Food consumption patterns for women of child bearing age with different folic acid intakes (FSANZ April 2007)

The choice of a food vehicle for fortification with folic acid has been the subject of considerable discussion during the development of P295 Consideration of mandatory fortification with folic acid. One issue raised by the food industry at recent consultation meetings was that of exploring the potential for identifying food vehicles that would more effectively target women of child bearing age who currently have low folic acid intakes.

What are the differences in current folic acid intakes for the target group?

We can predict current folic acid intakes for all population groups aged 2 years and above by using current information on the folic acid content of foods, the market share of fortified products and what foods people eat, using the 1995/97 National Nutrition Survey data. FSANZ recognises the NNS data are now old and have made some adjustments to take account of completely new foods in the market place, such as formulated beverages and ready to drink teas. Other trends, such as changes in the type of bread or milk consumed, have not been included in the models. In terms of consumption of fortified product a market weighted folic acid concentration level was used where the NNS records did not specify whether a product with permissions to fortify was fortified or not.

To assess differences between low and high folic acid consumers we divided the survey respondents into five groups or 'quintiles of intake', quintile 1 being the low folic acid intake group (bottom 20% women of child bearing age), quintile 5 being the high folic acid intake group (top 20% women of child bearing age).

There was a marked difference in mean folic acid intakes for those women of child bearing age in the quintile 1 low folic acid intake group compared to the quintile 5 high folic acid group (Australia: 54 µg folic acid /day compared to 277 µg folic acid /day; New Zealand: 31 µg folic acid /day compared to 253 µg folic acid /day)[1].

What foods are currently the main sources of folic acid for the low and high folic acid intake groups of women of child bearing age?

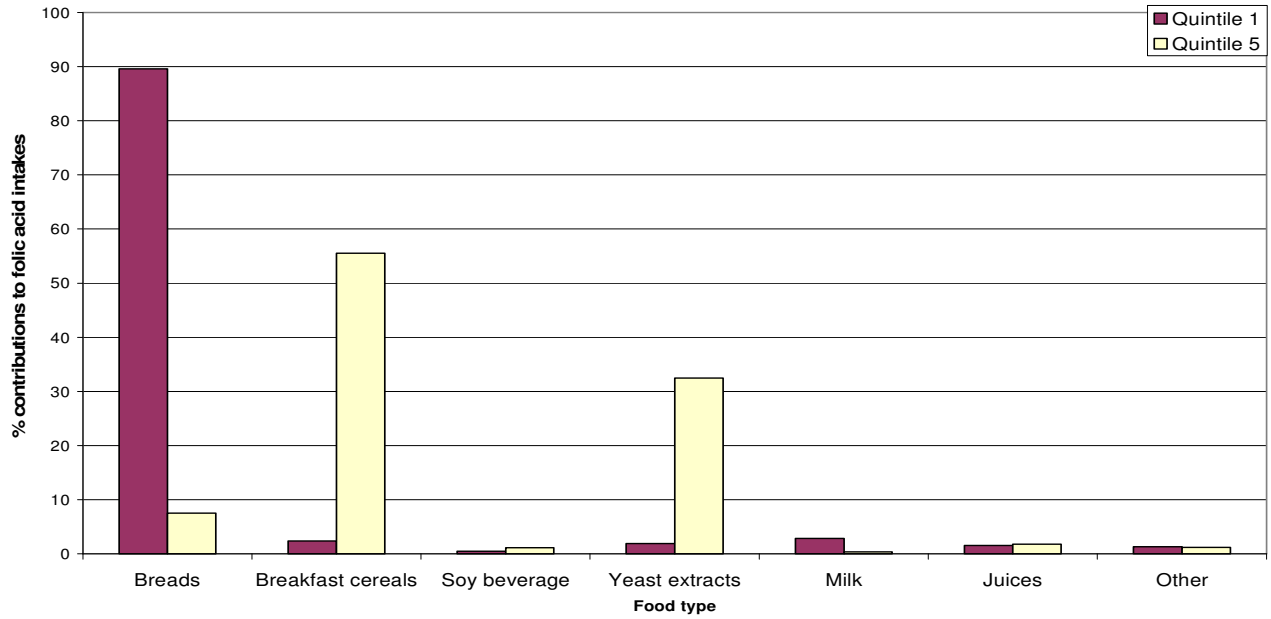
Women of child bearing age in the low and high folic acid intake groups did appear to source their folic acid from different foods. For Australian women bread was currently the main source for low folic acid consumers (49 µg folic acid /day or 90% total) whilst breakfast cereals, yeast extracts and bread were the main sources for high folic acid consumers (breakfast cereals 155 µg folic acid /day or 56% total; yeast extracts 89µg folic acid /day or 32% total; bread 20 µg folic acid /day or 7% total), see Figure 1.

