Report on the pattern of white and wholemeal bread consumption in Irish adults and pre-school children.

(Commissioned by the Irish Bread Bakers Association)

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Analysis of the National Adult Nutrition Survey and the National Pre-School Nutrition Survey

IRISH UNIVERSITIES NUTRITION ALLIANCE

The Irish Universities Nutrition Alliance (IUNA) is a formal association of the academic nutrition units at University College Dublin, Trinity College Dublin, University College Cork and Ulster University. The IUNA is committed to joint initiatives in research and teaching and forms part of the Irish Food and Health Research Alliance (www.ifhra.ie).

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Key Points

- 57% of Irish adults are consumers of white bread, with a mean daily intake of 32.8g (approx. 0.9 slices). In comparison 72% of Irish adults were wholemeal bread consumers with a mean daily intake of 51.2g (approx. 1.3 slices).

- 63% of Irish pre-school children are consumers of white bread, with a mean daily intake of 18.1g (approx. 0.5 slices). Wholemeal bread was less, with 56% of pre-school children consuming wholemeal bread (15.5g/d; approx. 0.4 slices).

- There was a higher percentage of adult male than female consumers of white bread (61% males; 52% females) but in contrast there was a higher percentage of female than male consumers of wholemeal bread (69% males; 74% females). However, females consumed significantly lower amounts of both breads than men with males over 65 years consuming the highest mean daily intake of bread compared to all other age groups.

- In the pre-school children's survey, one year olds consumed significantly less than the older age groups for both white and wholemeal bread.

- Wholemeal bread contributed a greater percentage of nutrient intake for all nutrients analysed in comparison with white bread in the adult total population.

- White and wholemeal bread provided similar percentage contributions for most nutrients in the pre-school total population. However, wholemeal provided a higher percentage of fibre (8%) and sodium (6%) intake than white bread (fibre, 4%; sodium, 1%) in the total population.

- For both adults and pre-school children, wholemeal bread made significant contributions to fibre and sodium intakes. However it is important to note that the database is limited with regards to sodium as it does not account for sodium added during cooking or at the table. Therefore, results may under-represent the true sodium intakes of Irish adults and pre-school children.

- In pre-school consumers with the lowest intakes of white bread, weight and height were significantly lower than those with higher intakes. No such differences were observed in the adult survey.

Methodology

Survey methods

The National Adult Nutrition Survey (NANS) examined habitual food and beverage consumption of a representative sample of the adult population aged 18-90 years (740 males, 760 females), recruited in the Republic of Ireland during October 2008 and April 2010. Eligible respondents were free-living and were not pregnant or breast feeding. The National Pre-school Nutrition Survey (NPNS) examined habitual food and beverage consumption in 500 pre-school children, aged 1-4 years, living in the Republic of Ireland. Both samples were representative of the population groups with respect to size, gender and location.

A four-day semi-weighed (NANS) and weighed (NPNS) food record was used to collect food and beverage intake data. Participants were asked to record detailed information regarding the amount and types of all foods, beverages and nutritional supplements consumed over the recording period and where applicable, the cooking methods used, brand names of the foods consumed and details of recipes. Additionally, data were collected on the time of each eating or drinking occasion, the participants definition of each eating or drinking occasion (e.g. morning snack, lunch) and the location of the preparation of the meal or snack consumed (e.g. home, takeaway, crèche).

Food intake data were analysed using WISP© V3.0 (Tinuviel Software, Anglesey, UK). WISP© contains data from McCance and Widdowson's 'The Composition of Foods', Sixth (Food Standards Agency, 2002) and Fifth (Holland *et al.,* 1995) editions plus all nine supplemental volumes (Holland *et al.*, 1988; Holland *et al.*, 1989; Holland *et al.*, 1991; Holland *et al.*, 1992; Holland *et al.,* 1993; Chan *et al.*, 1994; Chan *et al.*, 1995; Chan *et al.,* 1996; Holland *et al.,* 1996) to generate nutrient intake data. During each survey, modifications were made to the food composition database to include recipes of composite dishes, nutritional supplements, generic Irish foods that were commonly consumed and new foods on the market.

Food intake databases created both from NANS and NPNS comprises of rows of data that describe every food and drink item consumed by each of the participants. In NANS, the final food consumption database consisted of 133,050 rows of data, while for NPNS, the food intake database comprised of over 36,000 rows. For each item consumed, the weight of food/drink consumed and a full nutrient breakdown for the amount of food consumed is listed.

Each food was assigned to either 68 (NANS) or 77 (NPNS) food groups in the database. For the purpose of this report, these food groups were reduced to 12 food groups, with white and wholemeal bread comprising of two separate food groups. The data was then aggregated to examine mean daily intakes of foods and nutrients.

Anthropometric measurements such as weight and height were measured and body mass index (BMI) was derived from these measurements. All the dietary and anthropometric data were compiled into a fully integrated regional database with each piece of data collected for each participant linked to a unique ID number. Quality control procedures were implemented throughout the collection, processing and compilation of the data.

Bread analysis

Tertiles of white and wholemeal consumption were generated based on the participants' mean daily intake of these foods (g/d), i.e. participants were categorised into low, medium and high according to their mean daily intake of white and wholemeal bread. Tertiles are automatically generated so that there are almost equal numbers of participants in each of the categories. Analysis was done for consumers only, i.e. excluding those that did not consume white or wholemeal bread during the four-day period. The ranges of intakes of those in the low, medium and high categories are listed in Table 4(a) to highlight the differences between groups. Due to the very low consumption of gluten free bread in NANS (n=4) and NPNS (n=0), no analysis could be completed on this food group and therefore intakes have not been reported.

Statistical analysis

Statistical analysis was conducted using SPSS© Version 20.0 for Windows™ (SPSS Inc. Chicago, IL, USA). Descriptive statistics including mean and standard deviation (SD) were calculated for daily energy, macronutrient, micronutrient and fibre intakes for all 12 food groups, for both total population and consumers only. Total population refers to all participants (adults or pre-school children) who took part in the survey and consumers only exclude those who did not consume white or wholemeal bread during the four survey days. A one way analysis of variance (ANOVA) for multiple comparisons was used to calculate differences according to age and gender ($P<0.05$). The Scheffe *post hoc* test was used to check for significant differences between groups as appropriate. An independent samples *t*-test was used to compare energy, macronutrient, micronutrient and fibre intakes between gender of white and wholemeal bread consumers and non-consumers. A General Linear Model was conducted to adjust for age and gender, evaluating differences for energy, nutrient intakes and anthropometric data for consumers only, across tertiles of mean daily intake of white and wholemeal bread. To note, due to low numbers in NPNS when split by age and gender no analysis could be performed for gender and therefore results are only reported by age. Pearson's correlation was used to examine the association between mean daily white and wholemeal bread consumption with energy, nutrient intake and anthropometric data, for consumers only. Correlation coefficients range in value from -1 (a perfect negative relationship) and +1 (a perfect positive relationship); a value of 0 indicates no linear relationship between the two variables.

Results

Results are presented for Irish adults (as collected in NANS) and pre-school children (as collected in NPNS). For ease of interpretation, all results are presented for white and wholemeal bread separately.

Section 1: Patterns of white and wholemeal bread consumption

1.1. Food groups

Foods consumed by the participants in NANS and NPNS were allocated to one of 68 (NANS) or 77 (NPNS) food groups in the database. For the purpose of the present report, these food groups were reduced to 12 groups. Descriptions of each food group and items included are listed in Table 1. The 'White bread' food group consisted of white sliced bread only. White rolls and other white type breads were included in a separate group (Grains, rice, pasta and cereals). The wholemeal bread food group consisted of all wholemeal and brown bread excluding rolls. In NANS, 0.3% of adults consumed gluten free bread, while in NPNS; there were no gluten free bread consumers.

1.2. White bread consumption

Table 2(a) presents the mean daily intake of white bread (g/day) and standard deviation for all adults, split by gender and across age groups. Table 2(c) presents the same data for pre-school children excluding gender analysis. Data are shown for both the total population and consumers only. Results below are described for adults (NANS) and subsequently pre-school children (NPNS). Results are compared to the number of slices of bread: the average weight of one slice is taken as 38g.

Intake of white bread in Irish adults

Total population

The mean daily intake of white bread for the total population was 32.8 ± 45.4g. This relates to approximately 0.9 slices of white bread. Males consumed a significantly higher amount of white bread (41.7 ± 53.6g; approx. 1.1 slices) each day compared to females (24.1 ± 33.4g; approx. 0.6 slices; $P<0.001$). There was a significant difference in intake across age groups among males, with those over 65yrs consuming the highest mean daily intakes of white bread (50.2 ± 62.6g; approx. 1.3 slices) compared to 18-35yrs which consumed the lowest (32.5 ± 44.5g; approx. 0.9 slices). No significant difference across age groups was observed among females (Table 2 (a)).

Consumers only

Overall 57% of adults were consumers of white bread (61% males, 53% females) and the mean daily intake was 57.6 ± 46.8g (approx. 1.5 slices). For male and female consumers the mean daily intake of white bread was 68.6 ± 53.7g (approx. 1.8 slices) and 45.2 ± 33.7g (approx. 1.2 slices) respectively. Similar patterns of intake as for total population were noted, with males consuming a significantly higher amount of white bread compared to females ($P<0.001$), with those over 65yrs consuming the highest mean daily intakes of white bread (81.9 ± 61.7g; approx. 2.2 slices) and 18-35yrs consuming the lowest (57.5 ± 45.5g; approx. 1.5 slices). Similar to the total population, no differences between age groups were noted for females (Table 2 (a)).

Social status

Table S2 presents the mean daily intakes of white bread for Irish adults spilt across social class, for both total population and consumers only. The manual skilled group within the total population consumed significantly higher amounts of white bread compared to all other groups. The percentage contribution of each food group to nutrient intakes for social status is displayed in Table S3.

Intake of white bread in Irish children

Total population

The mean daily intake of white bread for the total population was 18.1 ± 23.1g (approx. 0.5 slices). A significant difference between age groups was observed with one year olds having significantly lower mean daily intakes of white bread (10.3 ± 13.1g; approx. 0.3 slices) compared to two, three and four year olds. Highest mean daily intakes were noted in four year olds (22.7 ± 25.8g; approx. 0.6 slices) (Table 2 (c)).

Consumers only

There were a total 63% of pre-school children consuming white bread. The mean daily intake of white bread consumed was 28.9 ± 23.3g (approx. 0.8 slices). Similar to the total population a significant difference between age groups was noted with one year olds consuming significantly lower amounts of white sliced bread than all other age groups (Table 2 (c)).

1.3. Wholemeal consumption

Table 2(b) presents the mean daily intake of wholemeal bread (g/day) and standard deviation for all adults, split by gender and across age groups. Table 2(d) presents the same data for pre-school children excluding gender analysis. Data are shown for both the total population and consumers only. Results below are described for adults (NANS) and subsequently pre-school children (NPNS). Results are compared to the number of slices of bread: the average weight of one slice is taken as 38g.

Intake of wholemeal bread in Irish adults

Total population

The mean daily intake of wholemeal bread was 50.2 ± 53.3g (approx. 1.3 slices). Males consumed a significantly higher mean daily intake of wholemeal bread (56.3 ± 61.1g; approx. 1.5 slices) compared to females (44.3 ± 43.6g; approx. 1.2 slices; $P<0.001$). A significant difference between age groups for the total population was observed for both males and females ($P<0.005$) with mean daily intakes of wholemeal bread increased across the age groups and 18-35yrs having the lowest intakes. The difference between the youngest and oldest age groups was approximately 0.5 slices for males and 0.6 slices for females (Table 2 (b)).

Consumers Only

Overall, 72% of adults were consumers of wholemeal bread (males 69%, females 74%) with a mean daily intake of 70.1 ± 50.7g (approx. 1.9 slices). The mean daily intake of wholemeal bread for males and females was 81.3 ± 57.9g (approx. 2.1 slices) and 59.9 ± 40.4g (approx. 1.6 slices) respectively. Males consumed a significantly higher amount of wholemeal bread compared to females ($P<0.001$). Similarly to total population, there was a significant difference between age groups for wholemeal bread consumers in both, males and females ($P<0.005$), with the 18-35yr age group eating significantly lower daily amounts of wholemeal bread compared to all other age groups. The difference between the youngest and oldest age groups was approximately 0.6 slices for males and 0.5 slices for females (Table 2 (b)).

Intake of wholemeal bread in Irish pre-school children

Total population

The mean daily intake of wholemeal bread consumed by pre-school children was 15.5 ± 20.2g (approx. 0.4 slices). A significant difference between age groups was noted with one year olds having a significantly lower mean daily intake of wholemeal bread compared with two and four year olds (Table 2 (d)).

Consumers only

Overall, 56% of pre-school children were consumers of wholemeal bread. The mean daily intake consumed was 27.8 ± 19.7g (approx. 0.7 slices). Similarly to total population, a significant difference was observed between age groups, with one year olds consuming significantly lower mean daily intakes of wholemeal bread than two and four year olds Table 2 (d)).

Section 2: Consumption of food group intake to the energy, macronutrient, micronutrient and fibre intake

The following section describes the contribution of the 12 food groups to energy, macronutrient, micronutrient and fibre intake in Irish adults and pre-school children. Contributions of food groups to intakes for the total population only are presented here.

2.1. Energy

Figure 1 presents the percentage of energy intake for the 12 different food groups for Irish adults (Fig. 1(a)) and pre-school children (Fig. 1(b)) for the total population only.

Irish adults

Grains, rice, pasta & cereals (12%), dairy & dairy products (12%) and other (12%) were the greatest sources of energy in the diets of Irish adults. Wholemeal bread (6%) provided a similar contribution to energy intake as potato & potato products (7%) and beverages (7%) and white bread provided 4% energy in Irish adults.

Irish pre-school children

Dairy & dairy products (28%), grains, rice, pasta & cereals (14%) fruit & vegetables (11%) and biscuits, cakes & confectionary (11%) were the highest sources of energy in the diets of Irish pre-school children. White bread provided 4% energy and wholemeal bread 3% energy, similar to meat & fish (4%) and potato & potato products (4%).

2.2. Protein

Figure 2 presents the percentage of energy intake for the 12 different food groups for Irish adult (Fig. 2(a)) and pre-school children (Fig. 2(b)) for the total population only.

Irish adults

Meat & fish (30%), meat & fish dishes (17%) and dairy & dairy products (15%) were the greatest sources of protein in the diets of Irish adults. White bread (3%) provided similar amounts of protein as biscuits, cakes & confectionary (3%). Wholemeal bread (6%) provided similar amounts of protein as fruit & vegetables (5%).

Irish pre-school children

Dairy & dairy products (34%), meat& fish dishes (16%) and meat & fish (14%) were the greatest sources of protein in the diets of Irish pre-school children. White bread contributed to 4% protein intake whereas wholemeal bread contributed 3%.

2.3. Carbohydrate

Figure 3 present the percentage of carbohydrate intake from the 12 different food groups for Irish adults (Fig 3 (a)) and pre-school children (Fig 3(b)) for the total population.

Irish adults

The greatest sources of carbohydrate in the diets of Irish adults were from grains, rice, pasta & cereals (20%), biscuits, cakes & confectionary (14%), potatoes & potato products (11%) and fruit & vegetables (11%). Wholemeal bread provided 10% of carbohydrate intake similar to dairy & dairy products (9%). White bread contributed 7% of carbohydrate intake.

Irish pre-school children

Grains, rice, pasta & cereals (21%), dairy & dairy products (20%) and fruit & vegetables (18%) were the biggest source of carbohydrate in the diets of Irish pre-school children. White bread provided 5% of carbohydrate intake and similarly, wholemeal provided 4%.

2.4. Total Sugar

Figure 4 present the percentage of sugar intake from the 12 different food groups for Irish adults (Fig 4(a)) and pre-school children (Fig 4(b)) for the total population.

Irish adults

Biscuits, cakes & confectionary (25%), Fruit & vegetables (23%) and dairy & dairy products (20%) were the greatest sources of total sugar in the diets of Irish adults. Bread was overall a low contributor with white bread providing 1% of sugar intake and wholemeal bread providing 2%.

Irish pre-school children

Dairy & dairy products (36%), fruit & vegetables (31%) and biscuits, cakes & confectionary (15%) were the greatest contributors to sugar in the diet of Irish pre-school children. White bread (1%) was the lowest contributor of total sugar. Wholemeal bread did not contribute to total sugar intakes.

2.5. Total fat

Figure 5 present the percentage of total fat intake from the 12 different food groups for Irish adults (Fig (a)) and pre-school (Fig (b)) for the total population.

Irish adults

The greatest sources of total fat in the diets of Irish adults were from other (23%), dairy & dairy products (16%) and meat & fish dishes (14%). White bread provided a low contribution of 1% and wholemeal bread contributed 2% to total fat intake.

Irish pre-school children

Dairy & dairy products (37%), other (15%), meat & fish dishes (13%) and biscuits, cakes & confectionary (12%) were the highest contributors to total fat intake. Both white and wholemeal bread provided a low contribution of 1% to total fat intake.

2.6. Saturated fat

Figure 6 present the percentage of total fat intake from the 12 food groups for Irish adults (Fig 4 (a)) and pre-school children (Fig 4 (b)) for the total population.

Irish adults

The greatest sources of saturated fat in the diets of Irish adults were from dairy & dairy products (24%), other (22%), meat & fish dishes (13%) and biscuits, cakes & confectionary (13%). Wholemeal bread contributed 2% to saturated fat intake. White bread provided 0% of saturated fat intake.

Irish pre-school children

The greatest sources of saturated fat in the diets of Irish pre-school children were from dairy & dairy products (47%), other (14%) and biscuits, cakes & confectionary (13%). Similar to adult intake, wholemeal bread contributed 1% to saturated fat intake and white bread provided 0% of saturated fat intake.

2.7. Fibre

Figure 7 present the percentage of fibre intakes from the 12 different food groups for Irish adults (Fig (a)) and pre-school children (Fig (b)) for the total population.

Irish adults

Fruit & vegetables (28%), grains, rice, pasta & cereals (18%) and wholemeal bread (15%) were the greatest source of fibre in the diets of Irish adults for the total population. White bread provided less fibre than wholemeal bread at 5%.

Irish pre-school children

Fruit & vegetables (34%), grains, rice, pasta & cereals (22%) and wholemeal bread (8%) were the greatest source of fibre in the diets of Irish pre-school children for the total population. White bread provided less fibre than wholemeal bread at 4%.

2.8. Total Folate

Figure 8 present the percentage of total folate intake from the 12 different food groups for Irish adults (Fig (a)) and pre-school children (Fig (b)) for the total population.

Irish adults

The greatest sources of total folate in the diets of Irish adults were from other (17%), Fruit & vegetables (16%) and grains, rice, pasta & cereals (15%). Wholemeal bread contributed 8% to total folate whereas white bread contributed less at 3%.

Irish pre-school children

The greatest sources of total folate in the diets of Irish pre-school children were from dairy & dairy products (26%), grains, rice, pasta & cereals (24%) and fruit & vegetables (18%). Both white (3%) and wholemeal (4%) bread were similar in contribution to total folate.

2.9. Sodium

Figure 9 present the percentage of sodium intakes from the 12 different food groups for Irish adults (Fig 9(a)) and (Fig 9(b)) for the total population.

Irish adults

The greatest sources of sodium in the diets of Irish adults were from other (18%), meat & fish dishes (17%) and meat & fish (14%). Wholemeal bread provided 9% of sodium for total population whereas white bread provided less sodium at 6%.

Irish pre-school children

The greatest sources of sodium in the diets of Irish pre-school children were from dairy & dairy products (22%), meat & fish dishes (18%) and other (14%). Wholemeal bread contributed 6% to sodium intake whereas white bread was a low contributor, providing only 1%.

2.10. Iron

Figure 10 present the percentage of calcium intakes from the 12 different food groups for Irish adults (Fig 10(a)) and pre-school children (Fig 10(b)) for the total population.

Irish adults

Grains, rice, pasta & cereals (23%), other (12%), meat & fish dishes (11%) and fruit & vegetables (11%) were the biggest sources of iron intake in the diets of Irish adults. Wholemeal bread (9%) contributed similar amounts of iron as meat & fish (9%). White bread contributed to a smaller amount at 5%.

