Supplementary Material 1: Methods to update the Australian whole grain database and determine compliance with the Healthgrain whole grain food definition

To determine foods and food products within the Australian Food, Supplement and Nutrient Database (AUSNUT) 2011-13 that comply with the Healthgrain Forum's whole grain food definition, data from five databases were used:

1. The Australian whole grain database developed by Dalton et al. (2014)[1] and further updated by Galea et al. (2016)[2]
2. AUSNUT 2011-13 Food Nutrient Database[3]
3. AUSNUT 2011-13 Food Recipe File[4]
4. AUSNUT 2011-13 Food Details File[5]
5. Australian Health Survey: User's guide 2011-13 – Discretionary Food List[6]

Supplemental Table 1 describes the databases used and their reason for use. It should be noted that in Australia, the term non-discretionary is the classification used to determine "healthful" foods as described by the Healthgrain Forum[7].

Processes are described in detail below, however in brief, the process initially involved calculating the percentage of whole grain content for foods, on a dry weight basis, such that the Healthgrain whole grain food definition could be applied (Step 1). If this value was ≥30% of the foodstuff, foods and food products were then analysed to determine if a food contained more whole grain than refined grain ingredients (Step 2-5). This process used databases, product ingredients lists, a recipe based approach and professional judgement. Finally, foods containing any amount of whole grain were labelled if they met the definition of a discretionary food or not (Step 6).

Step 1. Whole grain content on a dry weight basis calculations

The whole grain content on a dry weight basis for foods was determined as the grams of whole grain per 100 grams of dry weight of food (g/100g dry weight). This value was converted to a percentage to be consistent with the Healthgrain definition. The process involved collating whole grain content of foods (g/100g) from the Australian whole grain database with moisture content data using the AUSNUT 2011-13 Food Nutrient Database (g/100g). In this approach, grams of whole grain per 100g of food were divided by percent of dry weight and further multiplied by 100, as adapted from Ross et al. (2017)[7] Online Supporting Material, as shown in Supplemental Equation 1:

$$\text{Whole grain content (g/100g dry weight)} = \left(\frac{\text{whole grain content (g/100g)}}{\text{percentage dry weight*}}\right) \times 100$$

Where;

$$\text{Percentage dry weight (\%)} = \left(\frac{\text{(total weight of ingredients(g)-moisture content (g)}}{\text{total weight of ingredient (g)}}\right) \times 100$$

Supplemental Equation 1: Calculation of whole grain content on a dry weight basis using whole grain content and moisture content from the Australian wholegrain database and AUSNUT 2011-13 Food Nutrient Database respectively. Equations were adapted from Ross et al. (2017) Online supporting material.

**NOTE: 'Percentage dry weight' is interchangeable with the term 'dry weight g/100g foodstuff'*

As an example, the following shows calculations for the whole grain content of *'Bread, from wholemeal flour, extra grainy, four seeds, commercial*' on a dry weight basis, where;

- Whole grain content = 21.6g/100g
- Total weight of ingredients = 100g
- Moisture content = 28.2g/100g

$$\text{Percentage dry weight} = \left(\frac{\text{100g-28.2g}}{\text{100g}}\right) \times 100 = \mathbf{71.8\%}$$

$$\text{Whole grain content} = \left(\frac{\text{21.6g}}{\text{71.8g}}\right) \times 100 = \mathbf{30.08g/100g\ dry\ weight}$$

$$\text{Whole grain content percentage} = \left(\frac{30.08}{100}\right) \times 100 = \mathbf{30.08\%}$$

Therefore, this food contains 30.08g whole grain per 100g dry weight, and thus meets the ≥30% whole grain on a dry weight basis criteria for the Healthgrain whole grain food definition.

Step 2-5. Determination of food products containing more whole grain than refined grain ingredients

An overview of the systematic method to determine whole grain and refined grain content of foods is illustrated in Supplemental Figure 1. The following process was applied to foods that had previously met the first criteria point from the Healthgrain whole grain food definition[7]; the food is made with ≥30% whole grains on a dry weight basis.

Step 2 - Those foods containing >50% whole grain on a dry weight basis were assumed to contain more whole grain than refined grain ingredients.

