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Trends in food consumption over 30 years: evidence from a British birth cohort

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Abstract

Background—As populations are ageing, more emphasis is placed on healthy ageing. Over the past decades, food consumption patterns and food availability have also changed drastically and therefore this study aimed to describe these changes in an ageing population.

Subjects/Methods—Food consumption of participants from the MRC National Survey on Health and Development (NSHD), a British birth cohort study, was assessed using a 5 day estimated food records at 60-64y (2006-11), 53y (1999), 43y (1989), and 36y (1982). Only those who recorded ≥ 3 days at all four time points were included in the analyses, n=989 (n=438 men and n=551 women); trends were tested using the Friedman test.

Results—Consumption of white bread, whole milk, fats and oils, meat and meat products, alcoholic drinks, coffee, and sugar, preserves and confectionery decreased ($p<0.001$) whilst consumption of wholemeal and granary bread, semi-skimmed milk, fish, and fruit and vegetables increased ($p<0.001$) over time. These observed changes in food consumption reflect a healthier diet, e.g. replacement of white bread by granary and wholemeal bread, lower consumption of red and processed meats, somewhat higher consumption of fish, higher consumption of vegetables, and lower consumption of coffee. This could partly be due to ageing of the cohort or compliance with dietary recommendations, facilitated by greater availability of healthier foods, such as semi-skimmed milk and wholegrain bread, in the UK.

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GP analysed and interpreted the data, and wrote the manuscript. AMS and CJP designed and supervised the research. AMS, CJP, SAM, DK all contributed the writing the paper.

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Conclusions—The changes in food consumption in this British birth cohort over the past three decades are encouraging and reflect a healthier diet in the later years.

Keywords

NSHD/1946 British birth cohort; food consumption; time trends; UK

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Introduction

Populations worldwide are ageing: the proportion of adults over 60 years is growing faster than any other age group and is projected to triple in the next four decades (1). Interest in healthy ageing is also increasing, as higher numbers strive to avoid disability in their later decades. Diet plays an important role in the ageing process (2, 3) and hence studying changes in food consumption across life is of great importance. Vast changes in food habits and food supply have been seen in the past decades which have resulted in consumption of different, new or more healthy foods (4). In the UK, besides changes in food habits such as consumption of a greater proportion outside the home, increased immigration rates (5), as well as changing lifestyles such as more holidays abroad have contributed to a larger range of foods available (6).

To study changes in food consumption patterns, prospective cohort studies across life with dietary assessment carried out at regular intervals in the same individuals are enormously valuable. The Medical Research Council National Survey of Health and Development (NSHD; 1946 British Birth Cohort) is the longest running birth cohort in the world and is unique in having collected detailed dietary information at a number of time points through the life course (7). It therefore provides an important opportunity to study lifetime dietary changes in relation to ageing. Diet has been assessed in detail at a number of time points in this cohort. This paper focuses on food consumption now covering thirty years of follow-up and aims to provide a comprehensive overview of changes in food consumption between 36 years (1982) and 60-64 years (2006-11) in this British birth cohort. Food consumption patterns were viewed using the same food groups as the National Diet and Nutrition Survey (NDNS), a cross-sectional nutritional national survey in the UK (4).

Methods

Subjects

NSHD is a longitudinal study based on a social class-stratified sample of 5632 singleton births occurring within marriage in England, Scotland, and Wales during one week in March 1946 (8, 9). Adult dietary data have been collected in this cohort when participants were aged 36 (1982), 43 (1989), 53 (1999) and 60-64 years (2006-11). The last assessment was part of a detailed clinic or home visit, requiring considerable time for each cohort member and took from March 2006 to February 2011 (10). In 2006-11, of the original 5632 cohort members, 718 had died, 567 had emigrated, 594 had previously withdrawn from the study, and 320 were lost to follow-up. Of those invited, 2229 (78%) were assessed: 1690 (76%) attended a clinical research facility and the remaining 539 (24%) were seen at home (10).

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 North Thames Multicentre Research Ethics Committee (7).