Irish pre-school children

Grains, rice, pasta & cereals (36%), fruit & vegetables (13%) and dairy & dairy products were the biggest sources of iron intake in the diets of Irish pre-school children. Both white and wholemeal bread contributed 5% to iron intakes within the total population.

2.11. Calcium

Figure 11 present the percentage of calcium intakes from the 12 different food groups for Irish adults (Fig 11 (a)) and pre-school children (Fig 11(b)) for the total population.

Irish adults

Dairy & dairy products (41%) were the greatest source of calcium in the diets of Irish adults. Wholemeal bread (9%) was the third highest contributor to calcium intakes. White bread provided 7% of calcium for the total population.

Irish pre-school children

Dairy & dairy products (62%) were the greatest source of calcium in the diets of Irish pre-school children. White bread and wholemeal bread were similar, contributing 4% and 3% of calcium intakes, respectively.

2.12. Comparisons of consumers and non-consumers of white bread

Table 3 (a) compares the mean daily energy, macronutrient and micronutrient intakes of consumers and non-consumers of white bread in Irish adults and pre-school children.

Irish adults

During the four-day survey period, 57% of Irish adults consumed white bread. Significantly higher intakes of energy, percentage energy from total fat and saturated fat were noted in consumers and significantly higher intakes of fibre and total folate, percentage energy from protein, carbohydrates and total sugar in non-consumers of white bread ($p<0.05$). No differences were found between the other nutrients.

Irish pre-school children

During the four-day survey period, 63% of Irish pre-school children consumed white bread. Percentage energy from protein and intakes of fibre, total folate and sodium were found to be significantly higher in non-consumers of white bread ($p<0.05$) No differences were found between the other nutrients.

2.13. Comparisons of consumers and non-consumers of wholemeal bread

Table 3 (b) compares the mean daily energy, macronutrient and micronutrient intakes of consumers and non-consumers of wholemeal bread in Irish adults and pre-school children.

Irish adults

During the four-day survey period, 72% of Irish adults consumed wholemeal bread. Significantly higher intakes of fibre, folate, sodium, calcium and percentage energy from protein, carbohydrates and sugar were noted in consumers and significantly higher percentage energy from fat and saturated fat in non-consumers of wholemeal bread ($P<0.05$). There were no significant differences found between the intakes of the other nutrients.

Irish pre-school children

During the four-day survey period, 56% of Irish pre-school children consumed wholemeal bread. Percentage energy from protein and intakes of fibre, folate and sodium were significantly higher in consumers of wholemeal bread ($P<0.05$). No differences were found between the other nutrients.

Section 3: Tertile and correlation analysis of white and wholemeal bread consumption

3.1. Tertile description

Table 4 (a) presents a breakdown of the tertiles of the mean daily intake of white and wholemeal bread, for adults and pre-school children (consumers only; g/day). Both are described separately below.

Irish adults

White bread

The mean daily intake for those in the low category was 17.2g (approx. 0.5 slices), in the medium category 45.5g (approx. 1.2 slices) and for those in the high intake category 109.8g (approx. 2.9 slices).

Wholemeal bread

The mean daily intake for those in the low category was 23.1g (approx. 0.6 slices), in the medium category 59.7g (approx. 1.6 slices) and for those in the high intake category 127.6g (approx. 3.4 slices).

Irish pre-school children

White bread

The mean daily intake of white bread for Irish pre-school children in the low category was 8.9g (approx. 0.2 slices), in the medium category 22.8g (approx. 0.6 slices) and for those in the high intake category 55.0g (approx. 1.5 slices).

Wholemeal bread

The mean daily intake for wholemeal bread for those in the low category was 8.9g (approx. 0.2 slices), in the medium category 23.8g (approx. 0.6 slices) and for those in the high intake category 50.5g (approx. 1.3 slices).

3.2. Energy, macronutrient and micronutrient intakes from white bread

Table 4 (b) presents the mean daily energy, macronutrient and micronutrient intakes across tertiles of mean daily intake of white bread for adults and pre-school children (consumers only). Table 5 describes the Pearson's rank order correlations for associations between mean daily intake of white bread (g/d) and energy, macronutrient and micronutrient intakes for consumers only. Outcomes for both are described below.

White bread consumption in Irish adults

There was a significant difference between high and low consumers of white bread, with those in the highest tertile having higher intakes of energy (kcal/d), total fat (%TE) Saturated fat (%TE) and sodium (mg/MJ) (Table 4 (b)). Furthermore those in the lowest tertile of white bread consumption had overall significantly higher intakes of protein (%TE), total sugar (%TE) and fibre (g/MJ) compared to those in the highest tertile. No significant difference between high, medium and low consumers of white bread was apparent for the other nutrients.

In addition, a weak significant positive correlations between weight of white bread (g/d) and energy (kcal/d), fat (%TE), saturated fat (%TE) and sodium (g/MJ) was observed (Table 5; $P<0.01$), indicating that as consumption of white bread increased, intake of these nutrients also increased. There was also a small significant negative correlation found between the weight of white bread consumed (g/d) and the mean daily intake of sugar (%TE) and fibre (g/MJ) ($P<0.01$), indicating that as consumption of white bread increased, intakes of these nutrients decreased. No correlation was found between white bread and the remaining nutrients.

White bread consumption in Irish pre-school children

There was a significant difference between high and low consumers of white bread, with those in the highest tertile having higher intakes of energy (kcal/d). No significant difference between high, medium and low consumers of white bread was apparent for the other nutrients.

A significant positive correlation was found between weight of white bread (g/d) and the mean daily intake of energy (kcal/d) (Table 5; $P<0.01$), indicating that as consumption of white bread increased intake of energy also increased. There was a significant negative correlation found between the weight of white bread consumed and the mean daily intake of sugar (%TE) and calcium (g/MJ) ($P<0.05$) indicating that as consumption of white bread increased, intakes of sugar (%TE) and calcium (g/MJ) decreased.

3.3. Energy, macronutrient and micronutrient intakes from wholemeal bread

Table 4 (c) presents the mean daily energy, macronutrient and micronutrient intakes across tertiles of mean daily intake of wholemeal bread for adults and pre-school children (consumers only). Table 5 describes Pearson's rank order correlations for associations between mean daily intake of wholemeal bread (g/d) and energy, macronutrient and micronutrient intakes for consumers only.

Wholemeal bread consumption in Irish adults

There was a significant difference between high and low consumers of wholemeal bread, with those in the highest tertile having higher intakes of energy (kcal/d), carbohydrate (%TE), fibre (MJ/d) and sodium (MJ/d) (Table 4 (c)). No significant difference between high, medium and low consumers of wholemeal bread was apparent for the other nutrients.

Although weak, significant positive correlations were found between the weight of wholemeal bread (g/d) and energy (kcal/d), carbohydrate (%TE), fibre (g/MJ), sodium (mg/MJ) and calcium (mg/MJ) ($P<0.01$), indicating that as consumption of wholemeal bread increased, as did these nutrients. A negative correlation was found between the weight of wholemeal bread (g/d) and total fat (%TE) ($P<0.05$), indicating as the weight of wholemeal bread increased, intakes of fat (%TE) decreased. However, this correlation is weak (<0.1).

Wholemeal bread consumption in Irish pre-school children

Pre-school children in the highest tertile for consumers of wholemeal bread showed higher intakes of energy (kcal/d), fibre (g/MJ) and sodium (g/MJ) compared to all other tertiles.

Table 5 shows a significant positive correlation between weight of wholemeal bread (g/d) and the mean daily intake of energy (kcal/d). A weaker positive correlation was found between weight of wholemeal bread consumers (g/d) and the mean daily intakes of fibre (g/MJ) and sodium (g/MJ) ($P<0.05$). A significant negative correlation found between the weight of wholemeal bread consumed and the mean daily intake of calcium (g/MJ) ($P<0.01$), indicating that as consumption of wholemeal bread increased, intakes of calcium (g/MJ) decreased. Again, this relationship was weak (<0.16).

3.4. Anthropometry

The mean anthropometric measurements of adults and pre-school children across the tertiles of mean daily intake of white and wholemeal bread (consumers only) are described below. Measures are described for both groups in relation to white bread consumption (Table 6(a), 7) and subsequently for wholemeal bread consumption (Table 6 (b), 7).

White bread

White bread consumption and anthropometry in Irish adults

There was no significant difference in weight (kg), height (m), BMI (km/m^2), waist and hip circumference (cm), and waist/hip circumference ratio across tertiles of white bread intake, indicating that these measurements did not increase across tertiles.

A weak significant positive correlation between white bread (g/d) consumed and mean body weight (kg), height (cm), BMI (km/m^2), waist circumference (cm) and hip/waist circumference ratio (P<0.01) was noted, indicating that these measurements increased as intakes of white bread increased (Table 7).

White bread consumption and anthropometry in Irish pre-school children

There was a significant difference in weight (kg) and height (cm) between the lowest tertile and medium/highest tertile of white bread consumption, with these measurements being lower in consumers in the lowest tertile (Table 6 (a)).

Similarly in Table 7, a significant correlation was observed between white bread (g/d) consumed and mean body weight (kg) and height (cm) (P<0.01) of pre-school children.

Wholemeal bread

Wholemeal bread consumption and anthropometry in Irish adults

There was no significant difference in anthropometric measurements across tertiles of wholemeal bread intake, indicating that these measurements did not increase as wholemeal bread intake increased. (Table 6(b)).

A weak positive correlation existed between weight of wholemeal bread consumed (g/d) and weight (kg), height (m), waist circumference (cm) and hip/waist circumference ratio (P<0.05). No correlations were observed for BMI (kg/m^2) and hip circumference (cm) (Table 7).

Wholemeal bread consumption and anthropometry in Irish pre-school children

For Irish pre-school children, there was no significant difference in weight (kg), height (cm) and BMI (km/m^2) across tertiles of wholemeal bread intake, indicating that these measurements did not increase as wholemeal bread intake increased (Table 6(b)). Although, a weak positive correlation existed between weight of wholemeal bread consumed (g/d) and weight (kg) and height (cm) (P<0.01).

Summary

Irish Adults

More adults consumed wholemeal bread (72%) than white bread (57%) during the survey period with a mean daily intake of 51.2g (approx. 1.3 slices) and 32.8g (approx. 0.9 slices) respectively. Gluten free bread was not analysed due to low consumers (NANS, *n*= 4; NPNS, *n*= 0). There were more male than female consumers of white bread (61% males, 68.6g/d; 54% females, 45.5g/d) in comparison more females consumed wholemeal bread (74% females, 59.9g/d; 69% male, 81.3g/d). There was a significant difference of consumption of white and wholemeal breads between genders, indicating males consume more than females for both bread types across the age groups. Males in the over 65 age group consumed the most white (81.9g, approx. 2.2 slices) and wholemeal (96.2g, approx. 2.5 slices) bread compared to all other age groups. Consumption of wholemeal bread generally increased across the age groups, with the 18-35 age group consuming significantly lower amounts than the other groups. Similar to wholemeal intake, there was a significant difference of white bread intake among total consumers and males, indicating the 18-35 age group consumed significantly lower amounts of white bread than the over 65 age group.

When examining the percentage contribution of white and wholemeal bread to nutrient intake for total population, wholemeal bread contributed a greater amount to all nutrients in comparison with white bread. In white bread, mean daily energy, fat, saturated fat and sodium were significantly higher in consumers than in non-consumers. For wholemeal bread, mean daily energy, protein, carbohydrate, sugar, fibre, folate, sodium and calcium were significantly higher in wholemeal bread consumers than in non-consumers.

When examining nutrient intakes across tertiles of white bread for consumers only, it showed as intakes of white bread increased, there was a significant increase in energy, carbohydrate, fat, saturated fat and sodium. For wholemeal bread, mean daily energy, protein, carbohydrate, fat, saturated fat, fibre, folate, sodium and calcium significantly increased across tertiles of consumers.

Analysis comparing anthropometric measurements across tertiles for both white and wholemeal bread (consumers only) showed no significant differences for all measurements in Irish adults.

Irish pre-school children

Irish pre-school children consumed more white bread (63%) than wholemeal bread (56%). There were no consumers of gluten free bread within NPNS. The mean daily intake of white bread was 18.1g (approx. 0.5 slices), whereas mean daily intake of wholemeal bread was 15.5g (approx. 0.4 slices). One year olds consumed significantly less than the older age groups for both white and wholemeal bread. As previously mentioned in this report, gender analysis was not conducted due to the low number when the data was split.

White (4%) and wholemeal (3%) bread contributed similar percentages of total energy intake in pre-school children within the total population. In general, they provided similar percentage contributions for most nutrients analysed. However, wholemeal provided a higher percentage of fibre (8%) and sodium (6%) intake than white bread (fibre, 4%; sodium, 1%) within the total population. Similarly, when comparing consumers and non-consumers and their mean daily intakes, fibre and sodium displayed a significant increase in consumers of wholemeal bread.

Across the tertiles of intake, as white bread consumption increased, mean daily energy (kcal), protein, carbohydrate, and sodium, also increased. Across tertiles of wholemeal bread, as the consumption increased, mean daily energy (kcal), protein, carbohydrate, fat, fibre and sodium also increased.

Anthropometric measurements for weight and height across tertiles were significantly lower in the low tertile for white bread consumption in pre-school children. There were no significant differences in anthropometric measurements across tertiles for wholemeal bread consumption.

Under-reporting in food consumption surveys is common and occurs when respondents fail to report items that have actually been consumed or change their food consumption to include what they perceive to be more healthy items. This can introduce bias into food consumption surveys. The effect of under-reporting has not been considered in these analyses, so the results should be interpreted with this caveat in mind. Finally caution should be exerted in the interpretation of data relating to sodium as it does not account for sodium added during cooking/at the table.

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Table 1: Description of the food items included in each of the 12 food groups

Food group	Foods included
Grains, rice, pasta & cereals	Rice, pasta, flours, grains & starches, scones, bagels & pittas, white rolls & other breads, ready to eat breakfast cereals and other breakfast cereals
White bread	White sliced bread
Wholemeal bread	Wholemeal bread & brown/wholemeal soda type breads
Biscuits, cakes & confectionary	Biscuits including crackers, cakes, pastries & buns, sugars, syrups, preserves & sweeteners, chocolate and non-chocolate confectionary
Dairy & dairy products	Whole milk, low fat, skimmed milk & fortified milks, other milks and milk based beverages, creams, cheeses, yoghurts, ice-creams, desserts, rice puddings and custards
Potatoes & potato products	Potatoes boiled, baked, mashed, processed & homemade potato products, chipped, fried, roasted potatoes
Fruit & Vegetables	Vegetables & pulse dishes, peas, beans & lentils, green vegetables, carrots, salad vegetables, other vegetables, tinned or jarred vegetables, fruit juices & smoothies, fruit purees, bananas, other fruits, citrus fruits, tinned fruits and other fruit dishes, seeds herbs & spices
Meat & Fish	Fish & fish products, bacon & ham, beef & veal, lamb, pork, chicken, turkey & game
Meat & fish dishes	Fish dishes, offal & offal dishes, beef & veal dishes, lamb, pork & bacon dishes, burgers, sausages, meat pies & pastries and meat products
Beverages	Teas, coffees, other beverages, alcoholic beverages, carbonated beverages, diet carbonated beverages, squashes, cordials & fruit juice drinks
Other	Soups, sauces & miscellaneous foods, savouries, egg & egg dishes, butter, low fat spreads, other fat spreads, oils, hard cooking fats and nutritional supplements.
All snacks	Savoury snacks and nuts

Table 2(a): Mean daily intake of white bread (g/d) and standard deviation, for Irish adults. Data are shown for both male and females across age groups for the total population and consumers only.

Mean daily weight of white bread (g/d) for adults (NANS)															
	Total					Male					Female					
	Age group	*n*	Mean	SD	% cons	Age group	*n*	Mean	SD	% cons	Age group	*n*	Mean	SD	% cons	*P*
Total population	18-35	531	28.2	38.8		18-35	276	32.5[a]	44.5		18-35	255	23.6	30.9		**
	36-50	437	35.3	46.5		36-50	205	45.7[ab]	56.0		36-50	232	26.0	33.5		**
	51-64	306	33.7	48.4		51-64	153	47.2[ab]	56.6		51-64	153	20.2	33.8		**
	≥65	226	37.4	52.2		≥65	106	50.2[b]	62.6		≥65	120	26.1	37.5		**
	All adults	1500	32.8	45.4		All males	740	41.7	53.6		All females	760	24.1	33.4		**
Consumers only	18-35	296	50.6[a]	39.6	56	18-35	156	57.5[a]	45.5	57	18-35	140	43.0	30.0	55	**
	36-50	265	58.2[ab]	47.2	61	36-50	133	70.5[ab]	55.6	65	36-50	132	45.8	32.7	57	**
	51-64	165	62.4[ab]	50.6	54	51-64	96	75.1[ab]	54.7	63	51-64	69	44.8	37.9	45	**
	≥65	128	66.1[b]	54.0	57	≥65	65	81.9[b]	61.7	61	≥65	63	49.7	38.8	53	**
	All adults	854	57.6	46.8	57	All males	450	68.6	53.7	61	All females	404	45.2	33.7	53	**

Statistical test used to measure differences between gender: Independent samples *t*- test (P<0.05)

Statistical test used to measure differences between age groups: one-way ANOVA with Scheffe post-hoc test.

[abc] Different superscript letters indicate significant differences in mean values (P<0.05)

Table 2(b): Mean daily intake of wholemeal bread (g/d) and standard deviation, for Irish adults. Data are shown for both male and females across age groups, for the total population and consumers only.

Mean daily weight of wholemeal bread (g/d) for adults (NANS)																
	Total					Male					Female					
	Age group	*n*	Mean	SD	% cons	Age group	*n*	Mean	SD	% cons	Age group	*n*	Mean	SD	% cons	*P*
Total population	18-35	531	40.8[a]	45.7		18-35	276	47.1[a]	52.0		18-35	255	33.8[a]	36.5		**
	36-50	437	49.3[ab]	55.6		36-50	205	54.5[ab]	63.2		36-50	232	44.6[ab]	47.5		ns
	51-64	306	60.3[c]	56.8		51-64	153	68.2[b]	67.3		51-64	153	52.5[b]	42.6		*
	≥65	226	60.6[bc]	56.5		≥65	106	66.2[ab]	66.1		≥65	120	55.7[b]	46.1		ns
	All adults	1500	50.2	53.3		All males	740	56.3	61.1		All females	760	44.3	43.6		**
Consumers only	18-35	351	61.6[a]	43.2	66	18-35	178	73.1[a]	47.9	64	18-35	173	49.9[a]	34.1	68	**
	36-50	314	68.6[ab]	54.5	72	36-50	148	75.5[ab]	62.8	72	36-50	166	62.4[b]	45.2	72	*
	51-64	240	76.9[b]	53.2	78	51-64	113	92.3[ab]	62.5	74	51-64	127	63.2[b]	38.8	83	**
	≥65	169	81.1[b]	51.0	75	≥65	73	96.2[b]	58.7	69	≥65	96	69.6[b]	41.0	80	**
	All adults	1074	70.1	50.7	72	All males	512	81.3	58.0	69	All females	562	59.9	40.4	74	**

NANS- National Adult Nutrition Survey; *n*- number; % cons- percentage consumers; SD- standard deviation; ns- not significant at P>0.05.
Statistical test used to measure differences between gender: Independent samples *t* -test (P<0.05).
Statistical test used to measure differences between age groups: one-way ANOVA with Scheffe post-hoc test.
[abc] Different superscript letters indicate significant differences in mean values (P<0.05).

Table 2(c): Mean daily intake of white bread (g/d) and standard deviation for pre-school children (NPNS). Data are shown across age groups, for the total population and consumers only

		Mean daily weight of white bread (g/d)						
		Total Population			Consumers only			
	Age group	*n*	Mean	SD	*n*	Mean	SD	% cons
NPNS (Pre-school)	1 year	126	10.3[a]	13.1	74	17.5[a]	12.9	59
	2 years	124	17.8[ab]	22.9	75	29.4[b]	22.9	60
	3 years	126	21.6[b]	26.5	80	34.1[b]	26.1	63
	4 years	124	22.7[b]	25.8	84	33.5[b]	24.9	68
	All children	500	18.1	23.1	313	28.9	23.3	63

NPNS- National Pre-school Nutrition Survey
n- number; % cons- percentage consumers; SD- standard deviation.
Statistical test used to measure differences between age groups: one-way ANOVA with Scheffe post-hoc test.
[abc] Different superscript letters indicate significant differences in mean values ($P \leq 0.05$).