Step 3 - Foods that contained 30-50% whole grains on a dry weight basis were analysed using a recipe based approach and data from AUSNUT 2011-13 Food Recipe File where the food recipe data was available and ingredients are listed in their basic form. The process involved disaggregating foods into their basic ingredients and amounts, and further calculating the amount of each ingredient on a dry weight basis using moisture data collected previously from the AUSNUT 2011-13 Food Nutrient Database as shown in Supplemental Equation 2:

$$\text{Dry weight ingredient (g)} = (\text{weight of ingredient(g)- moisture in defined weight of ingredient(g)})$$

Where;

$$\text{Moisture in defined weight of ingredient (g)} = \text{weight of ingredient (g)} \times \left(\frac{\text{moisture of ingredient (g/100g)}}{100}\right)$$

Supplemental Equation 2: Calculation to identify if foods contained more whole grain than refined grain ingredients applying a recipe based approach, using data collected from AUSNUT 2011-13 Food Recipe File and AUSNUT 2011-13 Food Nutrient Database

Ingredients were categorised into whole grain as defined by Food Standards Australia New Zealand (FSANZ)[8], refined grain or other. For each category, total weight of ingredients on a dry weight basis was determined, and further converted to a percentage of the food as shown in Supplemental Equation 3 using the whole grain category as an example.

$$\text{Whole grain ingredient content on dry weight basis (\%)} = \left(\frac{\text{sum of wholegrain ingredients weight on dry weight basis (g)}}{\text{total weight of ingredients on a dry weight basis (g)}}\right) \times 100$$

Supplemental Equation 3: Calculation to determine whole grain/refined grain ingredient content percentage on a dry weight basis, using manipulated data from AUSNUT 2011-13 Food Recipe File and Food Standards Australia New Zealand (FSANZ) whole grain definition.

Step 4 - Foods that did not contain a recipe within AUSNUT 2011-13 Food Recipe File or the recipe contained ingredients which were not basic foods, were matched with a specific food product/s as outlined in AUSNUT 2011-13 Food Details File database. The ingredient lists of specific food products were analysed to determine if the product contained more whole grain than refined grain ingredients, provided that the product currently exists in the Australian market and ingredient list information could be sourced. If ingredient list information could not be sourced, the food product was matched, based on professional judgment, to a similar food product with assumed matching whole grain and refined grain composition.

E.g. Under '*bread, soy & linseed, commercial',* the ingredients of the specific product '*Aroma Bakery soy and linseed*' could not be sourced, therefore the product was assumed to have the same composition as '*Burgen soy and linseed*', another specific product whereby ingredient list information was accessible.

Similarly, food products which are listed but do not have a known specific food currently on the market, were also matched to a food product with assumed similar composition. This was provided that at least one other product, under the same food, currently exists in the Australian market and ingredient list information could be sourced.

E.g. Under '*Bar, muesli or snack, with 10% dried fruit & 5% nuts'*, the specific product '*Be Natural trail bar berry*' is not currently on the market, thus composition was assumed to be the same as '*Uncle Toby's forest fruits*', a listed specific food currently on the market, whereby ingredient list information was able to be sourced.

Step 5 - If all food products within a food group did not currently exist in the Australian market, the grain composition of the food could not be determined. Professional judgement was required to determine whole grain and refined grain composition of the food product, and therefore, whether it would comply with the Healthgrain whole grain food definition. This was the case of food groups that only contained one food product in AUSNUT 2011-13 Food Details File, yet no longer existed in the Australian market at time of analysis. These food products were often reasonably assumed to contain more refined grain than whole grain ingredients, as the main ingredient may have typically been listed as "wheat flour", which is indicative of refined grains. If the ingredient was whole grain, then it would have been typically listed as "whole wheat flour".

Additionally, current products which are similar in description, were found to contain more refined grain than whole grain ingredients, and furthermore, these non-descript foods were highly unlikely to be consumed in significant quantities within the National Nutrition and Physical Activity Survey (NNPAS) intake data. Therefore, if the food product did contain more whole grain than refined grain ingredients, the margin of error would be very minimal, and would not alter results significantly.

E.g. '*Breakfast cereal, mixed grain (wheat, oat & corn), flakes, fruit & nut, added vitamins B1, B2, B3, C & folate & Fe'* was assumed to contain more refined grain than whole grain ingredients.

However, there were some minor exceptions to the above assumption.

E.g. '*Bar, muesli or snack, with 10% nuts, added flaxseeds'* was assumed to contain more whole grain than refined grain ingredients since the specific food product listed in AUSNUT 2011-13 Food Details File is an Uncle Toby's branded muesli bar. From analysis of other Uncle Toby's muesli bars, it shows they all contain >50% whole grain ingredients, thus it is safe to assume this product also contained more whole grain than refined grain ingredients.

Food groups that were "not for coding" in AUSNUT 2011-13 Food Details File, underwent further investigation to determine the composition of whole grains and refined grains. Ingredient lists of food products presumed to fall under the food group were analysed.

E.g. The majority of assumed specific food products for *'Bread roll, for use in subway sandwich recipes'* were presumed to not contain more whole grain than refined grain ingredients.

Alternatively, professional judgement was again applied to provide an educated decision on whole grain and refined grain composition of food groups.