Dietary assessment and food-groups

Dietary data were collected as part of the clinic visit for the NSHD assessment at ages 36, 43, 53, and 60-64 years (7, 10). Dietary intakes were evaluated using a 5-day estimated (unweighed) diet diary (11). All food and drinks consumed both at home and away were recorded using household measures, and portion sizes were estimated using detailed guidance notes and photographs provided at the beginning of the diary (12).

Dietary data collected at age 36 years were coded in Bristol and later converted to the in-house program 'Diet In Data Out' (DIDO) of MRC HNR (13, 14), incorporating McCance and Widdowson's 'The composition of foods', 4th edition (15), its supplements (16, 17) and the 6th edition (18); which was also used to code the diet diaries at age 43 and 53 years (14). Time-appropriate nutrient databases were used for the analyses of the different time points. In recent years, DIDO has been updated and improved and the diet diaries at 60-64 years were coded using the new Access based system program, DINO ('Diet In Nutrients Out'), which is based on McCance and Widdowson's Composition of Foods series (18), Food Standards Agency Food portion sizes (19) and manufacturer's data where applicable. The diet diaries coded at 36, 43 and 53 years have now been transferred to the newer DINO system. As some of the food-groups were not the same at each time point these have been recoded to allow comparisons of food-groups over time. Data on dietary supplements were not included in these analyses.

DINO is arranged by major and then by individual food-groups; for the purpose of this paper data on 10 main and 34 sub- food-groups are presented. Only those diet diaries with at least 3 complete recording days at all 4 time points were considered valid and included in these analyses.

The focus of this paper is food consumption; however, since this is closely related to nutrient intake also information on total energy intake is presented in this paper.

Population characteristics

Information on sex and social class were collected through structured questionnaires (20). Changes in characteristics of the study population over time were described in terms of marital status, smoking status, physical activity, as well BMI and total energy intake.

Statistical analyses

Food consumption data were presented including non-consumers as mean and SD for men and women separately. As food consumption was highly skewed, these tables also include the percentage of consumers. Time trends in food consumption data for those who completed a food record at all four time points, were analysed using the Friedman test, which is the non parametric equivalent of repeated measures ANOVA as food consumption data was highly skewed, however, a Friedman test does not allow to adjust for potential

covariates. Therefore, a sensitivity analysis for those who did not complete diet diaries at all four time points was performed exploring whether they were different in terms of percentage men and women, BMI, smoking and marital status at age 60-64. Data analysis was carried out using SPSS for MS Windows 21.0 (SPSS Inc, Chicago, IL) and a more stringent p value of less than 0.001 was used to denote statistical significance and describe trends.

Results

Response rates

Between 2006-2011, 1869 cohort members (880 men and 989 women) completed at least 3 days of the food diary, representing 84% of those (83% men and 85% women) who attended a clinic or home visit. The majority of cohort members completed 5 days of the diet diary (98%) and 1.6% completed 4 days. A total of 989 cohort members filled in the food record for at least 3 days at all 4 adult time points at which diet was assessed in NSHD (n=438 men and n=551 women). Those with complete dietary data at all 4 time points had a similar BMI compared to those who did not complete dietary data at all 4 time points but included somewhat more women (55.7% vs. 47.9%) and fewer current smokers (6.8% vs. 9.0%) and more married cohort members (78.4% vs. 44.4%).

Population characteristics

Cohort members who were included in these analyses were 44% men and 56% women (Table 1). At age 36 years, 65% of men and 56% of women were classified as non-manual social class. The percentage of married people and current smokers decreased with time and the percentage of physical inactivity increased with time, as did BMI. Energy intake changed over time, with the highest mean energy intake reported at age 43 years in both men and women.

Food consumption

Data on food consumption for men are presented in Table 2 and in Table 3 for women.

Cereal and cereal products—White bread was the subgroup that contributed most to cereal and cereal product intake, both in terms of intake as well as percentage consumers. Compared to previous ages, white bread consumption at 60-64 years had decreased in both men and women (Table 2 & 3); increased consumption of wholemeal bread was seen in men (Table 2) and of brown/granary and wheat-germ bread in women (Table 3). Consumption of sweet cereal products (including biscuits, puddings, pastries, buns and pies) had gone down from previous assessments. Consumption of pasta and pasta dishes, and rice and rice dishes increased from 36 to 53 years but then plateaued or decreased at 60-64 years; there were no changes in consumption of pizza.