Table 2(d): Mean daily intake of wholemeal bread (g/d) and standard deviation for pre-school children (NPNS). Data are shown across age groups, for the total population and consumers only

		Mean daily weight of wholemeal bread (g/d)						
		Total Population			Consumers only			
	Age group	*n*	Mean	SD	*n*	Mean	SD	% cons
NPNS (Pre-school)	1 year	126	9.5[a]	14.5	63	18.9[a]	15.6	50
	2 years	124	17.9[b]	21.0	74	29.9[b]	19.3	60
	3 years	126	15.9[ab]	20.1	71	28.2[ab]	19.2	56
	4 years	124	18.9[b]	23.1	71	32.9[b]	21.5	57
	All children	500	15.5	20.2	279	27.8	19.7	56

NPNS- National Pre-school Nutrition Survey
n- number; % cons- percentage consumers; SD- standard deviation.
Statistical test used to measure differences between age groups: one-way ANOVA with Scheffe post-hoc test.
[abc] Different superscript letters indicate significant differences in mean values ($P < 0.05$).

Table 3(a): Comparison of mean daily energy, macronutrient, micronutrient and fibre intakes. Data are shown for Irish adults (NANS) and pre-school children (NPNS) for consumers and non-consumers of white bread

		White Bread Intake (g/d)						
		Consumers		Non-consumers of white bread*		Non-consumers of white & wholemeal bread		
		(n=854)		(n=563)		(n=83)		
		Mean	SD	Mean	SD	Mean	SD	*P*
NANS (Adults)	Energy (kcal/d)	2065.4	636.9	1973.4	681.6	1757.3	626.4	*
	Protein (g/d)	84.5	27.2	84.3	29.3	76.1	25.7	ns
	Protein (%TE)	16.6	3.3	17.5	3.9	18.3	5.9	**
	Carbohydrate (g/d)	231.8	75.8	227.2	82.9	204.1	79.5	ns
	Carbohydrate (%TE)	42.4	6.9	43.5	6.8	43.2	7.3	**
	of which sugars (g/d)	90.6	43.5	90.6	43.2	87.0	40.0	ns
	of which sugars (%TE)	16.4	5.8	17.2	5.6	18.5	6.3	**
	Fat (g/d)	79.2	28.8	72.6	29.9	65.0	25.1	**
	Fat (%TE)	34.5	6.4	33.0	6.5	33.4	6.8	**
	saturated fat (g/d)	31.4	13.0	28.2	12.8	24.5	10.1	**
	saturated fat (%TE)	13.6	3.6	12.8	3.5	12.6	3.7	**
	Fibre (g/d)	17.9	7.3	21.5	8.3	15.9	8.4	**
	Fibre (g/MJ)	21.1	6.9	26.8	8.2	22.0	8.9	**
	Total folate (µg/d)	358.7	349.7	392.5	303.0	284.9	149.9	ns
	Total folate (µg/MJ)	424.1	451.7	519.2	997.0	388.9	171.6	*
	Sodium (mg/d)	2574.2	910.9	2457.5	878.5	2005.1	812.2	*
	Sodium (mg/MJ)	2998.8	666.2	3028.2	738.3	2744.6	699.4	ns
	Iron (mg/d)	14.1	15.5	15.1	16.9	16.4	24.7	ns
	Iron (mg/MJ)	16.9	21.8	18.4	18.9	23.2	37.6	ns
	Calcium (mg/d)	939.8	403.7	955.0	427.0	896.3	448.0	ns
	Calcium (mg/MJ)	1102.9	408.5	1177.3	428.3	1292.4	754.4	**

		Consumers (n=313)		Non-consumers of white bread* (n=137)		Non-consumers of white & wholemeal bread (n=50)		
		Mean	SD	Mean	SD	Mean	SD	
NPNS (Pre-school children)	Energy (kcal/d)	1157.6	261.7	1121.2	229.8	1026.6	273.5	ns
	Protein (g/d)	43.1	11.2	44.1	10.1	38.0	10.3	ns
	Protein (%TE)	14.9	2.4	15.8	2.5	15.1	2.7	**
	Carbohydrate (g/d)	151.7	37.3	148.4	36.2	134.9	39.5	ns
	Carbohydrate (%TE)	49.2	5.8	49.6	5.7	49.3	6.9	ns
	of which sugars (g/d)	76.4	23.1	75.7	23.5	72.8	21.1	ns
	of which sugars (%TE)	24.9	5.5	25.4	5.6	26.8	5.1	ns
	Fat (g/d)	42.0	12.4	40.4	10.9	37.6	14.0	ns
	Fat (%TE)	32.5	5.1	32.4	5.1	32.8	7.1	ns
	saturated fat (g/d)	19.2	6.4	18.6	6.1	17.1	6.3	ns
	saturated fat (%TE)	14.8	3.2	14.8	3.4	15.1	4.2	ns
	Fibre (g/d)	11.2	3.9	13.0	3.4	11.1	4.1	**
	Fibre (g/MJ)	23.3	6.9	27.9	6.2	26.2	8.6	**
	Total folate (µg/d)	180	81.2	189.0	81.8	148.1	63.7	ns
	Total folate (µg/MJ)	374.3	155.6	407.9	181.8	355.4	169.1	*
	Sodium (mg/d)	1195.9	388.5	1276.8	439.2	942.1	412.9	ns
	Sodium (mg/MJ)	2456.1	572.5	2693.4	691.5	2176.2	791.7	**
	Iron (mg/d)	7.4	3.3	7.4	2.6	7.5	3.7	ns
	Iron (mg/MJ)	15.4	6.3	15.9	5.3	17.8	9.5	ns
	Calcium (mg/d)	780.9	277.2	766.3	250.7	746.5	308.9	ns
	Calcium (mg/MJ)	1620.6	488.8	1651.1	543.3	1775.7	644.1	ns

NANS- National Adult Nutrition Survey; NPNS- National Pre-school Nutrition Survey; *n* - number; SD - standard deviation; %TE- percentage of total energy; 10MJ - micronutrients per 10 mega joule, ns - not significant at P>0.05. *Non-consumers of white bread- this group includes wholemeal bread consumers.
Statistical test used to measure differences between consumers and non-consumers of white bread: Independent samples *t* test (P<0.05).

Table 3(b): Comparison of mean daily energy, macronutrient, micronutrient and fibre intakes. Data are shown for Irish adults (NANS) and pre-school children (NPNS) for consumers and non-consumers of wholemeal bread

		Wholemeal Bread Intake (g/d)						
		Consumers		Non-consumers of wholemeal bread*		Non-consumers of white & wholemeal bread		
		(n=1074)		(n=343)		(n=83)		
		Mean	SD	Mean	SD	Mean	SD	*P*
NANS (Adults)	Energy (kcal/d)	2037	655.7	2003.3	656.1	1757.3	626.4	ns
	Protein (g/d)	85.6	28.2	80.7	27.2	76.1	25.7	**
	Protein (%TE)	17.2	3.6	16.4	3.5	18.3	5.9	**
	Carbohydrate (g/d)	232.6	78.8	221.6	77.8	204.1	79.5	*
	Carbohydrate (%TE)	43.2	6.8	41.8	7.0	43.2	7.3	**
	of which sugars (g/d)	91.9	43.0	86.6	44.3	87.0	40.0	*
	of which sugars (%TE)	16.9	5.6	16.2	6.2	18.5	6.3	*
	Fat (g/d)	75.9	29.1	78.5	30.1	65.0	25.1	ns
	Fat (%TE)	33.4	6.3	35.2	6.8	33.4	6.8	**
	saturated fat (g/d)	29.8	12.8	31.2	13.6	24.5	10.1	ns
	saturated fat (%TE)	13.1	3.4	14.0	3.9	12.6	3.7	**
	Fibre (g/d)	20.7	7.9	15.1	6.3	15.9	8.4	**
	Fibre (g/MJ)	25.0	7.9	18.4	5.9	22.0	8.9	**
	Total folate (µg/d)	387.2	302.6	324.9	408.1	284.9	149.9	*
	Total folate (µg/MJ)	484.8	785.3	390.1	458.3	388.9	171.6	*
	Sodium (mg/d)	2560.2	889.3	2426.5	925.6	2005.1	812.2	*
	Sodium (mg/MJ)	3042	699.5	2911.6	675.1	2744.6	699.4	**
	Iron (mg/d)	14.5	14.3	14.4	20.7	16.4	24.7	ns
	Iron (mg/MJ)	17.3	16.6	18.1	30.0	23.2	37.6	ns
	Calcium (mg/d)	969.2	414.3	872.6	401.3	896.3	448.0	**
	Calcium (mg/MJ)	1158.3	425.0	1051.3	384.5	1292.4	754.4	**

		Consumers		Non-consumers of wholemeal bread*		Non-consumers of white & wholemeal bread		
		(n=279)		(n=171)		(n=50)		
NPNS (Pre-school children)	Energy (kcal/d)	1140.8	228.2	1155.9	288.7	1026.6	273.5	ns
	Protein (g/d)	43.9	10.2	42.6	12.0	38.0	10.3	ns
	Protein (%TE)	15.4	2.4	14.8	2.5	15.1	2.7	**
	Carbohydrate (g/d)	149.5	33.5	152.6	42.0	134.9	39.5	ns
	Carbohydrate (%TE)	49.3	5.6	49.5	5.9	49.3	6.9	ns
	of which sugars (g/d)	75.8	22.1	76.8	25.1	72.8	21.1	ns
	of which sugars (%TE)	25.0	5.3	25.0	5.9	26.8	5.1	ns
	Fat (g/d)	41.5	11.6	41.5	12.7	37.6	14.0	ns
	Fat (%TE)	32.6	5.2	32.2	4.9	32.8	7.1	ns
	saturated fat (g/d)	19.0	6.2	18.9	6.4	17.1	6.3	ns
	saturated fat (%TE)	14.9	3.3	14.7	3.1	15.1	4.2	ns
	Fibre (g/d)	12.6	3.7	10.4	3.7	11.1	4.1	**
	Fibre (g/MJ)	26.5	6.7	21.6	6.5	26.2	8.6	**
	Total folate (µg/d)	189.0	84.8	173.0	74.6	148.1	63.7	*
	Total folate (µg/MJ)	397.7	170.1	363.2	153.2	355.4	169.1	*
	Sodium (mg/d)	1247.2	403.1	1177.0	407.6	942.1	412.9	ns
	Sodium (mg/MJ)	2593.5	617.0	2422.2	612.1	2176.2	791.7	**
	Iron (mg/d)	7.5	3.0	7.2	3.2	7.5	3.7	ns
	Iron (mg/MJ)	15.8	6.1	15.1	5.7	17.8	9.5	ns
	Calcium (mg/d)	783.5	265.8	765.0	275.0	746.5	308.9	ns
	Calcium (mg/MJ)	1647.1	505.7	1601.9	505.6	1775.7	644.1	ns

NANS- National Adult Nutrition Survey; NPNS- National Pre-school Nutrition Survey; *n* - number; SD - standard deviation; %TE- percentage of total energy; 10MJ - micronutrients per 10 mega joule, ns - not significant at P>0.05.
Statistical test used to measure differences between consumers and non-consumers of wholemeal bread: Independent samples *t* test (P<0.05).
*Non-consumers of wholemeal bread- this group includes white bread consumers

Table 4 (a): Mean daily intake of white and wholemeal bread (g/d) divided into low, medium and high tertiles of mean daily intake for Irish adults and children (consumers only)

	Tertiles of mean daily intake of bread (g/d)		Mean daily intake of white bread (g/d)	Mean daily intake of wholemeal bread (g/d)
NANS (Adults)	Non-consumers	*n*	646	426
	Low	*n*	284	358
		mean	17.2	23.1
		SD	6.5	10.0
		min	2.3	2.5
		max	30.3	38.3
	Medium	*n*	285	358
		mean	45.5	59.7
		SD	10.2	11.9
		min	30.5	38.8
		max	65.6	81.0
	High	*n*	285	358
		mean	109.8	127.6
		SD	43.8	42.9
		min	66.0	81.3
		max	310.5	396.3
NPNS (Preschool children)	Non-consumers	*n*	187	221
	Low	*n*	104	92
		mean	8.9	8.9
		SD	3.8	3.8
		min	1.5	0.8
		max	15.5	14.8
	Medium	*n*	105	94
		mean	22.8	23.8
		SD	4.0	5.6
		min	16.3	15.0
		max	30.8	34.3
	High	*n*	104	93
		mean	55.0	50.5
		SD	22.0	15.1
		min	31.0	34.5
		max	138.5	98.0

NANS- National Adult Nutrition Survey; NPNS- National Pre-school Nutrition Survey; *n* - number; SD - standard deviation

Table 4(b): Mean daily energy, macronutrient, micronutrient and fibre intakes across tertiles of mean daily white bread intake in Irish adults (NANS) and pre-school children (NPNS) for consumers only

		Tertiles of mean daily white bread intake (g/d)								
		Low			Medium			High		
		n	Mean	SD	*n*	Mean	SD	*n*	Mean	SD
NANS (Adults)	Weight of white bread (g/d)	284	17.2[a]	6.5	285	45.5[b]	10.2	285	109.8[c]	43.8
	Energy (kcal/g)	284	1937.9[a]	632.9	285	2079.2[ab]	612.4	285	2178.5[b]	641.1
	Protein (g/day)	284	80.5	27.7	285	85.1	27.0	285	87.7	26.3
	Protein (%TE)	284	16.9[a]	3.4	285	16.6[ab]	3.4	285	16.4[b]	3.2
	Carbohydrate (g/d)	284	220.3	73.3	285	230.1	73.8	285	244.9	78.4
	Carbohydrate (%TE)	284	43.0	6.6	285	41.8	6.9	285	42.5	7.2
	of which sugars (g/d)	284	91.8	40.3	285	89.7	43.6	285	90.3	46.5
	of which sugars (%TE)	284	17.8[a]	5.6	285	16.0[b]	5.7	285	15.4[b]	6.0
	Fat (g/d)	284	72.1[a]	26.4	285	79.7[a]	27.3	285	85.6[b]	30.9
	Fat (%TE)	284	33.5[a]	5.8	285	34.6[ab]	6.5	285	35.2[b]	6.7
	Saturated fat (g/d)	284	27.7[a]	11.1	285	31.7[b]	12.0	285	34.7[c]	14.8
	Saturated fat (%TE)	284	12.9[a]	3.1	285	13.7[b]	3.6	285	14.3[b]	3.9
	Fibre (g/d)	284	19.2[a]	8.0	285	17.4[b]	7.2	285	17.2[b]	6.5
	Fibre (g/MJ)	284	23.9[a]	7.6	285	20.2[b]	6.4	285	19.1[c]	5.5
	Total folate (µg/d)	284	345.1	184.1	285	363.1	347.6	285	367.9	460.8
	Total folate (µg/MJ)	284	428.8	197.4	285	432.1	554.6	285	411.4	516
	Sodium (mg/d)	284	2344.2[a]	826.2	285	2556.2[a]	891.1	285	2821.2[b]	950.4
	Sodium (mg/MJ)	284	2926.1[a]	660	285	2951.3[a]	647.2	285	3118.7[b]	676.8
	Iron (mg/d)	284	14.0	15.7	285	14.3	17.2	285	14.0	13.5
	Iron (mg/MJ)	284	17.9	22.8	285	17.4	26.2	285	15.6	14.6
	Calcium (mg/d)	284	923.1	448.0	285	918.2	358.6	285	977.9	398.5
	Calcium (mg/MJ)	284	1151.6	485.1	285	1076.5	379.9	285	1080.7	344.8

NPNS (Pre-school children)	Weight of white bread (g/d)	104	8.9[a]	3.8	105	22.8[b]	4.0	104	55.0[c]	22.0
	Energy (kcal/g)	104	1072.8[a]	204.2	105	1144.4[a]	260.7	104	1255.8[b]	282.6
	Protein (g/day)	104	40.7[a]	10.5	105	42.7[ab]	11.1	104	45.8[b]	11.6
	Protein (%TE)	104	15.1	2.6	105	15.0	2.3	104	14.7	2.2
	Carbohydrate (g/d)	104	138.9[a]	26.5	105	148.2[a]	37.1	104	168.1[b]	40.9
	Carbohydrate (%TE)	104	48.9	5.8	105	48.6	6.0.	104	50.2	5.4
	of which sugars (g/d)	104	72.7	20.0	105	76.5	23.4	104	79.9	25.4
	of which sugars (%TE)	104	25.6	6.0	105	25.1	5.2	104	23.8	5.2
	Fat (g/d)	104	39.3	10.8	105	42.5	12.5	104	44.2	13.4
	Fat (%TE)	104	32.6	4.7	105	33.3	5.5	104	31.5	4.9
	Saturated fat (g/d)	104	17.9	5.8	105	19.5	6.6	104	20.0	6.6
	Saturated fat (%TE)	104	14.9	3.3	105	15.3	3.2	104	14.3	2.9
	Fibre (g/d)	104	10.6	3.3	105	11.1	4.0	104	11.9	4.2
	Fibre (g/MJ)	104	23.7	6.8	105	23.3	7.1	104	22.8	6.9
	Total folate (µg/d)	104	173.3	86.16	105	183.4	87.07	104	179.9	81.2
	Total folate (µg/MJ)	104	385.1	156.9	105	385.4	173.5	104	352.4	132.5
	Sodium (mg/d)	104	1095.1[a]	382.4	105	1170.2[ab]	370.6	104	1322.8[b]	380.9
	Sodium (mg/MJ)	104	2405.8	637.1	105	2442.1	553.9	104	2520.6	519.8
	Iron (mg/d)	104	7.3	2.6	105	7.1	3.7	104	7.9	3.4
	Iron (mg/MJ)	104	16.4	5.9	105	14.9	7.6	104	14.9	4.9
	Calcium (mg/d)	104	750.9	255.7	105	795.4	296	104	796.3	278.5
	Calcium (mg/MJ)	104	1674.3	477.5	105	1677.4	547.5	104	1509.6	417.5

NANS- National Adult Nutrition Survey; NPNS- National Pre-school Nutrition Survey; *n*- number; SD- standard deviation; %TE- percentage of total energy; 10MJ - micronutrients per 10 mega joule.

Statistical test used to measure differences between tertiles: General Linear Model adjusted for age in years and gender (NANS) with Bonferroni post hoc test.

[abc] Different superscript letters indicate significant differences in mean values across tertiles ($P<0.05$).

