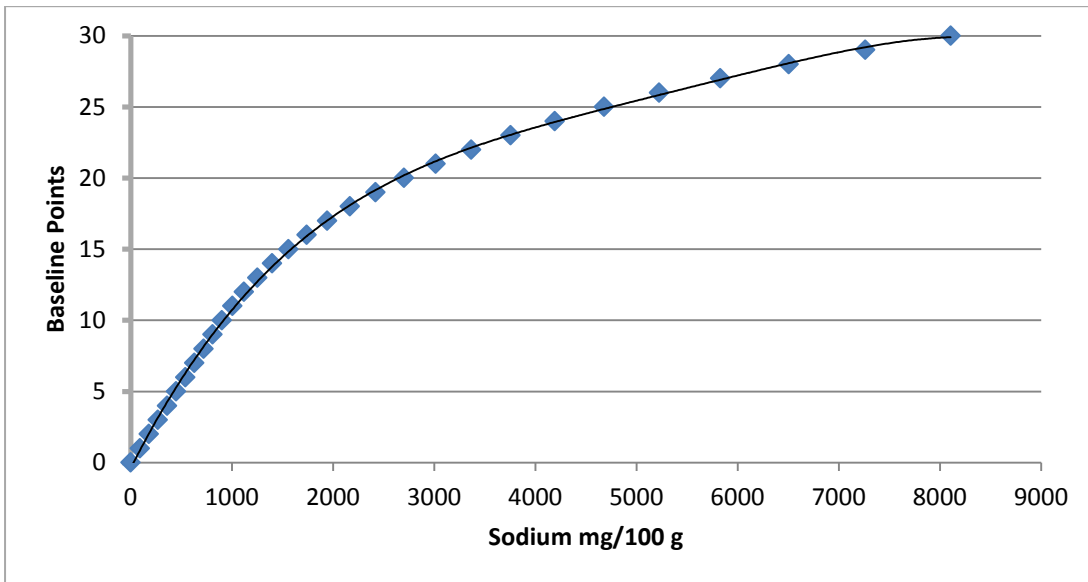


Figure 2: Sodium points, HSR Categories 1 & 2

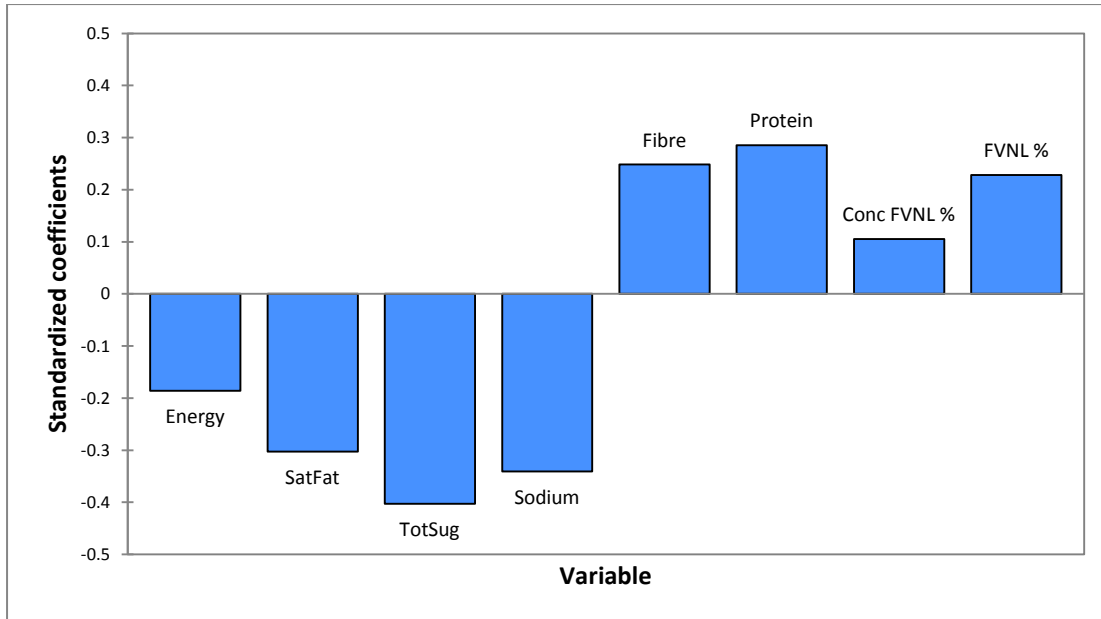


Figure 3: Nutrient sensitivities across the HSR system

Indicative HSRs for product groups in the TAG database with high sodium content (i.e. cereals, hard cheeses, discretionary products, protein (meat and alternatives) and vegetables – fruit, soft cheeses, dairy and non-dairy beverages and fats and oils excluded), displayed according to total sodium content, are provided in Figures 4 and 5. In Figure 4 the y-axis has been truncated at 7000 mg/100 g as no products in the TAG database with sodium content ≥ 7000 mg/100 g receive a HSR greater than 0.5. These data indicate that:

- Most foods have a sodium content of < 2000 mg/100 g. Foods with higher sodium content tend to be discretionary foods.
- Sodium is a strong determinant of HSR in the following HSR categories: vegetable, protein and discretionary. Sodium is not a strong determinant of the HSR for hard cheese or cereals.
- All products with sodium content ≥ 600 mg/100 g that receive a HSR of 5 are FFG dairy (hard cheese) products (HSR Category 3).

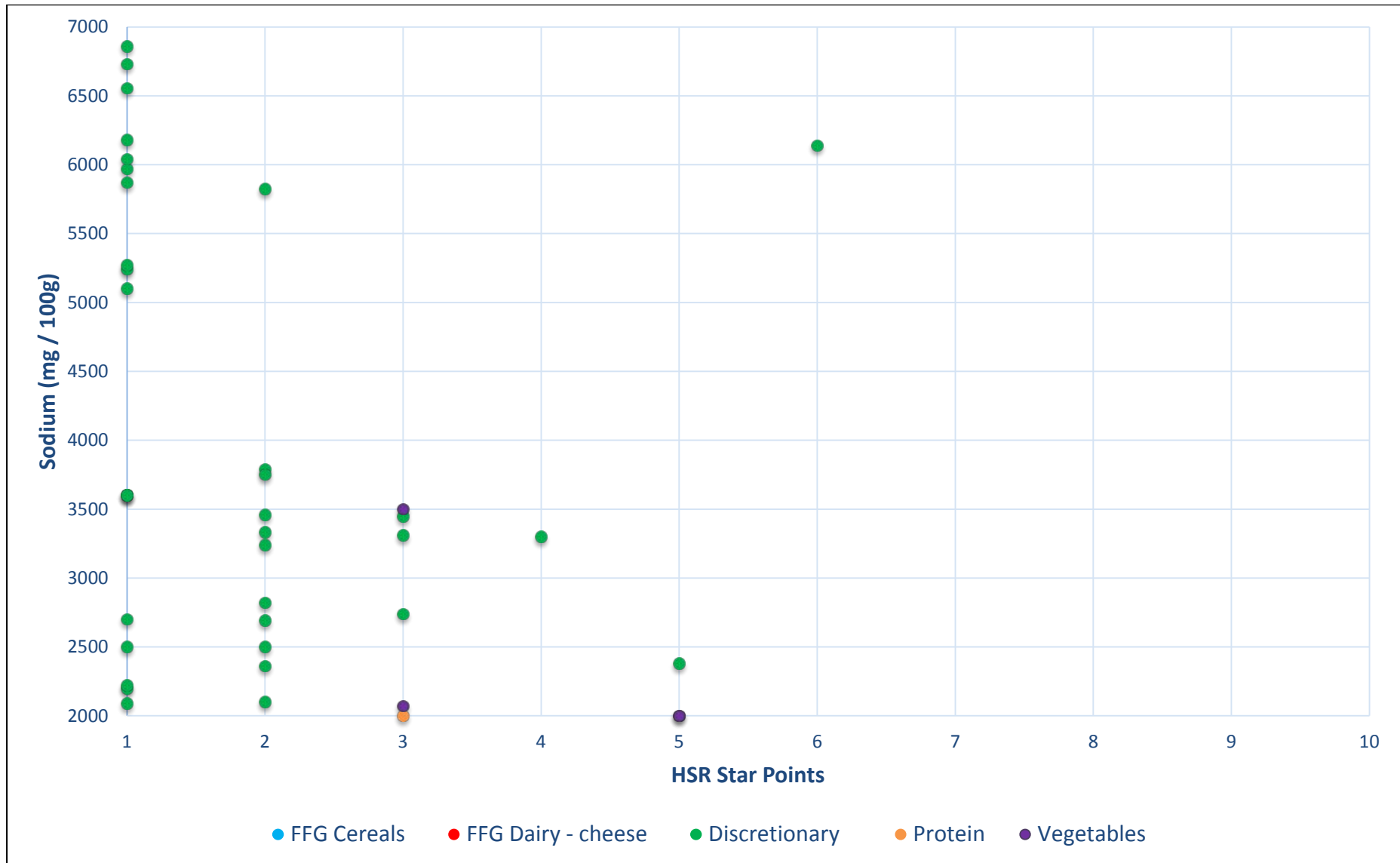


Figure 4: Products with sodium content between 2000 and 7000 mg/100 g, displayed by Star Points in the TAG database

Foods that contain more than 2000 mg sodium are mainly discretionary foods and some vegetables (e.g. potato products or other salted vegetables). Note that the raw outputs of the HSR algorithm are called 'Star Points' and correspond 2:1 to HSRs.