Milk and milk products—At 36 years, the most commonly consumed type of milk was whole milk; consumption of whole milk decreased over the years, while skimmed milk consumption increased. At 60-64 years, semi-skimmed milk was the most commonly consumed type of milk; 80.6% of all cohort members recorded this type (82.2% men and 79.3% women).

Cheese was consumed by 83.3% of men and women at 60-64 years; the consumption of cheese decreased over the years. The mean intake of yoghurt and yoghurt drinks increased, as well as the percentage of cohort members consuming yoghurt; this rose from 20.1% for men and 30.1% for women at 36 years to 46.3% men and 63.3% women) by 60-64 years. Consumption of ice cream did not change significantly.

Fats and oils—Plant-based margarines were the most common type of spread used by cohort members at 60-64 years, with 76.9% of men and 71.7% of women using these, compared to 50.7% men and 58.6% women using butter. Compared to previous years, the percentage of cohort members consuming plant-based margarines had risen and that of butter had fallen.

Meat and meat products—Total meat consumption decreased over the years in both men (17.2% reduction) and women (14.4% reduction). The percentage of consumers of red meat and processed meat decreased over the years, whereas the percentage of white meat increased.

Fish and fish products—There was a small upward trend in consumption of oily fish in men and women; for women there was also an increased trend in white fish consumption. The most common type of fish consumed at 60-64 years was white fish; 58.2% of men and 58.8% of women reported consuming white fish, while 40.4% of men and 44.1% of women consumed oily fish.

Vegetables—During this time period, the average consumption of total vegetables (excluding potatoes) rose from 132g to 197g per day for men and from 114g to 194g per day for women. All cohort members reported eating some vegetables during the 5-days of recording at all four time points. Over 90% of cohort members consumed potatoes; the average weight of potatoes consumed per day decreased since 36 years and the consumption of potato products increased in both men and women.

Fruit—The average weight of total fruit consumed had almost doubled since 36 years from 72.7g/d for men and 85.4g/d for women to 154.0g/d for men and 170.1g/d for women aged 60-64 years. At this most recent age, most cohort members reported consuming fruit over the 5-day recording period: 93% of men and 98% of women. This percentage increased since age 36y especially in men (from 85% at age 36y) but not so much for women (92% at age 36 years).

Sugar, preserves and confectionery—There was a reduction in the average consumption of sugar, preserves and confectionery since 36 years; the proportion of consumers remained fairly stable.

Non-alcoholic drinks—Tea and coffee consumption increased in both men and women and coffee consumption was highest at age 43 years. Consumption of water increased over the years; in addition, the proportion of consumers of water was higher at age 60-64 years (77% for men and 91% for women) than it was at age 36 years (28% for men and 29% for women). Consumption of carbonated soft drinks was higher in women than in men at all

ages and the largest differences in consumption of carbonated soft drinks were observed in women. The proportion of consumers of carbonated soft drinks went up between age 36 and 43 years in men and women; after age 43 years there was a decline, most pronounced in women.

Alcoholic drinks—The average consumption of beer by men fell since age 36; in women there was a slight upward trend in consumption of total alcoholic drinks, which was mainly consumption of wine; the average consumption of total alcoholic drinks in men was higher than it was for women. At 60-64 years, alcoholic beverages were consumed by 84.7% of men and 69.1% of women over the 5 days of recording. For men the proportion of consumers of alcoholic drinks remained fairly stable, but for women this proportion increased from 36 to 43 years.

Discussion

In this ageing cohort, the changes in food consumption that were observed reflect a diet of improved diet quality, as indicated by changes such as replacement of white bread by granary and wholemeal bread, lower consumption of red and processed meats, coffee, sugar and confectionery and higher consumption of fruit, vegetables and fish. Few differences occurred between men and women, with the most striking being related to drink consumption: men consumed more alcoholic drinks than women; however women at 60-64 years tended to drink more alcoholic drinks than previously while men showed a small decrease in alcoholic drinks. Another noticeable finding was water consumption, which increased markedly over the years. An increased trend in water consumption has also been observed in other studies including a wider age range, such as the NDNS in the UK (4) and in an older German population (21) which may suggest this could be due to more accurate recording of water consumption.

