

# Swedish Nutrition Recommendations Objectified (SNO)

– Basis for general advice on food consumption  
for healthy adults

by Heléne Enghardt Barbieri and Cecilia Lindvall

This is a translation of the National Food Administration Report No. 1/2003.



**LIVSMEDELS  
VERKET**

NATIONAL FOOD  
ADMINISTRATION, Sweden

# Contents

Preface .....	3
Summary .....	4
Background .....	6
Goals and limitations .....	8
Starting points .....	9
Methods .....	10
Food list .....	11
Nutrient content of the food list .....	14
Protein and iron .....	14
Fat .....	14
Carbohydrate .....	16
Dietary fibre .....	16
Vitamin A .....	16
B-vitamins .....	16
Folate .....	17
Sodium .....	17
Food groups in the list .....	17
Fruit and vegetables .....	17
Dried pulses .....	19
Bread and breakfast cereals .....	19
Potatoes, rice and pasta .....	21
Meat and cured meat products .....	25
Fish, seafood and eggs .....	25
Milk, cheese and other dairy products .....	26
Margarine and oil .....	27
The leeway .....	28
Menus for four weeks .....	29
Breakfast .....	30
Snacks .....	31
Lunch and dinner .....	31
Menus .....	34
Final word .....	31
References .....	44

# Preface

This report describes work in which nutritionists at the Swedish National Food Administration realised a long-held ambition – that of converting the current nutrition recommendations into actual foods and menus. The project was christened 'SNO' which stands for **S**wedish **N**utrition recommendations **O**bjectified. We have chosen to retain this internal abbreviation since it already seems to have spread outside the National Food Administration. This conversion provides the National Food Administration and dieticians in Sweden with a basis that can be used for a range of purposes. One of the first tasks of the National Food Administration will be to formulate a number of general pieces of dietary advice for the Swedish population. For the first time, we now have the potential to evaluate specific pieces of advice in relation to the diet as a whole.

The work was begun in a group comprising Heléne Enghardt Barbieri, Cecilia Lindvall, Wulf Becker and Ulla Hagman. Latifa Lindberg at the former KF Test Kitchen took on the difficult task of preparing menus and recipes. This work was continued at the National Food Administration with the help of Fredrika Aleman and Jennifer Terry and finally completed by Heléne Enghardt Barbieri and Cecilia Lindvall, in consultation with the National Food Administration nutrition group. The group is collectively responsible for the results.

At this point, we would also like to thank Eva Callmer and her colleagues at Hälsomålet, Stockholm County Council, for valuable inspiration and constructive discussions on the SNO work.

It is the hope of the National Food Administration that SNO will become a useful tool in the continuing task of developing appropriate and meaningful dietary advice for the Swedish population.

Uppsala, January 2003

Heléne Enghardt Barbieri and Cecilia Lindvall

Nutritionists at the Swedish Food Administration

# Summary

SNO stands for **S**wedish **N**utrition recommendations **O**bjectified (in terms foods and menus). This conversion of the recommendations into actual values of food consumption applies for healthy adults of working age with little to moderate physical activity and with 'Swedish' eating habits. SNO encompasses the entire diet and not simply individual foodstuffs/food groups or meals.

The reference energy levels used for SNO are for women and men aged 19-60 years with a sedentary occupation and with little or no physical activity in their leisure time. These energy levels are 9.1 MJ for women and 11.5 MJ for men. The two energy levels are referred to here as Gretel and Hansel respectively.

A range of foodstuffs, mainly raw ingredients, were chosen from the Swedish food database (PC-Kost). These were considered representative of Swedish eating habits and of what might comprise a balanced varied diet. The foods selected were also nutritionally representative of their food group.

Portion sizes and frequencies were then determined so that the quantity of each foodstuff was sufficient for a four-week period. These portion sizes and frequencies were subsequently adjusted in order to comply with the specified energy levels.

On the basis of this, a food list was compiled with the average amounts to be consumed per day and per week for different food groups in order to achieve the two energy levels. This food list fulfils all the Swedish Nutrition Recommendations except those for iron and protein. The higher iron recommendation for women of childbearing age in combination with the low energy level was the main reason for protein slightly exceeding the recommended level. Iron and protein are often found in the same foodstuff.

Keeping the saturated fat level low without the total amount of fat becoming too low is difficult with Swedish dietary habits. SNO shows that choice of spread is critical for whether the recommendation is fulfilled or not. Margarine, preferably low-fat, and oil or liquid margarine are needed to offset the saturated fats that originate from milk, cheese, meat and cured meat products.

Salt intake should be limited to 5 g per day. This recommendation is impossible to meet because of the amount of salt in processed products, bread, cheese and cured meat products.

