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Australian children are not consuming enough long chain omega-3 polyunsaturated fatty acids for optimal health

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Abstract

Objectives: To determine children's polyunsaturated fatty acid (PUFA) intakes, compare these with adequate intake and adjusted suggested dietary targets, and determine if intakes between children of different body weight and physical activity levels differed.

Methods: The necessary data files were obtained from the Australian Social Science Data Archive and were merged for 4486 children 2 to 16 y old, with physical activity data collected only for children 5 to 16 y old.

Results: The median (interquartile range) PUFA intakes at 2 to 3, 4 to 8, 9 to 13, and 14 to 16 y were 4.7 g (3.1–6.2), 6.0 g (4.4–8.1), 7.1 g (5.3–9.7), and 8.5 g (6.0–11.3), respectively, for linoleic acid; 0.75 g (0.57–1.0), 0.91 g (0.67–1.2), 1.02 g (0.73–1.42), and 1.15 g (0.81–1.62), respectively, for a-linolenic acid; and 56 mg (29–104), 68 mg (37–128), 88 mg (46–159), and 98 mg (49–190), respectively, for long-chain (LC) u-3 PUFAs. Most children met the adequate intakes for linoleic acid and a-linolenic acid, but only 50% to 60% of children met the adequate intake for LC u-3 PUFAs. Furthermore, only 6% of children met the adjusted suggested dietary target for LC u-3 PUFA per day. Comparison of LC u-3 PUFA tertile intakes showed no differences in intakes in different weight categories and physical activity levels.

Conclusion: Most Australian children are not consuming enough LC u-3 PUFAs for optimal health.

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Australian children are not consuming enough long chain omega-3 polyunsaturated fatty acids for optimal health

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Abstract

Objectives: To determine the children's polyunsaturated fatty acid (PUFA) intakes, compare them to Adequate Intake (AI) and adjusted Suggested Dietary Targets (aSDT) and to determine if intakes between children of different body weight and physical activity levels differed. **Research Methods & Procedures:** The necessary data files were obtained from the Australian Social Science Data Archive and were merged for 4486 children aged 2-16 years, with physical activity data collected only for children aged 5-16 years. **Results:** The median (interquartile range) PUFA intakes for 2-3 yrs, 4-8 yrs, 9-13 yrs, 14-16 yrs are as follows: linoleic acid (LA, g) 4.7 (3.1-6.2), 6.0 (4.4-8.1), 7.1 (5.3-9.7), 8.5 (6.0-11.3) respectively; alpha-linolenic acid (ALA, g) 0.75 (0.57-1.0), 0.91 (0.67-1.2), 1.02 (0.73-1.42), 1.15 (0.81-1.62) respectively; long chain omega-3 (LC n-3) PUFA (mg) 56 (29-104), 68 (37-128), 88 (46-159), 98 (49-190) respectively. Most children met the AI for LA and ALA, but only 50-60% of children met the AI for LC n-3 PUFA. Furthermore, only 6% of children met the adjusted SDT for LC n-3 PUFA per day. Comparison of LC n-3 PUFA tertile intakes showed no differences in intakes in different weight categories and physical activity levels. **Conclusion:** The majority of Australian children are not consuming enough LC n-3 PUFA for optimal health.

Introduction

Australian children's intakes of long chain omega-3 polyunsaturated fatty acids (LC n-3 PUFA) were first determined from the National Nutrition Survey data collected in 1995 [1]. That publication highlighted that whilst fish/seafood is the richest source of LC n-3 PUFA, children only consumed less than 20g per day of fish/seafood [2]; whereas meat consumption was at least 7 fold higher than fish/seafood consumption [2] and hence was a major contributor to LC n-3 PUFA intakes [1].

Given the major contribution of meat to LC n-3 PUFA intakes, when the analytical data on meat became available, the National Nutrition Survey (NNS) data was re-analysed using the analytical data on meat [3]. Children's intake of meat contributed at least 50% of the LC n-3 PUFA intakes [3]. However, these intake assessments were conducted on consumption data obtained in 1995 and since then foods enriched with LC n-3 PUFA and also fish oil supplements have become more prevalent in the market place.

The 2007 Australian National Children's Nutrition and Physical Activity Survey is the first national survey of Australian children's nutrition since 1995 [2] and the first national physical activity survey since 1985 [4]. The survey results were released by the Australian government October 2008 [5]. The report contains information on height and body weight assessments, physical activity levels, food intake and macronutrient and micronutrient intakes. In addition, the report contained information about total PUFA intakes but omega-6 and omega-3 intakes were lacking.