The prospective design of this cohort study makes it difficult to differentiate between ageing of this population and time trends occurring during follow-up time. In the case of replacing whole milk by semi-skimmed milk this change is most likely due to changes in availability of the new food, alongside a recommendation to consume a lower fat diet. However, in other cases it is less straightforward to separate a time trend from an age trend. Only a few longitudinal studies have investigated dietary changes over time and most of these were focussed on changes in nutrient intakes (22). Prynne et al studying changes in nutrient intakes in the NSHD cohort found that nutrient intakes from 36 to 43 years in the NSHD cohort had changed (12); moreover, they found that these changes were accompanied by changes in consumption of certain key foods including an increased consumption of fruit and vegetables and a shift away from whole milk, butter, and red meat. Osler et al found that food habits, as measured by FFQ, changed in the direction of a more healthy diet in middle-aged Danes over 10 years in both the cross-sectional data as well as longitudinal data (23). Changes in food consumption patterns observed in this study are therefore likely to be due to a combination of changes in food availability, as well as ageing the population and therefore choosing a healthier diet. This is also supported by other studies that have reported trends in dietary intake from national cross-sectional surveys, like NDNS (4) or food purchasing studies in the UK, like the Family Food Survey by DEFRA (6, 24). While these are cross-

sectional studies and therefore do not include the same people at each time point like NSHD, they nevertheless can indicate trends in food consumption, which can help distinguish between age-related changes in consumption versus those which are time-related.

Compared to UK dietary recommendations, which are mostly nutrient orientated and only comprise two food-based quantitative dietary recommendations (5-a-day for fruit and vegetable consumption and at least two portions of fish per week (25), results of this study showed that fish consumption came close to the dietary recommendations to consume two portions of fish per week at 1.8-1.9 portion per week on average in men and women (39g/d for and 36g/d for women), though compliance with 5-a-day fruit and vegetable recommendation could not be assessed as that requires data to disaggregated to include fruit and vegetables from composite dishes (26), which was only available for 60-64 years.

Limitations include that previous investigations of the cohort have shown that participants who complete diet diaries are quite health conscious overall (12) despite the cohort as a whole remaining relatively representative of the British population of that age (8). The other concern could be attrition, with only about a fifth of the original cohort included in these analyses. The representativeness of the sample was comparable to Census data, for example at age 53 years (8) and results were similar to trends observed in NDNS (4), which make it likely that this study reflects the changes in food consumption in the UK in this time period.

The dietary data at 36 years were coded by a different institution using a different programme, which could possibly have led to differences in food consumption despite great efforts that were made to standardize the dietary data and the structure of the food-groups. Another limitation in dealing with food consumption data rather than nutrient data is that often these are not normally distributed and have excess zero´s which limit the options for statistical testing.

Strengths of this study include that NSHD is the longest running birth cohort worldwide (27), and where dietary data have been collected longitudinally and in great detail using 5-day food diaries over a period of more than three decades. At all 4 time points where diet was assessed in adulthood, the same method of dietary assessment was used and diet diaries are currently still considered to be the gold standard for dietary assessment (11). Another advantage is that in a birth cohort all members are the same age and therefore no age-related issues arise in terms of dietary assessment.

This paper only focusses on food consumption rather than nutrient intake. However, as populations age their nutrient requirements change (3, 28); factors such as loss of appetite, lower metabolic rate, reduced physical activity, and altered sensations of taste and satiety could also affect food intake but were beyond the scope of this paper.

In conclusion, the changes in food consumption in this British birth cohort over the past three decades are encouraging and reflect a healthier diet in the later years.

