FOOD STANDARDS Australia New Zealand
Te Mana Kounga Kai – Ahitereiria me Aotearoa

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Supporting document 1

Updated ready-to-eat breakfast cereal consumption information (at Review) – Application A1090

Voluntary Addition of Vitamin D to Breakfast Cereal

Executive Summary

Since the Technical and Nutritional Risk Assessment for the approval decision for A1090 was prepared, more recent Australian food consumption data has become available. A further detailed analysis of ready-to-eat breakfast cereal consumption has been undertaken for the Australian and New Zealand populations.

The most recent national nutrition survey data indicates that approximately one third of Australians aged 2 years and above (36%) and New Zealanders aged 15 years and above (34%), and half (50%) of New Zealand children aged 5–14 years consume breakfast cereals. In general, in Australia and New Zealand there are a higher proportion of consumers of breakfast cereals in younger age groups, this proportion declines as age increases and then increases again in older population groups.

In the 2011–12 National Nutrition and Physical Activity Survey (NNPAS), the majority of Australian breakfast cereal consumers (58%) chose cereals with <15 g total sugars/100 g, while 5% chose cereals with ≥30 g total sugars/100 g. Similarly, more New Zealanders aged 5–14 years (74%) and 15 years and above (59%) chose breakfast cereals with <15 g total sugars/100 g compared to those choosing breakfast cereals with ≥30 g total sugars/100g (5–14 years 21%, 15 years and above 12%).

Breakfast cereals contribute from 1–4% of **total** sugars and 2–4 % of sodium intakes across all population groups in Australia and New Zealand. For the whole Australian population aged 2 years and above, breakfast cereals contribute 3% to **added** sugar intakes, 2% from non-discretionary cereals and <1% from discretionary cereals (classified as those with ≥30 g total sugars/100 g).

Currently, approximately 15% of breakfast cereals were identified by the industry as likely to not meet the Nutrition Profiling Scoring Criterion (NPSC). Three percent of the Australian population reported consuming breakfast cereals likely to not meet the NPSC. Australian children aged
2–3 years (9%) and 4–8 years (10%) were more likely to consume breakfast cereals that did not meet the NPSC than older Australians aged 31 years and above (2%).

Should voluntary fortification of breakfast cereals with Vitamin D be limited to only those cereals that met the NPSC, there would very little impact overall on predicted increases in vitamin D status for the Australian population. Some brand loyal consumers may always choose a cereal that does not meet the NPSC, resulting in no change to their Vitamin D status, with this impact likely to be more pronounced in younger age groups than for older age groups as a higher proportion of children consumed cereals that did not meet the NPSC in the 2011–12 NNPAS.

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1 Introduction

A detailed Technological and Nutritional Risk Assessment was prepared for the Approval report for A1090 (FSANZ, 2015), using the most up-to-date food consumption data available at the time for the Australian and New Zealand populations. Since that assessment was prepared more recent Australian food consumption data has become available and a further detailed analysis of breakfast cereal consumption has been undertaken.

1.1 Ready-to-eat breakfast cereal consumption data

Ready-to-eat (RTE) breakfast cereal consumption and its contribution to the dietary intake of total sugars and sodium was estimated using food consumption data (derived from day 1 only) from the most recent National Nutrition Surveys (NNS) for the Australian and New Zealand populations:

- 2002 New Zealand National Children's Nutrition Survey (2002 NZ NCNS): a 24-hour recall survey of 3,275 New Zealand children aged 5–14 years, with a second 24-hour recall undertaken for 15% of respondents.

- 2008–09 New Zealand Adult Nutrition Survey (2008–09 NZ ANS): a 24-hour recall survey of 4,721 New Zealanders aged 15 years and above, with a second 24-hour recall undertaken for 25% of respondents.

- 2011–12 Australian National Nutrition and Physical Activity Survey (2011-12 NNPAS), a component of the 2011–13 Australian Health Survey (AHS): a 24-hour recall survey of 12,153 Australians aged 2 years and above, with a second 24-hour recall undertaken for 64% of respondents.

Only RTE breakfast cereal was included in the calculations for the amount of cereal consumed. RTE breakfast cereal consumption included the following types of breakfast cereal:

- extruded, puffed or flaked cereal
- single or mixed grain cereal (corn, oat, wheat, rice)
- fortified or unfortified cereal, with our without added sugar
- toasted or natural mueslis
- cereal with added fruit and/or nuts
- bran based cereal.

Porridge or similar cooked grain cereal, breakfast bars, cereal 'toppers' and breakfast drinks were excluded from the breakfast cereal consumption estimates.

For the purpose of this document, any reference to breakfast cereal will mean RTE breakfast cereal as defined above.

Estimates of food consumption and contributions of breakfast cereals to total sugars and sodium intakes were derived using FSANZ's custom built dietary modelling computer program, Harvest[1]. All results are based on the first 24-hour recall data only from each of the surveys. The proportion of consumers, mean and 90th percentile (P90) breakfast cereal consumption amounts were derived for each age group assessed for consumers of breakfast cereal only, as defined above.

[1] Harvest replaced FSANZ's previous dietary modelling program, DIAMOND, in 2015.

Mean and P90 total sugars and sodium intake amounts and the contribution from breakfast cereal alone (and with added sugar/honey[2]) to these intakes were derived for each age group assessed in the Australian and New Zealand populations, except for sodium for New Zealand children as it was not reported in the nutrition survey. Where data were available, further analysis of breakfast cereal consumption has been undertaken for both the Australian and New Zealand populations, however for some analyses (e.g. added sugars intake amounts) New Zealand data were not available and only Australian data are provided.

A detailed discussion of the FSANZ methodology and approach to conducting dietary intake assessments is set out in *Principles and Practices of Dietary Exposure Assessment for Food Regulatory Purposes* (FSANZ 2009).