Table 4(c): Mean daily energy, macronutrient, micronutrient and fibre intakes across tertiles of mean daily wholemeal bread intake in Irish adults (NANS) and pre-school children (NPNS) for consumers only

		Tertiles of mean daily wholemeal bread intake (g/d)								
		Low			Medium			High		
		n	Mean	SD	*n*	Mean	SD	*n*	Mean	SD
NANS (Adults)	Weight of wholemeal bread (g/d)	358	23.1[a]	10	358	59.7[b]	11.9	358	127.6[c]	42.9
	Energy (kcal/g)	358	1945.8[a]	647.4	358	1960.8[a]	607.8	358	2204.3[b]	679.4
	Protein (g/day)	358	80.9[a]	27.2	358	83.6[ab]	27.7	358	92.2[b]	28.4
	Protein (%TE)	358	17.0	3.8	358	17.4	3.7	358	17.1	3.2
	Carbohydrate (g/d)	358	217.6[a]	74.5	358	223.4[a]	73.5	358	256.9[b]	82.7
	Carbohydrate (TE%)	358	42.5[a]	7.2	358	42.9[a]	6.5	358	44.1[b]	6.6
	of which sugars (g/d)	358	88.53[a]	42.4	358	88.5[ab]	39.3	358	98.8[b]	46.2
	of which sugars (%TE)	358	17.1	5.9	358	16.9	5.5	358	16.6	5.4
	Fat (g/d)	358	72.7[a]	28	358	74.2[ab]	27.3	358	80.9[b]	31.4
	Fat (%TE)	358	33.5	6.3	358	34.0	6	358	32.8	6.4
	Saturated fat (g/d)	358	28.1[a]	12.3	358	29.2[ab]	12.1	358	31.9[b]	13.7
	Saturated fat (%TE)	358	12.9	3.4	358	13.3	3.3	358	12.9	3.4
	Fibre (g/d)	358	17.6[a]	6.9	358	19.9[b]	7.2	358	24.6[c]	7.8
	Fibre (g/MJ)	358	22.4[a]	7.7	358	25.1[b]	7.8	358	27.4[c]	7.3
	Total folate (µg/d)	358	351.9[a]	327.1	358	366.3[a]	200.9	358	443.4[b]	350.7
	Total folate (µg/MJ)	358	499.9	1237.7	358	454.8	221.6	358	499.70	520.5
	Sodium (mg/d)	358	2367.3[a]	861	358	2462.2[b]	890.1	358	2850.9[c]	843.4
	Sodium (mg/MJ)	358	2952.6[a]	739.7	358	3020.8[a]	664	358	3152.6[b]	664
	Iron (mg/d)	358	13.8	13.6	358	13.8	11.4	358	16.1	17.3
	Iron (mg/MJ)	358	17.1	15.5	358	17.1	13.77	358	17.7	20.0
	Calcium (mg/d)	358	897.5[a]	391.3	358	926.8[a]	394.3	358	1083.3[b]	432.8
	Calcium (mg/MJ)	358	1132.8	453.9	358	1150.4	396.7	358	1191.8	421.5

NPNS (Pre-school children)	Weight of wholemeal bread (g/d)	92	8.9[a]	3.8	94	23.8[b]	5.6	93	50.5[c]	15.1
	Energy (kcal/g)	92	1064.6[a]	219.3	94	1130.6[a]	198.3	93	1226.5[b]	238
	Protein (g/day)	92	40.7[a]	10.1	94	43.6[ab]	9.2	93	47.3[b]	10.3
	Protein (%TE)	92	15.4	2.4	94	15.5	2.5	93	15.5	2.3
	Carbohydrate (g/d)	92	137.8[a]	32.9	94	148.9[ab]	29	93	161.9[b]	34.3
	Carbohydrate (%TE)	92	48.6	6.0	94	49.5	5.3	93	49.7	5.5
	of which sugars (g/d)	92	73.1	24	94	75.1	17.9	93	79.1	23.6
	of which sugars (%TE)	92	25.8	6.1	94	25	4.8	93	24.2	4.9
	Fat (g/d)	92	38.8[a]	10.9	94	41.1[ab]	10.5	93	44.7[b]	12.5
	Fat (%TE)	92	32.7	5.2	94	32.6	5.3	93	32.5	5.0
	Saturated fat (g/d)	92	18.0	6.0	94	18.7	5.6	93	20.4	6.8
	Saturated fat (%TE)	92	15.1	3.4	94	14.7	3.1	93	14.9	3.4
	Fibre (g/d)	92	10.9[a]	3.5	94	12.5[b]	3.1	93	14.5[c]	3.5
	Fibre (g/MJ)	92	24.5[a]	6.7	94	26.5[ab]	6.0	93	28.5[b]	6.8
	Total folate (µg/d)	92	176.5	86.6	94	184.7	85.2	93	205.6	80.8
	Total folate (µg/MJ)	92	399.0	193.4	94	390.3	168.6	93	403.8	146.8
	Sodium (mg/d)	92	1064.2[a]	316.7	94	1231.9[a]	392.2	93	1443.6[b]	404.6
	Sodium (mg/MJ)	92	2390.9[a]	565.1	94	2592.9[ab]	683.2	93	2794.5[b]	457.4
	Iron (mg/d)	92	7.1	3.6	94	7.6	2.8	93	7.9	2.5
	Iron (mg/MJ)	92	15.9	7.5	94	16.1	5.7	93	15.5	5.0
	Calcium (mg/d)	92	794.1	304.2	94	760.7	235.6	93	795.9	255.2
	Calcium (mg/MJ)	92	1786.3	617.9	94	1608.3	432.9	93	1548.5	418.1

NANS- National Adult Nutrition Survey; NPNS- National Pre-school Nutrition Survey; *n*- number; SD- standard deviation; %TE- percentage of total energy; 10MJ - micronutrients per 10 mega joule.
Statistical test used to measure differences between tertiles: General Linear Model adjusted for age in years and gender (NANS) with Bonferroni post hoc test.
[abc] Different superscript letters indicate significant differences in mean values across tertiles ($P<0.05$).

Table 5: Relationship between mean daily intake of white and wholemeal bread (g/d) and mean daily intake of energy, macronutrients, fibre and micronutrients for Irish adults and pre-school children (consumers only)

		Mean daily intakes (g/d)			
		White bread (g/d)		Wholemeal bread (g/d)	
		Pearson Correlation		Pearson Correlation	
		n= 854	*P*	*n*= 1074	*P*
NANS (Adults)	Energy (kcal/d)	0.20	**	0.22	**
	Protein (g/d)	0.16	**	0.20	**
	Protein (%TE)	-0.04	ns	-0.02	ns
	Carbohydrate (g/d)	0.21	**	0.26	**
	Carbohydrate (%TE)	0.02	ns	0.10	**
	of which sugars (g/d)	0.05	ns	0.12	**
	of which sugars (%TE)	-0.12	**	-0.06	ns
	Fat (g/d)	0.22	**	0.15	**
	Fat (%TE)	0.09	**	-0.06	*
	saturated fat (g/d)	0.16	**	0.15	**
	saturated fat (%TE)	0.26	**	-0.02	ns
	Fibre (mg/d)	-0.59	ns	0.44	**
	Fibre (g/MJ)	-0.25	**	0.28	**
	Total folate (µg/d)	0.02	ns	0.14	**
	Total folate (µg/MJ)	-0.31	ns	0.00	ns
	Sodium (mg/d)	0.28	**	0.27	**
	Sodium (mg/MJ)	0.16	**	0.11	**
	Iron (mg/d)	0.03	ns	0.10	**
	Iron (mg/MJ)	-0.03	ns	0.03	ns
	Calcium (mg/d)	0.15	**	0.22	**
	Calcium (mg/MJ)	-0.01	ns	0.05	ns

		n=313		*n*=279	
NPNS (Pre-school children)	Energy (kcal/d)	0.31	**	0.35	**
	Protein (g/d)	0.20	**	0.28	**
	Protein (%TE)	-0.11	ns	0.00	ns
	Carbohydrate (g/d)	0.35	**	0.35	**
	Carbohydrate (%TE)	0.10	ns	0.08	ns
	of which sugars (g/d)	0.11	ns	0.19	**
	of which sugars (%TE)	-0.18	**	-0.08	ns
	Fat (g/d)	0.17	**	0.24	**
	Fat (%TE)	-0.11	ns	-0.02	ns
	saturated fat (g/d)	0.13	*	0.19	**
	saturated fat (%TE)	-0.10	ns	-0.03	ns
	Fibre (mg/d)	0.10	ns	0.41	**
	Fibre (g/MJ)	-0.11	ns	0.22	**
	Total folate (µg/d)	0.10	ns	0.15	*
	Total folate (µg/MJ)	-0.05	ns	0.01	ns
	Sodium (mg/d)	0.21	**	0.42	**
	Sodium (mg/MJ)	0.03	ns	0.26	**
	Iron (mg/d)	0.19	**	0.12	*
	Iron (mg/MJ)	0.00	ns	-0.03	ns
	Calcium (mg/d)	0.10	ns	0.05	ns
	Calcium (mg/MJ)	-0.13	*	-0.16	**

NANS- National Adult Nutrition Survey; NPNS- National Pre-school Nutrition Survey; *n*- number; %TE- percentage of total energy; 10MJ - micronutrients per 10 mega joule.

Statistical test used to examine the association between mean daily white bread and nutrients: Pearson's Correlation.

*Correlation is significant at $P<0.05$

**Correlation is significant at $P<0.01$

Table 6(a): Mean anthropometric measurements across tertiles of mean daily white bread intake for Irish adults and pre-school children (consumers only)

		Tertiles of mean daily white bread intake (g/d)								
		Low			Medium			High		
		n	Mean	SD	*n*	Mean	SD	*n*	Mean	SD
NANS (Adult)	Weight (kg)	269	75.5	15.2	267	76.8	16.0	262	80.7	15.8
	Height (m)	271	1.7	0.1	268	1.7	1.0	261	1.7	1.0
	Body mass index (kg/m^2)	269	26.8	4.6	267	26.5	4.9	261	27.9	5.08
	Waist circumference (cm)	251	90.8	14.0	234	91.2	13.7	233	95.1	13.8
	Hip circumference (cm)	251	104.0	9.2	234	102.8	9.1	231	104.7	9.6
	Waist /hip circumference ratio	251	0.9	0.1	234	0.9	0.1	231	0.9	0.1
NPNS (Pre-school children)	Weight (kg)	103	14.0^a	2.8	105	15.5^b	3.1	103	16.2^b	2.82
	Height (cm)	102	90.8^a	9.4	104	95.3^b	9.6	103	97.7^b	8.5
	Body mass index (kg/m^2)	103	16.7	2.2	105	16.9	2.2	103	16.9	1.4

NANS- National Adult Nutrition Survey; NPNS- National Pre-school Nutrition Survey; *n*- number; SD- standard deviation; %TE- percentage of total energy; 10MJ - micronutrients per 10 mega joule.

Statistical test used to measure differences between tertiles: General Linear Model adjusted for age in years and gender (NANS) with Bonferroni post hoc test.

^{abc} Different superscript letters indicate significant differences in mean values across tertiles ($P<0.05$).

Table 6(b): Mean anthropometric measurements across tertiles of mean daily wholemeal bread intake for Irish adults and preschool children (consumers only)

		Tertiles of mean daily wholemeal bread intake (g/d)								
		Low			Medium			High		
		n	Mean	SD	*n*	Mean	SD	*n*	Mean	SD
NANS (Adult)	Weight (kg)	332	76.5	15.8	340	78.0	17.1	342	79.7	15.7
	Height (m)	333	1.7	0.1	341	1.7	0.1	342	1.7	0.1
	Body mass index (kg/m^2)	331	26.9	5.0	340	27.5	5.4	342	27.2	4.4
	Waist circumference (cm)	309	90.6	13.9	306	92.3	14.6	312	92.8	12.7
	Hip circumference (cm)	309	103.7	9.7	306	104.5	10.2	311	104.6	8.6
	Hip waist circumference	309	0.9	0.1	306	0.9	0.1	311	0.9	0.1
NPNS (Preschool children)	Weight (kg)	92	14.5	2.8	94	15.4	2.9	92	16.2	3.0
	Height (cm)	91	92.1	9.7	93	95.3	9.2	92	97.5	8.8
	Body mass index (kg/m^2)	92	16.7	2.3	94	16.7	2.2	92	16.9	1.2

NANS- National Adult Nutrition Survey; NPNS- National Pre-school Nutrition Survey; *n*- number; SD- standard deviation; %TE- percentage of total energy; 10MJ - micronutrients per 10 mega joule.
Statistical test used to measure differences between tertiles: General Linear Model adjusted for age in years and gender (NANS) with Bonferroni post hoc test.
[abc] Different superscript letters indicate significant differences in mean values across tertiles (P<0.05).

Table 7: Relationship between mean daily intake of white and wholemeal bread (g/d) and anthropometric measurements of Irish adults and pre-school children (consumers only)

		Mean Daily Intake (g/d)					
		White bread			Wholemeal bread		
		n	Pearson's correlation		*n*	Pearson's correlation	
NANS (Adults)	Weight (kg)	798	0.15	**	1014	0.10	**
	Height (m)	800	0.11	**	1016	0.16	**
	Body mass index (kg/m^2)	797	0.11	**	1013	0.00	ns
	Waist circumference (cm)	718	0.14	**	927	0.07	*
	Hip circumference (cm)	716	0.03	ns	926	0.03	ns
	Hip/waist circumference ratio	716	0.19	**	926	0.20	**
NPNS (Pre-school children)	Weight (kg)	311	0.30	**	278	0.24	**
	Height (m)	309	0.29	**	276	0.23	**
	Body mass index (kg/m^2)	311	0.04	ns	278	0.03	ns

NANS- National Adult Nutrition Survey; NPNS- National Pre-school Nutrition Survey; *n*- number.

Statistical test used to examine the association between mean daily white and wholemeal bread and nutrients: Pearson's Correlation.

*Correlation is significant at $P<0.05$

**Correlation is significant at $P<0.01$

Fig. 1(a) Percentage contribution of food groups to energy intake in adults (Total population).

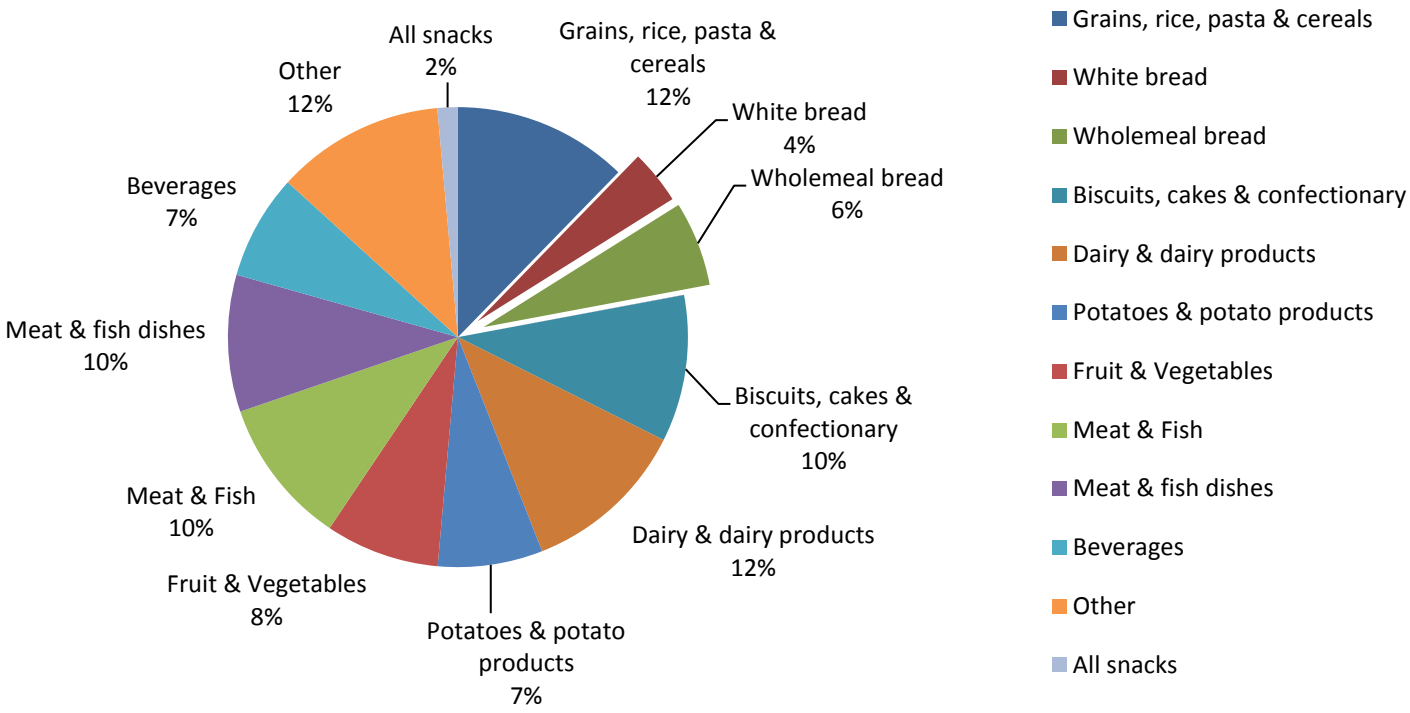


Fig. 1(b) Percentage contribution of food groups to energy intake in pre-school children (Total population).

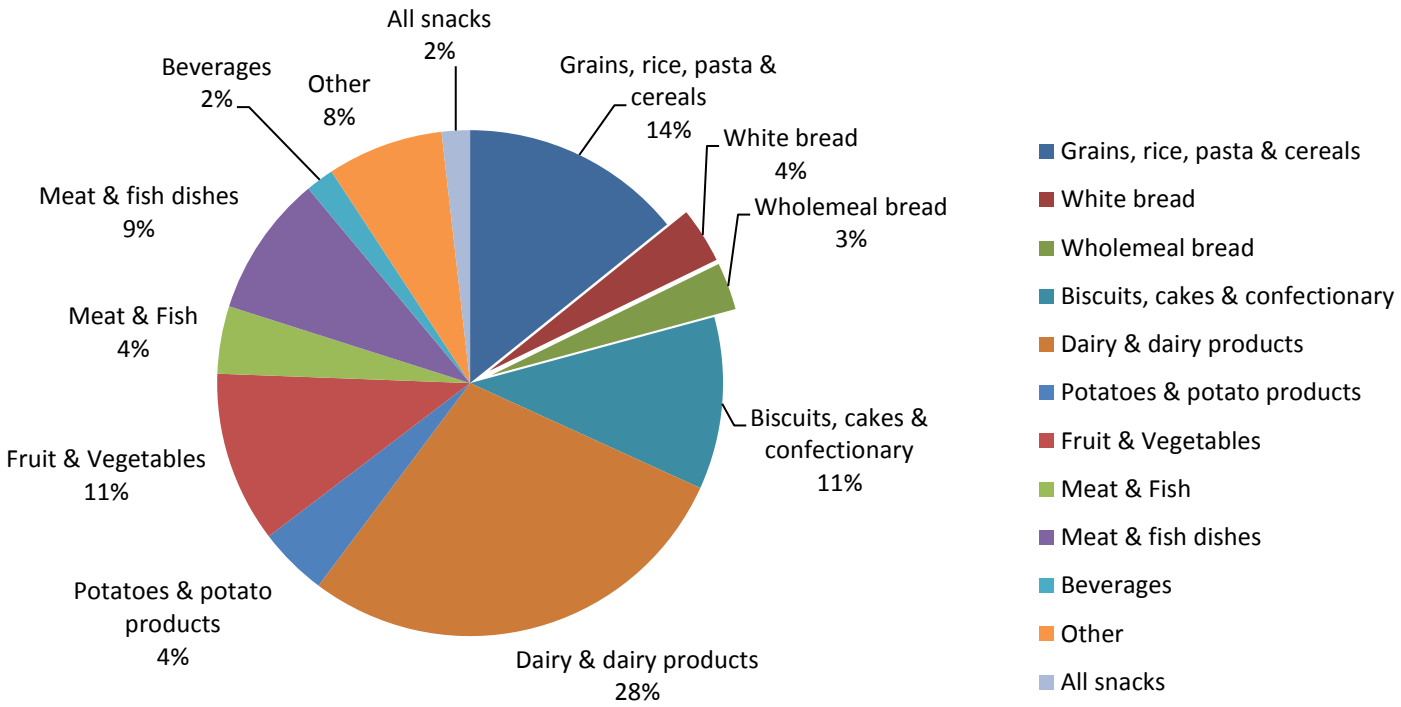


Fig. 2(a) Percentage contribution of food groups to protein intake in adults (Total population).