E.g. *'Breakfast cereal, mixed grain (wheat & corn), flakes or extruded, no added salt, unfortified'*, was presumed to contain more refined grain than whole grain. This is based on the justification that at the time when AUSNUT 2011-13 was developed, unfortified cereals were 'homebrand' cereals, and typically did not contain more whole grain than refined grain ingredients.

Finally, food groups that did not contain a specific food product in AUSNUT 2011-13 Food Details File nor could be matched to a food product of assumed similar composition, were analysed using a recipe based approach. This process was similar to analysis described previously, using AUSNUT 2011-13 Food Recipe File. Recipes matching the food's description were gathered, and individual ingredients were analysed to determine whole grain and refined grain composition. Professional judgement was applied where necessary to determine grain composition of food groups.

Step 6. Discretionary food data

The Healthgrain definition strongly advise whole grain foods meet accepted standards for healthy foods and includes specific direction on these qualities. Here, we used data imputed from the Australian Health Survey: Users' Guide, 2011-13 - Discretionary Food List to determine if foods containing any amount of whole grain were classified as discretionary or non-discretionary. Values from this database were derived from the 2013 ADGs and supporting documents, with foods and food products specified or inferred as discretionary[9]. Foods were given values of either 0 or 1 to categorise into a non-discretionary food category or a discretionary food category respectively.

Updated whole grain database

Following the application of all steps listed above, a final whole grain database was created. As an update of the existing Australian whole grain database it included values for the absolute grams of whole grain, the gram moisture content of foods and the grams of whole grain on a dry weight basis. It also describes if a food contains more whole grain than refined grain ingredients and if it is classified as non-discretionary. Furthermore, the updated database specifically addresses the Healthgrain definition and describes if foods comply with the definition both including and excluding discretionary foods.

Compliance of AUSNUT 2011-13 foods to the Healthgrain Forum whole grain food definition

A schematic flow diagram illustrates the breakdown of compliance to each criteria point of the Healthgrain whole grain food definition (Supplemental Figure 2). From the 609 foods containing any amount of whole grain, 214 were compliant with the total Healthgrain definition. For the 281 items containing ≥30% whole grains on a dry weight basis, whole grain and refined grain

compositions were determined using mathematical based assumptions for 202 items, AUSNUT 2011-13 Food Recipe File for 8 items, AUSNUT 2011-13 Food Details File for 37 items, AUSNUT 2011-13 Food Details File with matching of food products for 18 items and finally application of professional judgement for 16 items.

Supplemental Table 2 depicts the data used to determine compliance of some foods that may be commonly consumed to the Healthgrain definition, and whether this definition is met when including and excluding discretionary foods.

Additionally, non-compliant foods were further explored to examine the major and sub-major food groups these foods belong to and their reason for non-compliance with the Healthgrain definition. Two separate investigations were conducted, in which both explored non-compliant foods after applying the two main criteria points of the Healthgrain definition; the food product must contain ≥30% whole grain on a dry weight basis and must contain more whole grain than refined grain ingredients. The second investigation differed by additionally applying the third advised criteria point; foods must meet accepted standards for healthy foods. Foods were matched to their major and sub-major food groups identified in AUSNUT 2011-13 Food and Dietary Supplement Classification System, using the 2-digit and 3-digit food codes.

Supplemental Table 3 partially summarises those foods that are non-compliant with the Healthgrain definition and are therefore excluded. Following application of the two and three criteria points mentioned previously, 367 and 395 foods were excluded respectively. Unsurprisingly, for both analyses, majority of these foods were '*cereals and cereal products*' or '*cereal based products and dishes*'. However, there were a greater number of excluded foods classified as '*snack foods*' or '*confectionery and cereal/nut/fruit/seed bars*' when the third criteria point was applied.

Supplementary Material 2: Calculations to determine whole grain intake

Calculation 1. – Determination of energy-adjusted whole grain intakes

This was achieved by dividing adjusted whole grain intakes (g/day) by total energy intakes also adjusted through the Multiple Source Method (MSM) and further multiplying by 10,000kJ, as shown below;

$$g\ whole\ grain/10MJ\ /day = \left(\frac{adjusted\ whole\ grain\ intake\ (g/day)}{adjusted\ energy\ intake\ (kJ/day)}\right) \times 10{,}000$$

Supplemental Equation 4. Calculation to determine energy-adjusted whole grain intakes using Multiple Source Method (MSM) output values, previously analysed using values obtained from the National Nutrition and Physical Activity Survey (NNPAS) 2011-12 data.