1.2 Age groups assessed

As breakfast cereal consumption varies by age and sex, a range of age/sex groups was selected for this analysis, based on the National Health and Medical Research Council (NHMRC) /New Zealand Ministry of Health (NHMRC, 2006) nutrient reference value age groups that would normally be used for nutrient intake assessments, within the limitations of each Australian and New Zealand nutrition survey (refer to Table 1).

Table 1: Population sub-groups used in this assessment

Country	Survey	Population surveyed	Population age-groups analysed (by sex)
Australia	2011–12 NNPAS	2 years and above	2–3 years 4–8 years 9–13 years 14–18 years 19–30 years 31–50 years 51–70 years 71 years and above
New Zealand	2002 NZ NCNS	5–14 years	5–8 years 9–13 years 14 years
	2008 NZ ANS	15 years and above	15–18 years 19–30 years 31–50 years 51–70 years 71 years and above

[2] For the 2011-12 NNPAS this information was derived using the 'combination code' variable which indicates what foods in the 24-hour recall were consumed together. Similar data were not available for New Zealand nutrition surveys.

2 Breakfast cereal consumption

2.1 Breakfast cereal consumption by age and sex

Estimated proportion of consumers, mean and P90 breakfast cereal consumption was determined for each Australian (

Table 2) and New Zealand (

Table 3) population group assessed. Breakfast cereals were consumed by 36% of Australians aged 2 years and above, 50% of New Zealand children aged 5–14 years and 34% of the New Zealand population aged 15 years and above. More males tended to consume breakfast cereals than females across all age groups assessed in both Australia and New Zealand, except for Australian boys and girls aged 2–3 years (52% compared to 57% consuming breakfast cereals respectively) and New Zealand men and women aged 31–50 years (28% compared to 31%). Boys aged 5–8 years were the most prevalent consumers of breakfast cereal amongst all of the age groups in New Zealand (64%) while girls aged 2–3 years were the most prevalent consumers in Australia (57%). In both Australia and New Zealand the proportion consuming breakfast cereals decreased across the childhood years to adulthood, with an increase in the older age groups of 51–70 years and 71 years and above.

Generally, mean daily intake of breakfast cereals (grams/day) for both Australians and New Zealanders increased as age increased until the older age groups of 51–70 years and 71 years and above were reached, when daily intake decreased. Male consumers had both a greater daily mean and P90 breakfast cereal consumption than females in both countries. For Australian breakfast cereal consumers, the mean and P90 quantities consumed increased with age between 2–3 years and 19–30 years, with the mean and P90 quantities consumed per occasion decreasing with age after this time. New Zealand population groups showed a similar pattern but with the highest mean consumption amounts for 31–50 year olds.

Table 2: Proportion (%) of persons and mean and P90 breakfast cereal consumption (g/day) in Australia

National Nutrition Survey	Sex	NRV Age Group	No. of respondents	% consuming breakfast cereal	Consumption amount of breakfast cereal, for consumers only (g/day)	
					Mean	***P90***
2011–12 NNPAS	Males	2–3 years	165	52	33	60
		4–8 years	401	53	41	80
		9–13 years	435	44	54	102
		14–18 years	373	35	73	138
		19–30 years	1116	32	83	141
		31–50 years	1757	35	70	136
		51–70 years	1335	37	67	119
		71 years & above	462	54	52	104
		Total Males	*6045*	*39*	*64*	*119*
	Females	2–3 years	152	57	24	39
		4–8 years	374	50	32	51
		9–13 years	426	32	47	78
		14–18 years	367	26	57	102
		19–30 years	1072	28	54	94
		31–50 years	1778	28	57	118
		51–70 years	1379	36	51	104
		71 years & above	560	46	38	84
		Total Females	*6108*	*34*	*48*	*92*
	Persons	**Total 2 years & above**	**12153**	**36**	**57**	**108**

Table 3: Proportion (%) of persons and mean and P90 breakfast cereal consumption (g/day) in New Zealand

National Nutrition Survey	Sex	NRV Age Group	No. of respondents	% consuming breakfast cereal	Consumption amount of breakfast cereal, for consumers only (g/day)	
					Mean	***P90***
2002 NZ NCNS	Males	5–8 years	663	64	42	60
		9–13 years	857	52	52	90
		14 years	163	48	68	108
		Total Males	*1683*	*56*	*49*	*90*
	Females	5–8 years	622	48	34	53
		9–13 years	818	41	39	60
		14 years	152	33	45	75
		Total Females	*1592*	*43*	*37*	*60*
	Persons	**Total 5–14 years**	**3275**	**50**	**44**	**75**
2008–09 NZ ANS	Males	15–18 years	177	36	62	120
		19–30 years	465	27	71	134
		31–50 years	813	28	76	120
		51–70 years	609	43	67	120
		71 years & above	207	47	42	72
		Total Males	*2271*	*34*	*67*	*120*
	Females	15–18 years	169	26	45	81
		19–30 years	478	25	59	120
		31–50 years	907	31	55	101
		51–70 years	639	41	43	80
		71 years & above	256	47	34	61
		Total Females	*2450*	*34*	*48*	*96*
	Persons	**Total 15 years & above**	**4721**	**34**	**57**	**108**

2.2 Consumers of breakfast cereal by level of total sugar and consumers who add sugar/honey to their cereal

The total number of consumers of breakfast cereals in Australia was 4,393 (Table 4) and New Zealand was 3,230 (

Table 5). Of these consumers, a large proportion chose varieties of cereal containing <15 g total sugars per 100 g across a majority of the age groups. For Australian breakfast cereal consumers, 46–72% consumed cereals with <15 g total sugars per 100 g; 28–50% consumed cereals with 15–<30 g total sugars per 100 g; and 2–14% consumed cereals ≥30 g total sugars per 100 g. In New Zealand, a similar proportion of consumers chose cereals containing <15 g total sugars per 100 g, however a larger proportion of children and adolescent consumers aged 5–18 years chose cereals ≥30 g total sugars per 100 g than cereals with 15–<30 g total sugars per 100 g. In New Zealand, 30% of teenage boys aged 15–18 years consumed breakfast cereals containing ≥30 g total sugars per 100 g followed by 25% of boys aged 14 years, a higher proportion compared to Australia where the largest proportion of consumers of breakfast cereal high in sugar were teenage boys aged 14–18 years (14%) followed by girls 9–13 years (12%).