Hence the aims are to determine 1) the actual intakes of all PUFA and compare these intakes to the adjusted SDT, 2) the contribution of major food groups and LC n-3 supplements, and 3) if differences in body weight and physical activity levels were associated with different LC n-3 PUFA intakes.

Materials and Methods

Ethics

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by the NHMRC registered Ethics Committees of CSIRO and University of South Australia [4].

Data

Data that was collected as part of the 2007 Australian National Children's Nutrition and Physical Activity Survey (ANCNPAS) was obtained with permission from the ASSDA [5]. The population characteristics of the children (aged 2-16 years) have been described elsewhere [4]. Data were collected in two separate interviews, Computer Assisted Personal Interview (CAPI) and Computer Assisted Telephone Interview (CATI). There were differences in intakes between the two interview days: median difference in energy (1738kJ), PUFA (3.3g), LA (2.9g), LNA (420mg) and LC n-3 PUFA (60mg). To account for such within-individual variability, average intakes over both interview days were used for the analyses in this study. Data were in the form of six datasets, of which, the physical activity, demographic and nutrient intake datasets were Nutrient intake, physical activity and demographic data from only those individuals who had completed data from both interviews (n=4 486) were merged using the respondent identifier 'RESPID' and analysed. All merging and data analysis was conducted using Statistical Analysis Software (SAS) 9.1 statistical software.

Demographic data

Demographic data included age, sex, population characteristics including ethnicity, physical measurements and dietary patterns for the participants. Physical measurements of the children (including height and weight used for calculating body mass index (BMI)) were measured by trained interviewers [4]. The BMI categories used in the 2007 ANCNPAS were based on the sex and age-specific cut-offs for underweight at 18.5 (kg/m^2) [6], overweight at 25 (kg/m^2) and obese at 30 (kg/m^2) [7].

Nutrient data:

The nutrient dataset contained nutrient values for each of the foods eaten by all of the children i.e., multiple observations (n = 196 109) per child. All the intakes of a given nutrient for a given child on a given day were added using Statistical Analysis Software (SAS) 9.1 to give the total intake per each interview day for that child. An average intake from CAPI and CATI were determined for each child's intake of total PUFA, linoleic acid (LA, 18:2n-6), alpha linolenic acid (ALA 18:3n-3) and LC n-3 PUFA (EPA, DPA plus DHA) and were used for this study. NUTTAB2006 was the database used to determine the different fatty acids.

Fatty acids and food sources

Mean (standard deviations, SD) and median (interquartile range, IQR) intakes of fatty acids by age group were analysed for PUFA intakes and their respective food sources.

Meeting the Adequate Intakes (AI) and Suggested Dietary Target (SDT) for LC n-3 PUFA

The NHMRC Adequate Intakes (AI) are based on the median intakes of any age and gender related age groups [8] and are shown in table 1. Suggested Dietary Target (SDT) values for 14 year olds and over are 610mg/day (males) and 430mg/day (females) [8]. LC n-3 PUFA intakes of children aged 14-16 were compared to these SDT. The younger children's intakes were also compared to the adjusted SDT (aSDT), (table 1). The aSDT were deduced from the SDT values based on the age and sex-specific energy intakes for each age group. For example, the mean energy intake for 2-3 year old boys and 14-16 year old boys was 6,157 kJ and 11,598 kJ, respectively [4]. Therefore the 2-3 year olds consumed 53% the energy intake compared to the 14-16 year olds, which translates to 53% of 610mg LCn-3 PUFA = 323mg as the SDT for 2-3 year old boys. The other age groups were calculated according to their proportion of energy intake. Similar calculations were carried out for the various girls age groups, using 430mg per day for the 14-16 year old girls as the reference.

Physical Activity data

Physical activity data were measured by pedometer over one week of normal activities of the children aged 5-16 years. Physical Activity Levels (PAL) in the form of Metabolic Equivalents (METs) were available for the 9-16 years olds only in the dataset [4].

The children were divided into tertiles (i.e. top, mid and bottom tertile) of LCn-3 PUFA intakes. These three groups of children were subsequently assessed to determine if there were any differences in their dietary patterns, their BMI and their physical activity levels.

Statistical Analysis

Merging of data were done using SAS 9.1. Mann-Whitney U test and the Wilcoxon rank test were used for non-parametric data. LC n-3 PUFA intakes were analysed with respect to any differences in their dietary patterns, their BMI and their physical activity levels. Chi square tests were used to assess the relationship between BMI categories and children meeting the aSDT. Kruskall Wallis test was used to assess the LC n-3 PUFA intakes and various BMI categories. A P value of less than 0.01 was considered significant.