Calculation 2 – Determination of whole grain intake per 24hr recall, per participant

Firstly, participants that consumed any foods complying with the whole grain food definition approach of interest were identified. Grams of whole grains consumed from each of the different foods, for each participant, for each day were then calculated. This process used the gram weight of foods consumed, obtained from the NNPAS 2011-12 Basic Confidentialised Unit Record Files (CURF), and the whole grain content (g/100g) within these foods, obtained from the updated Australian whole grain database. Supplemental Equation 5 illustrates the calculation used to determine total grams of whole grain consumed for each 24 hour recall day, for each participant.

$$Total\ whole\ grain\ consumption\ (g/day) =$$
$$sum\ [amount\ of\ whole\ grain\ from\ each\ compliant\ food\ consumed\ (g)]\ for\ each\ day$$

Where;

$$amount\ of\ whole\ grain\ from\ a\ compliant\ food\ \ consumed$$
$$= \left(\frac{total\ gram\ weight\ of\ compliant\ food\ consumed\ (g)}{100}\right)$$
$$\times\ whole\ grain\ content\ (g/100g)$$

Supplemental Equation 5. Calculation to determine total grams of whole grain consumed for each 24 hour recall day, for each participant using data obtained from the National Nutrition and Physical Activity Survey (NNPAS) 2011-12, and data from the updated Australian whole grain database.

In the case that participants did not complete the second 24 hour recall, the whole grain intake value for ‘day 2’ was left blank.

Calculation 3 – Determination of percentage of total whole grain intake

Supplemental Equation 6 illustrates the calculation used to determine percentage of total whole grain intake using the '*children'* age group category and the '*breakfast cereals, ready to eat'* sub-major food group as an example.

$$Percentage\ of\ total\ whole\ grain\ intake\ for\ 'breakfast\ cereals, ready\ to\ eat'\ in\ children\ (\%)$$
$$= \left(\frac{total\ whole\ grain\ consumption\ for\ breakfast\ cereals, ready\ to\ eat\ of\ children\ (g)}{Total\ whole\ grain\ consumption\ for\ children\ (g)} \right) \times 100$$

Such that:

$$Percentage\ of\ total\ whole\ grain\ intake\ for\ breakfats\ cereals, ready\ to\ eat\ in\ children\ (\%)$$
$$= \left(\frac{29167\ (g)}{81671\ (g)} \right) \times 100$$

$$= 35.71\%$$

Supplemental Equation 6. Calculation to determine percentage of total whole grain intake using values from analysed National Nutrition and Physical Activity Survey (NNPAS) 2011-12 data. As an example the 'children' age group category and the 'breakfast cereals, ready to eat' sub-major food group are used.

Supplemental References

1. Dalton SMC, Probst YC, Batterham MJ *et al.* (2014) Compilation of an Australian database of manufactured and packaged food products containing wholegrain ingredients. *J Food Comp Anal* 36, 24-34.
2. Galea LM, Dalton SMC, Beck EJ *et al.* (2016) Update of a database for estimation of whole grain content of foods in Australia. *J Food Comp Anal* 50, 23-29.
3. Food Standards Australia New Zealand (FSANZ) (2014) AUSNUT 2011-13 Food Nutrient Database.
4. Food Standards Australia New Zealand (FSANZ) (2014) AUSNUT 2011-13 Food Recipe File.
5. Food Standards Australia New Zealand (FSANZ) (2014) AUSNUT 2011-13 Food Details File.
6. Australian Bureau of Statistics (ABS) (2014) Australian health survey: Users guide 2011-13 – Discretionary food list.
7. Ross AB, van der Kamp J-W, King R *et al.* (2017) Perspective: A definition for whole-grain food products – Recommendations from the Healthgrain Forum. *Adv Nutr* 8, 525-531.
8. Food Standards Australia New Zealand (FSANZ) (2015) Australia New Zealand Food Standards Code – Standard 2.1.1 – Cereal and cereal products.
9. Australian Bureau of Statistics (ABS) (2015) Australian health survey: User's guide 2011-13 (2014).

Supplemental Table 1. Databases used to determine compliance of foods within the AUSNUT 2011-13 database with the Healthgrain Forum whole grain food definition

Database Name	Description	Reason for use
Australian whole grain database	Provides whole grain compositional data for all foods and food products within AUSNUT 2011-13	Contains gram weight for any amount of whole grain within 100g of a foodstuff. Used to determine whole grain content on a dry weight basis. (Step 1)
AUSNUT 2011-13 Food Nutrient Database	Contains information on the content for 51 different nutrients within foods in the AUSNUT 2011-13 database	To determine whole grain content on a dry weight basis. (Step 1) To determine the relative amount of whole grain to refined grain ingredients of foods (Step 2)
AUSNUT 2011-13 Food Recipe File	Contains information about the ingredients used in a food in the AUSNUT 2011–13 database when the nutrient data was derived using a reported recipe	To determine the relative amount of whole grain to refined grain ingredients of foods (Step 3)
AUSNUT 2011-13 Food Details File	Contains non-nutrient information on the foods within the AUSNUT 2011-13 database, such as specific food items included under a food name	To determine the relative amount of whole grain to refined grain ingredients of foods (Step 4)
Australian Health Survey: User's guide 2011-13 – Discretionary Food List	Contains classification of foods within the AUSNUT 2011-13 database as discretionary or non-discretionary	To determine the classification of foods and food products in terms of discretionary or non-discretionary (Step 6)

