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Secular trends in diet among elderly Swedes – cohort comparisons over three decades

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Abstract

Objective: The purpose of this study was to compare dietary practices among different birth cohorts of 70-year-old Swedes, who were examined between 1971 and 2000.
Setting: Göteborg, Sweden.
Design: Four population-based samples of 1360 70-year-olds, born in 1901, 1911, 1922 and 1930, have undergone health examinations and dietary assessments over a period of almost three decades. One-hour diet history (DH) interviews were conducted in 1971, 1981, 1992 and 2000 with a total of 758 women and 602 women. The formats and contents of the dietary examinations were similar over the years. Statistical analysis of linear trends was conducted, using year of examination as the independent variable, to detect secular trends in food and nutrient intakes across cohorts.
Results: At the 2000 examination, the majority of 70-year-olds consumed nutritionally adequate diets. Later-born cohorts consumed more yoghurt, breakfast cereals, fruit, vegetables, chicken, rice and pasta than earlier-born cohorts. Consumption of low-fat spread and milk also increased, along with that of wine, light beer and candy. In contrast, potatoes, cakes and sugar were consumed less in 2000 than in 1971. The ratio of reported energy intake to estimated basal metabolic rate did not show any systematic trend over time in women, but showed a significant upward trend in men.
Conclusions: The diet history method has captured changes in food selections in the elderly without changing in general format over three decades. Dietary quality has improved in a number of ways, and these findings in the elderly are consistent with national food consumption trends in the general population.

Keywords
Elderly
Diet
Cohort
Gerontology
Secular trends

Life expectancy among the elderly has changed over recent decades from 72.3 years (men) and 78.1 years (women) in 1971 to 77.1 and 81.9 years, respectively, in 2000[1]. Thus, the elderly constitute a rapidly growing segment of the population in Sweden, as in most Western countries. This changing demographic structure makes it increasingly important to document dietary quality in older individuals, many of whom are at risk of nutritional deficiencies[2]. Relatively little is known about energy and nutrient intakes among free-living elderly populations. However, many hospitalised elderly patients in Sweden are undernourished, and the large variation in energy and nutrient intakes in free-living elderly populations confirms the presence of subgroups that are nutritionally at risk[2]. The main aim of the present study was to compare the diets of four population-based samples of 70-year-old Swedes who were examined between 1971 and 2000, with particular attention to the latest examination in the cohort born in 1930.

Methods

Populations sampled

The data for this study were obtained from two sources: the Gerontological and Geriatric Population Studies in Gothenburg ('H70')[3–5] and the Population Study of Women in Gothenburg[6–9]. Both studies have been reviewed and approved by the ethics committee of Göteborg University. Gothenburg (Göteborg, in Swedish) is the second largest city in Sweden and is located on the west coast. The Revenue Office of Göteborg has a registry of all inhabitants, from which representative study groups of specific ages may be identified. Using this registry, population-based samples of 70-year-old residents were recruited for health examinations in 1971, 1981, 1992 and 2000. In the first two examinations, 70-year-old cohorts born in 1901 and 1911 were sampled and invited to participate based on day of birth. In the latter two examinations, men born in 1922 and 1930 were sampled

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in the same way, but the 70-year-old women born in those years were identified on the basis of previous inclusion in the Population Study of Women in Gothenburg. To make the 1922 and 1930 female birth cohorts representative in 1992 and 2000, the samples were supplemented with additional women, born on selected birth dates, who had moved to Göteborg after the original study was started. None of the variables listed in Table 1 differed when comparing the newly included women.

In this paper, we report only on non-institutionalised subjects who completed the dietary and anthropometric parts of the health examinations. Because the subjects were not hospitalised or otherwise institutionalised, it may be assumed that most of the meals were prepared at home. The three original dietary surveys included the following numbers of subjects: 181 women and 179 men in 1971; 129 women and 132 men in 1981; and 130 women and 59 men in 1992. Results from these surveys have been reported previously[10–12]. The 1971, 1981 and 1992 diet sub-samples were chosen from the complete H70 cohorts in a random way. In contrast, all 70-year-olds in the 2000 survey were scheduled for the dietary part of the examination, and diet history interviews were performed on a total of 318 women and 232 men. A small fraction of participants ($n = 19$) in the main health survey did not complete the diet interview for various reasons, e.g. impaired cognitive function, difficulties with the Swedish language, leaving after half of the day or unavailability of a dietitian (data not shown).