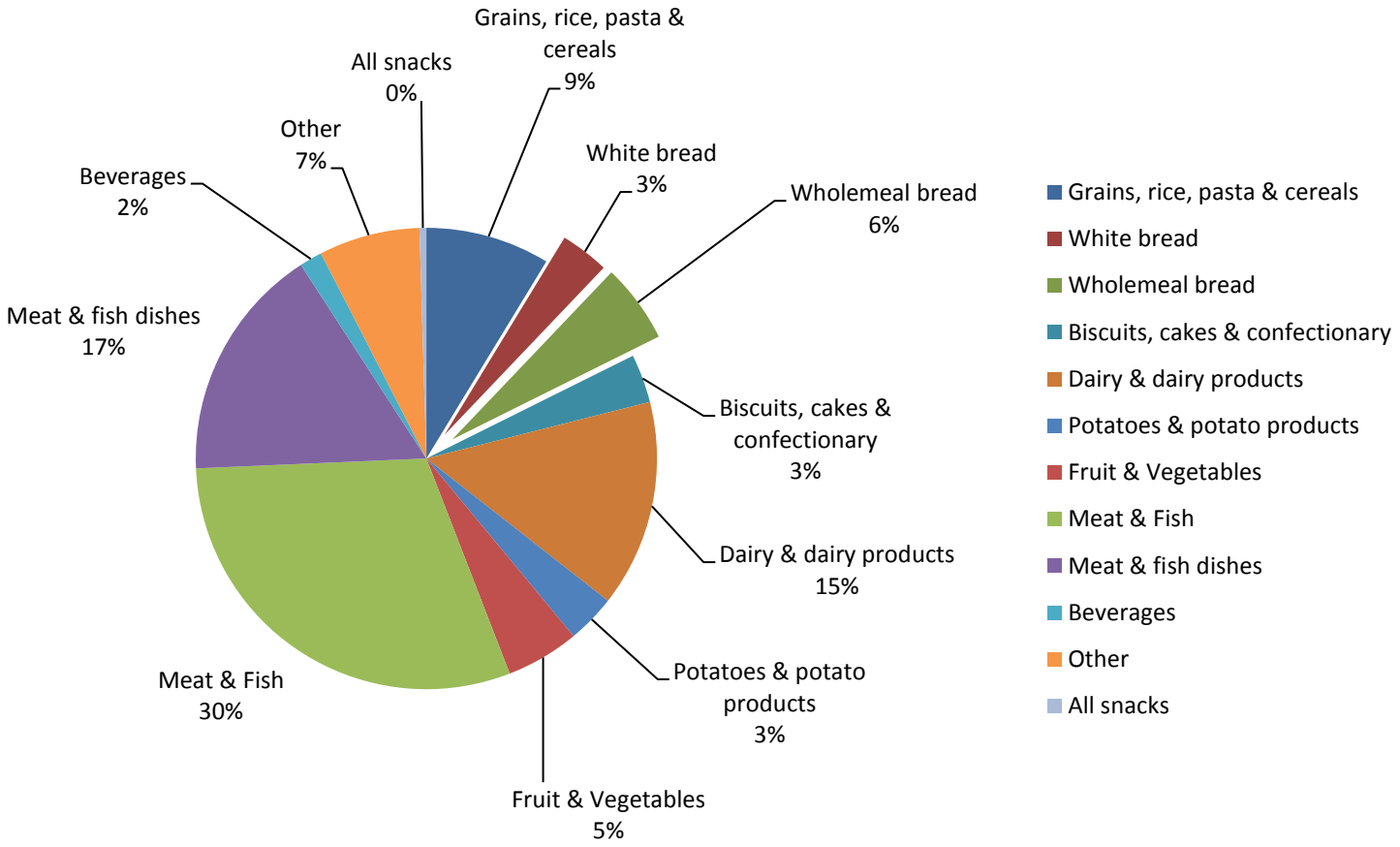


Fig 2(b) Percentage contribution of food groups to protein intake in pre-school children (Total population).

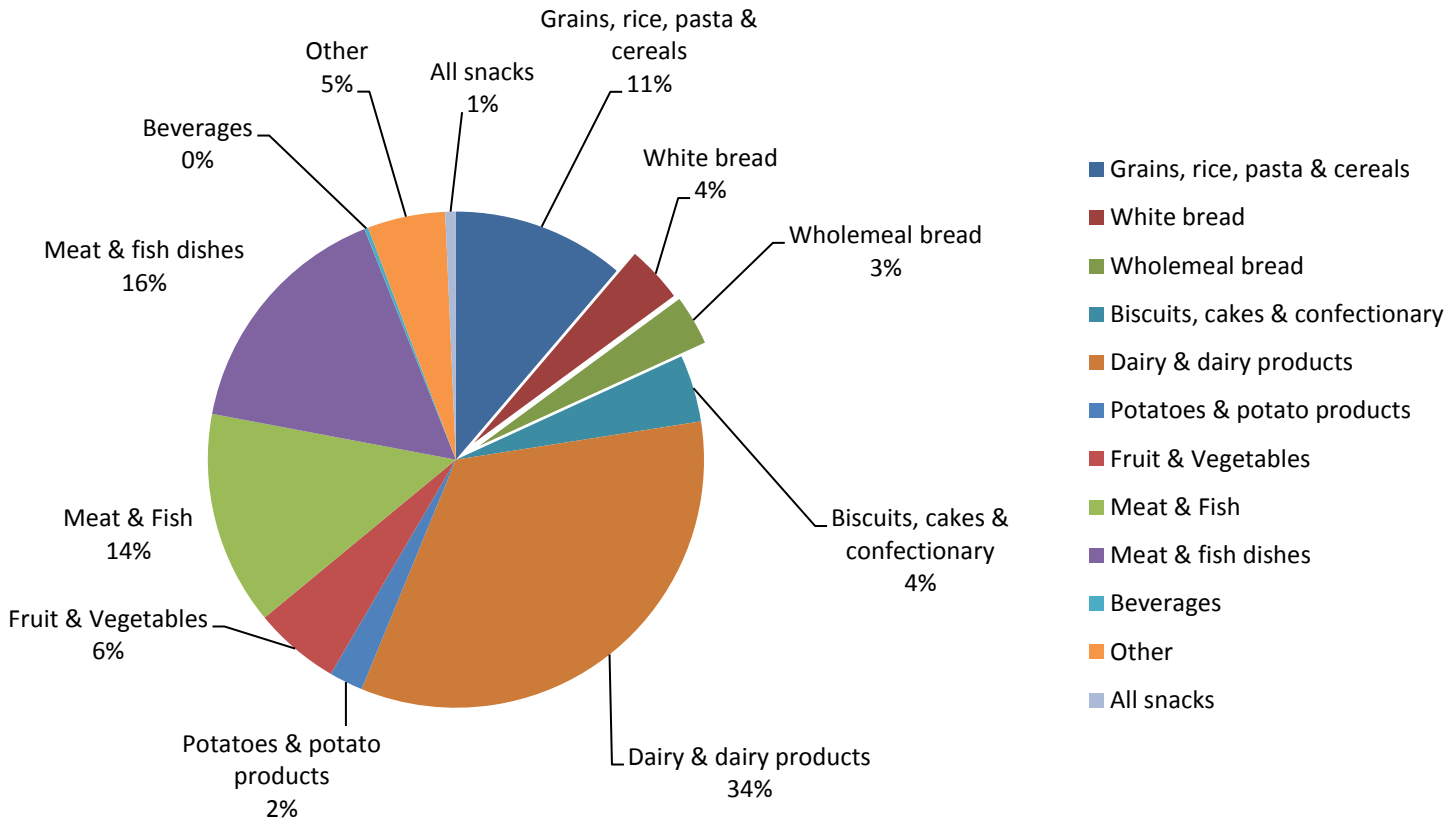


Fig. 3(a) Percentage contribution of food groups to carbohydrate intake in adults (Total population).

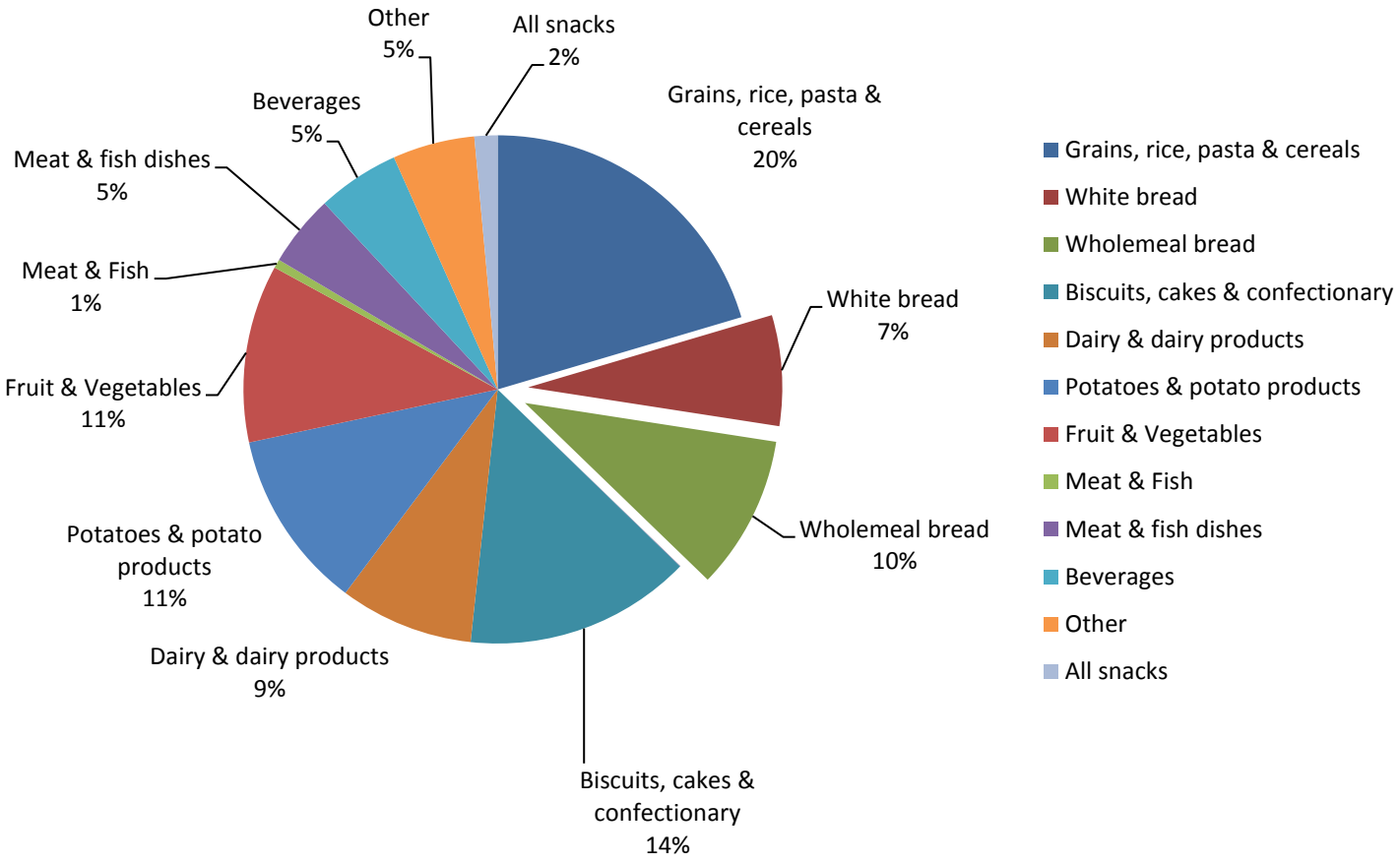


Fig. 3(b) Percentage contribution of food groups to carbohydrate intake in pre-school children (Total population).

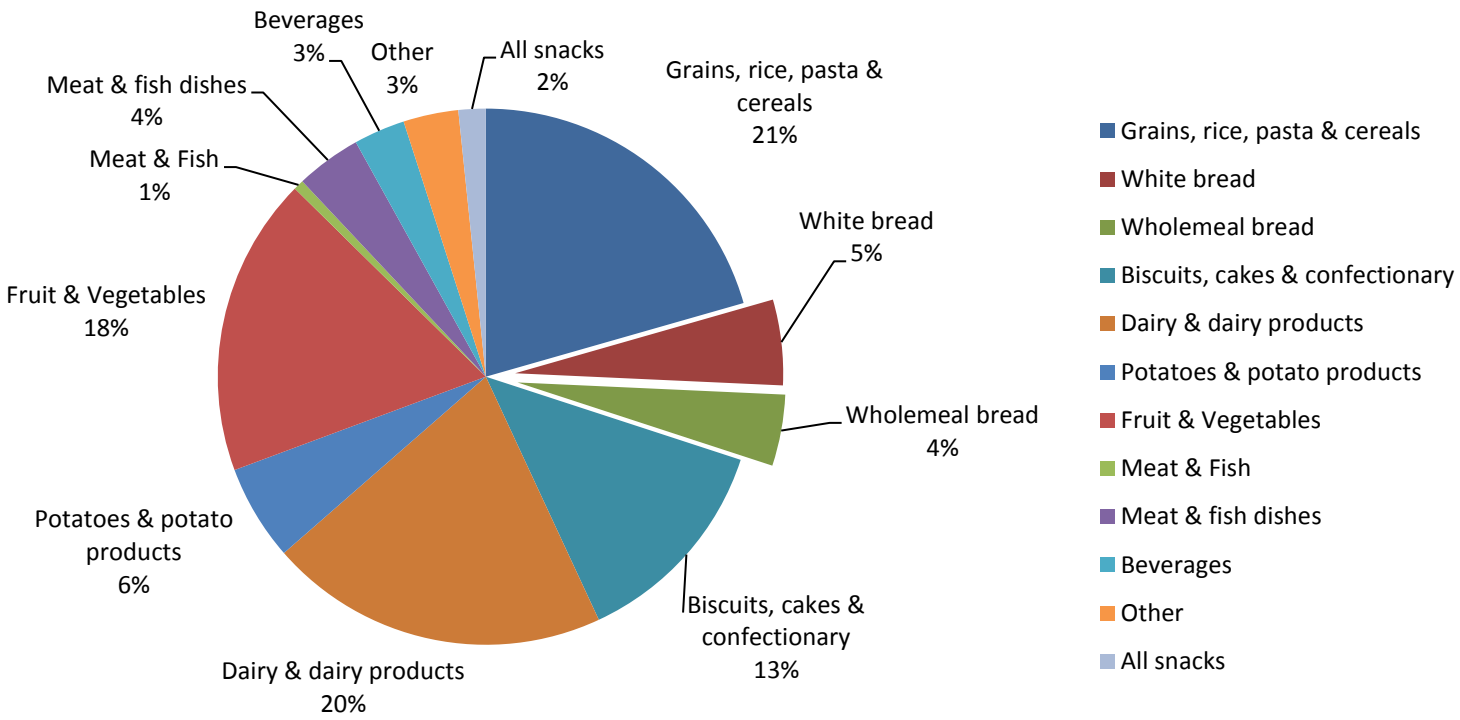


Fig. 4(a) Percentage contribution of food groups to total sugars intake in adults (Total population).

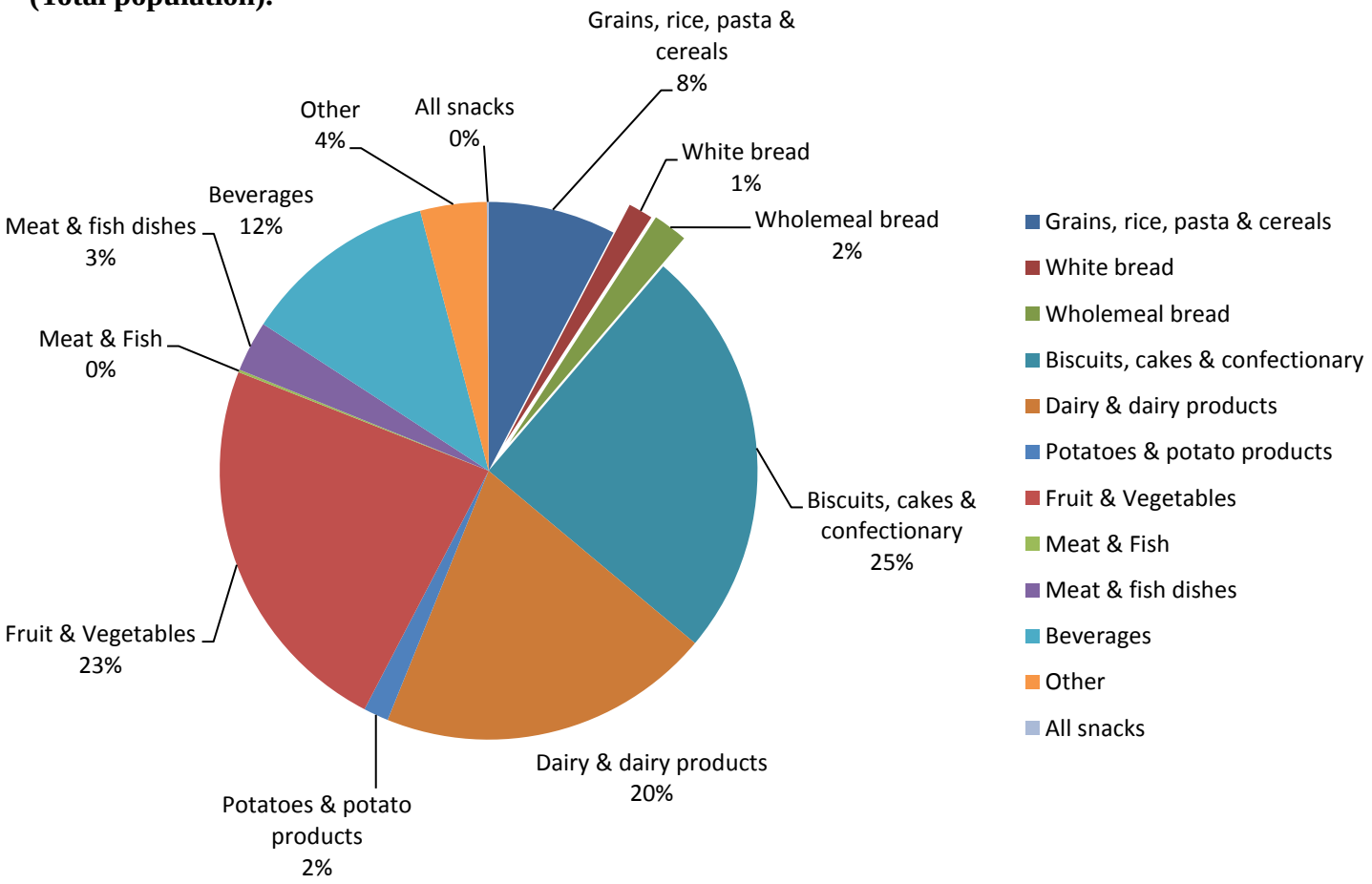


Fig. 4(b) Percentage contribution of food groups to total sugars intake in pre-school children (Total population).

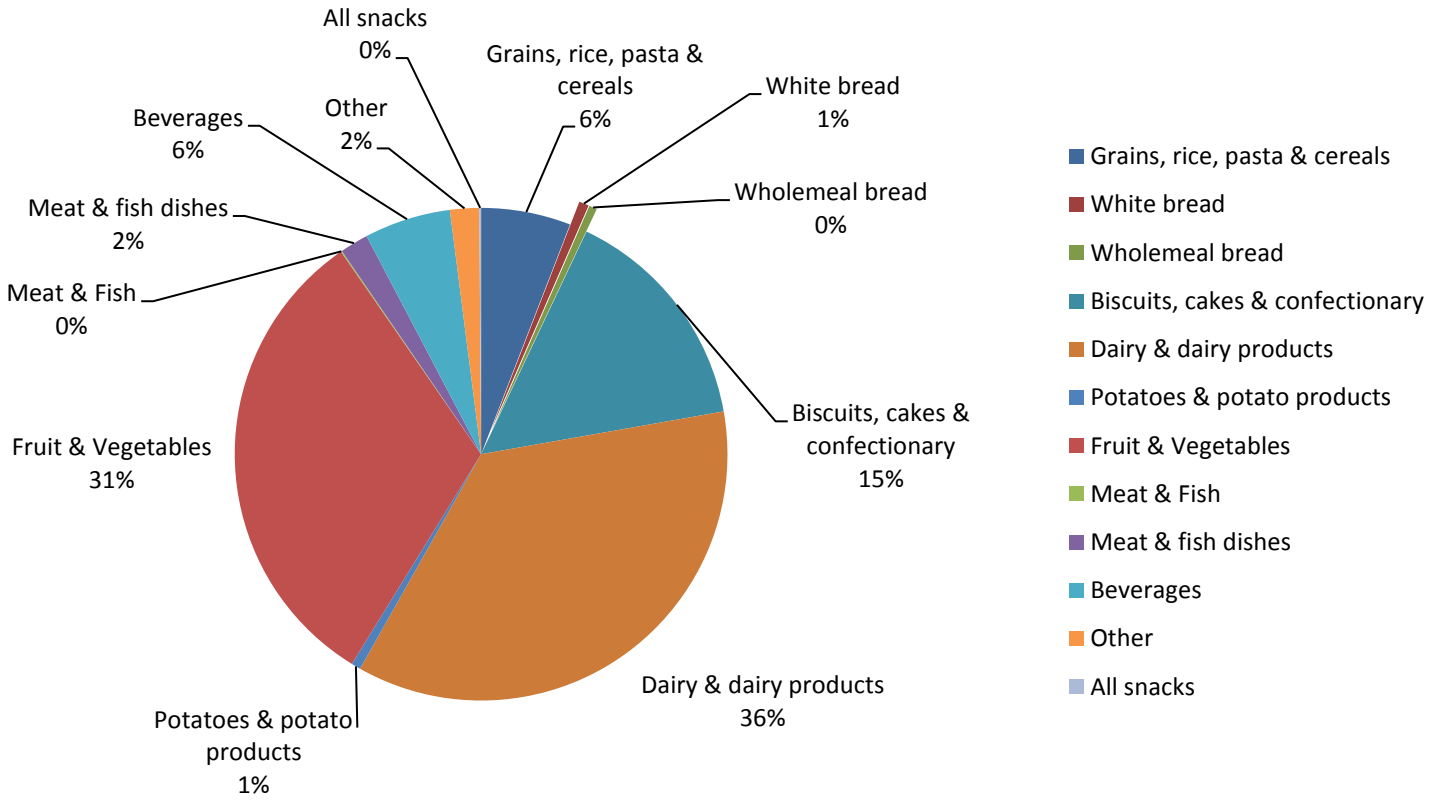


Fig. 5(a) Percentage contribution of food groups to total fat intake in adults (Total population).