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Table 1

Characteristics of the British birth cohort members who provided dietary information at age 60-64, 53, 43 and 36 years presented by sex (n=989 in total, 438 men and 551 women)

	36y		**43y**		**53y**		**60-64y**	
Men (n=438)	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Marital status (% married)	389	89	383	87	377	86	360	82
Occupational social class at age 36y (1982) % non-manual	286	65						
Smoking status (% current)	93	21	78	18	61	14	28	6
Physical activity (% none)	122	28	179	41	179	41	272	62
	mean	*SD*	*mean*	*SD*	*mean*	*SD*	*mean*	*SD*
BMI (kg/m^2)	24.3	2.8	25.1	2.9	26.9	3.6	27.4	3.9
Energy intake (kcal/d)	2437	588	2522	612	2285	479	2177	460
Protein (% FE)	14.0	2.1	14.2	2.2	15.4	2.5	16.1	2.7
Fat (% FE)	38.6	4.6	38.6	5.5	34.2	5.6	33.9	5.8
Carbohydrate (% FE)	41.4	5.6	41.2	6.0	43.5	7.1	43.2	6.9
Women (n=551)	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Occupational social class at age 36y (1982) % non-manual	307	56						
Marital status (% married)	480	87	463	84	448	81	415	75
Smoking status (% current)	124	23	103	19	79	14	39	7
Physical activity (% none)	193	35	273	50	239	43	318	58
	mean	*SD*	*mean*	*SD*	*mean*	*SD*	*mean*	*SD*
BMI (kg/m^2)	22.7	3.1	24.2	3.8	26.4	4.6	27.2	4.8
Energy intake (kcal/d)	1803	461	1921	468	1808	359	1757	343
Protein (% FE)	15.0	3.2	14.9	2.6	16.1	2.6	16.8	3.0
Fat (% FE)	40.5	5.0	39.2	5.2	34.3	5.9	34.1	6.1
Carbohydrate (% FE)	41.6	6.0	42.9	5.9	46.2	6.4	45.3	6.6

Abbreviations: BMI (body mass index); FE (food energy); SD (standard deviation)

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Table 2

Average daily consumption of food groups (grams) of **men** at age 60-64 (2006-11), 53 (1999), 43 (1989) and 36 years (1982): all cohort members including non- consumers, mean, SDs and percentage consumers

Men (including non-consumers)	**36y**			**43y**			**53y**			**60-64y**			**p for trend**
n=438	**mean**	**SD**	**% cons**	**mean**	**SD**	**% cons**	**mean**	**SD**	**% cons**	**mean**	**SD**	**% cons**	
Cereal and cereal products	267.4	113.7	100.0	280.1	109.9	100.0	268.8	103.1	100.0	244.3	95.4	100.0	<0.001
White Bread	88.1	67.8	91.1	77.8	63.4	89.5	73.9	59.3	88.4	46.0	44.7	78.1	<0.001
Brown and granary bread	17.4	39.5	31.7	19.9	35.5	42.0	18.4	34.3	41.1	16.0	31.4	35.8	0.036
Whole meal bread	24.3	50.8	32.6	27.3	45.8	41.1	21.1	40.0	35.4	28.4	40.5	49.8	<0.001
Other breads	2.1	8.7	14.6	4.4	12.8	19.4	5.5	12.7	26.0	9.9	20.2	38.4	<0.001
Pasta and pasta dishes	8.7	20.0	23.5	13.7	27.1	29.2	26.1	36.8	42.9	19.2	31.0	37.4	<0.001
Pizza	3.6	12.1	9.6	7.3	20.3	14.4	6.7	17.4	18.3	5.9	20.6	11.4	0.005
Rice and rice dishes	13.1	25.6	29.7	19.9	29.1	44.1	22.8	31.8	45.0	22.0	29.2	46.8	<0.001
Sweet cereal products (incl biscuits and puddings)	83.5	72.2	92.7	76.5	68.8	87.0	58.2	55.8	85.8	53.6	52.1	87.2	<0.001
Milk and milk products	280.2	134.2	100.0	306.3	139.3	99.5	320.8	163.1	99.8	296.2	163.5	99.1	<0.001
Whole milk	217.1	118.6	99.1	106.9	134.5	64.8	18.8	64.3	21.2	22.6	84.3	17.1	<0.001
Skimmed milk	6.4	46.3	9.6	41.4	100.9	32.6	43.6	112.9	22.4	39.3	101.1	30.6	<0.001
Semi-skimmed milk				92.3	130.7	49.1	190.3	157.6	82.4	150.9	142.0	82.2	<0.001
Ice-cream and dairy desserts	18.5	25.9	51.6	19.9	27.3	55.5	17.0	27.1	48.9	15.0	22.5	45.2	0.014
Yoghurt and drinking yoghurts	8.7	24.2	20.1	14.1	27.7	30.8	25.6	42.2	39.0	33.7	49.8	46.3	<0.001
Cheese	23.4	21.8	85.8	26.2	23.3	81.5	18.6	19.3	80.6	17.4	16.4	83.3	<0.001
Fats and Oils	32.1	14.8	100.0	27.6	14.5	98.6	22.1	12.8	96.6	21.3	13.4	98.2	<0.001
Butter	12.3	14.4	68.3	9.4	14.4	53.4	7.2	11.5	47.3	6.4	10.7	50.7	<0.001
Oils	6.1	6.4	74.4	0.2	0.9	8.4	0.9	1.9	41.1	2.7	3.4	71.2	<0.001
Plant based fats	8.7	11.9	55.5	15.8	14.6	76.0	13.8	13.1	75.1	12.0	11.6	76.9	<0.001
Meat and meat products	173.3	74.9	99.1	166.1	83.3	98.2	154.0	80.3	97.9	143.5	70.8	97.5	<0.001
Red meat	79.9	54.4	90.6	76.6	65.7	87.2	62.2	55.1	84.7	57.3	49.2	84.7	<0.001
White meat	23.4	37.3	49.5	24.1	28.0	64.8	45.3	47.9	77.2	40.7	39.7	78.5	<0.001
Processed meat	62.9	45.5	96.3	60.8	48.8	90.9	43.2	37.9	89.7	42.4	38.0	89.7	<0.001
Fish and fish products	27.5	28.7	68.0	31.1	32.8	72.1	36.0	36.9	75.1	39.0	31.8	80.6	<0.001