Of the 4,393 consumers of breakfast cereals in Australia, 295 added extra sugar/honey to their cereal at the time of consumption (7%), (Table 4). Data of additional sugar/honey added to breakfast cereal was unavailable for New Zealand.

Table 4: Number of consumers of breakfast cereals and proportion (%) by sugar content category and who added extra sugar/honey in Australia

National Nutrition Survey	Sex	NRV Age Group	No. of breakfast cereal consumers	No. of breakfast cereal consumers who add sugar/honey	% of breakfast cereal consumers who add sugar/honey	Proportion (%) of consumers of breakfast cereal by sugar content category[1]		
						<15 g total sugars/100 g	15–<30 g total sugars/100 g	≥30 g total sugars/100 g
2011–12 NNPAS	Males	2–3 years	85	4	5	72	28	5
		4–8 years	213	21	10	64	33	7
		9–13 years	192	18	9	57	37	6
		14–18 years	132	9	7	48	40	14
		19–30 years	354	35	10	53	43	7
		31–50 years	611	62	10	58	39	7
		51–70 years	496	36	7	63	41	2
		71 years & above	250	18	7	71	33	2
		Total males	*2334*			*60*	*38*	*6*
	Females	2–3 years	86	6	7	67	31	3
		4–8 years	186	13	7	57	31	12
		9–13 years	138	8	6	46	44	10
		14–18 years	97	5	5	55	34	11
		19–30 years	295	12	4	46	50	5
		31–50 years	505	21	4	56	47	3
		51–70 years	491	12	2	53	50	2
		71 years & above	259	15	6	64	40	2
		Total females	*2058*			*55*	*44*	*4*
	Persons	**Total 2 years & above**	**4393**	**295**	**7**	**58**	**41**	**5**

[1]Total proportions across sugar categories >100% due to each category of breakfast cereals calculated as a proportion of total individually, and some respondents consuming from, and therefore being counted in, more than one category. Does not include sugar/honey added to cereals.

Table 5: Number of consumers of breakfast cereals and proportion (%) by sugar category in New Zealand

National Nutrition Survey	Sex	NRV Age Group	No. of breakfast cereal consumers	Proportion (%) of consumers of breakfast cereal by sugar category[1]		
				<15 g total sugars/100 g	15–<30 g total sugars/100 g	≥30 g total sugars/100 g
2002 NZ NCNS	Males	5–8 years	424	74	9	23
		9–13 years	444	70	9	24
		14 years	78	76	4	25
		Total males	*946*	*72*	*8*	*23*
	Females	5–8 years	299	78	5	20
		9–13 years	336	78	11	13
		14 years	49	70	14	23
		Total females	*683*	*77*	*9*	*17*
	Persons	**Total 5–14 years**	**1630**	**74**	**9**	**21**
2008–09 NZ ANS	Males	15–18 years	63	65	7	30
		19–30 years	127	72	14	20
		31–50 years	227	66	27	11
		51–70 years	263	60	41	9
		71 years & above	96	77	25	9
		Total males	*777*	*66*	*28*	*13*
	Females	15–18 years	45	54	26	20
		19–30 years	118	50	39	20
		31–50 years	278	46	47	10
		51–70 years	261	55	41	7
		71 years & above	121	59	39	10
		Total females	*822*	*52*	*42*	*11*
	Persons	**Total 15 years & above**	**1600**	**59**	**35**	**12**

[1]Total proportions across sugar categories >100% due to weightings

- Added sugar/honey to breakfast cereal data not available for New Zealand Surveys

2.3 Estimated contribution from breakfast cereals to overall total sugars and sodium intakes

Estimated daily intakes of total sugars and sodium[3] were determined for each population group assessed. Males consumed on average a greater daily intake of both total sugars and sodium than females across all of the age groups in each population group. In Australia, the mean and P90 intakes of total sugars for the whole population increased with age for children, peaking at 134 g/day and 247 g/day respectively for males 14–18 years and at **115 g/day and 182 g/day for females 9–13 years before declining for older age groups (**

[3] Total sodium excludes salt added at the table and in cooking

Table 6). Similarly in New Zealand, the mean and P90 whole population intake of total sugars for all children increased as age increased. Mean intake peaked at 155 g/day and 127 g/day respectively for males and females aged 14 years, while the P90 intake peaked at 261 g/day for 15–18 year males and 251 g/day for females aged 14 years (

Table 7). Mean and P90 intake of total sugars for consumers of breakfast cereals were slightly higher to those for the whole population for Australia and New Zealand children aged 5-14 years and similar for the New Zealand population aged 15 years and above (Tables 6 & 7).

Mean and P90 daily intakes of sodium for the whole population also increased with age in both Australia and New Zealand up until the teenage or young adult age groups. In Australia, mean sodium intake peaked at 3120 mg/day for males 19–30 years and at 2399 mg/day for teenage girls aged 14–18 years before declining, whereas P90 sodium intake peaked at 5328 mg/day for males 14–18 years and at 3994 mg/day for females 19–30 years before declining (

Table 8). In New Zealand, mean and P90 intake of sodium peaked at 3575 mg/day and 5636 mg/day respectively for males aged 19–30 years before declining, whereas, mean and P90 peaked at 2265 mg/day and 3784 mg/day for females 31–70 years (
Table 9).

Overall, the contribution of breakfast cereal to total sugars in the diet (for all survey respondents) was small, ranging between 1–4% in Australia (

Table 10) and New Zealand (
Table 11). In Australia, the addition of extra sugar/honey to breakfast cereal only increased the contribution of the breakfast cereal meal to total sugars by 1% in some of the age groups assessed (

Table 10). For consumers of breakfast cereals, the contribution of breakfast cereals alone to total sugars intake for this group ranges from 2–8% across Australian and New Zealand populations.