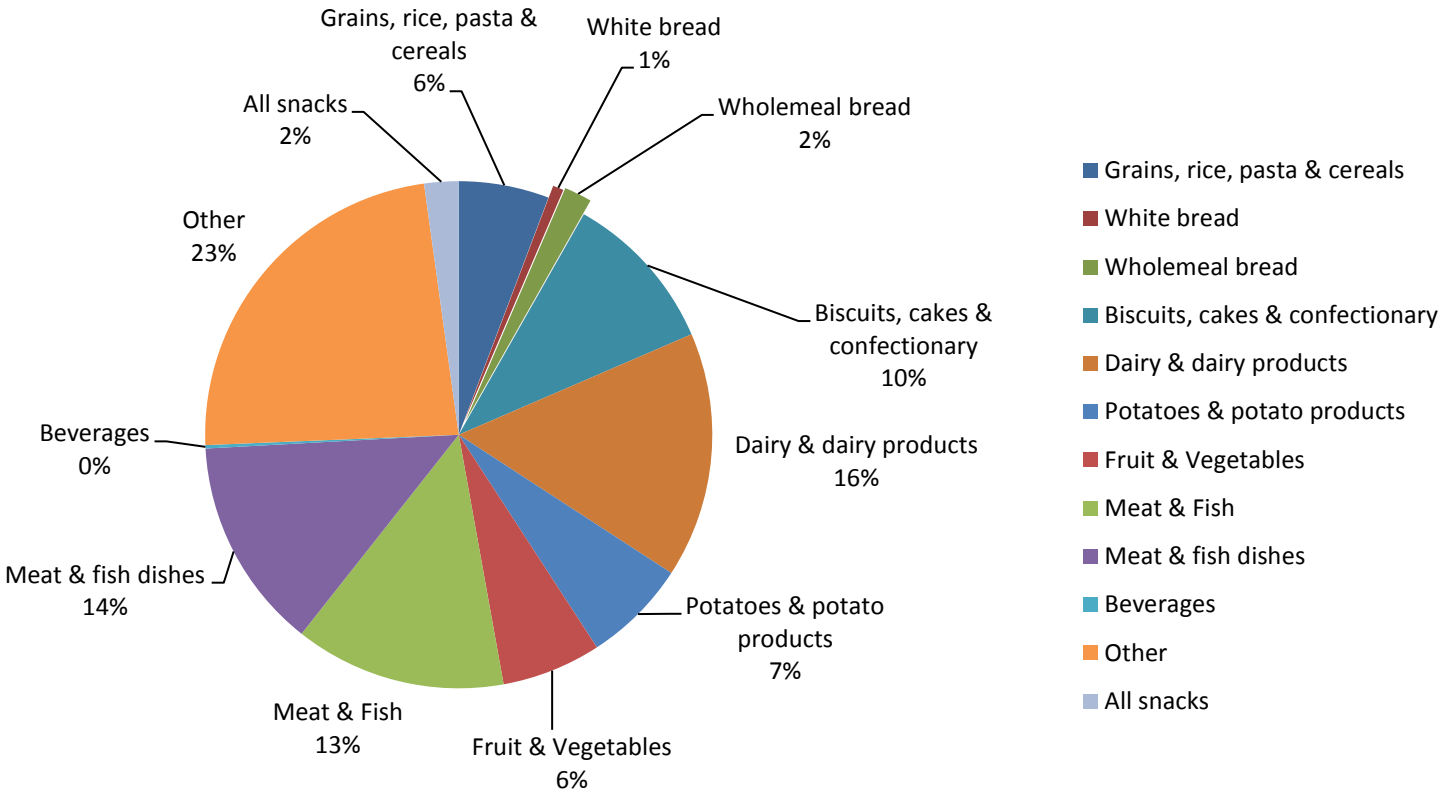


Fig. 5(b) Percentage contribution of food groups to total fat intake in pre-school children (Total population).

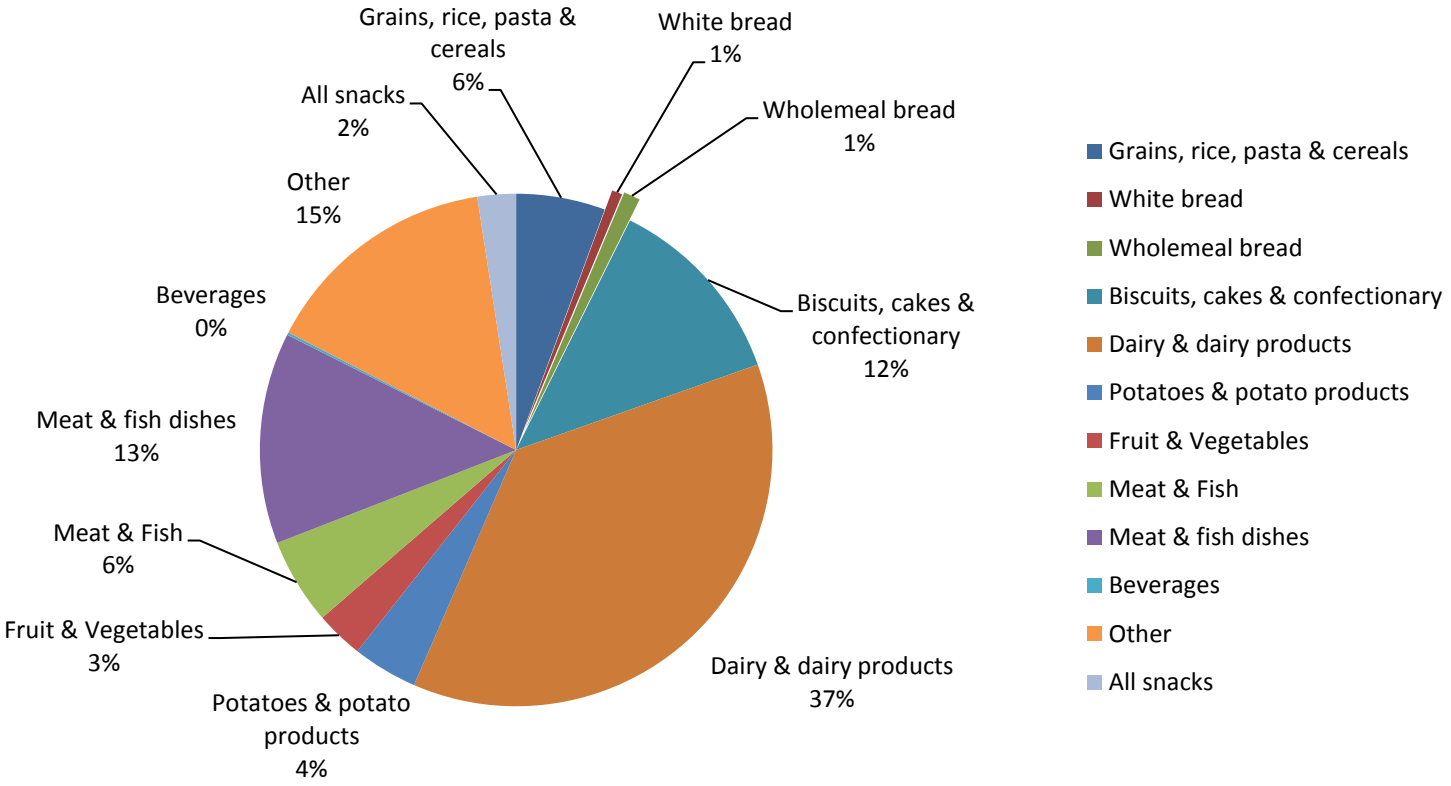


Fig. 6(a) Percentage contribution of food groups to saturated fat intake in adults (Total population).

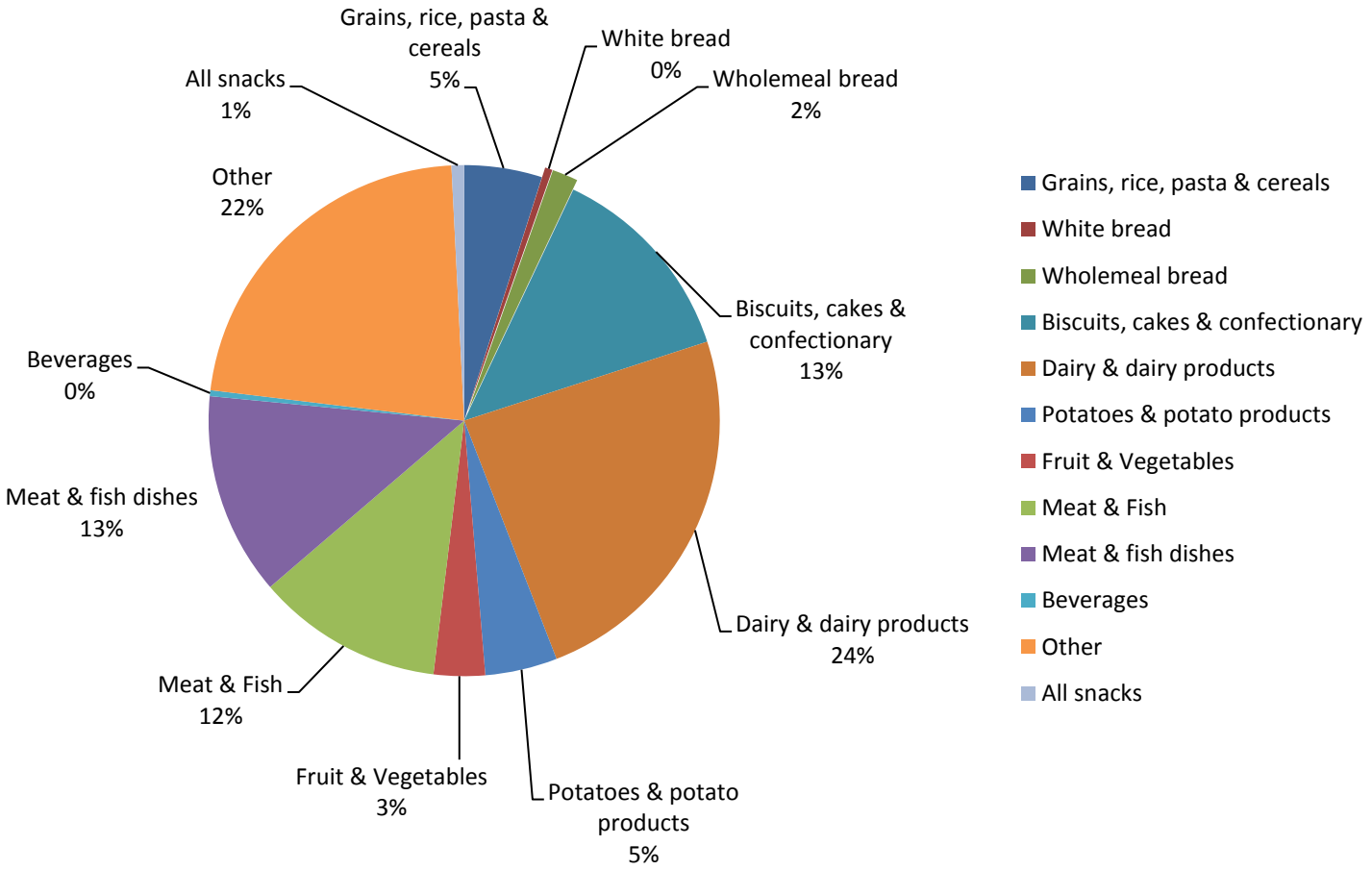


Fig. 6(b) Percentage contribution of food groups to saturated fat intake in pre-school children (Total population).

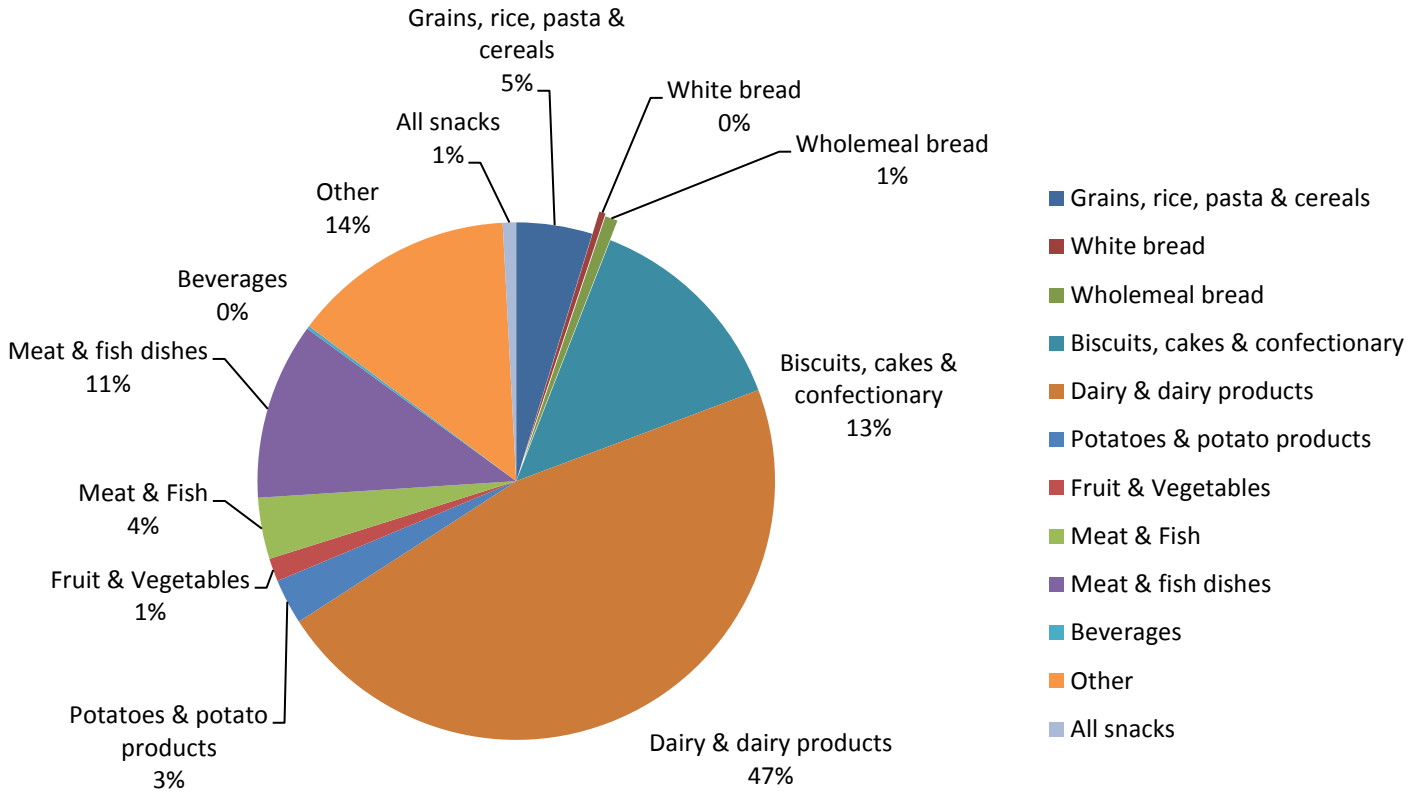


Fig 7(a) Percentage contribution of food groups to fibre intake in adults (Total population).

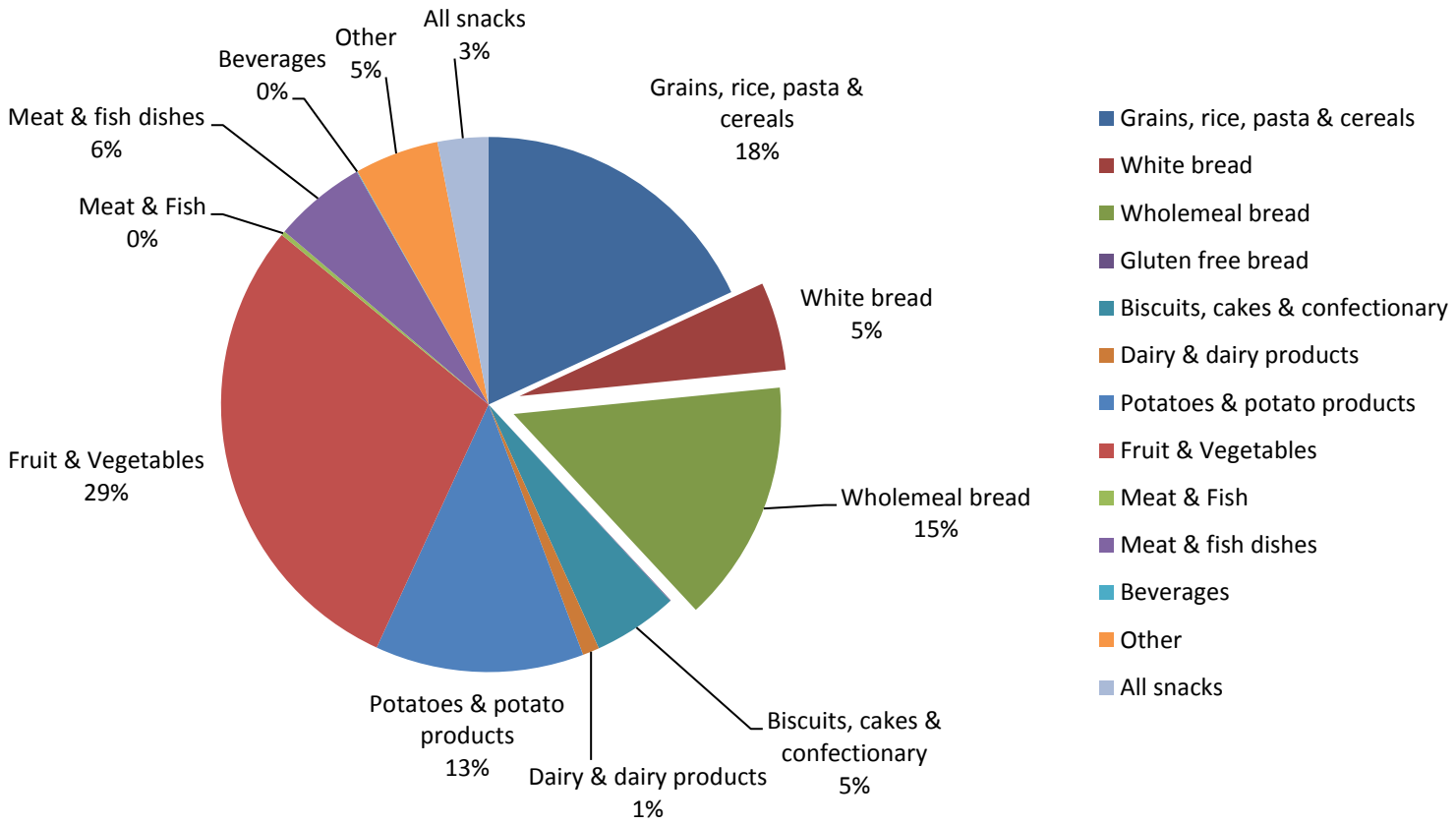


Fig. 7(b) Percentage contribution of food groups to fibre intake in pre-school children (Total population).