The National Food Administration has previously recommended ½ kg of fruit and vegetables per day. This recommendation is based on the minimum amount at which positive effects on cardiovascular disease and obesity have been observed in epidemiological studies. SNO shows that in practice, larger amounts are needed for a balanced diet. For Gretel, this means over 500 g and for Hansel closer to 700 g. Around half the amount is vegetables and half fruit and juice. In SNO, vegetables

are divided into two groups depending on their fibre content. Half the vegetables come from the high-fibre group, i.e. with over 2 g of dietary fibre per 100 g. Juice contains a smaller amount of fibre than fruit and therefore at most 100 ml per day can replace the equivalent amount of fruit and vegetables.

SNO shows that the old recommendation from the 1970s of 'six to eight slices of bread a day' still holds true (1 slice = 25 g). Half the bread in SNO is Keyhole-labelled (*Swedish symbol indicating low-fat and/or high-fibre product*). In addition, there is one portion of breakfast cereal per day. Four of Gretel's six slices of bread have margarine (two with low-fat margarine and two with 80% fat margarine). One slice has a meat-based spread, e.g. liver paté, and one slice is eaten with food. For Hansel, there are two slices without margarine. To increase iron intake, meat-based spread is used once a day and black pudding once a month for Gretel. Cold cut products are Keyhole-labelled. Meat is included as one portion per day, sausage once a week, fish three portions a week. Two to three eggs per week are also included.

Potatoes are included once a day and rice and pasta four times a week. Each day includes 300-400 ml of milk or yoghurt, the majority of which is low-fat. Two slices of cheese, almost exclusively a low-fat variety, can be included every day.

One of the starting points of SNO was that there should be scope for all kinds of foods, even those normally considered unhealthy. In SNO, the amount of energy that comes from this type of food (savoury snacks, pastries, cakes, ice cream, jam, fizzy drinks, sweets and alcoholic drinks) is called the *leeway*. For Gretel and Hansel, 13-14 % of total energy, i.e. 1.2-1.6 MJ, falls into this category. More sweet foods than fatty foods are included within the framework of the leeway so as not to affect the energy balance. Following comparisons with current consumption patterns, the conclusions drawn by SNO are that the following areas should be considered when developing dietary advice:

- Consumption of fruit and vegetables is too low and should be increased, as should consumption of bread
- Improving the quality of the fats consumed is just as important as reducing the total fat intake.
- Consumption of the so-called leeway foods should decrease.

# Background

According to Swedish National Aims and Strategies for Nutrition (1999-2004), the National Food Administration has accepted the responsibility of producing both general and target group-specific food messages: 'a basis for practical advice on food and meal levels for children and women and men in different age groups will be drawn up' (Goal 3, measure 4). The Swedish Food Administration's reference group for collaboration on healthy dietary habits has also expressed a request for a small number, three to five, of general messages that can be used by different actors. Using such general messages, information and other activities could be given a common direction and probably achieve greater breakthrough. The goals of nutrition work as expressed e.g. in Swedish Nutrition Recommendations (SNR) (1997), will of course be the guide when such messages are being produced. However, one should also take into account the current reality, the eating habits of the Swedish population, which can be described with the help of data from the Swedish Dietary Survey (Riksmaten 1997-98). Practical and concrete advice should also be based on knowledge of the factors controlling eating behaviours.

Good advice and messages about food are not lacking, since Swedish dietary information has a long tradition. For example, the National Food Administration and the National Board of Health and Welfare have devised diet and exercise recommendations, which were most recently published in the book *Kost, Motion och Hälsa* (1992). The basic content of official information has remained relatively stable over the years. Examples are the National Food Administration's recommendation for consumption of ½ kg fruit and vegetables per day (Becker & Hagman, 1999), or the guideline stating that the equivalent of around ½ litre milk per day is appropriate for adults (Expertgruppen för kost och hälsofrågor, 1990). However, neither these nor established models and symbols intended to make it easier for people to make good choices consider the diet as a whole. The food circle (1991) encourages variation, but says nothing about how often one should eat, the plate model (Lindvall, 1992) illustrates the relative proportions of different food groups in e.g. a lunch, but provides no guidance on other meals; and the Keyhole label (SLVFS 1989) indicates certain low fat or high fibre products but is not used on e.g. fruit and vegetables.

Food-based recommendations are a concept that must be viewed in relation to nutrition recommendations. The latter refer to values for desirable daily intake of energy and nutrients. They are primarily intended for use in diet planning for different groups. However, nutrients sometimes also occur in dietary advice, e.g. 'eat less fat'. It is known that this type of advice/recommendation is difficult for people to apply in practice. Therefore, to make dietary advice understandable and

concrete, different types of food-based recommendations or guidelines are used as a basis for advice directed at the population in general or at specific target groups (FAO, 1996).