Supplementary Material

Supplemental Table 2. Determining compliance through assessment against the Healthgrain whole grain food definition for a selection of commonly consumed foods

Food name	Whole grain content on a dry weight basis (g/100g)[a]	Does it contain more whole grain than refined grain ingredients?[b]	Discretionary food list categorisation (0=non-discretionary, 1= discretionary)[c]	Does it comply with the Healthgrain Forum definition (Including discretionary foods)[d]	Does it comply with the Healthgrain Forum definition (Excluding discretionary foods)[d]
Rice, brown, boiled, no added salt	101.47	Yes	0	Yes	Yes
Bread, mixed grain, commercial	47.69	No	0	No	No
Bread, from wholemeal flour, commercial	99.91	Yes	0	Yes	Yes
Muffin, English style, from wholemeal flour, commercial, toasted	99.97	Yes	0	Yes	Yes
Pasta, wholemeal wheat flour, plain, boiled from dry, no added salt	99.28	Yes	0	Yes	Yes
Breakfast cereal, wheat bran, flakes, sultanas, added vitamins B1, B2, B3, B6 & folate, Fe & Zn	42.46	Yes	0	Yes	Yes
Muesli, commercial, toasted, added dried fruit & nuts, unfortified	65.40	Yes	0	Yes	Yes
Porridge, rolled oats, prepared with cow's milk	65.70	Yes	0	Yes	Yes
Biscuit, savoury, from wholemeal wheat flour	38.22	No	0	No	No
Pastry, shortcrust, wholemeal, commercial, baked	66.99	Yes	1	Yes	No
Crumpet, from wholemeal flour, commercial, toasted	41.46	No	0	No	No
Milk, rice, fluid, added calcium	102.36	Yes	0	Yes	Yes
Popcorn, commercial, butter flavoured, salted	81.00	Yes	1	Yes	No
Corn chips, plain toasted, salted	30.36	Yes	1	Yes	No
Bar, muesli or snack, plain or with 10% dried fruit	50.58	Yes	1	Yes	No

a) Values obtained through calculations using data from the updated Australian whole grain database and AUSNUT Food Nutrient Database
b) Grain composition determined through use of databases (AUSNUT Food Nutrient Database, AUSNUT Food Recipe File and AUSNUT Food Details File), product ingredients lists, a recipe based approach and professional judgement.
c) Values obtained from Australian Health Surveys: User's Guide – Discretionary Food List
d) The Healthgrain whole grain food definition as defined by Ross et al. (2017)

Supplemental Table 3. Classification and reason for exclusion of foods following application of two and three criteria points of the Healthgrain whole grain food definition (an excerpt of 4 major food groups).

	Reason for exclusion[b]			Total[c]	
Food group classification[a]	**<30% whole grain dry weight basis**	**More refined grain than whole grain ingredients**	**Discretionary food**	**2 criteria points**	**3 criteria points**
Cereals and cereal products					
Flours and other cereal grains and starches	2	0	0	2	2
Regular breads, and bread rolls (plain/unfilled/untopped varieties)	19	27	0	46	46
English-style muffins, flat breads, and savoury and sweet breads	6	0	1	6	7
Pasta and pasta products (without sauce)	2	2	0	4	4
Breakfast cereals, ready to eat	12	6	1	18	19
	41	**35**	**2**	**76**	**78**
Cereal based products and dishes					
Sweet biscuits	7	0	0	7	7
Savoury biscuits	3	1	0	4	4
Cakes, muffins, scones, cake-type desserts	4	0	0	4	4
Pastries	0	0	2	0	2
Mixed dishes where cereal is the major ingredient	172	0	0	172	172
Batter-based products	0	1	0	1	1
	186	**2**	**2**	**188**	**190**
Snack foods					
Corn snacks	0	0	10	0	10
Extruded or reformed snacks	0	0	3	0	3
Other snacks	3	0	0	3	3
	3	**0**	**13**	**3**	**16**
Confectionery and cereal/nut/fruit/seed bars					
Fruit, nut and seed-bars	1	0	0	1	1
Muesli or cereal style bars	14	2	11	16	27
	15	**2**	**11**	**17**	**28**

a. *Major and sub-major food groups were determined through identification in AUSNUT 2011-13 Food and Dietary Supplement Classification System using the 2-digit and 3-digit foods codes of foods and food products*

b. *Reason for exclusion is based on the Healthgrain whole grain food definition criteria; a food must contain ≥30% whole grain on a dry weight basis, food products must contain more whole grain than refined grain ingredients and foods must meet acceptable standards for healthy foods.*

c. *Total for two criteria points refers to foods excluded due to containing <30% whole grain on a dry weight basis and food products contain more refined grain than whole grain ingredients. Total for three criteria points additionally includes foods classified as discretionary.*