2000 examination protocol

In the 2000 health examination survey, each subject underwent a series of interviews and tests that lasted most of the day. In addition to general physical and dietary examinations, psychiatric, psychological, dental, motor and other specialised examinations were conducted. Weights and heights were measured at the beginning of the day, when the subjects were in a fasting state. Body weight was recorded to the nearest 0.1 kg and standing height was measured to the nearest cm[5]. Measures were done in the morning with light clothing. Body mass index (BMI) was calculated as weight (in kg) divided by the square of height (in m). Physical activity levels were assessed by a physician-administered questionnaire, using a 4-point scale ranging from almost completely sedentary to extremely active.

The diet history (DH) method was used to estimate food, energy and nutrient intakes during the previous three months. The interviews lasted for about an hour, during which time participants were asked to report what they usually eat and drink for each meal and, as far as possible, to specify the food items and amounts consumed. The interviews started with open-ended questions about usual food pattern, and continued in a structured format. The same DH method has been used in all earlier cohorts. Methodological details on the three earlier examinations have been published previously[10–12]. In the 2000 DH examinations, four dietitians were trained by one of the dietitians who had participated in the previous surveys, two of whom entered all the dietary data. In contrast to the 1971 and 1981 examinations, during which dietary interviews had been performed in the participants' own homes, the DH interviews in 1992 and 2000 were part of a hospital-based protocol. The method has been validated and found to give comparable energy values to those predicted by the heart rate method and activity diary. However, it underestimated usual energy intake by 12% compared with the doubly labelled water method in 12 subjects and, some obesity-related underreporting was observed[11,12].

Subjects who were invited to the 2000 health examinations but did not attend were re-contacted and asked a short series of questions describing their marital status, self-rated health, medical treatment and smoking habits.

To maintain comparability across cohorts, data from all DH interviews were processed using the version of the Swedish National Food Administration's nutrient database, 'PC-kost', that was current at the most recent examination[13]. However, certain foods that were no longer listed in the 2000 codes were retrieved from previous databases. The one exception involved iron; values from earlier databases were used for the 1971, 1981 and 1992 interviews. This was necessary due to the removal of fortification prior to the 2000 examinations.

Statistical methods

The main results of this paper are based on tests for linear trend across the four examination years. To test for cohort trends in mean intakes of nutrients and foods (g day^{-1}) and proportion of eaters (%), tests of linear-by-linear association were used. All results are reported separately for females and males. Values are expressed as means and standard deviation.

To compare energy intakes as reported by the different cohorts, the Goldberg method was used[14], in which energy intake (EI) is divided by an estimate of basal metabolic rate (BMR). BMR is predicted from weight (W) by means of standard equations for subjects aged 60–74 years (males $0.0499 \times W + 2.93$, females $0.0386 \times W + 2.875$)[15,16]. An EI/BMR value of 1.35 has previously been used to identify probable underreporting[17].

For the physical activity comparisons reported here, the category described as 'almost completely inactive' was considered comparable across all cohorts. Subjects who described themselves as moderately or very active (by various definitions over the years) are pooled and considered together as the comparison group.

The intakes of nutrients have also been compared with the Nordic Nutrition Recommendations[18] and are described in terms of the percentage of subjects who have a nutrient intake above the recommended level and

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below the safe level, the latter suggesting risk for nutrient deficiency.

All statistical results are based on cross-sectional data collected on four different cohorts of 70-year-olds examined over three decades. Occasionally the text contains terminology suggestive of longitudinal measurements (increases, decreases). However, in the present paper, this usage refers exclusively to secular comparisons of different cohorts over time.

Results

Characteristics of participants and non-participants

Selected characteristics of the participants in the dietary interview are given in Table 1, including weight, height, BMI and percentage reporting being sedentary during their leisure time. Trends in anthropometric variables in the complete H70 samples will be reported elsewhere[19], but those values are in general agreement with the measurements in the dietary sub-samples included here; i.e. a secular trend towards increasing BMI among 70-year-olds of both sexes. In 1992 and 2000, 95% and 98% of subjects, respectively, had a BMI $> 20\,kg\,m^{-2}$. The percentage of subjects reporting sedentary physical activity habits varied over the years, particularly among women. Finally, participation rates in the four surveys, presented at the top of Table 1, indicate decreasing participation over time. Overall the participation rates varied from 85% in 1971 to 65% in 2000.