Results

Study population

Table 2 shows the number of the children according to their weight status per age category. Approximately 5% of children were underweight whilst 18% were overweight and 6% were obese.

PUFA intakes and meeting the Adequate Intakes (AI) and Suggested Dietary Target (SDT)

The total mean (SD) and median (IQR) intakes of total PUFA, LA, ALA and LC n-3 PUFA by age group from all food sources are shown in Table 3. The median intakes of total PUFA, LA and ALA are comparable to the mean intakes as the median intakes are approximately 90% of the mean intakes. However, the median LC n-3 PUFA intake are less than half those of the mean LC n-3 PUFA intakes, because the LC n-3 PUFA intakes is skewed to the right due to higher intakes by very few children. There were no significant differences between girls and boys in any of the PUFA intakes (accounting for energy intake) for all age categories (results not shown). While the median intake of LC n-3 PUFA is increasing with increased age due to increased energy intake, the LC n-3 PUFA intakes for girls is marginally reduced from age group of 9-13 years (85 mg) to 14-16years (78 mg).

Most children met the AI for ALA and as expected approximately 50-60% of the children met the AI for LC n-3 PUFA intakes, as the definition of AI is the median intakes [8]. However, only 6% of children met the SDT (energy adjusted).

Ethnicity and LC n-3 PUFA intakes

The LC n-3 PUFA intakes according to the child's country of birth are shown in Table 4. Children born in NE Asia consume 2.5 times as much LC n-3 PUFA compared to children born in Australia and New Zealand (*P* <0.01). Children born in Sub-Saharan Africa consumed 1.5 times LC n-3 PUFA compared to Oceania (*P* <0.01). Children from SE Europe tended to consume twice as much LC n-3 PUFA compared to Oceania but this was not statistically significant.

Major food sources contributing to LC n-3 PUFA intakes

Fish and seafood products and dishes contributed to about 33% of the total LC n-3 PUFA intake (Table 5) for all children, as did meat, poultry and game products (33%). Only 3% of children (n=145) consumed fish oil supplements which contributed about 8% of the LC n-3 PUFA intake. Less than 7% of children (n=303) consumed LC omega-3 enriched bread and milk contributing approximately 1% of LC n-3 PUFA intakes.

Fish and seafood and meat consumption

Children consume an average of 13g of fish/seafood per day, with the median intakes being zero (Table 6). It is not until the data reaches between the 80th and the 90th percentile that fish and seafood products and dishes consumption becomes apparent. In contrast, children consume on average 106g of meat per day. Children consume 8 times more meat than fish/seafood (Table 6), which explains the 33% contribution to the LC n-3 PUFA intakes from meat (Table 5).

Food groups eaten by children meeting and not meeting the adjusted Suggested Dietary Target (aSDT) intakes for LC n-3 PUFA

Approximately 6% of children meet the aSDT intakes for the LC n-3 PUFA. The children who meet the aSDT consumed 10-fold higher amounts of fish and seafood (the richest source of LC n-3 PUFA), but there were no differences in meat and egg consumption (Table 6).

Children who met the aSDT also consumed approximately 25% more vegetables and 4 times more dietary supplements than children who did not meet the aSDT.

LC n-3 PUA intake, BMI and physical activity

The whole population was divided into thirds in terms of LC n-3 PUFA intakes (<38mg; 38-103mg; >103mg) and there were no differences in LC n-3 PUFA intakes according to weight status (results not shown).

There was no significant correlation between LCn-3 PUFA intakes and pedometer measurements. There was no significant difference in physical activity levels of children in the top tertile of LCn-3 PUFA intake versus that of children in the bottom tertile of LCn-3 intakes (results not shown). Measures of physical activity (pedometer and MET) were not significantly different between children meeting the aSDT and those not meeting the aSDT for LC n-3 PUFA (results not shown).

Discussion

This study shows that Australian children consume adequate amounts of LA and ALA but not LC n-3 PUFA (Table 2). The median LC n-3 PUFA intakes are approximately 20% compared to the aSDT (Tables 1 & 2).