Results for New Zealand women were similar for the high folic acid consumers with breakfast cereals (150 µg folic acid /day or 59% total), yeast extracts (101 µg folic acid /day or 40% total) being the main contributors to folic acid intakes, noting that very few breads are currently fortified in New Zealand. Unlike the Australian women, there were no consumers of foods containing folic acid in the low folic acid intake group of women of child bearing age in

[1] Second day adjusted folic acid intakes, New Zealand women in the low folic acid intake group reported no consumption of foods containing folic acid in day 1 records, the second day adjustment resulted in mean intakes of 31 µg folic acid/day for this group.

New Zealand in the day 1 records due to the fact that fewer fortified foods are currently available in New Zealand.

Figure 1: Contribution of various foods to current folic acid intakes for Australian women aged 16-44 years, for low and high consumers of folic acid (1995 NNS)



Were there differences in food consumption patterns between women of child bearing age in the low and high folic acid intake groups?

Yes there were, both for foods containing folic acid and for all foods.

Folic acid containing foods
The main difference was that a higher proportion of women in the high folic acid intake group consumed all foods containing folic acid compared to the low folic acid intake group. Differences were more marked for breakfast cereals and yeast extracts.

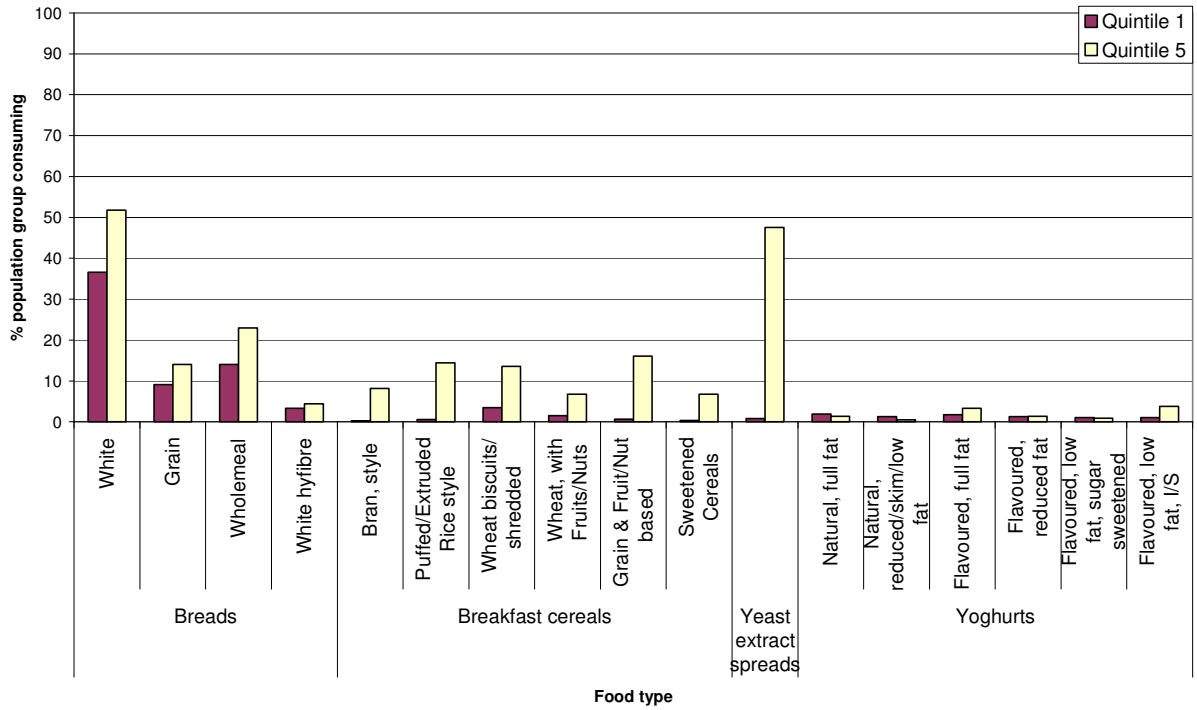
All foods
The foods consumed by the highest proportion of women in both low and high folic acid intake groups were bread and milk of various types (>80%)[2]; for the high folic acid consumers close to 50% of women of child bearing age also ate yeast extracts (see Figure 2). Breakfast cereals were consumed by less women than bread or milk, but when they were consumed they made a significant contribution to folic acid intakes.