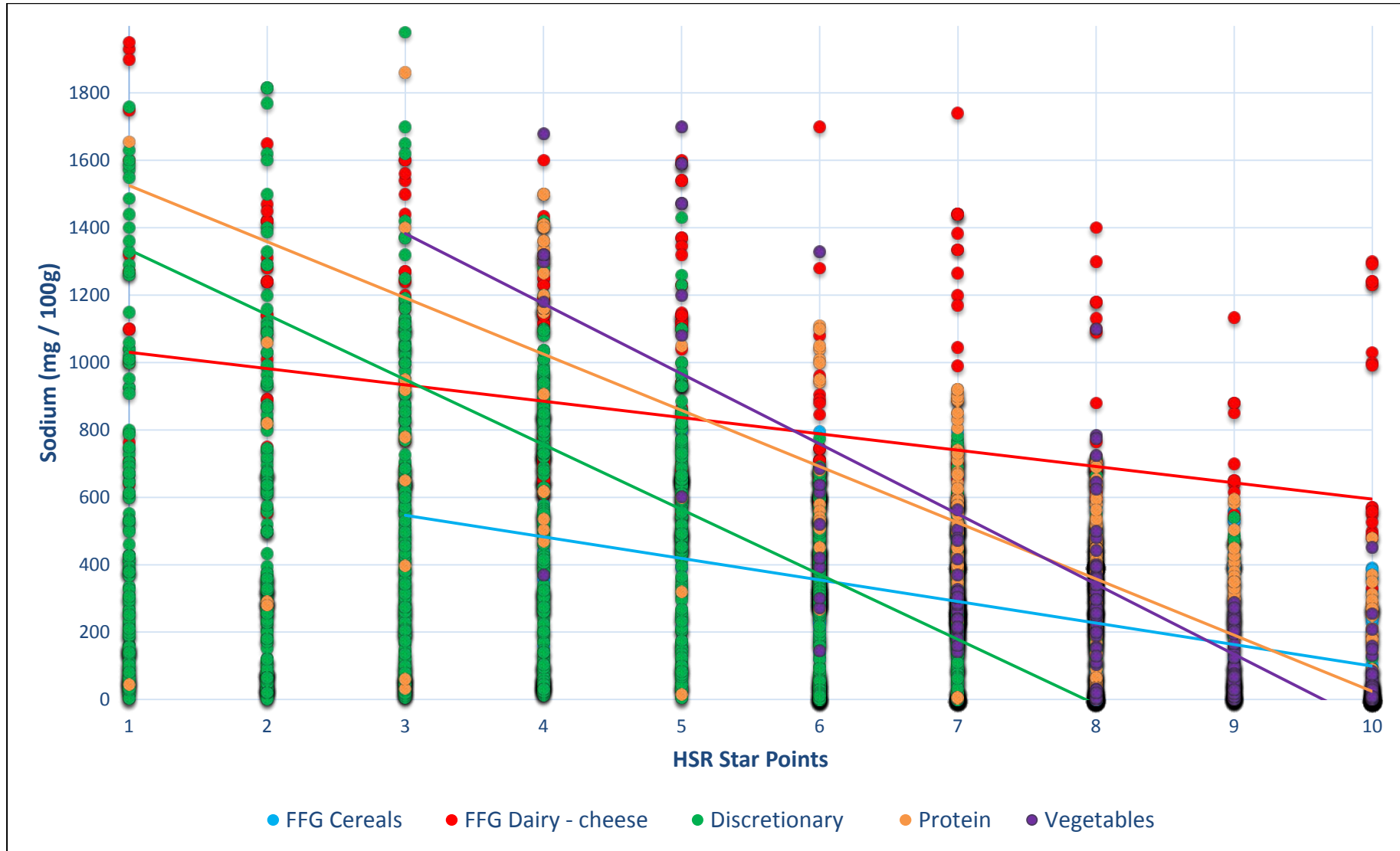


Figure 5: Product groups with sodium content between 0 mg/100 g and 1999 mg/100 g, displayed by Star Points in the TAG database

The majority of foods and particularly FFG foods have sodium contents between 0 and 2000 mg/100 g. Note that the raw outputs of the HSR algorithm are called 'Star Points' and correspond 2:1 to HSRs.

Current sodium intake

The most recent consumption data for Australians comes from the 2011-12 Australian Health Survey (AHS). It includes sodium naturally present in foods and added during processing, but excludes salt added by consumers in home prepared foods or 'at the table' due to the inability to obtain accurate measures for this type of use. Actual sodium intake is likely to be underestimated as the AHS found two in three (64%) of Australians added salt 'very often' or 'occasionally' either during meal preparation or at the table.⁴

Adults:

- From one-day intake data, the average sodium intake for adults in all age groups (19 years and above) was 2,404 mg (equivalent to around one teaspoon of table salt) which exceeds the 2006 Suggested Dietary Target (SDT) of 1,600 mg/day. All groups, except females aged 51 years and over, also exceeded the 2017 SDT of 2000 mg/day.
- Average sodium intakes declined in adults as age increased, and was highest amongst the 19-30 year old age group, with an average intake of 2,720 mg/day.
- Nearly two thirds of people aged two years and over had a usual intake that exceeded the 2006 UL value for sodium (76% of males and 42% of females).
- Intakes of sodium were consistently higher for males than females. Males were more likely to exceed the UL than females, and this difference was more pronounced for every group aged over nine years.

Children:

- Children were more likely than adults to exceed the relevant UL for sodium.
- The percentage of children exceeding the relevant UL for all age groups differed by age group and sex but was generally very high: 99.2% of males and 95.3% of females aged 2-3 years, 99.1% of males and 95.5% of females aged 4-8 years, 83.2% of males and 68.7% of females aged 9-13 years, and 86.4% of males and 50.6% of females aged 14-18 years.

⁴ABS, 2014, Australian Health Survey: Nutrition First Results - Food and Nutrients, 2011-12, available at: <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4364.0.55.007Main+Features7152011-12>

Sources of sodium in the diet

Table 2: Major sources of sodium in the Australian diet (ages 2 years and up)⁵

Product	Proportion of sodium intake from food group (%)	Classification ⁶	Impacted by this paper
Cereal based products and dishes	24.8	FFG and discretionary	To some extent. Many of these are unpackaged products purchased outside the supermarket e.g. in a fast food outlet
<i>Cakes, muffins, scones</i>	2.8	Mostly discretionary (plain scones FFG)	
<i>Mixed dishes where cereal is the major ingredient e.g. pizza, burgers, sandwiches, noodle and rice dishes</i>	14.6	Discretionary/ FFG	
Meat and poultry dishes	18.3	Mostly FFG	No
<i>Processed meat e.g. salami, ham</i>	6.0	Discretionary	Yes
Cereal products	18.2	Mostly FFG	Yes
<i>Regular breads, and bread rolls (plain/unfilled/untopped varieties)</i>	12.7	FFG	Yes
Milk products (cheese, milk, yoghurt, cream)	8.0	Mostly FFG	No. HSR Category 3 foods are not included in this analysis
Sauces, dips and condiments	5.9	Mostly discretionary	Yes
<i>Gravies and savoury sauces</i>	4.0	Discretionary	Yes
Vegetable and legume products and dishes	5.1	Mostly FFG	No
Soups	4.5	Mostly FFG	Yes
<i>Homemade soup</i>	3.0	FFG	Yes
Fish and seafood products and dishes	3.4	Mostly FFG	Yes
Snack foods (potato, corn and extruded snacks)	1.9	Mostly discretionary (popcorn FFG)	Yes
Other	9.9		

⁵ Australian Bureau of Statistics, 2014, Australian Health Survey: Nutrition First Results - Food and Nutrients, 2011-12

⁶ Australian Bureau of Statistics, 2014, Australian Health Survey: Users' Guide, 2011-13, available at: <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4363.0.55.001Chapter65062011-13>

The 2008/09 New Zealand Adult Nutrition Survey, for which data were “insufficiently reliable or incomplete”,⁷ and 2002 National Children’s Nutrition Survey do not include a breakdown for sodium consumption in the population. Analyses from previous New Zealand based surveys⁸ suggest that bread made the greatest contribution to sodium intake from processed foods (at approximately 35-43%). Processed meats, sauces, breakfast cereals and baked products are also likely to be important sources of dietary sodium. Other foods that are likely to contribute significantly to dietary sodium intake include takeaways, dairy products, cereals and pasta, biscuits and cake and meat and meat products.