Overall, the contribution of breakfast cereals to total sodium intake (for all survey respondents) for the Australian and New Zealand populations ranged from 2–4% (Table 13 and Table 14).

The Australian Bureau of Statistics (ABS, 2015) has undertaken further analysis of the 2011–12 NNPAS, investigating the intake of 'added sugars[4]' in the Australian diet and the proportion contributed by different food groups (ABS, 2016). The proportion of added sugars contributed by breakfast cereals ranged between 2–4% across the age groups in Australia (3% of persons 2 years & above), with 2% of added sugars coming from non-discretionary cereals and <1% from discretionary cereals[5] (Table 12) for the Australian population aged 2 years and above.

[4] The definition for added sugars is based on the definition of 'sugars' in Section 1.1.2—2 of the Australia New Zealand Food Standards Code and includes added forms of dextrose, fructose, sucrose, lactose, sugar syrups and fruit syrups.

[5] Discretionary cereals were defined by the ABS as RTE breakfast cereals containing ≥30 g total sugar/100 g, or ≥ 35 g total sugar/100 g for cereals containing added fruit.

Because these results are based on nutrition survey data collected in 2011–12, and FSANZ is aware that there has been some reformulation of breakfast cereals by manufacturers since that time, these proportions may be slightly overestimated. Equivalent information on intakes of added sugar is not available for New Zealand.

Table 6: Mean and P90 intakes (g/day) of total sugars for the whole population and for consumers of breakfast cereals and of sugars from breakfast cereal alone in Australia

National Nutrition Survey	Sex	NRV Age Group	Intake of total sugars (g/day) (all respondents)		Intake of total sugars (g/day) (breakfast cereal consumers)		Intake of sugars from breakfast cereal alone (g/day) (consumers only)	
			Mean	***P90***	***Mean***	***P90***	***Mean***	***P90***
2011–12 NNPAS	Males	2–3 years	94	150	102	174	3	7
		4–8 years	111	174	119	180	5	16
		9–13 years	125	212	132	232	7	21
		14–18 years	134	247	143	271	11	28
		19–30 years	131	239	142	229	12	30
		31–50 years	119	215	134	227	10	25
		51–70 years	101	181	115	195	9	22
		71 years & above	102	177	109	179	7	20
		Total Males	*116*	*206*	*126*	*212*	*9*	*24*
	Females	2–3 years	89	132	91	148	2	6
		4–8 years	95	145	97	148	4	13
		9–13 years	115	182	126	184	8	19
		14–18 years	109	181	132	247	8	15
		19–30 years	99	175	103	177	9	20
		31–50 years	91	165	104	170	9	21
		51–70 years	87	151	96	155	8	20
		71 years & above	84	147	92	148	5	15
		Total Females	*94*	*164*	*102*	*167*	*7*	*18*
	Persons	**Total 2 years & above**	**105**	**184**	**115**	**191**	**8**	**21**

Table 7: Mean and P90 intakes (g/day) of total sugars for the whole population and for consumers of breakfast cereals and of sugars from breakfast cereal alone in New Zealand

National Nutrition Survey	Sex	NRV Age Group	Intake of total sugars (g/day) (all respondents)		Intake of total sugars (g/day) (breakfast cereal consumers)		Intake of sugars from breakfast cereal alone (g/day) (consumers only)	
			Mean	***P90***	***Mean***	***P90***	***Mean***	***P90***
2002 NZ NCNS	Males	5–8 years	117	184	125	194	9	22
		9–13 years	139	232	148	240	10	19
		14 years	155	251	170	278	11	27
		Total Males	*132*	*223*	*140*	*226*	*10*	*22*
	Females	5–8 years	110	176	118	176	6	15
		9–13 years	119	203	125	208	6	15
		14 years	127	184	123	192	8	19
		Total Females	*116*	*192*	*122*	*194*	*6*	*15*
	Persons	**Total 5–14 years**	**124**	**206**	**132**	**211**	**8**	**19**
2008–09 NZ ANS	Males	15–18 years	143	261	154	254	7	18
		19–30 years	148	253	151	250	8	21
		31–50 years	132	228	151	236	11	23
		51–70 years	108	180	126	195	10	22
		71 years & above	105	171	116	180	5	14
		Total Males	*127*	*221*	*126*	*212*	*9*	*21*
	Females	15–18 years	118	211	130	204	7	18
		19–30 years	125	219	144	222	11	25
		31–50 years	98	166	114	195	9	20
		51–70 years	95	156	103	163	7	16
		71 years & above	84	134	92	141	5	13
		Total Females	*102*	*170*	*102*	*167*	*8*	*18*
	Persons	**Total 15 years & above**	**114**	**197**	**115**	**191**	**8**	**20**

Table 8: Mean and P90 intakes (mg/day) of sodium for Australian populations

National Nutrition Survey	Sex	NRV Age Group	Intake of sodium (mg/day) (all respondents)	
			Mean	***P90***
2011–12 NNPAS	Males	2–3 years	1517	2427
		4–8 years	2236	3649
		9–13 years	2656	4028
		14–18 years	3117	5328
		19–30 years	3120	5179
		31–50 years	2915	4870
		51–70 years	2510	4252
		71 years & above	2217	3689
		Total Males	*2721*	*4567*
	Females	2–3 years	1448	2287
		4–8 years	1868	2751
		9–13 years	2263	3651
		14–18 years	2399	3937
		19–30 years	2305	3994
		31–50 years	2154	3707
		51–70 years	1972	3223
		71 years & above	1773	2933
		Total Females	*2092*	*3569*
	Persons	**Total 2 years & above**	**2405**	**4135**

Table 9: Mean and P90 intakes (mg/day) of sodium for New Zealanders aged 15 years and above