Supplemental Table 4. Percentages of total whole grain intakes of major and sub-major food groups for no whole grain food definition (approach 1)

	Incl discretionary (approach 1a)		Excl discretionary (approach 1b)	
Major and sub-major food groups[a]	**Children[b]**	**Adults[c]**	**Children**	**Adults**
Cereals and cereal products	**82.97%**	**89.56%**	**92.64%**	**93.07%**
Flours and other cereal grains and starches	3.25	4.77	3.63	4.96
Regular breads, and bread rolls (plain/unfilled/untopped varieties)	33.07	36.08	36.96	37.52
English-style muffins, flat breads, and savoury and sweet breads	2.82	2.55	3.06	2.60
Pasta and pasta products (without sauce)	0.24	0.19	0.27	0.20
Breakfast cereals, ready to eat	35.71	35.39	39.91	36.79
Breakfast cereals, hot porridge style	7.89	10.59	8.81	11.01
Cereal based products and dishes	**6.13%**	**6.50%**	**6.08%**	**5.93%**
Sweet biscuits	0.33	0.34	0.00	0.00
Savoury biscuits	2.11	2.21	2.35	2.30
Cakes, muffins, scones, cake-type desserts	0.03	0.09	0.00	0.03
Mixed dishes where cereal is the major ingredient	4.35	3.69	3.60	3.42
Batter-based products	0.11	0.18	0.12	0.18
Fish and seafood products and dishes	**0.01%**	**0.01%**	**0.01%**	**0.01%**
Mixed dishes with fish or seafood as the major component	0.01	0.01	0.01	0.01
Fruit products and dishes	**0.03%**	**0.06%**	**0.04%**	**0.07%**
Mixed dishes where fruit is the major component	0.03	0.06	0.04	0.07
Meat, poultry and game products and dishes	**0.06%**	**0.07%**	**0.07%**	**0.07%**
Mixed dishes where beef, sheep, pork or mammalian game is the major component	0.03	0.03	0.03	0.03
Mixed dishes where sausage, bacon, ham or other processed meat is the major component	0.00	0.00	0.00	0.00
Mixed dishes where poultry or feathered game is the major component	0.03	0.04	0.04	0.04
Milk products and dishes	**0.01%**	**0.01%**	**0.01%**	**0.01%**
Yoghurt	0.01	0.01	0.01	0.01
Dairy & meat substitutes	**0.49%**	**0.52%**	**0.54%**	**0.54%**
Dairy milk substitutes, unflavoured	0.49	0.52	0.54	0.54
Soup	**0.04%**	**0.06%**	**0.04%**	**0.06%**
Soup, homemade from basic ingredients	0.03	0.05	0.04	0.05
Soup, commercially sterile, prepared from condensed or sold ready to heat	0.00	0.01	0.00	0.01
Vegetable products and dishes	**0.04%**	**0.12%**	**0.04%**	**0.13%**
Dishes where vegetable is the major component	0.04	0.12	0.04	0.13
Legume and pulse products and dishes	**0.04%**	**0.02%**	**0.05%**	**0.02%**
Mature legume and pulse products and dishes	0.04	0.02	0.05	0.02
Snack foods	**4.89%**	**1.31%**	**0.49%**	**0.09%**
Corn snacks	4.14	1.10	0.49	0.09
Extruded or reformed snacks	0.49	0.17	0.00	0.00
Other snacks	0.26	0.03	0.00	0.00
Confectionery and cereal/nut/fruit/seed bars	**4.50%**	**1.75%**	**0.00%**	**0.00%**
Fruit, nut and seed-bars	0.00	0.00	0.00	0.00
Muesli or cereal style bars	4.50	1.74	0.00	0.00

a) Major and sub-major food groups as specified in AUSNUT 2011-13 Food and Dietary Supplement Classification System

b) Children are defined as those aged 2-18 years old

c) Adults are defined as those aged 19 years and over

Supplemental Table 5. Percentages of total whole grain intakes of major and sub-major food groups when applying the Healthgrain definition (approach 2)