Amount of food consumed
Women of child bearing age in the high folic acid intake group generally ate more food in each major food group than those in the low folic acid intake group in both countries, this difference obviously contributing to some of the observed difference in folic acid intakes. The only exceptions to this for Australian women were for cola soft drinks, white wine, coffee and yoghurt (see Figure 3, Attachment 1); and, for NZ women in the low folic acid group exceptions were for yoghurt, fruit juice, ice cream and rye/heavy grain breads (see Attachment 1).

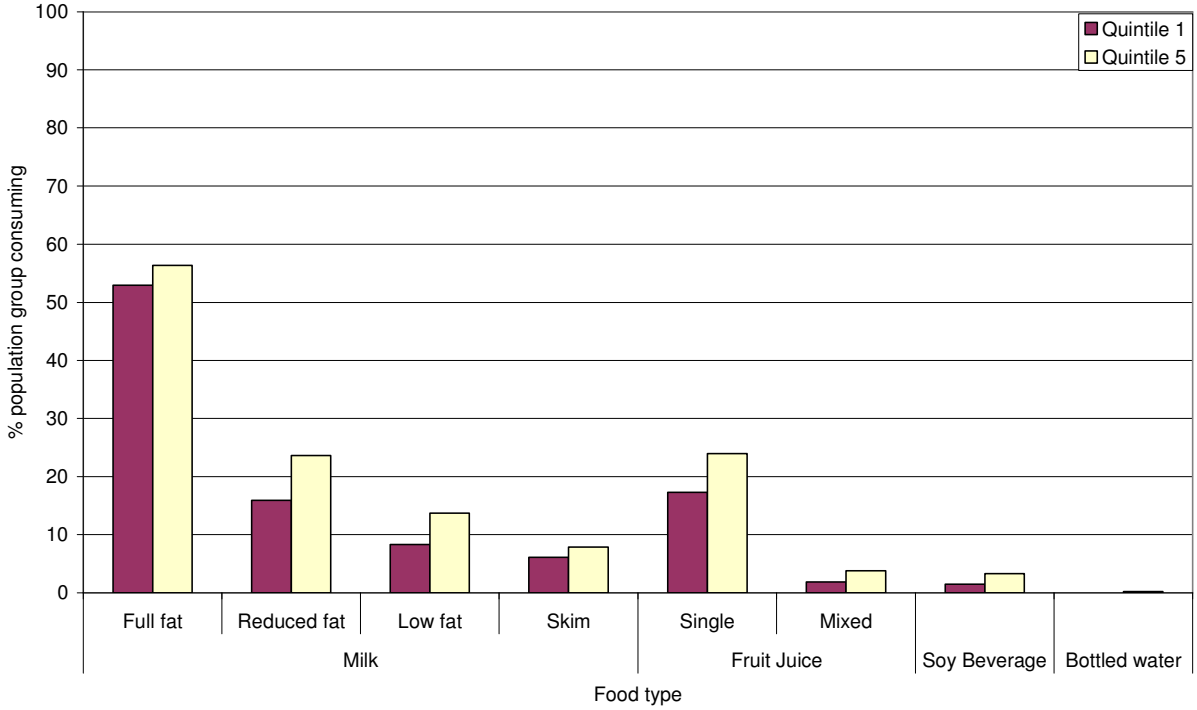
[2] For all bread and all milk types combined (see Sec 4.2, p74 FSANZ Issues Paper)