National Nutrition Survey	Sex	NRV Age Group	Intake of sodium (mg/day) (all respondents)	
			Mean	***P90***
2008–09 NZ ANS	Males	15–18 years	3381	6024
		19–30 years	3575	5636
		31–50 years	3086	5051
		51–70 years	2563	4237
		71 years & above	2198	3488
		Total Males	*2988*	*5202*
	Females	15–18 years	2244	3711
		19–30 years	2161	3744
		31–50 years	2265	3784
		51–70 years	1877	3164
		71 years & above	1663	2676
		Total Females	*2079*	*3462*
	Persons	**Total 15 years & above**	**2516**	**4367**

Table 10: Proportion (%) of total sugars intakes contributed by breakfast cereal alone and breakfast cereal with additional sugar/honey in Australia for the total population and consumers of breakfast cereals only

National Nutrition Survey	Sex	NRV Age Group	% of total sugars from breakfast cereal alone (all respondents)	% of total sugars from breakfast cereal with additional sugar/ honey (all respondents)	% of total sugars from breakfast cereal alone (breakfast cereal consumers only)
2011–12 NNPAS	Males	2–3 years	2	2	3
		4–8 years	3	3	5
		9–13 years	2	3	5
		14–18 years	3	3	8
		19–30 years	3	3	8
		31–50 years	3	3	8
		51–70 years	3	4	8
		71 years & above	3	4	6
		Total Males	*3*	*4*	*7*
	Females	2–3 years	2	2	3
		4–8 years	2	3	5
		9–13 years	2	3	7
		14–18 years	2	2	6
		19–30 years	2	3	8
		31–50 years	3	3	8
		51–70 years	3	3	8
		71 years & above	3	3	6
		Total Females	*3*	*3*	*7*
	Persons	**Total 2 years & above**	**3**	**3**	**7**

Table 11: Proportion (%) of total sugars intakes contributed by breakfast cereal alone in New Zealand for the total population and consumers of breakfast cereal only

National Nutrition Survey	Sex	NRV Age Group	% of total sugars from breakfast cereal alone to total sugars (all respondents)	% of total sugars from breakfast cereal alone (breakfast cereal consumers only)
2002 NZ NCNS	Males	5–8 years	3	3
		9–13 years	2	5
		14 years	2	5
		Total Males	*2*	*8*
	Females	5–8 years	2	8
		9–13 years	1	8
		14 years	1	8
		Total Females	*1*	*6*
	Persons	**Total 5–14 years**	**2**	**7**
2008–09 NZ ANS	Males	15–18 years	2	5
		19–30 years	2	5
		31–50 years	2	7
		51–70 years	4	8
		71 years & above	2	4
		Total Males	*2*	*7*
	Females	15–18 years	2	5
		19–30 years	2	8
		31–50 years	3	8
		51–70 years	3	7
		71 years & above	3	6
		Total Females	*3*	*7*
	Persons	**Total 15 years & above**	**3**	**7**

Table 12: Proportion (%) of total added sugars intakes contributed by breakfast cereal alone and % of total added sugars intakes from discretionary & non-discretionary breakfast cereals in Australia for the total population

National Nutrition Survey	Sex	NRV Age Group	% of added sugars from breakfast cereals[1]		
			All cereals	Discretionary cereals[2]	Non-Discretionary cereals[2]
2011–12 NNPAS	Males	2–3 years	3	-	-
		4–8 years	4	-	-
		9–13 years	4	-	-
		14–18 years	3	-	-
		19–30 years	3	-	-
		31–50 years	3	-	-
		51–70 years	3	-	-
		71 years & above	4	-	-
		Total Males	*3*	*1*	*2*
	Females	2–3 years	3	-	-
		4–8 years	4	-	-
		9–13 years	3	-	-
		14–18 years	2	-	-
		19–30 years	3	-	-
		31–50 years	3	-	-
		51–70 years	3	-	-
		71 years & above	4	-	-
		Total Females	*3*	*<1*	*3*
	Persons	**Total 2 years & above**	**3**	**<1**	**2**

[1] 'added sugars' refers to the sugar added in the manufacturing of the breakfast cereal, not the sugar added by the consumer prior to consumption. The definition for added sugars is based on the definition of 'sugars' in Section 1.1.2—2 of the Australia New Zealand Food Standards Code and includes added forms of dextrose, fructose, sucrose, lactose, sugar syrups and fruit syrups.

[2] Proportion of discretionary/non-discretionary breakfast cereals for individual NRV age group is unavailable

Table 13: Proportion (%) of total sodium intakes contributed by breakfast cereal in Australia for the total population

National Nutrition Survey	Sex	NRV Age Group	% contribution of sodium from breakfast cereal to sodium intake
2011–12 NNPAS	Males	2–3 years	4
		4–8 years	3
		9–13 years	3
		14–18 years	2
		19–30 years	2
		31–50 years	2
		51–70 years	2
		71 years & above	3
		Total Males	*2*
	Females	2–3 years	3
		4–8 years	3
		9–13 years	2
		14–18 years	2
		19–30 years	2
		31–50 years	2
		51–70 years	2
		71 years & above	3
		Total Females	*2*
	Persons	**Total 2 years & above**	**2**

Table 14: Proportion (%) of total sodium intakes contributed by breakfast cereal in New Zealand

National Nutrition Survey	Sex	NRV Age Group	% contribution of sodium from breakfast cereal to total sodium
2008–09 NZ ANS	Males	15–18 years	3
		19–30 years	2
		31–50 years	3
		51–70 years	3
		71 years & above	4
		Total Males	*3*
	Females	15–18 years	2
		19–30 years	2
		31–50 years	2
		51–70 years	3
		71 years & above	3
		Total Females	*3*
	Persons	**Total 15 years & above**	**3**

3 Application of the NPSC to breakfast cereals

3.1 Consumption of breakfast cereals that did not meet the NPSC

Following a request from FSANZ, a number of breakfast cereal manufacturers provided details of their product ranges, identifying which breakfast cereal products did not meet the NPSC (FSANZ, 2013). For those companies that provided information, approximately 15–25% of products did not meet the NPSC. One company advised that all of their product range met the NPSC.