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Men (including non-consumers)	36y			43y			53y			60-64y			p for trend
n=438	**mean**	**SD**	**% cons**	**mean**	**SD**	**% cons**	**mean**	**SD**	**% cons**	**mean**	**SD**	**% cons**	
Oily fish and products	5.4	12.8	23.5	9.8	18.6	35.2	10.4	19.6	33.8	13.3	21.7	40.4	<0.001
White fish and products	19.6	24.2	51.8	18.3	24.8	46.8	20.7	27.9	54.6	20.6	23.0	58.2	0.122
Vegetables excl potatoes	131.7	62.9	100.0	148.4	82.3	100.0	160.2	86.1	99.3	196.6	100.7	99.5	<0.001
Potato products	3.3	12.7	9.4	44.7	43.9	67.1	36.2	40.1	67.4	37.0	37.8	67.6	<0.001
Potatoes	174.8	95.4	98.4	91.5	57.3	92.9	88.4	52.8	93.8	78.5	52.0	92.2	<0.001
Pulses and baked beans	19.2	33.2	55.0	20.6	26.1	57.5	15.1	24.0	43.8	17.3	28.0	44.3	<0.001
Total fruit	72.7	68.5	84.7	94.8	97.9	87.0	145.7	124.7	90.2	154.0	122.2	93.4	<0.001
Nuts and seeds	2.6	6.8	26.9	3.8	9.3	33.3	3.8	9.7	32.9	7.4	15.8	44.3	<0.001
Sugar, preserves and confectionary	46.5	35.0	95.0	37.7	32.3	92.7	36.8	32.2	94.1	29.7	25.6	92.2	<0.001
Non-alcoholic drinks	595.4	392.1	100.0	1233.9	456.7	100.0	1357.5	495.7	100.0	1353.8	479.3	100.0	<0.001
Tea	505.0	397.5	91.6	563.2	448.6	90.0	606.8	470.7	87.9	594.4	428.9	90.2	<0.001
Coffee	26.6	87.1	92.2	453.9	387.8	89.3	411.1	375.6	85.8	348.7	338.7	85.8	<0.001
Water (still, tap, sparkling)	0.6	6.5	28.3	64.5	159.7	38.4	155.3	274.9	52.3	243.5	339.3	76.5	<0.001
Carbonated soft drinks	31.7	88.0	34.0	57.2	116.2	40.9	61.7	128.4	42.5	49.9	106.9	34.2	<0.001
Fruit based drinks	29.2	45.8	52.1	81.5	134.1	60.0	105.8	179.5	66.4	107.8	147.1	68.9	<0.001
Alcoholic beverages	540.4	714.3	81.1	512.7	667.9	81.7	487.8	662.1	82.0	403.7	490.5	84.7	0.448
Beer	491.4	701.5	71.5	441.2	651.2	68.0	393.4	642.1	64.8	278.3	459.4	58.9	<0.001
Wine	41.3	95.8	33.6	52.8	95.9	43.2	82.1	127.5	51.4	113.9	148.9	60.5	<0.001
Spirits and liqueur	5.0	12.3	27.4	5.9	15.1	28.5	6.9	16.4	33.3	6.4	16.2	26.7	0.119