Figure 2: Proportion of Australian women aged 16-44 years that consume various foods and beverages

a. Foods



b. Beverages



What changes have occurred in bread and milk consumption since 1995/97?

Looking at bread and milk consumption in more detail, Australian women in both quintiles of folic acid intake were more likely to eat white bread than grain or whole meal bread in 1995, though recent bread sale data would indicate this may have changed since then with more grain bread now likely to be consumed. The picture was slightly different in New Zealand with a much lower proportion of New Zealand women in the low folic acid intake group reporting consuming white bread in 1997 than Australian women in the same quintile of low intakes (Australia 37%, NZ 17%). Recent data from the Australian dairy industry and the Roy Morgan Single Source Survey for 2001-2006 also indicate that the proportion of women consuming full fat milk has decreased with that for reduced/low fat milks increasing since 1995/97 (eg 50-60% target group reported consuming full fat milk in 1995, 48% in the 2006 Roy Morgan Single Source Survey; 36% reported consuming reduced/low fat milk in 1995 compared to 42% in 2006)[3]. It is not known if the low and high folic acid groups would now behave differently in terms of the type of bread or milk consumed, however overall the amounts consumed in the broad food groups do not appear to have changed markedly[4].

Was there a food(s) that women of child bearing age who currently have low folic acid intakes consumed in greater quantities than those with high folic acid intakes that could be targeted for folic acid fortification?

No, based on the evidence assessed, there did not appear to be such a food that was feasible to fortify. The one possible exception was low or reduced fat yoghurt, which was consumed in greater amounts by women in the low folic acid intake group in both countries, but by a relatively low proportion overall of the women of child bearing age so did not meet the criteria for a suitable fortification vehicle[5]. Current sales data indicate this proportion may have increased since 1995/97. The 2006 Roy Morgan Survey indicates that <40% women of child bearing age reported consuming yoghurt of some type in the last 7 days (<20% in 1995 in last 24 hours), the proportion consuming reduced or low fat yoghurt is unknown but will be lower than these figures.

The only other foods that were consumed by more women in Australia in the low folic acid intake groups were cola soft drinks, wine, and coffee, which are not considered suitable food vehicles for folic acid fortification for women of child bearing age. The foods consumed by more women in New Zealand in the low folic acid intake groups were rye and heavy breads, fruit juices, regular soft drinks and ice cream. Bread and fruit juices already have voluntary permissions to fortify, soft drinks and ice cream are not considered suitable food vehicles for folic acid fortification for women of child bearing age.

[3] See Sec 4.2, p75 FSANZ Issues Paper, note some women could have consumed both types of milk.
[4] See Sec 3, p70 FSANZ Issues Paper
[5] See Sec 4.2, p72 FSANZ Issues Paper for criteria. Full fat yoghurt was also consumed in larger amounts by the low folic acid intake group but this is not considered a suitable vehicle for fortification as a greater proportion of children consume yoghurt than women of child bearing age and they are more likely to consume full fat yoghurt than reduced or low fat yoghurt (see Sec 4.2, p75 FSANZ Issues Paper).

Were the women in the high folic acid intake group currently consuming enough folic acid?

No, not all of them as current mean folic acid intakes for women of child bearing age were still well below the NHMRC target of 400 µg folic acid/day (Australia: 277 µg folic acid/day; New Zealand: 253 µg folic acid /day). Results indicate that only 5% Australian and 3% New Zealand women of child bearing age would meet the NHMRC target without the use of folic acid supplements[6].