Because participation rates were low in the two most recent surveys (66% in 1992, 65% in 2000), it was considered important to investigate whether non-participants differed in any measurable ways from participants. To accomplish this, responses to questions in the non-participant interview were compared with similar data from participants. An analysis was conducted comparing all subjects in the H70 study who came to the 2000 examination with those who did not attend but did complete the non-respondent questions (47% of all non-participants). This group was found to be similar with respect to self-rated health, history of myocardial infarction, smoking and diabetes, although unmarried men were significantly under-represented among participating men (data not shown).

Cohort differences in consumption of specific foods

Table 2 gives a summary of secular differences in consumption of selected products by the four cohorts. It summarises: those products that were consumed in increasing amounts across the four examinations; items that became less frequently consumed over the observation period; and products displaying no significant differences over time. A complete list is given in the Appendix, which details amounts of these items. Selected secular trends are described below, with significance levels referring to overall trends across examinations.

Fruits and vegetables

A large increase in grams per day was seen for vegetable consumption (see Appendix for amounts). Women and men respectively ate 92 and 84 g more vegetables per day in 2000 than in 1971. Interestingly, the proportion of women eating vegetables was unchanged, while the later-born men were more likely to be consumers (data not shown). Later-born cohorts of both sexes ate more fresh fruit and fruit yoghurt ($P < 0.0001$, both) and less canned fruit and fruit soup ($P < 0.0001$) than earlier-born cohorts.

Meat, poultry and fish

Consumption of poultry was higher in later-born cohorts ($P < 0.0001$, both sexes), together with meat consumption by men ($P < 0.0001$) and, to a lesser extent, women ($P < 0.01$). However, the proportion of subjects consuming meat and poultry did not change (data not shown). Consumption of fish increased in women only ($P < 0.01$).

Refined and complex carbohydrate sources

Intake of added sugar ($P < 0.0001$, both sexes) and of sweet buns and cakes ($P < 0.0001$ women, $P < 0.001$ men) decreased over the years; however, later-born women and men ate more candy than earlier-born cohorts

Table 1 Description of cohorts. Values are expressed as mean (standard deviation) or %

	1971	1981	1992	2000	Test of trend
Women	$n = 181$	$n = 129$	$n = 130$	$n = 318$	
Participation rate	84	72	66	65	<0.0001
Weight (kg)	68.3 (5.6)	69.5 (5.9)	68.6 (5.4)	71.2 (6.0)	0.012
Height (cm)	161 (11.6)	160 (12.0)	162 (11.2)	162 (12.3)	<0.01
Body mass index ($kg\,m^{-2}$)	26.3 (4.2)	27.2 (4.6)	26.1 (4.3)	27.1 (4.5)	0.18
Inactive	18	30	22	7	<0.0001
Men	$n = 179$	$n = 132$	$n = 59$	$n = 232$	
Participation	86	83	67	65	<0.0001
Weight (kg)	77.2 (6.8)	77.5 (6.2)	84.0 (5.9)	83.4 (6.9)	<0.0001
Height (cm)	174 (11.5)	173 (11.5)	177 (12.5)	176 (13.8)	<0.0001
Body mass index ($kg\,m^{-2}$)	25.6 (3.3)	25.9 (3.6)	26.9 (3.6)	26.9 (3.9)	<0.0001
Inactive	11	15	15	9	0.45

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Table 2 Overview of cohort differences in food consumption, 1971–2000 (see Appendix for details)