Issues raised in five year review

Stakeholders are concerned that products high in sodium, including those with an otherwise healthy nutritional profile, are receiving a “high” HSR. The concern is that people may find the HSR system misleading when used as a guide to choose a diet that meets the Australian and New Zealand dietary recommendations to limit intake of foods with added salt and/or select lower sodium options.

A full overview of the issues raised for this category by respondents to the five year review is provided in Appendix 1. They are summarised as follows:

- 1. The current weighting and/or cut-offs for baseline points for sodium in the HSR algorithm are not sensitive enough to effectively differentiate between products that have significantly different sodium levels.**
 - As a result, foods with added salt may receive a higher than expected HSR, that can be similar to their unsalted equivalent.
 - A common example cited was unsalted and salted peanuts which have a similar rating. Roasted, salted nuts (e.g. peanuts get 4.5 stars) receive a HSR 0.5 lower than raw, unsalted nuts (e.g. natural almonds get 5 stars). A difference of 0.5 stars does not adequately differentiate a salted product from an unsalted product.
 - Respondents also noted that certain highly processed cereals/snacks with high added sodium content have the same HSR (5 Stars) as plain oats
- 2. Products high in sodium, with an otherwise healthy or healthier nutritional profile, still receive a higher than expected HSR**
 - Respondents did not necessarily agree with the underlying premise that the HSR calculator represents the balance of negative and positive components i.e. that negative nutrients can be off-set by the positive components of a product.
 - A common example provided was mixed foods where the rating is determined by the combination of multiple negative and positive nutrients. A high sodium food may receive a higher than expected HSR because it is otherwise low in saturated fat and sugar and high in FVNL, protein and fibre content (e.g. salted chips and ready to eat meals). Another example is products where the HSR is determined ‘as prepared’, e.g. recipe mixes and pastes have a high sodium content ‘as sold’ but when fresh ingredients such as meat and vegetables are added, the ‘as prepared’ HSR is significantly lower. This ‘as prepared’ issue has been considered separately by the HSRAC and the Ministerial Forum on Food Regulation and an approach agreed. This approach to only permit the HSR of products to be rated ‘as sold’ unless water is added, will largely address this concern.

⁷ Ministry of Health, 2011, 2008/09 New Zealand Adult Nutrition Survey, p. 11, available at: <https://www.health.govt.nz/publication/focus-nutrition-key-findings-2008-09-nz-adult-nutrition-survey>

⁸ National Health and Medical Research Council, Ministry of Health, 2017, Nutrient Reference Values For Australia And New Zealand, p. 211, available at https://www.nhmrc.gov.au/_files_nhmrc/file/your_health/healthy/nutrition/17599_nhmrc_nrv_update-dietary_intakes_0.pdf

A number of other high sodium products achieving a HSR of 3.0 or above were identified in the TAG paper looking at the alignment of the HSR with dietary guidelines. These products included salty snacks and processed meat.

Respondents to the review provided recommendations to put a cap on negative components such as sodium which would result in a maximum HSR being awarded to products high in sodium, regardless of the content of other negative and positive components.

3. The lack of differentiation in HSR for salted and unsalted products may be a disincentive for manufacturers to reformulate because large and possibly unrealistic reductions in sodium are required before an increase in the HSR is achieved.

- Significant sodium reductions do not necessarily result in higher ratings. The large differences in sodium between the cut-offs for baseline points were seen as the reason for this. In HSR Categories 1 and 2, these differences increase with each baseline point from 90 mg/100 g per point to 844 mg/100 g per point. These levels represent significant changes to the sodium content of a product.
- An example cited was that carrot soup with coriander, of reasonable nutritional quality except for the presence of a moderate amount of sodium at 360 mg per 100 mL, rates 3.5 stars. If the sodium content was reduced to 100 mg per 100 mL, which would be considered a low sodium food, it would still only receive 3.5 stars despite containing no other negative component levels and despite the relatively large reduction in sodium.

An issue raised was considered to be out of scope:

Addressing 'boundary' issues where two products with marginally different sodium levels could receive different HSRs because of the way in which the calculator works – this is the case for all HSR algorithm components as scales can never be truly continuous in practice, i.e. cut-offs/thresholds need to be set.

Alignment with system objectives and priorities

NPSC alignment

As previously noted, the HSR algorithm is derived from the NPSC. However, the purpose of the HSR system is different from that of the NPSC: the NPSC is concerned with eligibility to apply health claims while the HSR aims to provide a comparison of all products in the food supply along a continuum. The baseline points table of the NPSC dealt with lower levels of nutrient content only.⁹ Sodium point tables for the NPSC and HSR are the same for the first 10 baseline points (up to 900 mg/100 g) but diverge after this (see Table 1).

Intake recommendations

Australia and New Zealand Nutrient Reference Values¹⁰ (NRVs) are a set of recommendations for nutritional intake based on currently available scientific knowledge. The SDT is the daily average intake of a nutrient that may help in the prevention of chronic disease. The upper level of intake (UL) is the highest average intake likely to pose no risk in the general population.

Sodium NRVs for adults (updated on 13 July 2017):

- SDT – 2,000 mg/day (previously 1,600 mg/day)
- UL removed (previously 2,300 mg/day) as increased sodium intake was associated with increased blood pressure at all measured levels of intake.

Sodium NRVs for children (2006; these were not reviewed in 2017):

- SDT – none
- UL:
 - 2,300 mg/day for 14-18 years
 - 2,000 mg/day for 9-13 years
 - 1,400 mg/day for 4-8 years
 - 1,000 mg/day for 1-3 years.

Dietary recommendations

The ADG and New Zealand Eating and Activity Guidelines (NZEAG) translate the nutrient-based NRV into food based recommendations. Those relevant to sodium are:

ADG: Guideline 3b:¹¹

- Limit intake of foods and drinks containing added salt.
 - Read labels to choose lower sodium options among similar foods.
 - Do not add salt to foods in cooking or at the table.

NZEAG: Eating Statement 2:¹²

- Choose and/or prepare foods and drinks... that are low in salt (sodium); if using salt, choose iodised salt

⁹ Food Standards Australia New Zealand, 2017, Australia New Zealand Food Standards Code - Schedule 5 – Nutrient Profiling Scoring Method, available at <https://www.legislation.gov.au/Series/F2015L00475>

¹⁰ National Health and Medical Research Council, Ministry of Health, 2017, Nutrient Reference Values For Australia And New Zealand

¹¹ National Health and Medical Research Council, 2013, Australian Dietary Guidelines, p. 144

¹² Ministry of Health. 2015, Eating and Activity Guidelines for New Zealand Adults, p. 6, available at: <https://www.health.govt.nz/>

Linkages with other work

TAG

The sodium issue links in with the following TAG topics:

- Protein, saturated fat, fibre, FVNL, sugar: if significant changes to the weighting of other components of the algorithm are made there may be unintended consequences for issues considered here.
- Salty snacks and hot potato products: these products are high in both saturated fat and sodium and are currently obtaining a relatively high HSR because of their FVNL content.
- The alignment of the HSR with the dietary guidelines paper which identified outliers that had high sodium levels and a HSR of 3.0 or above.

Healthy Food Partnership

The Healthy Food Partnership is a mechanism for government, the public health sector and the food industry to cooperatively tackle obesity, encourage healthy eating and empower food manufacturers to make positive changes. Five working groups were established, including the Reformulation Working Group (RWG) which was tasked with developing food reformulation targets.

The RWG has prioritised three nutrients to focus on reducing through the Healthy Food Partnership Reformulation Program; these are saturated fat, sodium, and sugars. The RWG has focused its efforts on identifying and defining food categories to target for reformulation, determining draft targets for the identified food categories and nutrients, and developing a document that provides the rationale for reformulation and the actions of the group.

Analysis of options 2a and 2b

It should be noted throughout that current, projected and hypothetical results/distributions may change once final system rescaling is undertaken.