What impact would the mandatory fortification of wheat flour for bread making purposes in Australia and bread in New Zealand have on the low and high folic acid intake groups?

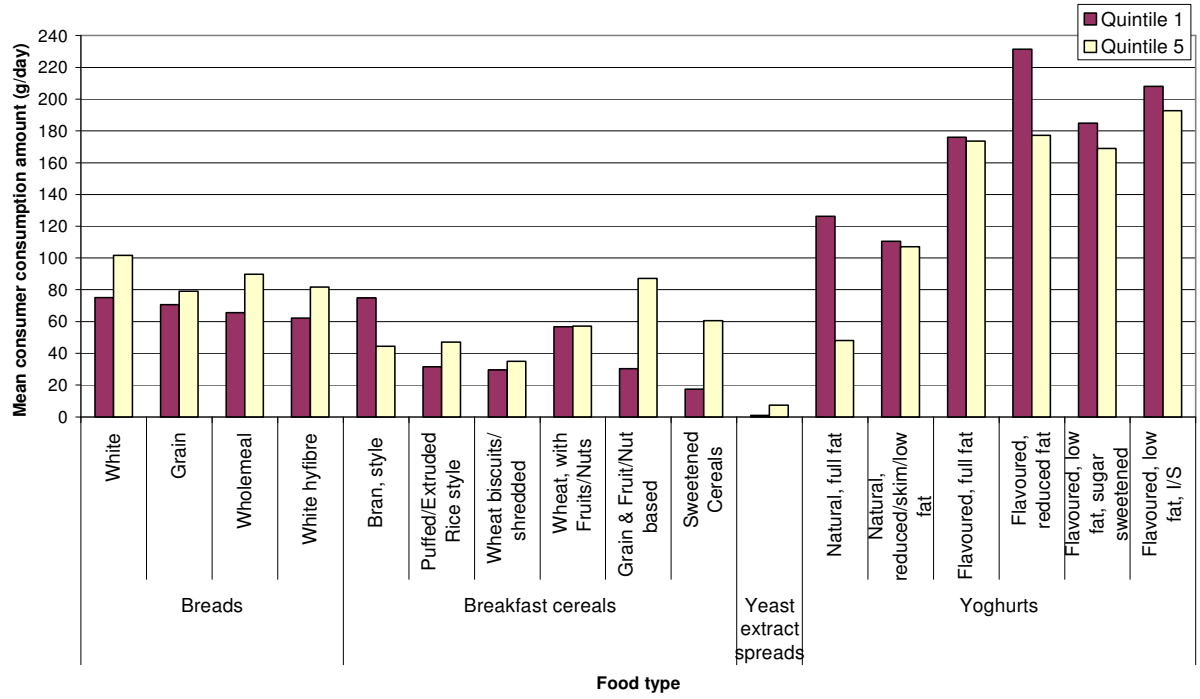
For both groups in Australia mean folic acid intakes would increase by ~ 100 µg folic acid/day. However the impact of a mandatory fortification program would be much greater for the low folic acid intake group as their folic acid intakes would increase by a greater proportional amount (Australia: increase of 212% for low folic acid intake group from 54 µg folic acid /day; increase of 138% for the high intake group from 277 µg folic acid /day).

For the New Zealand women of child bearing age who currently have very low folic acid intakes mandatory fortification has a bigger impact then that it does for the Australian women with an overall increase of ~ 130-140 µg folic acid /day for both groups (New Zealand: increase of 565% for low folic acid intake group from 31 µg folic acid /day; increase of 153% for the high intake group from 253 µg folic acid /day).