Descriptions of products that did not meet the NPSC were matched to 8–digit breakfast cereal survey food codes from the 2011–12 NNPAS using details on inclusions and exclusions for each breakfast cereal code contained in the AUSNUT 2011–13 Food Details File (FSANZ, 2014), noting that NNPAS data was collected between 2011–12 and therefore may not specifically represent current products. Additional 8-digit breakfast cereal codes were also identified as likely to not meet the NPSC where a reasonable assumption could be made that they were similar to specific products manufacturers identified as not meeting the NPSC.

Eight-digit breakfast cereal food codes identified as not meeting or likely to not meet the NPSC were identified and the proportion of consumers, mean and P90 breakfast cereal consumption amounts for cereals meeting the NPSC (85% of all breakfast cereals) and not meeting the NPSC (15%) were also derived.

While information on breakfast cereals that did not meet the NPSC were provided for both Australian and New Zealand products, a similar quantitative analysis was not undertaken for the New Zealand population as insufficient information was available to match current breakfast cereal products to New Zealand nutrition survey foods.

Overall, 3% of Australians aged 2 years and above reported consuming breakfast cereals likely to not meet the NPSC (Table 15). The proportion of consumers of cereals that did not meet the NPSC decreased as age increased and young children were more likely to consume this type of cereal (9% and 10% of children aged 2–3 years and 4–8 years, respectively) than older Australians (2% of Australians aged 31 years and above). Conversely, 33% of Australians aged 2 years and above reported consuming breakfast cereals that met the NPSC. The proportion of Australians consuming breakfast cereals that met the NPSC showed a similar pattern to the proportion consuming all breakfast cereals.

Mean breakfast cereal consumption was similar for all cereals, cereals that met the NPSC and cereals that did not meet the NPSC for the younger age groups aged 2–3 years, 4–8 years and 9–13 years, ranging from 27 g/day (mean consumption of cereals not meeting the NPSC for consumers aged 2–3 years) to 51 g/day (mean consumption of all cereals and cereals meeting the NPSC for consumers aged 9–13 years). For Australians aged 14–18 and older, mean consumption was similar between all cereals and cereals meeting the NPSC (ranging from 45–71 g/day), while mean consumption of cereals that did not meet the NPSC was usually less across the same age groups (ranging from 26–53 g/day).

High (P90) breakfast cereal consumption was similar across all age groups between all breakfast cereals and cereals meeting the NPSC. Overall, P90 consumption of cereals that did not meet the NPSC was lower across all age groups compared to P90 consumption of all cereals, except for children aged 2–3 years where P90 consumption was higher (68 g/day) compared to consumers of all breakfast cereals (51 g/day).

Table 15: Proportion (%) of Australian consumers and mean and P90 breakfast cereal consumption (consumers only) for all breakfast cereals, breakfast cereals that met the NPSC, and breakfast cereals that did not meet the NPSC (2011–12 NNPAS)

NRV Age Group	No. of Respondents	All breakfast cereals			Breakfast cereals that met the NPSC (85%)			Breakfast cereals that did not meet the NPSC (15%)		
		% consuming breakfast cereal	Consumption of breakfast cereal, consumers only (g/day)		% consuming breakfast cereal	Consumption of breakfast cereal, consumers only (g/day)		% consuming breakfast cereal	Consumption of breakfast cereal, consumers only (g/day)	
			Mean	P90		Mean	P90		Mean	P90
2–3 years	317	54	28	51	46	28	48	9	27	68
4–8 years	775	52	37	64	42	37	64	10	33	56
9–13 years	862	38	51	91	33	51	91	6	48	80
14–18 years	740	31	66	122	26	69	122	5	47	92
19–30 years	2188	30	70	136	27	71	136	3	53	104
31–50 years	3535	32	64	128	29	65	126	2	49	95
51–70 years	2714	36	59	117	35	59	117	2	49	122
71 years & above	1023	50	45	92	48	46	92	2	26	50
Total 2 years and above	12153	36	57	108	33	58	111	3	44	92

Note: proportion consuming breakfast cereal that met the NPSC and proportion consuming breakfast cereals that did not meet the NPSC may not total the proportion consuming all breakfast cereals as some consumers may have reported consuming both types of cereal on the day of the survey, and figures have also been rounded.

3.2 Consumption of breakfast cereals that did not meet the NPSC by SEIFA quintile

When undertaking the 2011–13 AHS, the ABS collected information on the Socio-economic Indexes for Areas (SEIFAs) for each respondent (ABS, 2013). The SEIFA indexes allow ranking of regions/areas that provide a method of determining the level of social and economic well-being in that region. SEIFA quintiles are numbered from 1 or lowest (most disadvantaged), to 5 or highest (least disadvantaged).

The index used for the NNPAS component of the AHS was the 2006 Index of Relative Socio-economic disadvantage. This is the SEIFA index most frequently used for analysis of health characteristics. SEIFA quintiles were derived for area-based groupings. As all area-based groupings are not equal in size and because the AHS samples are not selected to ensure an equal sample distribution at these lower level geographical groupings, this method does not result in an equal number of people (either records or weighted estimates) in each quintile. It should be noted that this index relates to the area in which the survey respondent lived, and is not necessarily indicative of an individual respondent's socio-economic status (i.e. a respondent may live in an area with a low SEIFA index but may actually have a higher socio-economic status than the index suggests, and *vice versa*).

As can be seen in Table 16, there is little difference in the proportion of Australians consuming cereals that did not meet the NPSC across SEIFA quintiles (3–4% of consumers across all quintiles), and no apparent trend.