Modelling

Options 2a and 2b were modelled for HSR Categories 1 and 2. HSR Category 3 was not included because these foods are either FFG foods and/or not significant sources of sodium in the diet.

Option 2a: 30 points are allocated from 0 points for ≤ 90 mg per 100 g to 30 points for >2700 mg per 100 g to category 1 and 2 products

Option 2b: 30 points are allocated from 0 points for ≤ 90 mg per 100 g to 30 points for >2000 mg per 100 g to category 1 and 2 products.

The rationale is that reducing the maximum level of sodium from its current 8106 mg/100 g to 2000 or 2700 mg/100 g will improve sodium sensitivity because products can incur baseline points faster.

- However it is important to note that in both options, allocation of baseline points used the NPSC sodium tables (see Table 1) up to 900 mg. Modelling therefore only looks at sodium values above 900 mg where a steeper sodium curve was applied up to 2000 or 2700 mg. In other words, the modelling will only impact those products with a sodium level above 900 mg/100 g.
- Key product categories were considered in the analysis. These included categories identified by respondents (lack of differentiation between salted and unsalted products), key sources of sodium in the diet (as per Table 2) and high sodium outliers identified in the TAG paper that looked at the alignment of the HSR with dietary guidelines (salty snacks, processed meat, gravy and recipe mixes).

The revised sodium points tables used in the modelling are provided below (Table 3). To ensure alignment with the NPSC, there is no change for sodium levels up to 900 mg/100 g. At levels higher than 900 mg/100 g, the reductions in sodium required for each baseline points (column 2) are much lower (<100 mg/100 g reductions) than the original sodium tables (column 1).

Table 3: Revised sodium points for maxima of 2000 mg or 2700 mg

Original HSR sodium table for HSR Categories 1 and 2	Revised sodium tables using a maximum 2000 mg (same as NPSC up to 900 mg)	Revised sodium tables using a maximum 2700 mg (same as NPSC up to 900 mg)	Profiler points
0	0	0	0
90.01	90.01	90.01	1
180.01	180.01	180.01	2
270.01	270.01	270.01	3
360.01	360.01	360.01	4
450.01	450.01	450.01	5
540.01	540.01	540.01	6
630.01	630.01	630.01	7
720.01	720.01	720.01	8
810.01	810.01	810.01	9
900.01	900.01	900.01	10
1005.01	955.01	990.01	11
1121.01	1010.01	1080.01	12
1251.01	1065.01	1170.01	13
1397.01	1120.01	1260.01	14
1559.01	1175.01	1350.01	15
1740.01	1230.01	1440.01	16
1942.01	1285.01	1530.01	17
2168.01	1340.01	1620.01	18
2420.01	1395.01	1710.01	19
2701.01	1450.01	1800.01	20
3015.01	1505.01	1890.01	21
3365.01	1560.01	1980.01	22
3756.01	1615.01	2070.01	23
4192.01	1670.01	2160.01	24
4679.01	1725.01	2250.01	25
5223.01	1780.01	2340.01	26
5829.01	1835.01	2430.01	27
6506.01	1890.01	2520.01	28
7262.01	1945.01	2610.01	29
8106.01	2000.01	2700.01	30

TAG Database

The initial database used in the development of the HSR system was expanded with data provided by the food industry in 2017. This revised TAG database includes product nutrient data for 5,885 food products across 42 food categories based on the Australian Guide to Health Eating (AGHE) food groups (e.g. fats and oils, core cereals, dairy, fruits and vegetables etc.). The vast majority of products are in HSR Categories 1 and 2. Data cover the range of HSR nutrients found in Australian and New Zealand foods, including fruit, vegetable, nut and legume (FVNL) and fibre content data for all foods where applicable. The data are not independently verified. All HSR parameters (profiler and scaling parameters) are as per the current version of the algorithm obtainable from the HSR website,¹³ or otherwise as defined in the current Guide for Industry to the HSR Calculator.¹⁴

Results

Of the HSR Category 1 and 2 products in the TAG database, 389 (8%) had a sodium level above 900 mg sodium per 100 g, and are therefore potentially impacted by the options proposed. Of these 389 products:

- 122 products are cheese and so are excluded from consideration in this paper
- An additional 37 products receive the minimum number of stars (0.5) apart from two outliers that appear to have a miscalculated HSR
- This leaves 230 products in the TAG database that are possibly impacted by these proposed changes.

The results for each of the key product categories from these 230 products are outlined in Table 4.

¹³ <http://www.healthstarrating.gov.au>

¹⁴ HSR Advisory Committee, 2018, Guide for Industry to the HSR Calculator, v. 6, available at: <http://www.healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/guide-for-industry-document>

Table 4: Impact of different sodium maximum levels on the HSR of key product categories

Category	% contribution to sodium intake in Australian diet (2 years and over)	Mean sodium content mg/100 g (range)	Mean Sodium content as % SDT (2,000 mg sodium/d)	Mean original HSR	Product with lowest sodium mg/100 g	Product with highest sodium mg/100 g	Products impacted by 2700 mg sodium cut-off				Products impacted by 2000 mg sodium cut-off				Commentary
							No. products impacted	Mean sodium content (mg/100 g) (range)	Mean original HSR	New mean HSR	No. products impacted	Mean sodium content (mg/100 g) (range)	Mean original HSR	New mean HSR	
Sauces, dips and condiments	5.9	878 (5-9600)	44	2.6	Savoury sauces, not tomato based, commercial 5mg, HSR=4	Dry savoury sauces and casserole bases and dry mixes 9600mg, HSR=0.5	20 (e.g. BBQ sauce)	2094 (1100 – 5822)	1.5 (1.0 – 2.5)	1.0 (0.5 – 2.0)	33	1837	1.5 (1-3)	1 (0.5-2.5)	
Cereal-based products and dishes e.g. scones, cakes, pizza, burgers	24.8	447 (5 – 2820)	22	2.2	Savoury biscuits, rice based (includes rice cakes) (5, HSR=3.5)	Savoury pasta/noodle and sauce dishes, saturated fat ≤5 g/100 g (2820, HSR=1)	6 (e.g. savoury biscuits)	1560 (1100 – 2820)	1.3 (1 - 1.5)	0.8 (0.5-1.0)	8	1177	(1.5 (1-2)	1 (0.5-1.5)	This category includes foods often purchased outside the supermarket so less relevant to the HSR
Meat and poultry dishes	18.3	551 (39 – 2700)	28	3.3	Chicken (39, HSR=4)	Dried meats e.g. jerky (2700, HSR=0.5)	19 (17 processed e.g. ham and bacon 2 chicken)	1529 (1000 – 3333)	2.0 (1.0 – 3.0)	1.3 (0.5 – 2.0)	27 (Ham-17, bacon 3, processed meat 5, smoked fish-1)	1352	2.12 (1.5-3)	1.46 (0.5-2)	Some impact as some products have >900mg
• <i>Processed meat</i>	6.0	1071 (342 – 2700)	54	2.5	<i>Canned meat e.g. chicken (342, HSR=3.5)</i>										
Cereal products	18.2	254 (0 – 798)	13	3.8	Rice and rice grain fractions (0, HSR=4)	Flat breads (e.g. Pita bread), wheat based (798, HSR=2.5)	0	-	-	-	0				No impact as all products contain < 900mg sodium
• <i>Regular bread</i>	12.7	422 (323 –	21	3.9	Porridge (3, HSR= 4)										