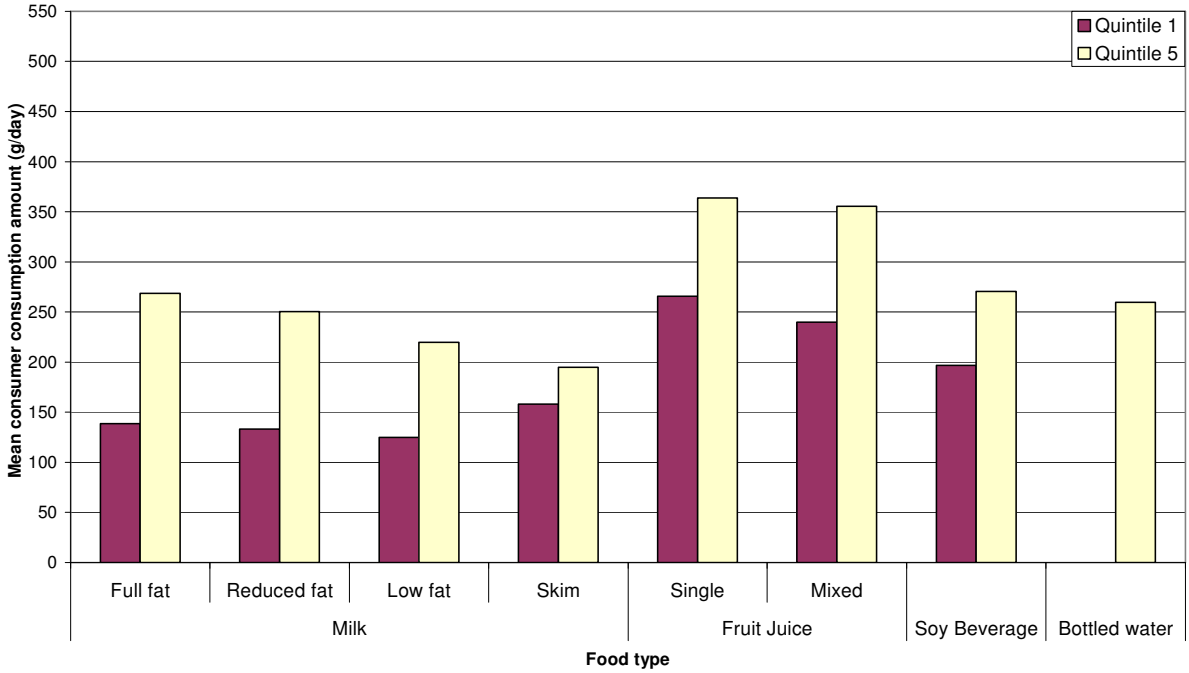
[6] See Sec 6.2.2, p83 FSANZ Issues Paper

Figure 3: Mean amounts of various foods and beverages eaten by Australian female consumers aged 16-44 years (1995 NNS)

a. Food



b. Beverages



What lessons can we learn from this data analysis?