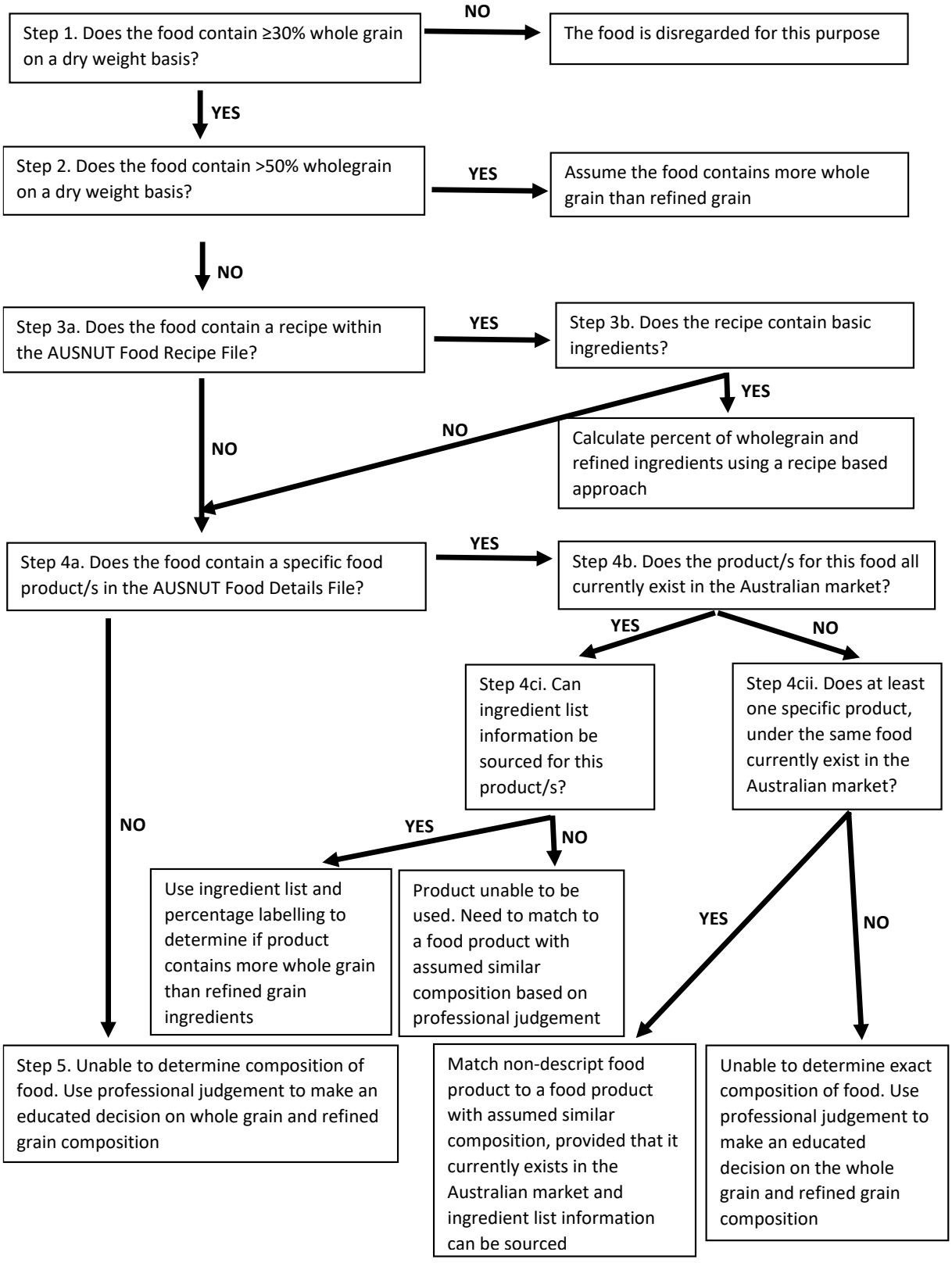
	Incl discretionary (approach 2a)		Excl discretionary (approach 2b)	
Major and sub-major food groups[a]	**Children[b]**	**Adults[c]**	**Children**	**Adults**
Cereals and cereal products	**86.58%**	**92.68%**	**95.85%**	**95.77%**
Flours and other cereal grains and starches	3.84	5.79	4.25	5.99
Regular breads, and bread rolls (plain/unfilled/untopped varieties)	28.03	28.74	31.05	29.72
English-style muffins, flat breads, and savoury and sweet breads	3.21	2.99	3.50	3.05
Pasta and pasta products (without sauce)	0.28	0.21	0.31	0.22
Breakfast cereals, ready to eat	41.89	42.06	46.40	43.49
Breakfast cereals, hot porridge style	9.33	12.87	10.33	13.31
Cereal based products and dishes	**2.63%**	**3.21%**	**2.91%**	**3.32%**
Sweet biscuits	0.00	0.00	0.00	0.00
Savoury biscuits	2.28	2.42	2.53	2.50
Cakes, muffins, scones, cake-type desserts	0.00	0.03	0.00	0.03
Mixed dishes where cereal is the major ingredient	0.27	0.38	0.30	0.68
Batter-based products	0.08	0.38	0.09	0.11
Fish and seafood products and dishes	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Mixed dishes with fish or seafood as the major component	0.00	0.00	0.00	0.00
Fruit products and dishes	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Mixed dishes where fruit is the major component	0.00	0.00	0.00	0.00
Meat, poultry and game products and dishes	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Mixed dishes where beef, sheep, pork or mammalian game is the major component	0.00	0.00	0.00	0.00
Mixed dishes where sausage, bacon, ham or other processed meat is the major component	0.00	0.00	0.00	0.00
Mixed dishes where poultry or feathered game is the major component	0.00	0.00	0.00	0.00
Milk products and dishes	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Yoghurt	0.00	0.00	0.00	0.00
Dairy & meat substitutes	**0.58%**	**0.63%**	**0.64%**	**0.65%**
Dairy milk substitutes, unflavoured	0.58	0.63	0.64	0.65
Soup	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Soup, homemade from basic ingredients	0.00	0.00	0.00	0.00
Soup, commercially sterile, prepared from condensed or sold ready to heat	0.00	0.00	0.00	0.00
Vegetable products and dishes	**0.03%**	**0.14%**	**0.04%**	**0.15%**
Dishes where vegetable is the major component	0.03	0.14	0.04	0.15
Legume and pulse products and dishes	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Mature legume and pulse products and dishes	0.00	0.00	0.00	0.00
Snack foods	**5.48%**	**1.55%**	**0.57%**	**0.11%**
Corn snacks	4.90	1.34	0.57	0.11
Extruded or reformed snacks	0.58	0.21	0.00	0.00
Other snacks	0.00	0.00	0.00	0.00
Confectionery and cereal/nut/fruit/seed bars	**4.70%**	**1.79%**	**0.00%**	**0.00%**
Fruit, nut and seed-bars	0.00	0.00	0.00	0.00
Muesli or cereal style bars	4.70	1.79	0.00	0.00