Category	% contribution to sodium intake in Australian diet (2 years and over)	Mean sodium content mg/100 g (range)	Mean Sodium content as % SDT (2,000 mg sodium/d)	Mean original HSR	Product with lowest sodium mg/100 g	Product with highest sodium mg/100 g	Products impacted by 2700 mg sodium cut-off				Products impacted by 2000 mg sodium cut-off				Commentary
							No. products impacted	Mean sodium content (mg/100 g) (range)	Mean original HSR	New mean HSR	No. products impacted	Mean sodium content (mg/100 g) (range)	Mean original HSR	New mean HSR	
		665)			Wholemeal bread (323, HSR=4.5)	White bread (665, HSR=3.5)									
Vegetable and legume products and dishes <i>Stalk vegetables e.g. stuffed olives</i>	5.1 0.1	156 (0 – 2000)	7.8	4.5	Sweetcorn (0, HSR=4)	Stalk vegetables (2000, HSR=2.5)	2 (e.g. olives)	1600 (1200 – 2000)	2.5	2.0	15 (mostly pickles and chutneys)	1703	2.5 (1.5-3)	1.5 (0.5-2.5)	Minimal impact because most products have sodium <900mg
Soups	4.5	287 (17 – 542)	14	3.3	Vegetable soup (17, HSR=3.5)	Vegetable soup (542, HSR=3)	0	-	-	-	0				No impact as all products have <900mg sodium
Fish and seafood products and dishes	3.4	389 (22 – 7895)	19	3.9	Fresh fish (frozen) (22, HSR=4.5)	Tinned fish (7895, HSR=0.5)	0	-	-	-	1 Smoked fish				No impact as all products have <900mg sodium
Snack foods (potato, corn and extruded snacks) <i>Salty snacks (crisps, corn chips and extruded snacks)</i>	1.9 1.4% from salty snacks	612 (1 – 1980) 541 (11 – 1010)	31 27	2.0 2.2	Popcorn (1, HSR=5) <i>Corn chips (11, HSR=2.5)</i>	Other snacks (1980, HSR=1.5) Potato crisps (970, HSR=2.5) <i>Potato crisps (1010, HSR=2.5)</i>	1 (pretzels)	1980	1.5	1.0	5	1468 (other snacks)	1.5 (1-2.5)	1 (0.5-2)	Some impact as some products have >900mg sodium

Category	% contribution to sodium intake in Australian diet (2 years and over)	Mean sodium content mg/100 g (range)	Mean Sodium content as % SDT (2,000 mg sodium/d)	Mean original HSR	Product with lowest sodium mg/100 g	Product with highest sodium mg/100 g	Products impacted by 2700 mg sodium cut-off				Products impacted by 2000 mg sodium cut-off				Commentary
							No. products impacted	Mean sodium content (mg/100 g) (range)	Mean original HSR	New mean HSR	No. products impacted	Mean sodium content (mg/100 g) (range)	Mean original HSR	New mean HSR	
Other <i>Herbs, spices, seasonings and stock cubes</i>	9.9 0.2	4276 (5 – 39259)	214	2.8	<i>Herbs(dried) and spices (5, HSR=5)</i>	<i>Salt (39259, HSR=1)</i>	10 (e.g. stock cubes)	3324 (1430 – 6140)	1.8 (1.0 – 3.0)	1.0 (0.5 - 2.5)	31	1628	1 (1-3)	0.5 (0.5-2.5)	Seasoning impacted due to high sodium of many of these products
<i>Nut and nut products</i>	0.4	211 (1 – 906)	11	3.9	<i>Unsalted peanuts</i>	<i>Salted nuts</i>	0	-	-	-	0				No impact on nuts as sodium <900mg

Option 2 – Change sodium table for HSR Categories 1 and 2

Option 2a – 2700 mg/100 g maximum (see Table 3)

Only a small number of foods are impacted by this change

Overall, there is no change in HSR for the majority of products with only 58 products in the TAG database impacted by this change. Table 5 shows the type of products impacted by the change and significance of the change. The HSR impact on these products is a 0.5 to 1.0 decrease.

Table 5: Impact of Option 2a (2700 mg sodium) on key product categories

Type of food	Sodium range mg/100 g	Original HSR	2700 mg HSR	Change
Protein foods Ham, Bacon, Processed deli meats, chicken	1000– 2000	1.5-3	1-2	0.5-1 star rating less
Vegetables – processed (15) Pickles, chutneys, tomato products, stalk vegetables	1200-3500	1.5-2.5	0.5-2	0.5 -1 star rating less
Yeast spreads	2380-3450	1.5-2.5	0.5-1.5	0.5-1 star rating less
Discretionary foods – meals and meal bases	1100-5822	1-2.5	0.5-2	0.5 star drop
Discretionary foods - biscuit (3)	1100-1620	1-1.5	0.5-1	0.5 star drop in rating
Discretionary foods – sauces and condiments(19)	1100-6140	1-3	0.5-2.5	0.5-1 star drop in rating
Discretionary foods snacks (2)	1770-1980	1-1.5	0.5-1.0	0.5 star drop in rating

Products impacted are Discretionary foods scoring a HSR of 3.0 or less

Products impacted by this change include discretionary foods such as biscuits, meal bases, sauces and condiments, snacks and yeast snack (vegemite/ marmite). Vegetables impacted include olives, and preserved vegetables such as grilled peppers, artichokes and capers. Processed meats are also impacted and include ham, bacon, sliced roast beef and flavoured chicken wings. A list of products affected, from the TAG database, is at Appendix 2.

Option 2b – 2000 mg/100 g maximum (see Table 3)

A larger number of products are impacted

This option proposes applying the maximum number of points (30) to sodium levels of 2000 mg /100 g and above for category 1 and 2 foods. Similar to option 2a the change in scaling occurs above 900 mg sodium per 100 g, therefore products such as milk and other FFG foods are not likely to be impacted. Table 6 shows the type of products impacted by the change and significance of the change.

Option 2b captures a larger number (106 versus 58) of products from the same food categories as option 2a that have a HSR of 3.0 or less. The impact of the rescaling is similar for both options being a drop of between 0.5-1.5 stars. Foods impacted by this change are listed in Appendix 3.

Table 6: Impact of Option 2b on key product categories

Type of food	Sodium range mg/100 g	Original HSR	2000mg HSR	Change
Protein foods (27) Ham, Bacon, Processed deli meats, chicken	1000– 2000	1.5-3	1-2	0.5-1 star rating less
Vegetables – processed Pickles, chutneys, Tomato product, stalk product (15)	1200-3500	1.5-3	0.5-2.5	0.5 -1 .5 star rating less
Yeast spreads (4)	2380-3450	1.5-2.5	0.5-1	0.5-1.5 star rating less
Discretionary foods – meals and meal bases (9)	1100-5822	1-2.5	0.5-2	0.5 star drop
Discretionary foods - biscuit (8)	958-1620	1-2	0.5-1.5	0.5 star drop in rating
Discretionary food dressings (7)	1095-1700	1-2	0.5-1.5	0.5-1 star drop in rating
Discretionary foods sauces and condiments (31)	1080 - 6140	1-3	0.5-2.5	0.5 – 1 star drop in rating
Discretionary foods – snacks (5)	970-1980	1-2.5	0.5-2	0.5-1 star drop in rating

Options 2a and 2b will not address processed meats with a HSR of ≥ 3.0 stars

The TAG paper looking at alignment of the HSR with the dietary guidelines identified a number of high sodium outliers that rate 3.0 stars or above. One of these is not being addressed by any other TAG papers: processed meats. The TAG database shows that most processed meats scoring 3.0 stars and above contain sodium levels <900 mg sodium per 100 g and are therefore not impacted by Options 2a or 2b.

Of the 10 products in the TAG database that received ratings of 3.0 stars and above and contained sodium levels above 900 mg (processed meats, hams, chicken, tomato products and stock cubes), 4 changed star rating using option 2a, and 7 changed their star ratings using Option 2b. This suggests that option 2b is more sensitive to sodium than Option 2a.

Options 2a or 2b will not address foods raised by respondents

The food examples provided in stakeholder responses are not impacted by any of the options as their sodium levels are below 900 mg/100 g (e.g. salted nuts, reformulated vegetable soup, and highly processed, high sodium cereal versus plain oats). This is highlighted in Appendix 4.

Option 3 - Restrict products with high sodium content to a maximum HSR (“capping”)

This option restricts products with certain sodium contents to a maximum HSR (not a compulsory HSR), effectively removing products from the algorithm at a pre-determined content threshold. This would require the development of sodium content thresholds and determination of the maximum HSRs applicable. The algorithm would consider all nutrients and components, as is current practice. However, should a product with sodium content exceeding the relevant threshold receive a HSR higher than the pre-determined maximum, the HSR would be scaled back to that upper limit regardless of the balance of other nutrients/components.

This option has not been modelled by TAG, though it is relatively simple to conceptualise.

Discussion

Options 2a and 2b have a strong rationale. The original maximum sodium level of 8106 mg/100 g for HSR Categories 1 and 2 is not reflective of the frequency of sodium levels in products in the food supply. A lower level would more appropriately reflect the range and frequency of sodium values in the food supply with the added benefit of reducing the sodium cut-offs between baseline points, thereby encouraging reformulation.

However one of the principles of the HSR system has been to remain consistent with the original NPSC nutrient tables. For this reason, modelling retained the original NPSC table up until 900 mg/100 g and only then steepened the curve up to 2000 or 2700 mg/100 g. This means that only products with a sodium content of more than 900 mg/100 g were impacted by the modelling. This represented only 389 products or around 8% of HSR Category 1 and 2 products in the TAG database. The food examples provided in stakeholder responses are not impacted by any of the options as their sodium levels are below 900 mg/100 g (this is highlighted in Appendix 4).