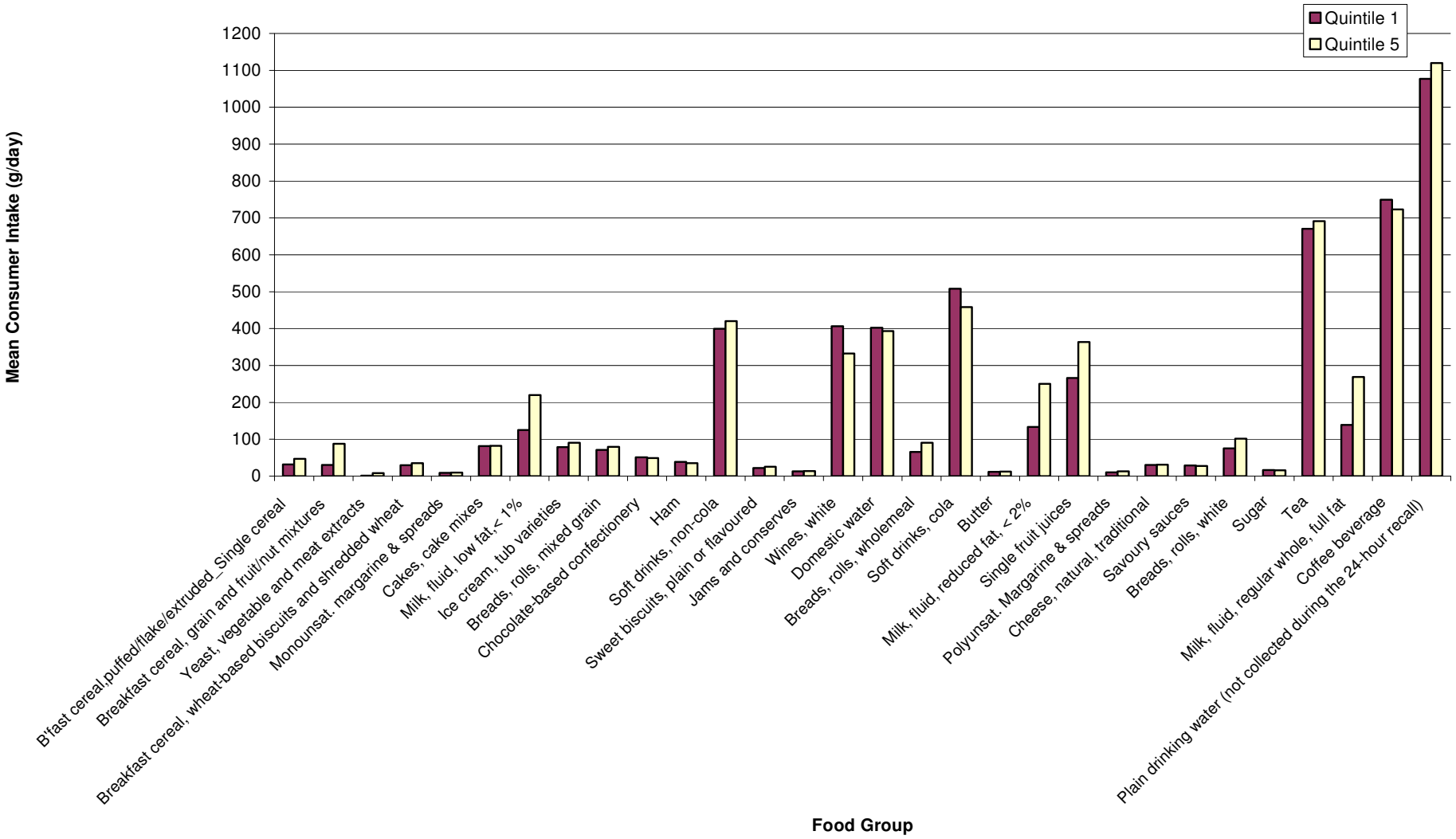
Food consumption patterns are complex, the proportion of people consuming and the amount of food they consume have an impact on both the total amount of folic acid consumed and the relative contribution each food make to that folic acid intake.

There does not appear to be a single food or food group that is consumed preferentially by women of child bearing age in the low folic acid intake group by a significant proportion of women that could be fortified to effectively target these women. Mandatory fortification of wheat flour for bread making in Australia and bread in New Zealand would effectively target women with low folic intakes without overly increasing intakes for women who currently have higher folic acid intakes. Educational messages could also highlight that fortified breakfast cereals and yeast extracts are good sources of folic acid that are currently available.

Mean folic acid intakes from food did not meet the NHMRC target for any of the quintile groups of women of child bearing age, therefore, increasing the folic acid in the food supply would assist all groups. Educational messages about folic acid intakes and NTD prevention would need to emphasise that folic acid supplements still need to be taken for women considering pregnancy and would apply to all women of this age.

Appendix 1

Foods consumed by Australian women aged 16-44 years (1995 NNS) where more than 10% of women in quintile 1 or 5 had consumed the food (fruit, vegetables and meat products were not included as they are not suitable vehicles for fortification)



Foods consumed by New Zealand women aged 16-44 years (1997 NNS) where more than 10% of women in quintile 1 or 5 had consumed the food (fruit, vegetables and meat products were not included as they are not suitable vehicles for fortification)