a) Major and sub-major food groups as specified in AUSNUT 2011-13 Food and Dietary Supplement Classification System

b) Children are defined as those aged 2-18 years old

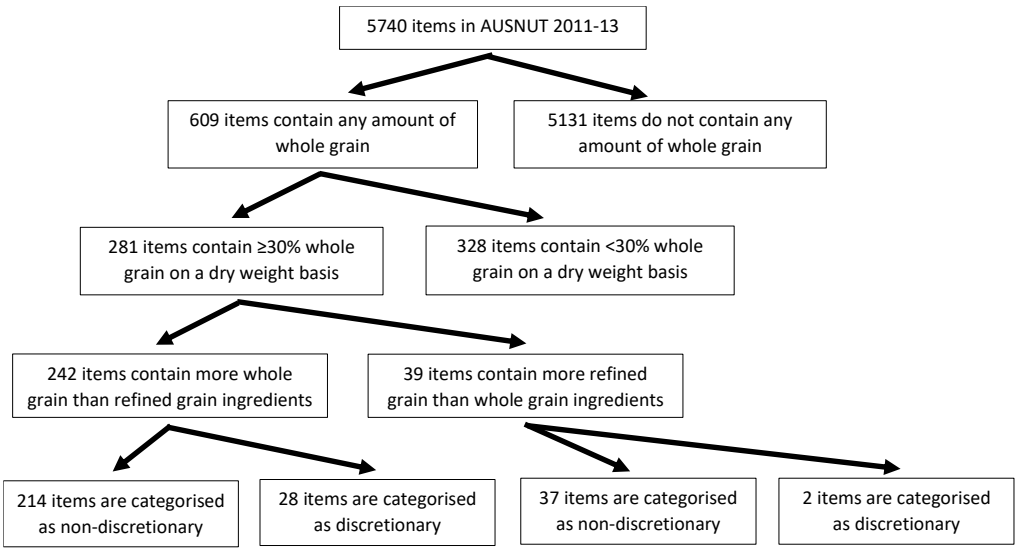
c) Adults are defined as those aged 19 years and over

Supplementary Material



Supplement Figure 1. Schematic diagram of the process to determine whole grain and refined grain composition of foods within the Australian whole grain database and AUSNUT 2011-13 database

Supplementary Material



Supplemental Figure 2: Schematic diagram illustrating the number of foods in AUSNUT 2011-13 that comply with the Healthgrain whole grain food definition criteria; contains ≥30% whole grain on a dry weight basis, contains more whole grain than refined grain ingredients and meets accepted standards for healthy foods.