Table 16: Number of consumers of breakfast cereals that did not meet the NPSC that fall within each SEIFA quintile, and proportion of consumers to respondents (2011–12 NNPAS)

	Consumers of breakfast cereals that did not meet the NPSC only	
SEIFA Quintile	No. of Consumers of breakfast cereals that did not meet the NPSC	Proportion of Consumers of breakfast cereals that did not meet the NPSC to Respondents[1] (%)
1st (most disadvantaged)	89	4
2nd	70	3
3rd	97	4
4th	62	3
5th (least disadvantaged)	96	3

[1] A respondent is any person included in the NNPAS, whether or not they consumed breakfast cereal that did not meet the NPSC

3.3 Potential impact on public health from applying the NPSC to breakfast cereals

In the Technological and Nutrition Risk Assessment prepared for Application A1090 four scenarios of breakfast cereal consumption and consequent increases in vitamin D intakes should cereals be voluntarily fortified with vitamin D, were considered. Potential increases in vitamin D intake from breakfast cereal were then used to estimate potential increases in blood serum vitamin D levels (as determined in the most recent Australian and New Zealand health surveys) which provided the best estimate of population vitamin D status.

The four breakfast cereal consumption scenarios related to mean and P90 consumption of breakfast cereals assuming a consumer may always choose the same brand of breakfast cereal (mean and high consumer brand loyal scenarios) or choose a variety of cereals (mean or P90 consumer market share (35%) scenarios). Analysis was based on the then available 2007 Australian National Children's Nutrition and Physical Activity Survey (for children aged 2–16 years) and the 1995 National Nutrition Survey (for Australians aged 17 years and above), the 2002 NZ NCNS and 2008–09 NZ ANS.

Further analysis of breakfast cereal consumption based on the 2011–12 NNPAS indicates that, should voluntary fortification of breakfast cereals with vitamin D be limited to only those cereals that meet the NPSC, overall there would be very little impact on predicted increases in vitamin D status for the Australian population compared to if all cereals were permitted to be fortified.

3.3.1 Brand loyal scenarios

For mean or high consumer brand loyal scenarios, representing consumers who always chose the same breakfast cereal that meets the NPSC and is fortified with vitamin D, mean and high consumption amounts are similar between consumers of any breakfast cereal and those who consume cereals that meet the NPSC. Therefore, predicted increases in vitamin D status would be the same. However, across the Australian population there will be a proportion of brand loyal consumers choosing a cereal that does not meet the NPSC (approximately 3%) whose Vitamin D status would not change (refer to Table 15). However, as we have no information on long term consumption patterns it is not possible to relate this to an overall population change in Vitamin D status for different age groups, though it is noted that a higher proportion of children consumed cereals that did not meet the NPSC than older age groups in the 2011–12 NNPAS.

3.3.2 Market share scenarios

For mean and P90 consumer market share scenarios, the overall public health impact of limiting voluntary fortification to those cereals that meet the NPSC would be small. If overall market uptake of voluntary fortification of breakfast cereals with vitamin D is estimated to be 35% (based on information provided in A1090) across all breakfast cereals, and 15% of all cereals did not meet the NPSC, then the market share scenario for cereals that meet the NPSC reduced to 30% (35% of 85% that meet the NPSC), a reduction of 5%. So, for consumers who choose a variety of breakfast cereals, some of which may be fortified with vitamin D, the chance of choosing a fortified cereal is reduced from approximately 35% to 30%.

Expected increases in serum 25-hydroxy vitamin D concentration (25OHD) were recalculated based on a 30% market share scenario, using the methodology established in the A1090 Technological and Nutrition Risk Assessment (Table 17 and Table 18). Overall, the predicted effect on the mean population serum 25OHD concentration from applying the NPSC to the permission to fortify cereals with Vitamin D is expected to be minimal with a reduction for high consumers of up to 0.8–0.9 nM for children aged 12–17 years and 1.2 nM for adults 18 years and above. This is equivalent to a reduction of <2% of the potential increase in mean serum vitamin D status previously predicted for Australian population groups assessed.

While a similar analysis was not undertaken for the New Zealand population, it is likely there would be a similar impact on public health in relation to population vitamin D status, compared to the Australian population, should voluntary fortification be limited to cereals that meet the NPSC.

It is noted that a greater proportion of the New Zealand population consume breakfast cereals with ≥30 g total sugars/100 g, compared to the Australian population and it is likely that many of these may not meet the NPSC.

Table 17: Predicted vitamin D intake and mean serum 25OHD concentrations in Australian children (12–17 years) consuming vitamin D fortified breakfast cereal

	Dietary intake	**Serum 25OHD concentration (nM)**		
Modelling scenario	*Vitamin D intake from cereal (µg/day)* [a]	*Calculated increase in serum 25OHD*	*Mean baseline* [b]	*Predicted mean with fortified cereal*
(1) Mean consumer, brand loyal	7.2–8.8	8.6–10.6	69.0	77.6–79.6
(2) High consumer, brand loyal	12.8–16.3	15.4–19.5	69.0	84.4–88.5
(3) Mean consumer, market share; all breakfast cereal (35%)	2.5–3.1	3.0–3.7	69.0	72.0–72.7
(4) High consumer, market share; all breakfast cereal (35%)	4.5–5.7	5.4–6.8	69.0	74.4–75.8
(5) Mean consumer market share; meet NPSC breakfast cereal (30%) [c]	2.2–2.6	2.6–3.1	69.0	71.6–72.1
(6) High consumer market share; meet NPSC breakfast cereal (30%) [c]	3.8–4.9	4.6–5.9	69.0	73.6–74.9

[a] *Values are the intake range for age groups 9–13 years and 14–16 years whereas mean serum 25OHD concentration was reported for the age group 12–17 years.*

[b] *Source 2011–13 Australian Health Survey(ABS 2013) . Mean serum 25OHD concentration as reported for 12–17 years. The standard deviation was calculated from the reported interquartile range (56.0, 80.4) to be 9.0 (with rounding).*