PUFA intakes have not differed greatly in the past 13 years and direct comparison is difficult due to the differences in the age brackets, but it appears that ALA may have increased by approximately 25% in the younger age groups (2-8 years) [1,3]. The current LC n-3 PUFA intakes for all age categories are approximately 20% of the aSDT. Fish intake also has not changed since 1995, as the current mean consumption of fish and seafood is 13g per day, whilst in the National Nutrition Survey in 1995, the average fish/seafood consumption for all children was also 13g per day [2].

Other countries' intakes of PUFA have been reported and different methodologies (food frequency questionnaire, vs 24 hour recalls, vs weighed food record) have been used to collect food intake data, as well as different food composition tables, some of which contain analytical fatty acid data. Therefore it is difficult to compare intakes from different countries. Bearing this difficulty in mind, Australian children's LC n-3 PUFA intakes are higher than Belgian [9], Chinese [10], British [11] children, but lower than Canadian children [12]. Australian ALA intakes are comparable to Taiwanese [13] and Danish [14] children, but Canadian children [12] consume twice as much ALA compared to Australian children. Children from the UK [11] consume a little less ALA compared to Australian children. Whilst there are no published LC n-3 PUFA intakes in Japanese children, Japanese adults certainly consume much higher intakes of LC n-3 PUFA consuming at least 1g per day [15,16].

The NHMRC Nutrient Reference Values (NRV) recommend AI for LA, ALA and LC n-3 PUFA ranging from 5-12 g/day, 0.5-1.2 g/day and 40-125 mg/day respectively, depending on the children's age and gender [8]. Comparison of the current children's median LC n-3 PUFA intakes to the AI, shows that approximately 50-60% of children are meeting the AI, which is expected, as the AI was set to the median intakes of the population as assessed in the NNS95 as published by Meyer et al [1] and Howe et al [3]. The definition of AI is "the average daily nutrient intake level based on observed or experimentally-determined approximations or estimates of nutrient intake by a group (or groups) of apparently healthy people that are assumed to be adequate" [8]. However, this NHMRC definition of AI is based on mean/median intakes and it is not based on physiological data. Furthermore, are the AIs really adequate given the health status of our children? In Australia the prevalence of children suffering from ADHD is 11% [17] and asthma is 10% [18], which does not suggest a "healthy" population. Hence given that the AI are merely reflecting the median intakes of the Australian population, recommendations should be based on physiological evidence.

In Australia the NHMRC also have Suggested Dietary Targets (SDT) for optimising diets for lowering chronic disease risk. The SDT is defined as "the daily average intake from food and beverages for certain nutrients that may help in prevention of chronic disease" [8]. The SDT for LC n-3 PUFA are based on the 90th percentile of intakes in the Australian population with due consideration of physiological, scientific evidence. The SDT for LC n-3 PUFA is 610 mg/day for males aged 14 years and over and 430mg/day for females aged 14 years and over [8]. Due to the lack of definitive scientific data on the optimal intakes of LC n-3 PUFA in children aged 2-14 years, the NHMRC have not determined SDT for these aged children. Therefore we have adjusted the SDT based on energy intakes for children younger than 14 years (Table 1). Comparisons of the 14-16 year old children's LC n-3 PUFA intakes to the SDT and the other children's intakes to the aSDT show that only 6% of children are meeting these recommended intakes.

The National Heart Foundation of Australia (NHFA) [19] has recommendations for children stating that children should follow the adult recommendation of 500mg/day for EPA plus DHA. Given the current children's LC n-3 PUFA intakes, less than 10% of these children are meeting the NHFA recommendations for optimal health.

It has been shown that children with amino acid metabolism disorders, who consume very little protein and hence do not consume pre-formed LC n-3 PUFA, have 30% lower DHA in their tissues compared to children who consume pre-formed LC n-3 PUFA, whilst arachidonic acid levels did not differ [20]. This suggests that these children are able to elongate and desaturate linoleic acid to form arachidonic acid but they are not able to elongate and desaturate alpha-linolenic acid to form sufficient amounts of DHA [20]. Therefore children need to consume pre-formed LC n-3 PUFA and not rely on the conversion of ALA to LC n-3 PUFA.

There were no correlations between LC n-3 PUFA intakes and with physical activity or weight status. Other studies have reported that consumption of LC n-3 PUFA can affect body weight. A recent review that describes evidence from randomised controlled trials of LC n-3 PUFA on weight suggested that there was limited evidence for LC n-3 PUFA reducing fat mass gain during growth and reducing body fat content in people who are already overweight/obese [21]. The lack of correlation seen between LC n-3 PUFA intakes and body weight status in this current study is a reflection of the actual doses of LC n-3 PUFA intakes, which were at least 10-fold lower. In this current study the highest tertile of LC n-3 PUFA intakes was >103mg per day, whilst the randomised trials (Buckley et al 2009) used doses of 4- 6g fish oil per day which equates to LC n-3 PUFA intakes of 1.5-4g per day. Therefore the range of LC n-3 PUFA intakes in Australian children is too low to be able to detect a significant correlation.