Increased	Test of trend	Decreased	Test of trend	Unchanged
Spread, ≤40% fat	***	Spread, ≥60% fat	***	Milk, 0.5% fat
Cheese, >17% fat (men)	**	Milk, 3.0% fat	***	Milk, 1.5% fat†
Cheese, <17% fat	***	Sweet rye bread (women)	*	Cheese, >17% fat (women)
Fruit yoghurt	***	Sweet rye bread (men)	***	White bread (men)
Breakfast cereal	***	White bread (women)	**	Fish (men)
Wholemeal bread (women)	**	Porridge	***	Coffee
Wholemeal bread (men)	***	Gruel	***	Tea
Meat (women)	*	Eggs (women)	***	Liquor
Meat (men)	***	Eggs (men)	*	
Poultry	***	Potatoes	***	
Fish (women)	*	Canned fruits, fruit soup	***	
Vegetables, fresh	***	Soft drinks, fruit syrup (women)	*	
Vegetables, total	***	Beer, ≥2.8% alcohol	*	
Pasta	***	Buns, cakes (women)	***	
Rice	***	Buns, cakes (men)	**	
Fresh fruit	***	Sugar	***	
Juice	***			
Soft drinks, fruit syrup (men)	*			
Light beer (women)	*			
Light beer (men)	**			
Wine (women)	***			
Wine (men)	*			
Candy	***			

Test of trend: ***, $P < 0.0001$; **, $P < 0.001$; *, $P < 0.05$; with same result for men and women unless otherwise indicated. All significance levels for alcoholic beverages refer to trends during the last three surveys only, due to methodological differences.
† Milk, 1.5% fat was not consumed in 1971 and 1980, and was unchanged in 1992–2000.

($P < 0.0001$). Later-born subjects ate more pasta and rice, but less potatoes ($P < 0.0001$, all) with cooked meals than subjects examined 30 years previously. Women and men surveyed in 2000 ate more breakfast cereal ($P < 0.0001$) compared with the earlier cohorts. The intake of whole-grain bread was higher in the later-born cohorts ($P < 0.001$ women, $P < 0.0001$ men).

Spreads and cheeses

'Spread' is defined here as table fat, mostly used on bread. Later-born women and men consumed less high-fat spread and more low-fat spread ($P < 0.0001$, all). The consumption of low-fat cheese increased ($P < 0.0001$) in both sexes, as did the consumption of high-fat cheese in men ($P < 0.001$).

Beverages

Total milk consumption, which includes fermented products, was stable across surveys, but the type of milk differed, with decreasing consumption of whole milk. Later-born women and men drank more juice ($P < 0.0001$) and light beer ($P < 0.01$ women, $P < 0.001$ men) over the years. Men were more likely to be consumers of caloric soft drinks at later examinations ($P = 0.012$) while the opposite time trend was seen in female cohorts ($P = 0.013$). Wine was consumed to a greater extent in the later-born cohorts of women and men ($P < 0.0001$ women, $P < 0.01$ men) while the consumption of strong beer (≥2.8% alcohol) decreased ($P = 0.035$ women, $P < 0.01$ men). The intake of liquor, tea and coffee was unchanged.

Energy and nutrients

The mean values for energy and selected nutrients in all four cohorts are presented in Tables 3 and 4. Energy intake increased in men ($P < 0.0001$) and showed a marginal increase in women ($P = 0.06$). EI/BMR was almost constant across the female cohorts, but in men this value displayed an overall upward trend. There was no significant trend in the proportions of women with EI/BMR value below the cut-off of 1.35 for under-reporting[17]; however, in men there was some evidence of less underreporting in the later-born cohorts (data not shown).

Compared with earlier-born cohorts, women and men examined in 2000 had higher intakes of protein, fibre, vitamin C, vitamin D (all $P < 0.0001$), calcium ($P < 0.001$ women, $P < 0.0001$ men) and riboflavin ($P < 0.01$ women, $P < 0.0001$ men), but a lower intake of iron ($P < 0.0001$ women, $P < 0.01$ men). The intake of carbohydrates increased only in men ($P < 0.01$) and fat intake showed a non-significant upward trend.

In the 2000 survey, more than 65% of subjects had intakes of vitamin C, riboflavin, thiamine, calcium, iron and vitamin A above recommended levels according to the Nordic Nutrition Recommendations[18]. None of the subjects were below the recommendation of safe intake for vitamin C, potassium and thiamine. Less than 3% were below the recommended safe intake for vitamin D, calcium, iron, riboflavin (mostly men) and vitamin A (mostly women). Nutrient density increased in the later-born cohorts for a number of nutrients, also as shown in Tables 3 and 4.