P for trend using Friedman Test (non-parametric, repeated measures)

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Table 3

Average daily consumption of food groups (grams) of **women** at age 60-64 (2006-11), 53 (1999), 43 (1989) and 36 years (1982): all cohort members including non- consumers, mean, SDs and percentage consumers

Women (including non-consumers)	**36y**			**43y**			**53y**			**60-64y**			**p for trend**
n=551	**mean**	**SD**	**% cons**	**mean**	**SD**	**% cons**	**mean**	**SD**	**% cons**	**mean**	**SD**	**% cons**	
Cereal and cereal products	214.4	95.3	99.8	212.9	82.4	100.0	221.6	83.6	99.8	199.0	72.4	100.0	<0.001
White Bread	60.2	50.0	88.2	48.9	42.2	82.6	48.7	40.7	86.2	28.4	30.4	72.4	<0.001
Brown and granary bread	10.7	24.7	28.9	14.5	25.2	41.0	14.4	25.3	40.1	12.1	21.0	40.3	<0.001
Whole meal bread	22.1	37.3	41.4	24.9	35.0	51.5	20.2	31.0	43.7	22.1	30.0	54.4	0.01
Other breads	3.5	12.7	27.8	3.8	9.4	24.3	7.3	21.0	30.7	9.6	17.5	43.7	<0.001
Pasta and pasta dishes	7.4	16.4	25.2	11.3	22.6	29.0	25.4	38.8	43.0	16.8	26.3	38.3	<0.001
Pizza	3.3	10.9	9.8	5.9	17.0	13.8	4.0	11.8	12.5	4.1	13.9	10.5	0.058
Rice and rice dishes	9.9	27.9	23.8	12.5	19.9	36.7	17.5	27.1	40.5	15.9	25.8	37.9	<0.001
Sweet cereal products (incl biscuits and puddings)	76.0	60.3	96.6	62.3	53.0	93.3	50.3	44.3	91.1	45.5	36.4	93.3	<0.001
Milk and milk products	254.5	131.0	100.0	294.0	142.7	99.8	320.5	156.3	99.8	291.9	142.3	99.8	<0.001
Whole milk	188.0	123.3	96.7	68.9	102.1	57.0	17.9	56.3	24.9	14.8	60.6	14.2	<0.001
Skimmed milk	11.1	46.0	12.9	68.4	119.8	40.1	70.9	139.9	35.0	52.3	98.5	36.7	<0.001
Semi-skimmed milk				86.8	133.3	47.7	153.1	142.7	78.0	126.4	130.6	79.3	<0.001
Ice-cream and dairy desserts	14.2	19.7	49.4	17.1	21.9	56.6	15.7	21.9	52.5	13.6	21.5	46.6	0.003
Yoghurt and drinking yoghurts	15.5	31.8	30.1	24.2	42.4	42.8	37.5	55.7	53.9	48.5	52.8	63.3	<0.001
Cheese	20.4	19.5	86.0	21.9	19.7	84.6	16.1	16.4	81.7	15.1	14.7	83.3	<0.001
Fats and Oils	22.7	11.8	99.1	19.9	10.6	97.5	16.8	10.8	94.6	16.3	10.2	98.5	<0.001
Butter	8.8	10.4	64.8	6.5	10.3	52.3	5.7	9.7	44.8	5.9	8.8	58.6	<0.001
Oils	3.6	4.5	62.8	0.2	0.8	9.8	1.0	1.9	43.7	2.3	2.9	72.6	<0.001
Plant based fats	6.1	8.3	54.4	11.9	10.4	78.4	10.0	9.8	74.4	7.9	8.6	71.7	<0.001
Meat and meat products	117.4	50.1	99.6	117.1	61.4	97.1	108.2	56.3	96.4	100.5	53.9	95.5	<0.001
Red meat	55.9	40.7	89.1	56.7	50.5	83.7	41.9	40.8	73.7	42.0	37.7	80.2	<0.001
White meat	16.5	23.3	47.2	19.7	22.9	65.7	38.4	37.9	76.2	32.4	34.0	71.9	<0.001
Processed meat	40.0	29.0	93.3	37.0	32.6	85.8	26.4	25.8	80.6	23.9	23.9	81.1	<0.001
Fish and fish products	23.9	25.6	67.2	27.2	29.0	72.2	29.3	26.8	78.4	36.1	29.5	82.6	<0.001