Fish and seafood are still the richest sources of LC n-3 PUFA per gram of intake [1,3] contributing 33% of LC n-3 PUFA intakes even though 8-9 out of 10 Australian children do not consume fish and/or seafood. These children consume 8 times more meat than fish and seafood and hence meat, poultry and game products and dishes contribute significantly (33%) to LC n-3 PUFA intakes. This is unlike other countries where fish and seafood contribute approximately 75% of LC n-3 PUFA intakes [9].

Given that the majority of Australian children are not meeting the aSDT of LC n-3 PUFA intake for optimal health, there needs to be a strategy to increase the consumption of these vital fatty acids. Given this need, the easiest way to achieve this, is to consume fish preferably oily fish twice per week. Fish contains other vital nutrients like vitamin D and iodine [22] and when substituted for meat in the diet will reduce saturated fat intake as well as increase these vital nutrients. However most Australian children do not consume fish and given that fish consumption has not changed since 1995, they are therefore unlikely to change their fish eating habits in the near future. Nevertheless, there are foods enriched with LC n-3 PUFA including breads, eggs and milks which could easily be incorporated into the children's diet. Furthermore, there are flavoured fish oil supplements also available which would contribute to the increase in the LC n-3 PUFA intakes.

Conclusion

Australian children are not consuming enough LC n-3 PUFA for optimal health.

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There is no conflict of interest from the authors.

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Table 1 Adequate Intake (AI) and adjusted SDT (aSDT) according to energy intake for each age and sex category.

Age group	Sex	AI LC n-3 PUFA (mg/d)	aSDT LC n-3 PUFA (mg/d)
2-3 years	Boys	40	325[#]
	Girls	40	300[#]
4-8 years	Boys	55	400[#]
	Girls	55	350[#]
9-13 years	Boys	70	510[#]
	Girls	70	410[#]
14-16 years	Boys	125	610*
	Girls	85	430*

[*] SDT values obtained from 'Nutrient Reference Values for Australia and New Zealand' by NHMRC (2006, p37).

[#] These aSDT values have been adjusted for total energy intake (please refer to the methods section for details), but are not currently endorsed by the NHMRC.

Table 2 Number of boys, girls and total children per age group and their respective weight status.

Age range		Boys	Girls	Total
2-3 years	Underweight	28	18	46
	Normal weight	403	409	812
	Overweight	98	76	174
	Obese	21	18	39
	Total	550	521	1 071
4-8 years	Underweight	24	26	50
	Normal weight	479	452	931
	Overweight	77	93	170
	Obese	33	32	65
	Total	613	603	1 216
9-13 years	Underweight	30	30	60
	Normal weight	377	377	754
	Overweight	86	135	221
	Obese	32	43	75
	Total	525	585	1 110
14-16 years	Underweight	28	28	56
	Normal weight	397	371	768
	Overweight	105	93	198

	Obese	31	37	68
	Total	561	529	1 090
Total	Underweight	110	102	212
	Normal weight	1 656	1 609	3 265
	Overweight	366	397	763
	Obese	117	130	247
	Total	2 249	2 238	4 487

Table 3 Total mean and median intakes per day of total PUFA, LA, ALA and LC n-3 PUFA by age group from all food sources (including supplements).

	Total PUFA (g)		LA (g)		ALA (g)		LC n-3 PUFA (mg)	
	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)
2-3 years (n=1,071)	6.3 (3.0)	5.8 (4.3 - 7.4)	5.3 (2.7)	4.7 (3.1 - 6.2)	0.85 (0.51)	0.75 (0.57 - 1.01)	112 (197)	56 (29 - 104)
4-8 years (n=1,216)	8.0 (3.8)	7.3 (5.4 - 9.5)	6.7 (3.4)	6.0 (4.4 - 8.1)	1.01 (0.56)	0.91 (0.67 - 1.20)	126 (192)	68 (37 - 128)
9-13 years (n=1,110)	9.4 (4.4)	8.5 (6.4 - 11.5)	8.0 (3.9)	7.1 (5.3 - 9.7)	1.13 (0.55)	1.02 (0.73 - 1.42)	157 (233)	88 (46 - 159)
14-16 years (n=1,090)	10.9 (5.2)	10.0 (7.2 - 13.3)	9.3 (4.6)	8.5 (6.0 - 11.3)	1.29 (0.67)	1.15 (0.81 - 1.61)	165 (234)	98 (49 - 190)
Total children (n=4,487)	8.9 (4.5)	7.8 (5.8 - 10.9)	7.5 (4.0)	6.5 (4.8 - 9.2)	1.09 (0.59)	0.97 (0.69 - 1.32)	143 (217)	79 (41 - 148)