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Table 3 Energy and nutrient intakes for women. Values are expressed as mean (standard deviation)

Nutrient	1971 ($n = 181$)	1981 ($n = 129$)	1992 ($n = 130$)	2000 ($n = 318$)	Test of trend	Test of trend, nutrient/energy density
EI/BMR*	1.40 (0.4)	1.49 (0.4)	1.41 (0.4)	1.45 (0.4)	0.44	
Energy (kcal)	1819 (504)	1967 (509)	1847 (435)	1931 (468)	0.06	
Protein (g)	67 (17)	71 (19)	76 (18)	77 (19)	<0.0001	<0.0001
Fat (g)	75 (25)	84 (26)	74 (24)	76 (26)	0.39	<0.0001
Carbohydrates (g)	217 (65)	227 (65)	213 (59)	226 (62)	0.26	0.35
Alcohol (g)†	–	2.4 (4.0)	3.5 (7.1)	4.8 (6.2)	<0.01	<0.0001
Fibre (g)	16 (5.3)	19 (5.7)	20 (7.2)	22 (6.7)	<0.0001	<0.0001
Vitamin D (μg)	5.6 (2.2)	5.4 (1.9)	6.4 (2.8)	6.5 (2.8)	<0.0001	<0.001
Thiamine (mg)	1.2 (0.3)	1.3 (0.4)	1.3 (0.3)	1.4 (0.3)	<0.0001	<0.0001
Riboflavin (mg)	1.6 (0.5)	1.7 (0.5)	1.8 (0.6)	1.8 (0.5)	<0.01	0.27
Vitamin C (mg)	94 (55)	84 (44)	114 (71)	128 (67)	<0.0001	<0.0001
Calcium (mg)	925 (354)	1034 (367)	1048 (376)	1056 (395)	<0.001	<0.01
Iron (mg)	14 (4.9)	13 (4.3)	13 (4.0)	12 (3.1)	<0.0001	<0.001
Vitamin A (mg)	1.8 (1.1)	1.7 (1.0)	2.1 (1.5)	1.8 (3.2)	0.88	0.71
Potassium (mg)	2701 (694)	2972 (702)	3257 (860)	3342 (783)	<0.0001	<0.0001

* Ratio of reported energy intake to estimated basal metabolic rate.
† Trends in alcohol from wine, beer and liquor are based on data from 1981 to 2000 only. Alcohol from beer in 1971 (mean 0.3 g) is included in energy and, where applicable, nutrient group means.

Discussion

Summary

We observed many secular changes in food selection patterns when comparing the different 70-year-old cohorts. The content of main meals shifted towards more meat and vegetables, and potatoes were exchanged for pasta and rice. Traditional breakfast foods such as porridge, gruel and more refined bread products were replaced with cereals, fruit yoghurt and whole-grain breads. As the consumption of extra sugar and sweet bakery products decreased, increases could be observed in candy consumption. In general, the majority of the 70-year-olds examined in 2000 consumed nutritionally adequate diets. Finally, although alcohol could not be estimated in the original (1971) survey, large increases were seen between 1981 and 2000 in both sexes. Beer consumption trends seem to have mirrored changes in the availability of stronger beer types in Swedish grocery stores.

Diet history method

The main limitation of this study, common to all dietary surveys comparing populations over time, involves using the same dietary instrument in cohorts examined across three decades. Over such long intervals, it is obvious that the availability of foodstuffs in shops and cooking methods may change in many ways, reflecting new consumption patterns and practices. Thus the instrument had to evolve over the years, both in terms of listed food choices and assumed preparation methods and recipes[10,12]. Whether the instrument is equally valid over the years remains an important methodological question, which we were only partially able to assess. Systematic trends were observed in the EI/BMR ratio among men, who were also getting heavier. Among women, the ratio was stable but there was some indication of changes in physical activity levels, suggesting that the ratio should have increased. Therefore, we cannot exclude the possibility of decreasing completeness in reported intake

Table 4 Energy and nutrient intakes for men. Values are expressed as mean (standard deviation)