Options 2a and 2b will likely incentivise reformulation to reduce sodium content for products containing > 900 mg/100 g sodium as the reduction required to improve ratings is smaller. An opportunity to reformulate in order to maintain current HSRs is also provided. However, products with sodium content considerably above the new maximum may not be encouraged to reduce sodium levels, though this may not prove a practical difference given the current disincentives to reformulate.

Option 3 proposes to restrict products with high sodium content to a maximum HSR, which would require the development of content thresholds and determination of maximum HSRs. This option has the potential to address the negative perception that products with “high” sodium content are receiving “high” HSRs. However, it also deviates from the intention of the algorithm to provide a summary of the balance of nutrient content. For products that would receive a HSR close to the maximum, reformulation may be encouraged, though there would necessarily need to be a significant reduction in sodium content. For products that would currently receive a much higher HSR, there may be limited incentive to reduce sodium content. Note that this option may be implemented across all (or some) components of the HSR algorithm, with cross-effects on both capacity to reformulate and differentiation between “healthier” and “less healthy” products.

Table 7: Summary of options to address issues identified for sodium

Option number	Option	Benefits	Disadvantages
1	Status quo	<ul style="list-style-type: none"> No disruption for industry to change labels 	<ul style="list-style-type: none"> Would not address stakeholder concerns regarding weighting of sodium by HSR Does not provide incentive for industry to reformulate.
2a	Apply the Category 3 sodium table to categories 1 & 2 (2700 mg/100 g)	<ul style="list-style-type: none"> An upper limit of 2700 mg better reflects the frequency of sodium values in products in the food supply. Aligns with dietary guidance recommending limiting intake of sodium by more heavily punishing products with high sodium content Reduces the HSR of a small number of products with sodium levels above 900 mg (n=58). May encourage some reformulation to reduce added salt content for moderate salt level foods May address stakeholder concerns of weighting of salt in the HSR. 	<ul style="list-style-type: none"> Does not reduce the HSR of the vast majority of products that have sodium levels < 900 mg/100 g Will require changes to current HSRs displayed for some products (n=58) Does not impact the HSR of discretionary foods such as processed meat and salty snacks that are scoring 3.0 stars or above (based on TAG database information). May also prove a disincentive for reformulation for very high sodium products
2b	Modify the sodium table for Category 1 and 2 foods to a maximum sodium level of 2000 mg/100 g	<ul style="list-style-type: none"> An upper limit of 2000 mg better reflects the frequency of sodium values in products in the food supply and aligns with dietary guidance recommending limiting intake of sodium by more heavily punishing products with high sodium content Reduces the HSR of a slightly larger number of products with sodium levels above 900 mg than 2a (n= 106). May encourage some reformulation to reduce added salt content for moderate salt level foods 	<ul style="list-style-type: none"> Does not reduce the HSR of the vast majority of products that have sodium levels <900 mg/100 g Will require changes to current HSRs displayed for some products (n=106) Does not impact the HSR of discretionary foods such as processed meat and salty snacks that are scoring 3.0 stars or above (based on TAG database information). May also prove a disincentive for reformulation for very high sodium products

Option number	Option	Benefits	Disadvantages
		<ul style="list-style-type: none"> • May address stakeholder concerns of weighting of salt in the HSR. 	
3	Restrict products with high sodium content to a maximum HSR ("capping")	<ul style="list-style-type: none"> • May align with dietary guidance recommending limiting intake of sodium • Clearly disadvantages products with high sodium content • May encourage reformulation to reduce sodium content • May resolve and be seen to address stakeholder concerns regarding sodium. 	<ul style="list-style-type: none"> • May prove a disincentive for reformulation for very high sodium products • Deviates from the intention of the algorithm to provide a summary of the balance of nutrient content, displayed as a continuum • Requires determination on maximum HSR available and sodium content threshold May require changes to current HSRs displayed for some products.

Limitations of the analysis

The TAG database may not be large enough to undertake a representative analysis, particularly for some food categories.

- The TAG database contains 5885 foods with sodium levels between 0 and 39,259 mg sodium per 100 g, only 389 of which are products with a sodium level above 900 mg sodium per 100 g, and are therefore potentially impacted by the options proposed. Of these 389 products, 122 are cheese and so are excluded from consideration in this paper. An additional 37 products receive the minimum number of stars (1/2 star) apart from two outliers that appear to have a miscalculated HSR. This leaves 230 products in the TAG database that are possibly impacted by these proposed changes.
- Other TAG papers have identified the low representation of some product categories in the TAG database. For this paper, the number of products in the salty snacks and processed meat categories represent less than 12% of products in their categories.

Conclusions

This paper provides an outline and analysis of various technical options to address concerns raised regarding the treatment of sodium in the HSR system. They are summarised below:

- All options only impact foods with a sodium level above 900 mg sodium per 100 g.
- All options will reduce the sodium level whereby reformulation will have an impact on HSRs.
- According to the TAG database, foods impacted by Options 2a and 2b have HSRs of 3 or below. The scope of change in HSR is to reduce the star rating by 0.5 – 1.5 stars.
- Options 2a and 2b may provide an incentive to industry to reformulate their product if the product contains a sodium level near or below the cut point determined (2000 mg or 2700 mg/100 g). Products with a substantially higher sodium level will have no incentive to reformulate.
- Option 3 deviates from the intention of the algorithm to provide a summary of the balance of the nutrient content.
- No options address issues relating to specific foods used as examples in stakeholder feedback, such as salted and unsalted nuts. Nor do they address the issue of healthier versions of salty discretionary foods such as salty snacks or processed meat scoring 3.0 stars or above. This is because these foods tended to have a sodium level below 900 mg/100 g and so are unaffected by the proposed options. To address this issue a new scale that is different to the NPSC would need to be considered.

APPENDIX 1: Feedback from submissions

Material presented in this Appendix represents the views of submitters and not necessarily those of TAG.

Concerns raised related to HSR algorithm that specifically relate to sodium:

- **Algorithm does not sufficiently penalise/weight salt** (and conversely, a higher weighting appears to be given to the negative component saturated fat, and the positive components protein and fibre). This leads to foods with added salt receiving higher than expected star ratings.
 - Most common example is unsalted and salted peanuts which have a similar rating. Roasted, salted nuts (roasted, salted peanuts get 4.5 stars) receive only 0.5 less stars than raw, unsalted nuts (natural almonds get 5 stars). A difference of 0.5 stars does not adequately differentiate a salted product from an unsalted product which is what is recommended in dietary guidelines.
 - Marginal difference in sodium between highly processed cereals/snacks with high added sodium content (4.5 – 5 stars), yet plain oats (5 stars) has significantly less sodium but receives the same rating.
 - Canned legumes with added sugar and sodium (e.g. chickpeas) receiving 5 stars does not differentiate from other canned legumes with no added sugar or sodium. Oven-ready potato products, containing 394mg of sodium per 100 g, also rate 4 stars.
- **Algorithm** takes into account three negative components: sugar, saturated fat and sodium. If a food is only high in one of these nutrients rather than a combination of all three it can receive a higher HSR.
- **Unclear impact on reformulation** because large changes in salt required before the HSR changes - a disincentive for some manufacturers to reformulate if no impact is shown on the end rating. Reformulation is only effective at increasing HSR if the points are below the cut-off value. Significant sodium reduction does not result in additional stars.
 - Carrot soup with coriander is a vegetable-based soup of reasonable nutritional quality, except for the presence of a moderate amount of sodium at 360 mg per 100mL. It rates 3.5 stars. If it reduced sodium to 100 mg per 100L, which would be considered a low sodium food, it would still only receive 3.5 stars despite containing no other risk nutrient levels. Similarly, Ardmona crushed and whole tomatoes with no added sugar, salt or fat, together with many other tinned vegetable products with minimal sugar or salt receive 4.5 stars at best. However many breakfast cereals with similar amounts of sodium, but higher in protein and fibre will rate 5 stars.
- Conversely, others suggested that the HSR should not take salt into account at all.