PUFA = polyunsaturated fatty acids; LA = linoleic acid, ALA = alpha-linolenic acid, LC n-3 PUFA = long chain omega-3 polyunsaturated fatty acids.

IQR = interquartile range

Table 4 Mean (SD and median (IQR) LC n-3 PUFA intakes according to country of birth of Australian children aged 2-16 years (n= 4 486).

Child's country of birth	LC n-3 PUFA intakes (mg/day)	
	Mean (SD)	Median (IQR)
Australia and New Zealand (n=4 239)	139 (211)	78 (40-144)
NW Europe (n=109)	149 (193)	88 (44-165)
SE Europe (n=10)	262 (236)	164 (125-254)
N Africa and the Middle East (n=7)	391 (614)	61 (51-149)
SE Asia (excluding subcontinent) (n=15)	134 (128)	102 (76-124)
NE Asia (n=14)	393* (513)	236* (98-336)
South and Central Asia (n=32)	133 (162)	45 (26-147)

Americas	200	101
(n=21)	(251)	(59-207)
Sub-Saharan Africa	239*	123*
(n=39)	(317)	(46-256)

* LC n-3 PUFA intakes significantly higher than Australia and New Zealand, $P<0.01$

Table 5 Total LC n-3 PUFA from food sources (including dietary supplements and omega-3 enriched foods) for all children

Food Sources	LC n-3 PUFA Boys	Girls	Total
Fish and Seafood Products and Dishes	32%	34%	33%
Meat, Poultry and Game Products and Dishes	34%	32%	33%
Milk Products and Dishes (excluding LC n-3 enriched milk)	7.4%	8.4%	7.9%
LC n-3 enriched milk	0.20%	0.03%	0.13%
Dietary Supplements	8.2%	7.0%	7.7%
Cereal-Based Products and Dishes	7.2%	7.3%	7.2%
Egg Products and Dishes	4.0%	4.5%	4.2%
Fats and Oils	1.7%	1.7%	1.7%
Vegetable Products and Dishes	1.6%	1.7%	1.7%
Cereals and Cereal Products (excluding LC n-3 enriched bread)	1.0%	0.9%	0.94%
LC n-3 enriched bread	1.1%	0.8%	0.93%
Snack Foods	0.65%	0.66%	0.65%
Soup	0.50%	0.36%	0.44%
Savoury Sauces and Condiments	0.42%	0.43%	0.42%
Sugar Products and Dishes	0.09%	0.10%	0.09%

Miscellaneous	0.05%	0.06%	0.06%
Infant Formulae and Foods	0.04%	0.06%	0.05%
Fruit Products and Dishes	0.04%	0.05%	0.04%
Confectionery and Cereal/Nut/Fruit/Seed Bars	0.03%	0.04%	0.04%
Legume and Pulse Products and Dishes	0.01%	0.01%	0.01%
Non-Alcoholic Beverages	0.00%	0.00%	0.00%
Total	100%	100%	100%

Table 6 Food intakes of children who do and do not meet the aSDT for LC n-3 PUFA intakes

Food Category (g/d)	Children not meeting the aSDT (n=4 215)		Children meeting the aSDT (n=271)		Total children (n=4 486)	
	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)
Fish and seafood products and dishes	8 (23)	0 (0-0)	89 (70)	74 (46-116)	13 (34)	0 (0-0)
Meat, poultry and game product and dishes	106 (90)	84 (44-143)	106 (107)	82 (37-145)	106 (91)	84 (43-143)
Egg products and dishes	8 (19)	0 (0-0)	10 (23)	0 (0-5)	8 (20)	0 (0-0)
Vegetable products and dishes	138 (108)	117 (61-194)	178 (124)	157 (86-233)	141 (110)	120 (62-197)
Dietary supplements	0.25 (1.39)	0 (0-0)	1.15 (4.70)	0 (0-1.00)	0.30 (1.78)	0 (0-0)