Nutrient	1971 ($n = 179$)	1981 ($n = 132$)	1992 ($n = 59$)	2000 ($n = 232$)	Test of trend	Test of trend, nutrient/energy density
EI/BMR*	1.59 (0.39)	1.84 (0.50)	1.67 (0.52)	1.77 (0.48)	<0.01	
Energy (kcal)	2218 (530)	2553 (645)	2425 (708)	2561 (651)	<0.0001	
Protein (g)	80 (19)	86 (22)	96 (25)	98 (25)	<0.0001	<0.0001
Fat (g)	92 (27)	109 (35)	96 (32)	101 (36)	0.056	<0.0001
Carbohydrates (g)	264 (69)	289 (77)	277 (99)	290 (83)	<0.01	<0.01
Alcohol (g)†	–	8.9 (12.6)	8.9 (11.7)	13.1 (15.5)	<0.0001	<0.0001
Fibre (g)	19 (5.7)	22 (8.5)	23 (8.0)	24 (8.2)	<0.0001	<0.0001
Vitamin D (μg)	6.7 (2.5)	6.7 (2.4)	8.8 (3.8)	8.5 (3.5)	<0.0001	<0.0001
Thiamine (mg)	1.4 (0.4)	1.6 (0.4)	1.7 (0.5)	1.7 (0.5)	<0.0001	<0.0001
Riboflavin (mg)	1.9 (0.6)	2.1 (0.6)	2.2 (0.8)	2.2 (0.7)	<0.0001	<0.05
Vitamin C (mg)	85 (45)	85 (42)	99 (54)	130 (80)	<0.0001	<0.0001
Calcium (mg)	1043 (395)	1229 (459)	1175 (396)	1316 (555)	<0.0001	<0.01
Iron (mg)	17 (5.2)	17 (5.5)	17 (5.9)	16 (3.8)	<0.01	<0.001
Vitamin A (mg)	2.0 (1.2)	1.7 (0.9)	2.8 (1.9)	1.9 (1.0)	0.94	<0.05
Potassium (mg)	3179 (801)	3611 (916)	3757 (1073)	3925 (954)	<0.0001	<0.0001

* Ratio of reported energy intake to estimated basal metabolic rate.
† Trends in alcohol from wine, beer and liquor are based on data from 1981 to 2000 only. Alcohol from beer in 1971 (mean 1.7 g) is included in energy and, where applicable, nutrient group means.

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for women, even in the situation of an apparently stable ratio of EI/BMR. For men the increases in EI/BMR are consistent with a strong secular increase in relative weight during that period.

Nutrient database

Another set of problems arises from changes in the nutrient database, which has been improved by new analytical techniques, making nutrient values in earlier databases obsolete. We used the 2000 database to decrease the probability that observed changes in dietary intake are due to changes in the database. This creates several problems. First, 'old' foods have to be added to the new database and this can re-introduce errors. For certain nutrients like iron, the new database cannot be used due to changes in fortification policies. Finally, using the same database masks real changes in nutrient composition for the same foods. However, we concluded that, on the whole, the benefits of using the new database outweigh the disadvantages.

Participation

A final limitation of these data involves differential non-response over time. Although all four cohorts were recruited from population-based registers, participation rates were higher in the first two cohorts than in the latter two. This decrease in participation with time is consistent with the results of other population-based surveys in the elderly over recent decades[20]. However, non-participant analyses have not revealed major biases, and we judge the effects of changing participation on the secular dietary trends described here to be minor[21]. Nevertheless, it is possible that the later examinations captured a more self-selected and healthier cohort, which could theoretically explain some of the apparent dietary improvements. On the other hand, it may be noted that the trends reported in these cohorts are consistent with food disappearance data from the Department of Agriculture[1], suggesting that the changes are likely to be real as well as being comparable with those in younger age groups.

Implications and a historical note

To our knowledge, studies of secular trends in diets of elderly cohorts have rarely been attempted. Our most recent data on later-born 70-year-olds are reassuring in the sense that most subjects appear adequately nourished and even better off than earlier-born cohorts. However, a worrying trend towards increasing overweight was also observed, particularly in men[19].

Of parenthetical interest, we can report that half way through the examinations the BSE (bovine spongiform encephalopathy) outbreak caused a great deal of public concern in Sweden. This could even be observed in the food intake data; fish consumption increased and non-poultry meat decreased in the second half of the study (data not shown). This should be taken into consideration when interpreting the long-term secular trends; however, this apparent change probably had no nutritional implications. The total protein intake was the same in the first and second halves of the study.