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Women (including non-consumers)	**36y**			**43y**			**53y**			**60-64y**			**p for trend**
n=551	**mean**	**SD**	**% cons**	**mean**	**SD**	**% cons**	**mean**	**SD**	**% cons**	**mean**	**SD**	**% cons**	
Oily fish and products	5.6	15.1	24.1	10.2	17.6	42.5	7.9	15.1	31.0	12.6	18.9	44.1	<0.001
White fish and products	16.8	20.8	51.7	13.9	20.2	41.9	18.3	21.2	61.0	18.8	22.2	58.8	<0.001
Vegetables excl potatoes	114.2	59.6	100.0	137.4	66.0	99.8	164.9	78.0	99.8	193.7	91.8	100.0	<0.001
Potato products	2.3	7.7	10.0	30.0	35.7	57.2	23.7	29.6	53.7	26.9	31.2	59.0	<0.001
Potatoes	103.2	70.3	94.7	74.4	49.8	91.1	78.1	49.0	92.0	73.1	45.5	94.2	<0.001
Pulses and baked beans	9.8	15.7	47.7	14.2	20.0	52.5	10.9	19.4	36.5	14.1	22.2	45.7	<0.001
Total fruit	85.4	75.9	91.3	113.7	102.2	91.8	186.4	136.3	94.9	170.1	112.1	98.0	<0.001
Nuts and seeds	2.5	7.6	30.9	3.0	6.8	37.7	3.9	15.0	35.2	6.0	11.0	45.7	<0.001
Sugar, preserves and confectionary	34.5	27.8	96.4	31.3	30.5	93.8	28.7	25.5	96.2	27.4	25.6	94.0	<0.001
Non-alcoholic drinks	533.1	350.5	100.0	1211.0	423.7	100.0	1412.8	499.5	100.0	1486.4	481.4	100.0	<0.001
Tea	451.2	357.0	89.5	528.5	441.5	88.4	605.8	436.7	88.2	636.2	399.8	90.4	<0.001
Coffee	14.6	38.1	93.8	441.7	366.9	89.1	353.8	342.6	85.8	295.1	293.2	84.0	<0.001
Water (still, tap, sparkling)	3.1	25.7	28.5	82.9	153.7	50.8	267.2	369.9	73.0	430.3	411.9	91.1	<0.001
Carbonated soft drinks	27.1	45.9	46.1	63.6	107.9	50.6	61.1	106.0	49.2	34.6	68.7	36.8	<0.001
Fruit based drinks	35.3	52.2	59.9	75.9	100.2	66.6	100.7	125.8	73.3	74.0	89.2	71.9	<0.001
Alcoholic beverages	89.5	159.9	62.4	96.5	141.8	68.6	109.2	143.2	73.0	120.5	160.7	69.1	<0.001
Beer	44.1	125.0	28.3	36.1	105.6	20.9	33.7	103.6	22.7	24.0	96.5	16.5	<0.001
Wine	34.5	77.4	32.3	48.3	77.6	48.6	67.6	90.8	58.4	90.5	127.9	58.6	<0.001
Spirits and liqueur	3.7	9.3	22.9	3.9	9.8	26.0	4.5	10.4	29.6	3.7	10.9	23.4	0.37

P for trend using Friedman Test (non-parametric, repeated measures)