[c] *35% market share of breakfast cereals that meet the NPSC (85% of all breakfast cereals)*

Table 18: Predicted vitamin D intake and mean serum 25OHD concentrations in Australian adults (18 years and above) consuming vitamin D fortified breakfast cereal

	Dietary intake	**Serum 25OHD concentration (nM)**		
Modelling scenario	*Vitamin D intake from cereal (µg/day)* [a]	*Calculated increase in serum 25OHD*	*Mean baseline* [b]	*Predicted mean with fortified cereal*
(1) Mean consumer, brand loyal	9.9	11.9	65.7	77.6
(2) High consumer, brand loyal	18.8	22.6	65.7	88.3
(3) Mean consumer, market share; all breakfast cereal (35%)	3.5	4.2	65.7	69.9
(4) High consumer, market share; all breakfast cereal (35%)	6.6	7.9	65.7	73.6
(5) Mean consumer market share; meet NPSC (30%) [c]	3.0	3.6	65.7	69.3
(6) High consumer market share; meet NPSC (30%) [c]	5.6	6.7	65.7	72.4

[a] *Values taken from the 17 years and above population group since this age range is most comparable to AHS age group (18 years and above) for which serum 25OHD was reported.*

[b] *Source 2011–13 Australian Health Survey (ABS 2014a). Mean serum 25OHD concentration as reported for 18 years and above. The standard deviation was calculated from the reported interquartile range (50.0, 80.0) to be 11.1 (with rounding).*

[c] *35% market share of breakfast cereals that meet the NPSC(85% of all breakfast cereals)*

4 Summary

The most recent national nutrition survey data for Australia and New Zealand indicates that:

- Approximately one third of Australians aged 2 years and above (36%) and New Zealanders aged 15 years and above (34%), and half (50%) of New Zealand children aged 5–14 years consume breakfast cereals. More males tend to consume breakfast cereals than females in both Australia and New Zealand.

- Generally, there are a higher proportion of consumers of breakfast cereals in younger age groups. The proportion consuming cereals declines as age increases and then increases again in older population groups.

- Mean and P90 consumption amounts of breakfast cereals are higher for males than females across all population groups in Australia and New Zealand.

- The majority of Australian breakfast cereal consumers (58%) chose cereals with <15 g total sugars/100 g of, while 5% chose cereals with ≥30 g total sugars/100 g. Similarly, more New Zealand children aged 5–14 years and the population aged 15 years and above chose breakfast cereals with <15 g total sugars/100 g (74% and 59% respectively) compared to those choosing breakfast cereals with ≥30 g total sugars/100 g (21% and 12%, respectively).

- Breakfast cereals contribute from 1–4% of total sugars and 2–4 % of total sodium intakes across all population groups in Australia and New Zealand.

- Breakfast cereals contribute between 2–4% to added sugar intakes across the Australian population groups assessed. For the whole population aged 2 years and above 2% of added sugar comes from non-discretionary cereals and <1% from discretionary cereals (≥30 g total sugars/100 g).

- Approximately 7% of Australian breakfast cereal consumers added sugar or honey to their cereal. The addition of sugar or honey to breakfast cereal increased the contribution to total sugars from breakfast cereals by up to 1% for some population groups (Australia only).

- Approximately 15% of cereals are likely to not meet the NPSC at the time of writing. Three percent of the Australian population reported consuming breakfast cereals likely to not meet the NPSC.

- Australian children aged 2–3 years (9%) and 4–8 years (10%) were more likely to consume breakfast cereals that did not meet the NPSC than older Australians aged 31 years and above (2%).

- There was little difference across SEIFA quintiles in the proportion of consumers of breakfast cereals that did not meet the NPSC.

- Australian population mean breakfast cereal consumption was similar for all cereals, cereals that met the NPSC only and cereals that did not meet the NPSC only. Overall, P90 consumption of cereals that did not meet the NPSC only was lower compared to high consumption of all cereals and cereals that meet the NPSC only.

- Should voluntary fortification of breakfast cereals with Vitamin D be limited to only those cereals that met the NPSC, there would very little impact on predicted increases in vitamin D status for the Australian population.

- For brand loyal consumers who always choose a cereal that does not meet the NPSC their Vitamin D status would not change, however, as we have no information on long term consumption patterns it is not possible to relate this to an overall population change in Vitamin D status for different age groups. However, it is noted that a higher proportion of children consumed cereals that did not meet the NPSC than older age groups in the 2011–12 NNPAS.

5 References

ABS (2013) Australian Health Survey: Biomedical Results for Nutrients, 2011 - 2012. 4364.0.55.006. Australian Bureau of Statistics, Canberra.

ABS (2016) *Household and Family Characteristics- SEIFA deciles/quintiles.* http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4363.0.55.001Chapter6352011-13

ABS (2016) *Australian Health Survey: Consumption of Added sugars, 2011–12* http://www.ausstats.abs.gov.au/Ausstats/subscriber.nsf/0/8520D6A4B5E6C6EBCA257FA10023056B/$File/4364.0.55.011 - consumption of added sugars.xls

FSANZ (2009) *Principles and Practices of Dietary Exposure Assessment for Food Regulatory Purposes*. http://www.foodstandards.gov.au/science/exposure/documents/Principles%20_%20practices%20exposure%20assessment%202009.pdf

FSANZ (2013) *Australia New Zealand Food Standards Code – Standard 1.2.7 – Nutrition, health and related claims (version 162).* https://www.legislation.gov.au/Details/F2016C00161

FSANZ (2015) *Technological and Nutritional Risk Assessment (Supporting Document 1, SD1) to the Approval Report for Application A1090 – voluntary addition of Vitamin D to breakfast cereal.* http://www.foodstandards.gov.au/code/applications/Pages/A1090-Addition-of-Vitamin-D-to-Breakfast-Cereal.aspx

NHMRC (2006) *Nutrient Reference Values for Australia and New Zealand*, Commonwealth of Australia. https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n35.pdf