Concerns raised related to HSR algorithm but not unique to sodium

- 'Boundary' issues may manifest themselves as different HSRs between effectively similar products. For example, while large changes in sodium content seem to be required to result in a change in HSR, only a 1 mg (insignificant) difference in sodium may result in an increase or decrease of 0.5 HSR at the boundary level. Some guidance on the management rounding to ensure consistency would be helpful and the treatment of 'boundary' values would be beneficial (industry).
 - Wheat biscuits receive a 4.5 star rating (the same as high sugar breakfast cereals) and a highly processed cereal with high added sodium content receives a 5 star rating. Yet the differences between the two wheat biscuit products are minimal with the former having 5 mg more sodium (gaining 1 extra baseline point) and 0.4 g less of fibre (missing out on 1 modifying point). In order for this product to receive 5 stars they would need to reduce the sodium content by 5 mg and increase the fibre content by 0.1g. These changes are minimal and do not warrant the 0.5 star rating difference.
- Is it easier for cereals to rate more highly than vegetables? This may be improved by creating a separate processed vegetable foods category, for which the algorithm is adjusted so that it does not rely so heavily on protein.

- Compensatory approach of “scoring” food, allowing manufacturers to offset “bad” ingredients with “good”. Should manufacturers be able to compensate for having ‘bad’ ingredients by adding more ‘good’ ingredients?

Concerns raised re sodium that are unrelated to the HSR algorithm

- Concerns about ‘low’ and ‘high’ claims and HSR - ‘Low’ or ‘high’ can be used as an on pack claim/in the nutrient icons attached to the HSR when the nutrient is present at levels required in the Food Standards Code to make a low saturated fat/sugar/sodium nutrient or ‘good source’ or ‘excellent source’ fibre etc. nutrient content claim. This allows manufacturers to highlight when a product is low in risk nutrients or high in positive nutrients but there is no mechanism that requires manufacturers to explicitly highlight through normative labels when risk nutrients are present in high amounts. Other respondents called for strong salt labelling (in line with the recently updated WHO Global Action Plan on the Prevention and Control of Non-communicable diseases Appendix III (‘Best Buys for NCDs’).

Suggestions for improving the algorithm in relation to sodium

- Increase weighting of sodium (and sugar) in the algorithm (+/- concurrently reduce that of protein) - increase baseline points for sugar and salt so that they are treated in a similar way to saturated fat.
- Introduce caps on sodium (as well as sugar and saturated fat) (to stop companies from adding positive nutrients/ingredients without reducing negative to get a higher HSR)
 - products should have to be below a threshold for saturated-fat, sugar and sodium (all three) to receive a HSR of 3 or higher. This could be achieved by applying extra baseline points for products that are “high” in any risk-increasing nutrients or making the product ineligible for all of the HSR modifying points with the intent of restricting foods with high contents of any of these nutrients to have a HSR <3. This would mean that consumers and stakeholders can trust that a HSR >3.5 is meaningful and aligned with FFG foods only.
 - Caps could be introduced in a graduated manner, allowing plenty of time to signal to industry and have better buy-in or penalty assigned to negative content could be graduated. For example for every 5% of sugar increase (above 5% or 10%) a product would lose ½ a point.
- Amend the Guide for Industry to include: guidance on ‘boundary issues’ which can result in different HSRs between effectively similar products. For example, a 1 mg difference in sodium may result in an increase or decrease of 0.5 HSR.
- If the algorithm is modified, once the algorithm has been amended to penalise sugar and sodium to a greater extent, modelling is required to ensure it can appropriately rate predominantly single nutrient (sugar or salt-based) flavourings. The algorithm should also be set so that a ‘ceiling’ HSR exists so that a lower salt or lower sugar flavouring could still not achieve a ‘healthy’ star rating, as flavourings are still adding salt and sugar to consumers’ diets.

APPENDIX 2: List of products impacted by option 2a

Products affected by option 2a, TAG database, ranked by sodium content. Note that products which already have a HSR of 0.5 are not included as their HSR would not change.

FoPL Evaluation Categories (AGHE-based)	5-digit classification name	Sodium mg/100g	HSR - 2700mg sodium table	HSR - 8106mg sodium table
Protein - meats/fish	Processed meat, commercially sterile (includes canned meats)	1000	★★	★★★
Discretionary foods - meals/meal bases	Dry savoury sauces and casserole bases and dry mixes	1100	★★	★★◇
Discretionary foods - meals/meal bases	Dry savoury sauces and casserole bases and dry mixes	1100	★★	★★◇
Discretionary foods - sauces/condiments	Savoury sauces, tomato based, commercial	1100	★◇	★★
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1100	★	★◇
Protein - meats/fish	Ham	1100	★★	★★★
Discretionary foods - biscuits	Savoury biscuits, wheat based, plain, energy >1800 kJ per 100 g	1100	★	★◇
Protein - meats/fish	Ham	1110	★★	★★★
Discretionary foods - meals/meal bases	Savoury pasta/noodle and sauce dishes, saturated fat ≤5 g/100 g	1115	★	★◇
Discretionary foods - sauces/condiments	Savoury sauces, tomato based, commercial	1120	◇	★
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	1200	★★	★★◇
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1280	★◇	★★
Protein - meats/fish	Ham	1300	★◇	★★
Discretionary foods - biscuits	Savoury biscuits, wheat based, plain, energy ≤1800 kJ per 100 g	1320	★	★◇
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1330	◇	★
Protein - meats/fish	Processed delicatessen meat, mammalian	1360	★◇	★★
Protein - meats/fish	Processed delicatessen meat, mammalian	1360	★◇	★★
Discretionary foods - meals/meal bases	Savoury pasta/noodle and sauce dishes, saturated fat ≤5 g/100 g	1387	◇	★
Protein - meats/fish	Bacon	1400	★◇	★★
Protein - meats/fish	Ham	1410	★◇	★★
Protein - meats/fish	Ham	1410	★◇	★★
Protein - meats/fish	Ham	1410	★◇	★★
Protein - meats/fish	Ham	1410	★◇	★★
Protein - meats/fish	Ham	1410	★◇	★★
Protein - meats/fish	Ham	1410	★◇	★★
Discretionary foods - sauces/condiments	Stock cubes and seasonings	1430	★★	★★◇
Protein - meats/fish	Ham	1500	★◇	★★
Protein - meats/fish	Ham	1500	★◇	★★
Discretionary foods - biscuits	Savoury biscuits, wheat based, plain, energy >1800 kJ per 100 g	1620	◇	★

Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1650	★	★★◇
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	1680	★★◇	★★★
Discretionary foods - snacks	Dried meats	1770	◇	★
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1815	◇	★
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1815	◇	★
Protein - meats/fish	Chicken	1861	★	★★◇
Discretionary foods - snacks	Other snacks	1980	★	★★◇
Protein - meats/fish	Bacon	2000	★	★★◇
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	2000	★★	★★★◇
Vegetables - processed	Stalk vegetables	2000	★★	★★★◇
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	2070	★	★★◇
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	2100	◇	★
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	2360	◇	★
Discretionary foods - yeast spread	Yeast extracts	2380	★★◇	★★★◇
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	2500	◇	★
Discretionary foods - sauces/condiments	Savoury pastes	2690	◇	★
Discretionary foods - sauces/condiments	Stock cubes and seasonings	2740	◇	★★◇
Discretionary foods - meals/meal bases	Savoury pasta/noodle and sauce dishes, saturated fat ≤5 g/100 g	2820	◇	★
Discretionary foods - sauces/condiments	Stock cubes and seasonings	3240	◇	★
Discretionary foods - yeast spread	Yeast extracts	3300	★	★★
Discretionary foods - yeast spread	Yeast extracts	3310	◇	★★◇
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	3333	◇	★
Discretionary foods - yeast spread	Yeast extracts	3450	★	★★◇
Discretionary foods - sauces/condiments	Stock cubes and seasonings	3460	◇	★
Vegetables - processed	Fruit-based pickles, chutneys and relishes	3500	◇	★★◇
Discretionary foods - meals/meal bases	Dry savoury sauces and casserole bases and dry mixes	3750	◇	★
Discretionary foods - sauces/condiments	Stock cubes and seasonings	3790	◇	★
Discretionary foods - meals/meal bases	Dry savoury sauces and casserole bases and dry mixes	5822	◇	★
Discretionary foods - sauces/condiments	Stock cubes and seasonings	6140	★★★◇	★★★★