Conclusion

When making comparisons between food intake data from different birth cohorts over long periods of time, it is necessary to achieve high precision in the standardisation of nutrient databases and to analyse and express intake data in such a way that observed differences are as unbiased as possible. Despite a number of important limitations, the present study is unique in its ability to monitor population-based cohorts over three decades using a comparable dietary method. Based on the dietary differences described in this paper, it may be concluded that the food habits of 70-year-olds have changed markedly over one generation. Certain changes have occurred earlier than others, while other differences can be detected as monotonic trends throughout the decades, and certain gender differences are also apparent. With some exceptions, the differences observed across these four cohorts are consistent with the hypothesis that secular dietary trends in the elderly have favourable health implications.

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Appendix – Amounts of foods in grams consumed daily by different 70-year-old cohorts examined between 1971 and 2000

	Women					Men				
	1971 ($n=181$)	1981 ($n=129$)	1992 ($n=130$)	2000 ($n=318$)	Test of trend	1971 ($n=179$)	1981 ($n=132$)	1992 ($n=59$)	2000 ($n=232$)	Test of trend
Spread, ≤40% fat	–	7	9	11	<0.0001	–	5	23	15	<0.0001
Spread, ≥60% fat	18	16	9	6	<0.0001	25	26	11	9	<0.0001
Milk, 3.0% fat	204	243	96	77	<0.0001	268	307	96	132	<0.0001
Milk, 1.5% fat	–	–	93	104	0.547	–	–	116	124	0.841
Milk, 0.5% fat	146	161	138	136	0.447	117	171	160	145	0.410
Fruit yoghurt	0.3	8	12	29	<0.0001	0.2	6	3	17	<0.0001
Cheese, >17% fat	25	28	33	28	0.216	30	36	39	43	<0.001
Cheese, <17% fat	4	4	10	18	<0.0001	3	3	8	15	<0.0001
Porridge	60	76	44	22	<0.0001	67	69	71	30	<0.0001
Gruel	25	13	6	3	<0.0001	33	26	10	6	<0.0001
Breakfast cereal	3	5	10	16	<0.0001	2	7	16	19	<0.0001
Sweet rye bread	53	29	29	40	0.016	77	59	48	48	<0.0001
Wholemeal bread	9	41	27	25	<0.001	9	35	38	35	<0.0001
White bread	26	27	20	17	<0.001	30	40	29	28	0.327
Eggs	26	20	20	17	<0.0001	31	32	25	24	<0.01
Meat	51	64	67	61	<0.01	58	79	100	81	<0.0001
Poultry	8	7	8	12	<0.0001	7	6	6	13	<0.0001
Fish	46	31	52	48	<0.01	57	43	68	57	0.269
Potatoes	129	124	92	95	<0.0001	202	209	151	134	<0.0001
Pasta	3	6	8	13	<0.0001	3	7	12	15	<0.0001
Rice	5	11	14	17	<0.0001	4	7	12	19	<0.0001
Vegetables, total	54	57	145	146	<0.0001	44	47	95	128	<0.0001
Vegetables, fresh	28	37	96	97	<0.0001	22	25	54	79	<0.0001
Fresh fruit	151	120	176	197	<0.0001	127	118	143	171	<0.0001
Canned fruit, fruit soup	63	64	37	39	<0.0001	59	66	34	36	<0.0001
Juice	30	37	55	67	<0.0001	12	24	33	84	<0.0001
Soft drinks, fruit syrup	116	69	54	74	0.013	117	99	118	172	0.012
Light beer	16	29	30	34	<0.01	44	75	79	83	<0.001
Beer, ≥2.8% alcohol	31	8	5	18	0.035	139	54	39	86	<0.01
Wine	–	11	17	29	<0.0001	–	23	35	46	<0.01
Liquor	–	2	3	2	0.937	–	12	8	13	0.618
Coffee	441	508	508	473	0.340	490	572	526	499	0.896
Tea	147	169	127	135	0.230	163	191	137	171	0.951
Buns, cakes	54	51	37	36	<0.0001	64	54	46	49	<0.001
Sugar	13	9	4	3	<0.0001	24	20	11	11	<0.0001
Candy	6	5	9	13	<0.0001	6	6	10	17	<0.0001

P-values refer to a test of linear trend across the examination years. These results are summarised in Table 2.