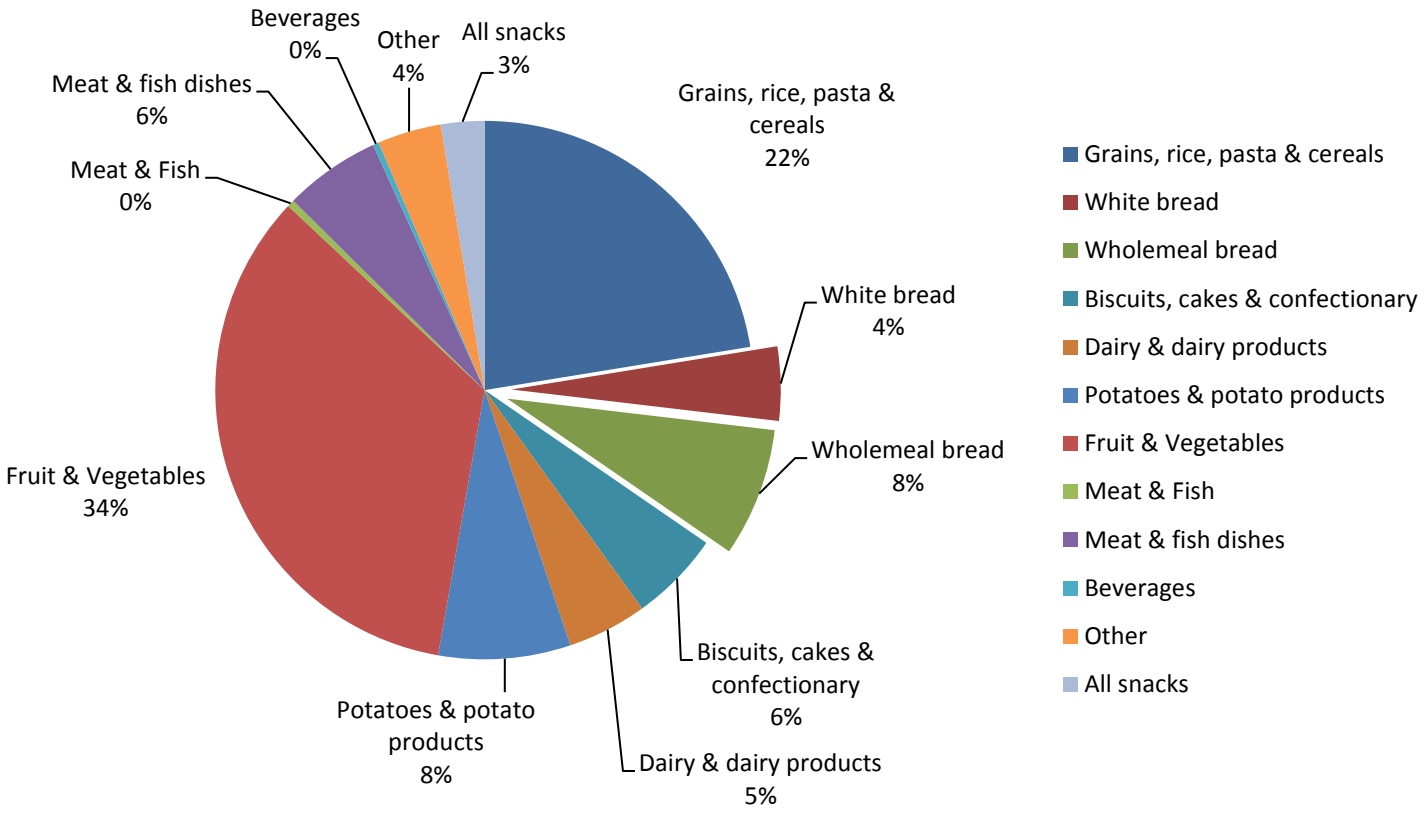


Fig. 8(a) Percentage contribution of food groups to total folate intake in adults (Total population).

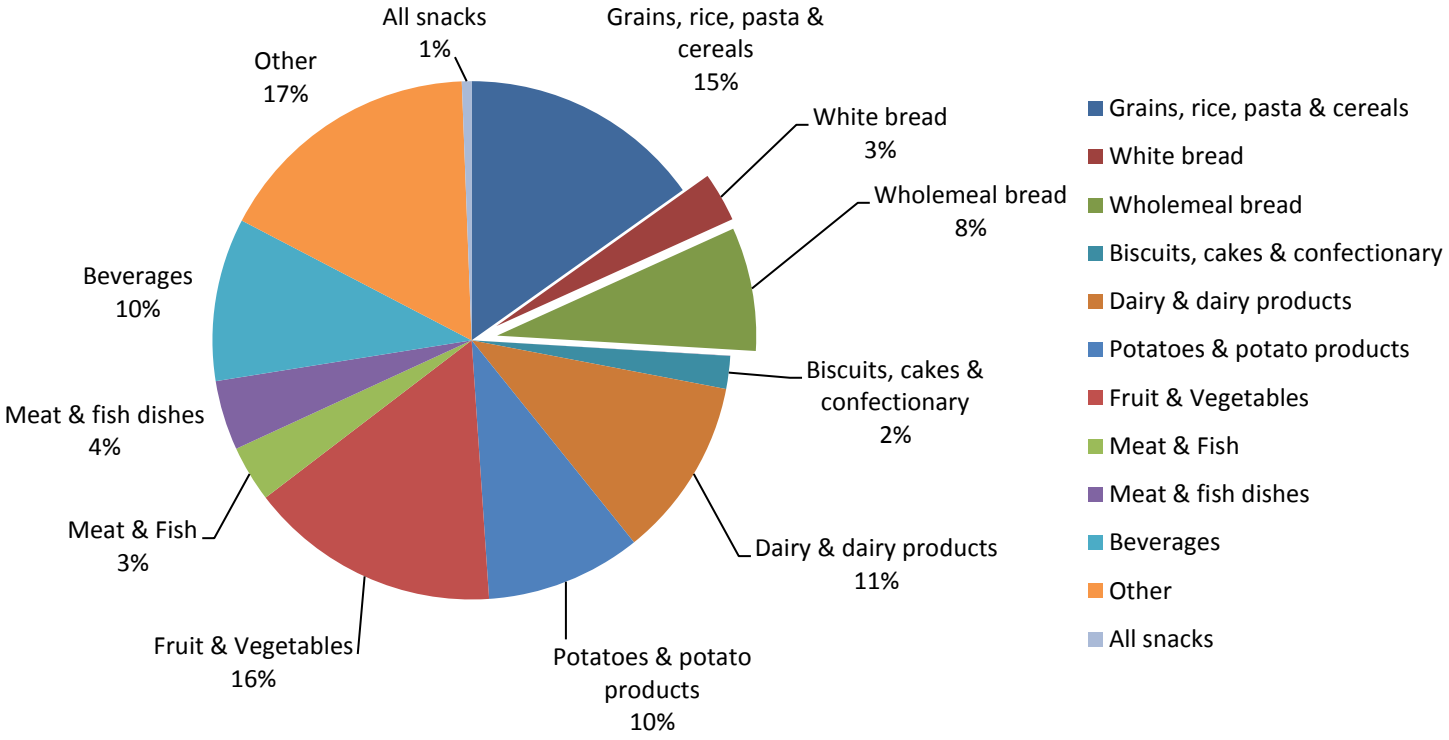


Fig. 8(b) Percentage contribution of food groups to total folate intake in pre-school children (Total population).

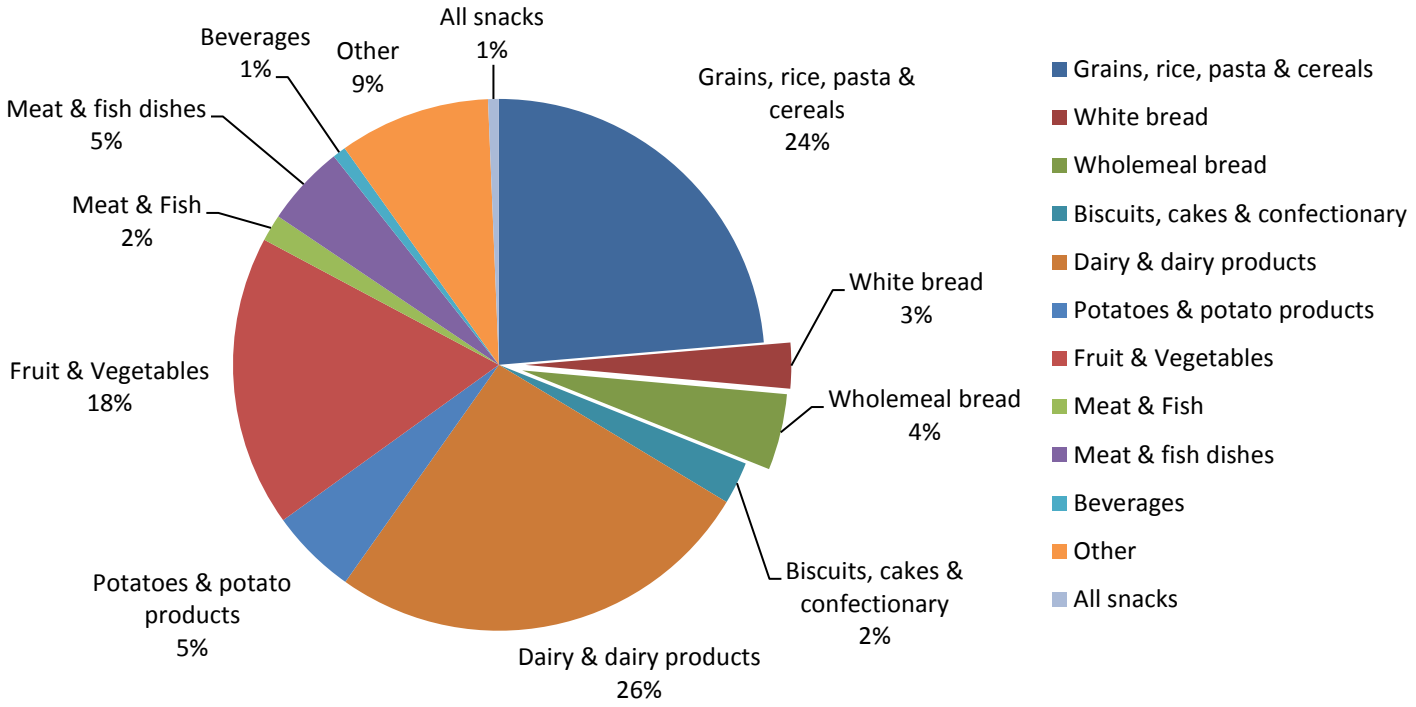


Fig. 9(a) Percentage contribution of food groups to sodium intake in adults (Total population).

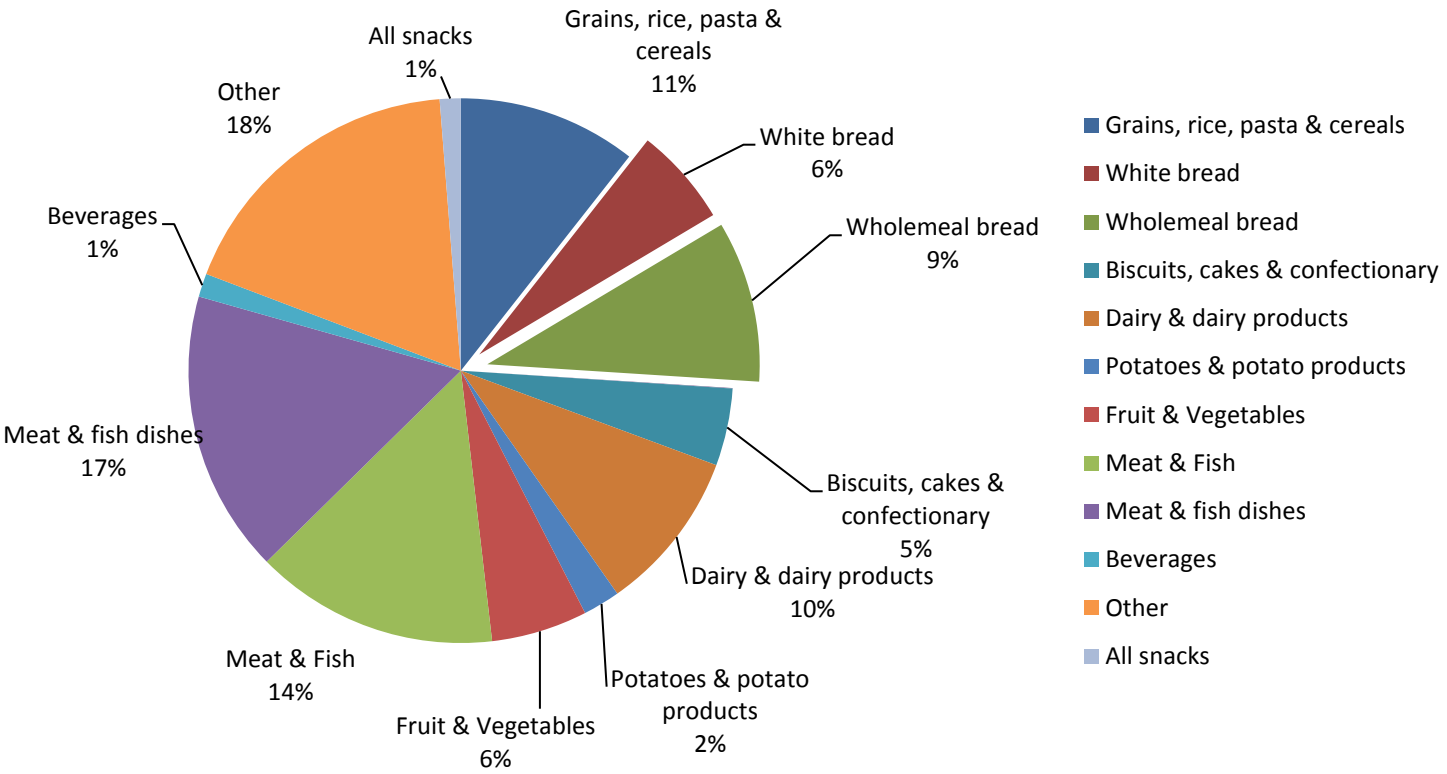


Fig. 9(b) Percentage contribution of food groups to sodium intake in pre-school children (Total population).

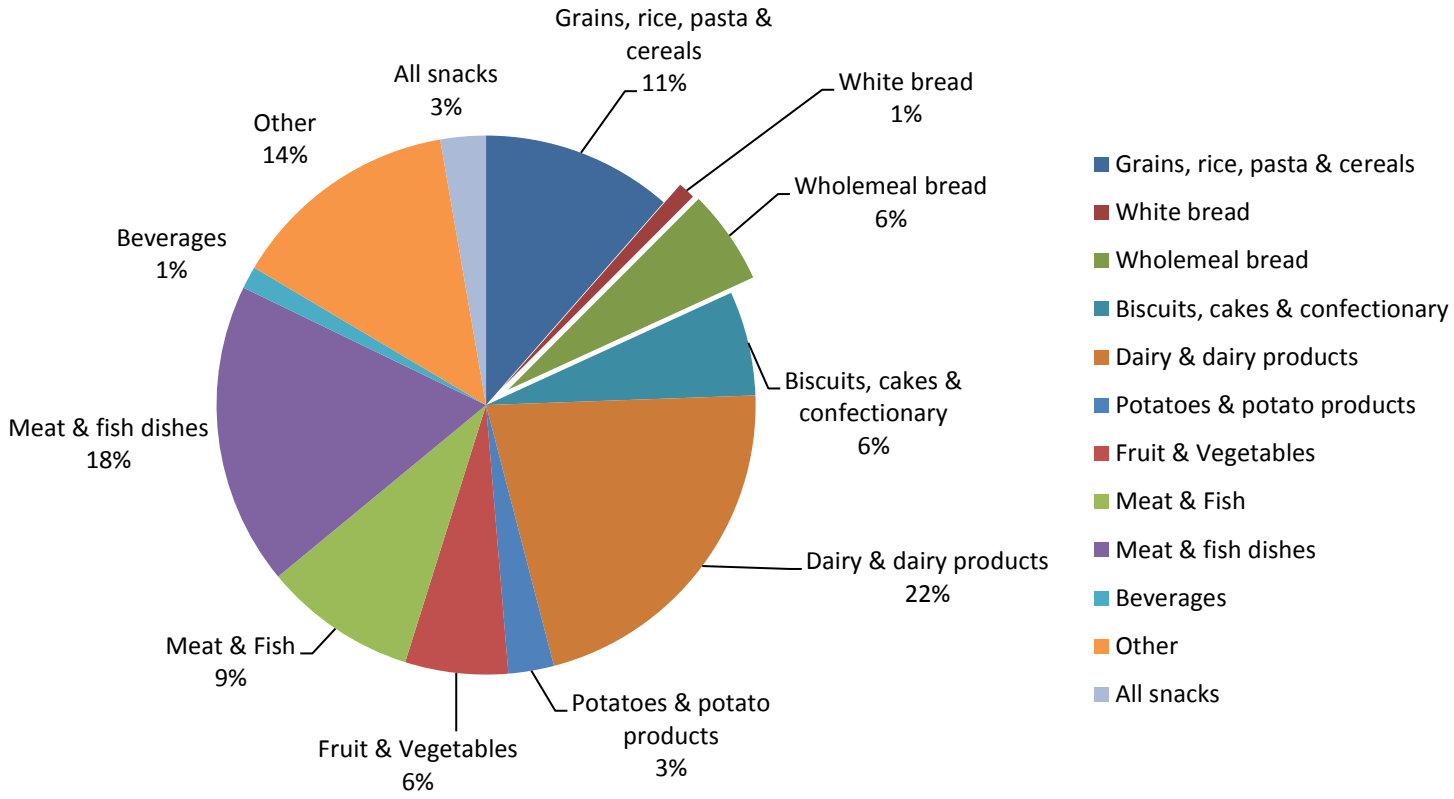


Fig. 10(a) Percentage contribution of food groups to iron intake in adults (Total population).