APPENDIX 3: List of products impacted by option 2b

Products affected by option 2b, TAG database, ranked by sodium content

FoPL Evaluation Categories (AGHE-based)	5-digit classification name	Sodium mg/100g	HSR - 2700mg sodium table	HSR - 8106mg sodium table
Discretionary foods - biscuits	Savoury biscuits, wheat based, plain, energy >1800 kJ per 100 g	958	★◇	★★
Discretionary foods - snacks	Potato crisps	970	★★	★★◇
Protein - meats/fish	Processed meat, commercially sterile (includes canned meats)	1000	★★	★★★
Protein - meats/fish	Processed delicatessen meat, mammalian	1040	★★	★★★
Protein - meats/fish	Processed delicatessen meat, poultry	1050	★★	★★★
Discretionary foods - biscuits	Savoury biscuits, wheat based, plain, energy >1800 kJ per 100 g	1067	◇	★
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1080	★◇	★★
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1080	★	★◇
Discretionary foods - biscuits	Savoury biscuits, wheat based, plain, energy >1800 kJ per 100 g	1089	◇	★
Discretionary foods - dressings	Italian and French-style dressings, reduced or non-fat	1095	★◇	★★
Discretionary foods - dressings	Italian and French-style dressings, reduced or non-fat	1095	★◇	★★
Discretionary foods - meals/meal bases	Dry savoury sauces and casserole bases and dry mixes	1100	★★	★★◇
Discretionary foods - meals/meal bases	Dry savoury sauces and casserole bases and dry mixes	1100	★★	★★◇
Discretionary foods - sauces/condiments	Savoury sauces, tomato based, commercial	1100	★◇	★★
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1100	★	★◇
Protein - meats/fish	Ham	1100	★★	★★★
Discretionary foods - biscuits	Savoury biscuits, wheat based, plain, energy >1800 kJ per 100 g	1100	★	★◇
Discretionary foods - biscuits	Savoury biscuits, wheat based, plain, energy >1800 kJ per 100 g	1100	◇	★
Protein - meats/fish	Ham	1110	★★	★★★
Discretionary foods - meals/meal bases	Savoury pasta/noodle and sauce dishes, saturated fat ≤5 g/100 g	1115	★	★◇
Discretionary foods - sauces/condiments	Savoury sauces, tomato based, commercial	1120	◇	★
Discretionary foods - biscuits	Savoury biscuits, wheat based, plain, energy >1800 kJ per 100 g	1158	◇	★
Discretionary foods - dressings	Italian and French-style dressings, reduced or non-fat	1160	★◇	★★
Discretionary foods - dressings	Italian and French-style dressings, reduced or non-fat	1160	★◇	★★
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1184	★	★◇
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1200	◇	★
Protein - meats/fish	Ham	1200	★◇	★★

FoPL Evaluation Categories (AGHE-based)	5-digit classification name	Sodium mg/100g	HSR - 2700mg sodium table	HSR - 8106mg sodium table
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	1200	★★	★★◇
Discretionary foods - sauces/condiments	Savoury sauces, tomato based, commercial	1230	★★	★★◇
Discretionary foods - snacks	Other snacks	1250	★	★◇
Discretionary foods - meals/meal bases	Other savoury grain dishes	1260	★★	★★◇
Protein - meats/fish	Smoked fish	1266	★◇	★★
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1280	★◇	★★
Discretionary foods - dressings	Mayonnaise and cream-style dressings, full fat	1290	◇	★
Discretionary foods - dressings	Mayonnaise and cream-style dressings, full fat	1290	◇	★
Protein - meats/fish	Ham	1300	★◇	★★
Protein - meats/fish	Ham	1300	★◇	★★
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	1300	★◇	★★
Discretionary foods - sauces/condiments	Savoury sauces, tomato based, commercial	1300	★◇	★★
Discretionary foods - biscuits	Savoury biscuits, wheat based, plain, energy ≤1800 kJ per 100 g	1320	★	★◇
Protein - meats/fish	Ham	1320	★◇	★★
Protein - meats/fish	Ham	1320	★◇	★★
Protein - meats/fish	Ham	1320	★◇	★★
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	1320	★◇	★★
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	1320	★◇	★★
Vegetables - processed	Tomato products	1330	★★◇	★★★
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1330	◇	★
Protein - meats/fish	Ham	1336	★◇	★★
Protein - meats/fish	Processed delicatessen meat, mammalian	1360	★◇	★★
Protein - meats/fish	Processed delicatessen meat, mammalian	1360	★◇	★★
Discretionary foods - snacks	Other snacks	1370	★	★◇
Discretionary foods - meals/meal bases	Dry savoury sauces and casserole bases and dry mixes	1373	★	★◇
Discretionary foods - meals/meal bases	Savoury pasta/noodle and sauce dishes, saturated fat ≤5 g/100 g	1387	◇	★
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1400	◇	★
Protein - meats/fish	Bacon	1400	★◇	★★
Protein - meats/fish	Bacon	1400	★	★◇
Protein - meats/fish	Ham	1410	★◇	★★
Protein - meats/fish	Ham	1410	★◇	★★
Protein - meats/fish	Ham	1410	★◇	★★
Protein - meats/fish	Ham	1410	★◇	★★

FoPL Evaluation Categories (AGHE-based)	5-digit classification name	Sodium mg/100g	HSR - 2700mg sodium table	HSR - 8106mg sodium table
Protein - meats/fish	Ham	1410	★◇	★★
Protein - meats/fish	Ham	1410	★◇	★★
Discretionary foods - sauces/condiments	Savoury sauces, tomato based, commercial	1420	★	★◇
Discretionary foods - sauces/condiments	Stock cubes and seasonings	1420	★◇	★★
Discretionary foods - sauces/condiments	Stock cubes and seasonings	1430	★◇	★★◇
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	1472	★★	★★◇
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	1472	★★	★★◇
Protein - meats/fish	Ham	1500	★	★★
Protein - meats/fish	Ham	1500	★	★★
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1500	◇	★
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	1590	★★	★★◇
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	1590	★★	★★◇
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1600	◇	★
Discretionary foods - biscuits	Savoury biscuits, wheat based, plain, energy >1800 kJ per 100 g	1620	◇	★
Discretionary foods - sauces/condiments	Stock cubes and seasonings	1620	◇	★◇
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1650	◇	★◇
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	1680	★	★★
Discretionary foods - dressings	Italian and French-style dressings, reduced or non-fat	1700	◇	★◇
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	1700	★◇	★★◇
Discretionary foods - snacks	Dried meats	1770	◇	★
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1815	◇	★
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	1815	◇	★
Protein - meats/fish	Chicken	1861	◇	★◇
Discretionary foods - snacks	Other snacks	1980	◇	★◇
Protein - meats/fish	Bacon	2000	◇	★◇
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	2000	★	★★◇
Vegetables - processed	Stalk vegetables	2000	★◇	★★◇
Vegetables - processed	Vegetable-based pickles, chutneys and relishes	2070	◇	★◇
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	2100	◇	★
Discretionary foods -	Savoury sauces, not tomato based,	2360	◇	★

FoPL Evaluation Categories (AGHE-based)	5-digit classification name	Sodium mg/100g	HSR - 2700mg sodium table	HSR - 8106mg sodium table
sauces/condiments	commercial			
Discretionary foods - yeast spread	Yeast extracts	2380	★	★★◇
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	2500	◇	★
Discretionary foods - sauces/condiments	Savoury pastes	2690	◇	★
Discretionary foods - sauces/condiments	Stock cubes and seasonings	2740	◇	★◇
Discretionary foods - meals/meal bases	Savoury pasta/noodle and sauce dishes, saturated fat ≤5 g/100 g	2820	◇	★
Discretionary foods - sauces/condiments	Stock cubes and seasonings	3240	◇	★
Discretionary foods - yeast spread	Yeast extracts	3300	★	★★
Discretionary foods - yeast spread	Yeast extracts	3310	◇	★◇
Discretionary foods - sauces/condiments	Savoury sauces, not tomato based, commercial	3333	◇	★
Discretionary foods - yeast spread	Yeast extracts	3450	★	★◇
Discretionary foods - sauces/condiments	Stock cubes and seasonings	3460	◇	★
Vegetables - processed	Fruit-based pickles, chutneys and relishes	3500	◇	★◇
Discretionary foods - meals/meal bases	Dry savoury sauces and casserole bases and dry mixes	3750	◇	★
Discretionary foods - sauces/condiments	Stock cubes and seasonings	3790	◇	★
Discretionary foods - meals/meal bases	Dry savoury sauces and casserole bases and dry mixes	5822	◇	★
Discretionary foods - sauces/condiments	Stock cubes and seasonings	6140	★★◇	★★★

APPENDIX 4: Analysis of the impact of options on foods used as examples in problem statement

Problem identified	Addressed by options	Rationale
Highly processed cereal with high added sodium content versus plain oats	Not addressed by any option	Sodium levels for both products are below 900 mg so no change in scale with any option
Nuts – salted versus unsalted	Not addressed	The sodium level of salted nuts is below 900 mg so are not impacted by the proposed changes
A vegetable soup of reasonable nutritional quality with 360 mg per 100 mL sodium, receives 3.5 stars. If the sodium content is reduced to 100 mg per 100mL, it would still only receive 3.5 stars.	No change	No change to the sodium scale below 900 mg