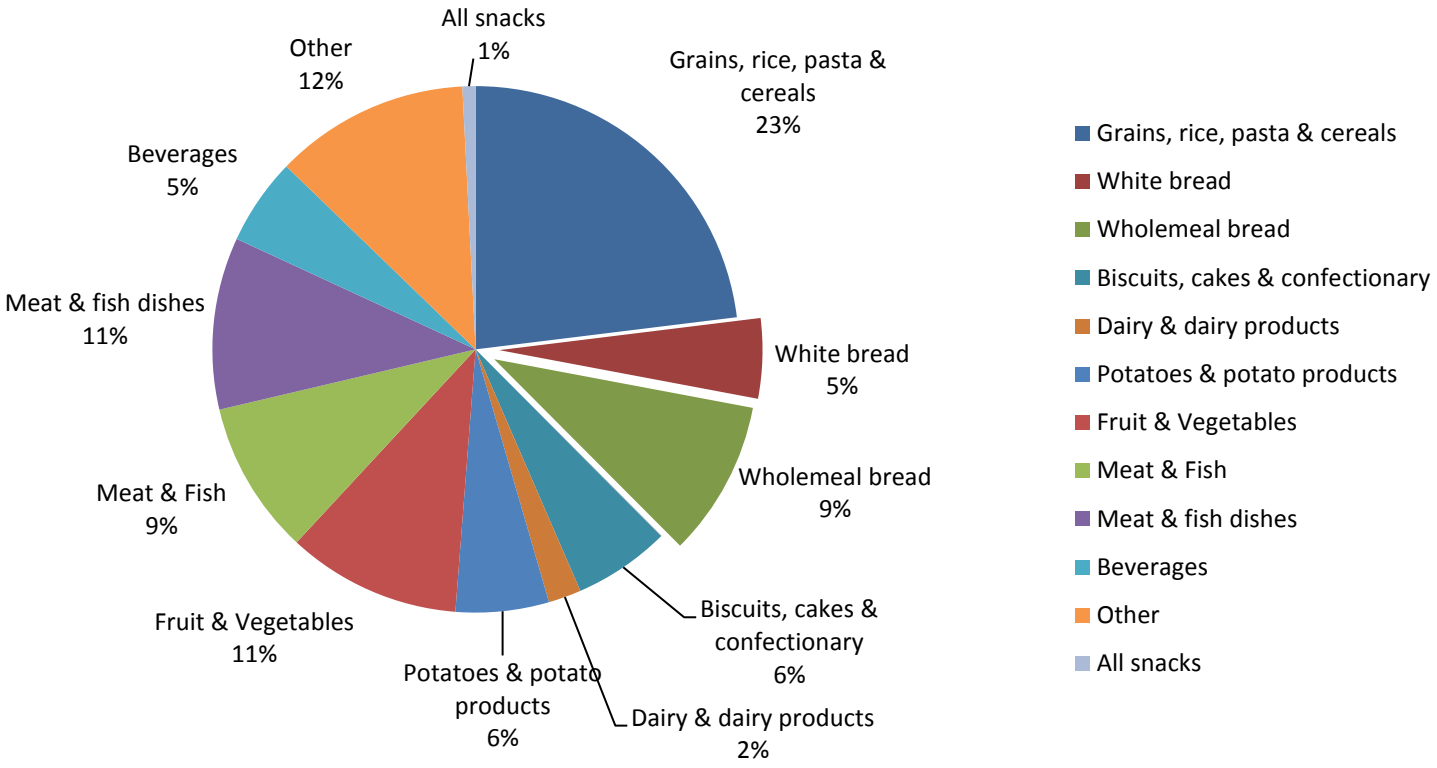


Fig. 10(b) Percentage contribution of food groups to iron intake in pre-school children (Total population).

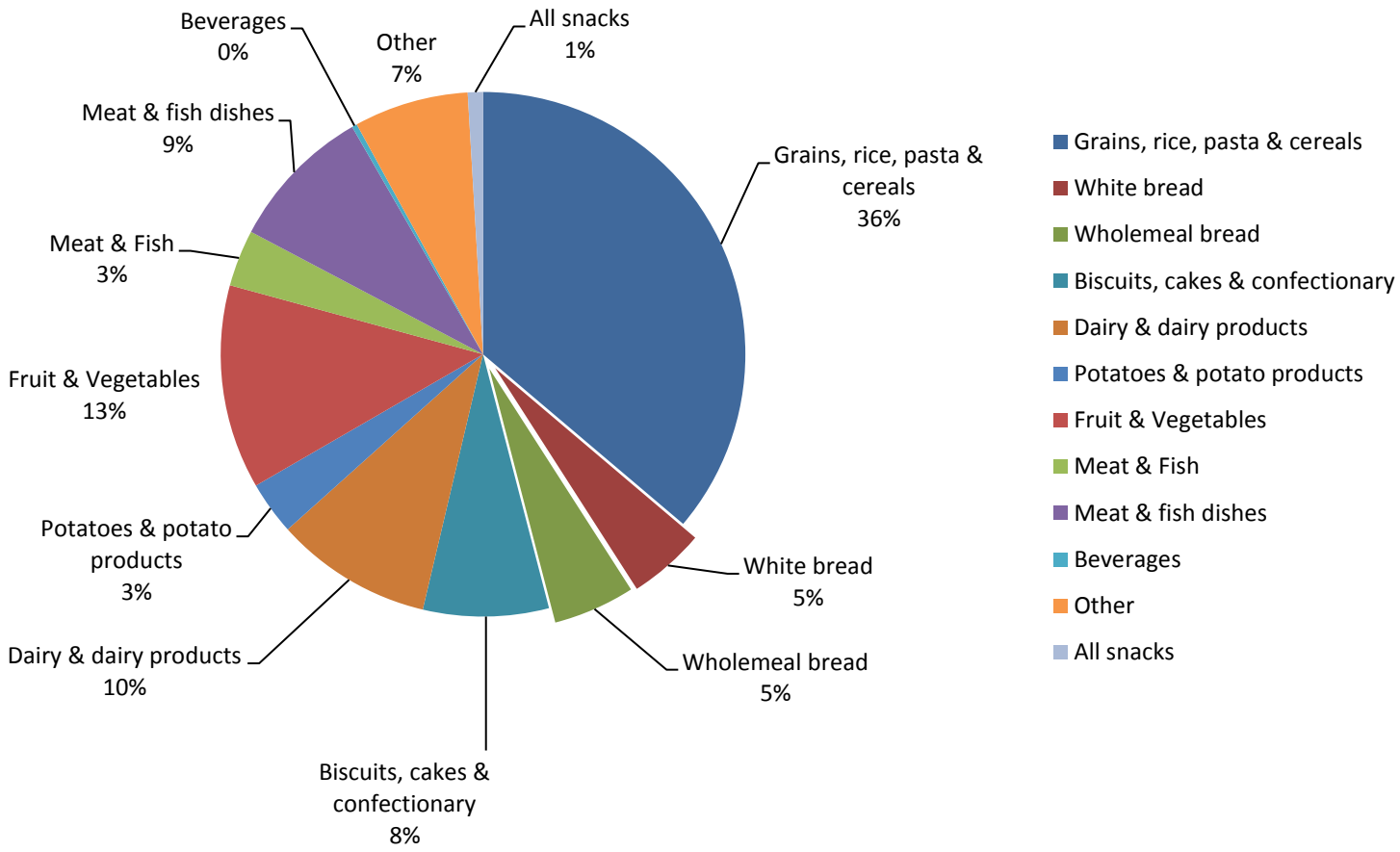


Fig. 11(a) Percentage contribution of food groups to calcium intake in adults (Total population).

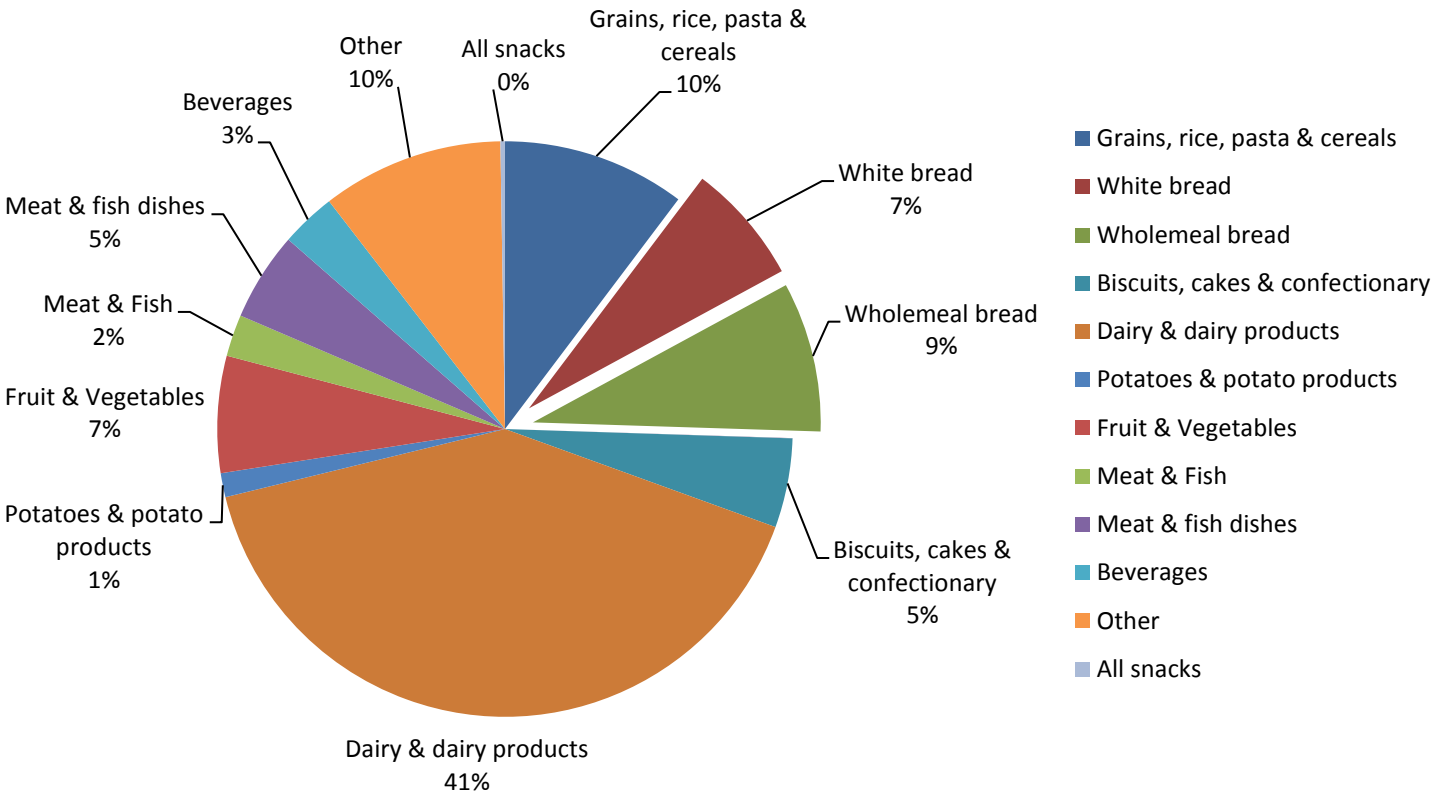
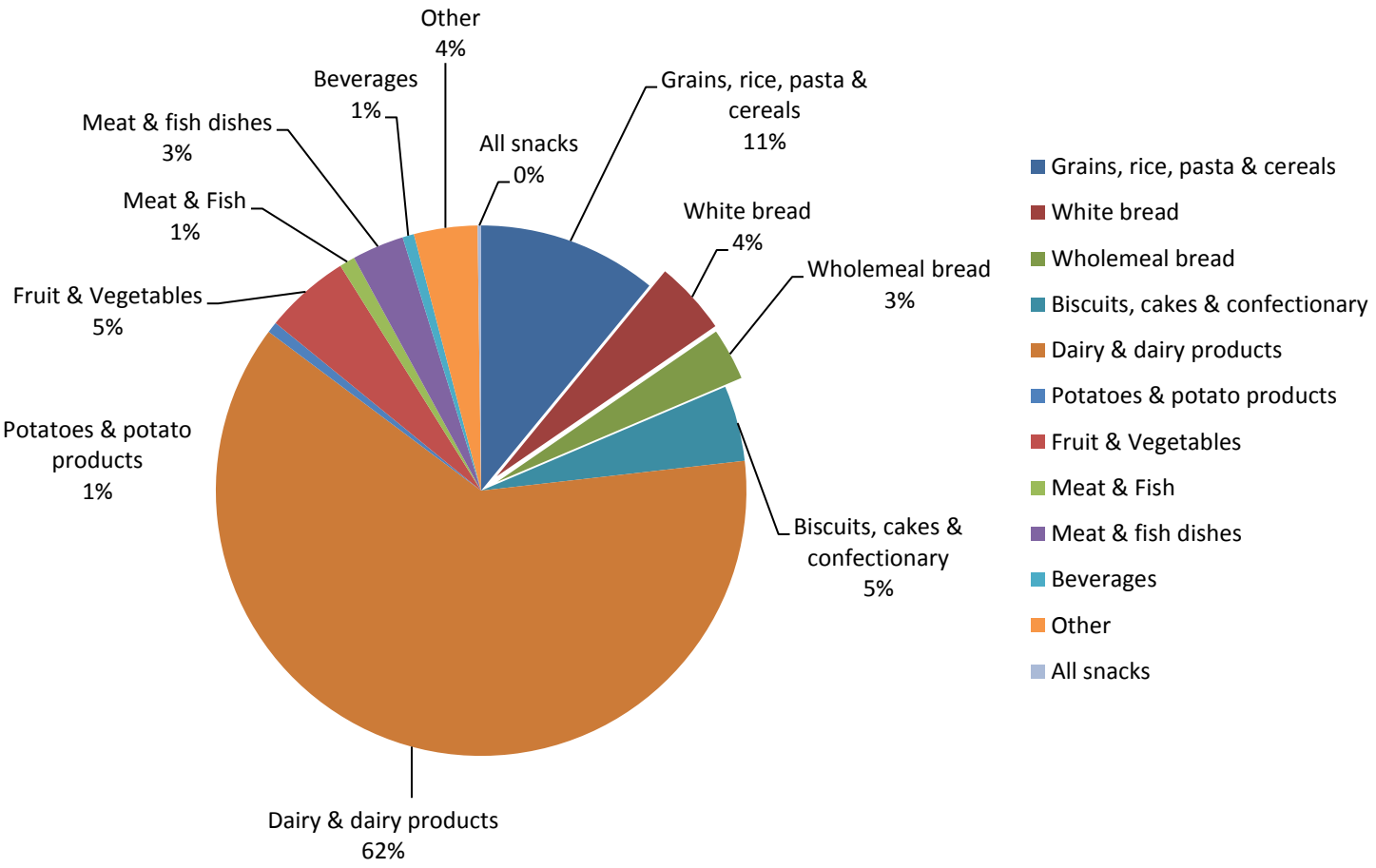


Fig. 11(b) Percentage contribution of food groups to calcium intake in pre-school children (Total population).



Appendix

Table S1: Mean daily intake of breads (g/d) for Irish adults and preschool children for the total population and consumers only

		Total Population			Consumers only			
		n	Mean	SD	*n*	Mean	SD	% cons
NANS (Adults)	White Bread	1500	32.8	45.4	854	57.6	46.8	57
	Wholemeal Bread	1500	50.2	53.3	1074	70.1	50.7	72
	Rolls (white/brown)	1500	12.1	23.4	481	37.7	27.2	32
	Other Breads	1500	5.0	13.7	263	28.7	19.6	18
	Artisan Breads	1500	4.2	16.3	184	34.0	33.9	12
NPNS (Pre-school)	White Bread	500	18.1	23.1	313	28.9	23.3	63
	Wholemeal Bread	500	15.5	20.2	279	27.8	19.7	56
	Rolls (white/brown)	500	4.9	10.3	135	18.0	12.4	27
	Other Breads	500	2.1	7.2	58	17.9	12.9	12
	Artisan Breads	500	1.5	7.1	46	16.7	17.5	9

NANS: National Adult Nutrition Survey, NPNS: National Adult Nutrition Survey; n- number; % cons- percentage consumers; SD- standard deviation
Other Breads include bagels, tortilla wraps, ciabattas
Artisan Breads include unpackaged & speciality breads

Table S2: Mean daily intake of white bread (g/d) for Irish adults (NANS) spilt by social class for the total population and consumers only.

		Total population			Consumers only			
NANS	Social class	n	Mean	SD	n	Mean	SD	% cons
White bread	Professional/managerial/technical	670	27.9[a]	42.5	349	53.5	45.7	52
	Non-manual skilled	267	33.7[a]	43.0	156	57.7	42.3	58
	Manual skilled	213	46.3[b]	51.8	149	66.1	50.2	70
	Semi-skilled/unskilled (includes students)	285	33.5[a]	48.4	160	59.7	51.0	56
	All adults	1500	32.8	45.4	854	57.6	46.8	57

NANS- National Adult Nutrition Survey; n- number; % cons- percentage consumers; SD- standard deviation
Differences in white bread intakes between social class in the total population analysis by one-way ANOVA with Scheffe post-hoc test.

Table S3: Percentage contribution of food groups to nutrient intakes in Irish adults spilt by social class for Total Population.

	Grains, rice, pasta & cereals	White bread	Wholemeal bread	Biscuits, cakes & confectionary	Dairy & dairy products	Potatoes & potato products	Fruit & vegetables	Meat & Fish	Meat & fish dishes	Beverages	Other	All snacks
	%	%	%	%	%	%	%	%	%	%	%	%
Energy												
Professional	13	3	7	11	12	7	9	10	9	7	11	1
Non-manual skilled	11	4	6	10	11	8	7	11	10	7	13	2
Manual skilled	11	5	6	9	11	8	7	11	11	8	12	1
Semi /unskilled	12	4	5	10	12	8	7	9	10	9	13	2
Protein												
Professional	9	3	6	3	15	3	6	31	15	2	7	0
Non-manual skilled	8	4	5	3	14	3	5	32	17	1	7	1
Manual skilled	8	5	5	3	14	4	4	31	18	2	6	0
Semi /unskilled	9	4	5	3	15	4	5	27	18	2	8	1
Carbohydrate												
Professional	22	6	11	15	9	10	13	1	4	4	5	1
Non-manual skilled	19	8	10	14	9	12	11	1	5	5	5	2
Manual skilled	17	10	10	14	8	13	10	1	6	6	5	1
Semi /unskilled	21	7	8	14	8	12	10	1	5	7	6	2
Total sugar												
Professional	8	1	2	24	20	1	26	0	3	9	4	0
Non-manual skilled	7	2	2	26	21	2	22	0	3	12	4	0
Manual skilled	7	2	2	26	20	2	21	0	3	14	4	0
Semi /unskilled	8	1	2	24	20	2	19	0	3	16	5	0
Total fat												
Professional	6	1	2	11	16	6	8	14	12	0	22	2
Non-manual skilled	5	1	2	10	15	7	5	14	13	0	25	3
Manual skilled	5	1	2	9	14	7	5	14	16	0	24	2
Semi /unskilled	5	1	1	10	16	8	5	12	15	0	24	3
Saturated fat												
Professional	5	0	2	14	25	4	4	12	12	1	21	1
Non-manual skilled	4	0	2	13	23	5	3	13	13	0	24	1
Manual skilled	4	0	2	13	23	5	3	13	13	0	24	1
Semi /unskilled	5	1	2	11	22	5	3	13	15	0	24	1

Table S3 cont: Percentage contribution of food groups to nutrient intakes in Irish adults spilt by social class for Total Population.

	Grains, rice, pasta & cereals	White bread	Wholemeal bread	Biscuits, cakes & confectionary	Dairy & dairy products	Potatoes & potato products	Fruit & vegetables	Meat & Fish	Meat & fish dishes	Beverages	Other	All snacks
	%	%	%	%	%	%	%	%	%	%	%	%
Fibre												
Professional	19	4	16	6	1	11	31	0	5	0	5	3
Non-manual skilled	17	6	15	5	1	13	29	0	6	0	6	3
Manual skilled	15	8	15	5	1	15	28	0	7	0	4	3
Semi /unskilled	20	6	13	5	1	15	25	0	6	0	6	4
Total folate												
Professional	15	2	8	2	12	8	17	3	4	9	17	1
Non-manual skilled	15	4	7	2	11	10	15	4	5	9	18	1
Manual skilled	13	4	7	2	11	11	14	4	4	12	17	0
Semi /unskilled	17	3	7	2	11	11	14	3	5	12	16	1
Sodium												
Professional	11	5	11	5	10	2	6	15	15	1	17	1
Non-manual skilled	10	6	9	4	9	3	5	15	18	1	18	1
Manual skilled	9	8	9	4	9	2	5	15	20	2	17	1
Semi /unskilled	11	6	8	4	10	3	5	12	17	2	20	2
Iron												
Professional	24	4	10	6	2	5	12	10	9	6	11	1
Non-manual skilled	22	5	9	5	2	6	10	10	11	5	14	1
Manual skilled	19	7	10	6	2	7	9	10	13	5	12	1
Semi /unskilled	25	5	8	6	2	7	10	8	11	4	13	1
Calcium												
Professional	11	5	9	5	41	1	8	3	4	3	10	0
Non-manual skilled	10	8	8	5	41	1	6	2	5	3	10	0
Manual skilled	10	10	8	4	39	1	5	3	6	3	11	0
Semi /unskilled	11	7	7	6	42	1	6	2	5	3	10	0

Professional - Professional/managerial/technical; % - Percentage contribution