Food-based recommendations can be said to be 'conversions' of nutrition recommendations that take into account the dietary habits and dietary patterns that apply for the actual population or group. The concept includes advice on foods, quantities, frequencies and eating habits. SNO includes these four aspects and encompasses the entire diet and not simply individual foods/food groups or meals.

A corresponding effort has been made by Hälsomålet, published for the first time in 1989 (Centrum för tillämpad näringslära, 1989). The work of Hälsomålet is directed towards, and based on, the eating habits of Stockholmers. The National Food Administration must consider the eating habits of the entire Swedish population. We decided that the National Food Administration could not use Hälsomålet's material directly and would have to develop its own material from a national perspective. However, the Hälsomålet approach to the work was an important source of inspiration and knowledge for SNO.

SNO can also be an important tool, e.g. for evaluating diets and in work on simulation models. For example, one can calculate how possible supplementation affects the intake of a certain nutrient. In the same way, one can calculate the intake of additives and foreign compounds. This type of calculation is usually based on data from diet surveys. SNO is valid for the reference individuals defined and can be used in the same way as SNR to assess the eating habits of the population and how these are changing.

The model can also be used to produce corresponding conversions for other energy levels, for vegetarians (who were not included in the present work) and to develop guidelines for different types of meals. SNO can also be regarded as a test of the nutrition recommendations and can provide an answer to the question of whether it is actually possible to eat according to the recommendations without the diet becoming extreme.

# Goals and limitations

The goal of the present work was to develop a basis for general advice on food and meal levels for healthy adults. The work was restricted to include the healthy adult population of working age with little or moderate physical activity and with 'Swedish dietary habits'. Therefore the work did not include specific target groups such as children, the elderly or the ill, for whom the National Food Administration has already produced advice and recommendations. In addition, the work did not include groups with specific requirements or food traditions, e.g. vegetarians, athletes or groups with different food cultures, nor was any particular attention devoted to environmental aspects. However, the intention for the material was that it should serve as a starting point and that it should be relatively easy to adapt to various specific requirements. We wish to emphasise that the material should not be regarded as final dietary advice. In addition to this basic material, much other information and knowledge of people's eating habits and the factors controlling these is needed if meaningful advice is to be formulated.

# Starting points

The starting point for this work was the Swedish Nutrition Recommendations (SNR) (1997). The conversion applies for energy levels for women and men with a sedentary lifestyle and little or limited physical activity in leisure time (PAL, Physical Activity Level = 1.6) in the age range 19-60 years. Since the energy levels are different for the age ranges 19-30 and 31-60 in SNR, they were weighted according to the proportion of the population in these age groups (Source: SCB. Population Statistics, Swedish population on 31 December 2001 according to age and gender). This produced an energy level of 9.1 MJ for women and 11.5 MJ for men. We decided to call these two energy levels Gretel and Hansel respectively.

When the recommendations for vitamins and minerals were different for the two age groups, the higher value was chosen. The upper limits that exist for certain vitamins and minerals were also complied with.

In SNR, it is recommended that consumption of alcohol should be restricted so that it does not exceed 5 % of energy intake. In SNO, the maximum level for alcohol consumption was set at 2 energy-%.

SNO also observed the meal pattern recommended in SNR. This involves dividing daily energy intake so that breakfast provides 20-25 %, lunch 25-35 and dinner 25-35 %. Two or three snacks must also be included.

In addition to SNR, we also took dietary habits in Sweden into consideration to the fullest possible extent by studying the results of HULK (1994) and Riksmaten (1997-98). Frequencies and portion sizes were compared to ensure that good existing practice was not altered unnecessarily, and also to establish that the portions in SNO were realistic.

Apart from SNR, there were other recommendations to be taken into consideration. These were included as starting points but were not controlling values or targets to achieve.

These recommendations were:

- Choose Keyhole-labelled goods in supermarkets and restaurants (from 1989)
- 'For adults, an intake of milk and cheese corresponding to approx. ½ litre of milk per day is appropriate... Adults should primarily choose low-fat products.' (from 1990)
- Eat according to the plate model (from 1992)
- Choose foods with good carbohydrates and high fibre – bread (preferably wholemeal), breakfast cereals, porridge, pasta, fruit, vegetables, potatoes and root vegetables (from 1992)
- National Food Administration advice on fish consumption, which states that fish is healthy and that most people should eat more fish, but with limitations for certain species due to PCB and heavy metal content (see advice on fish consumption from 1995)
- Choose soft fat rather than hard fat (from 1996)
- Eat ½ kg fruit and vegetables per day (from 1999)

# Methods

A range of foodstuffs, mainly raw ingredients, were chosen from the Swedish food database PC-Kost. These were appraised as representative of Swedish dietary habits and of what might comprise a balanced varied diet. The appraisal was carried out with the help of the eating habits reflected in the national dietary surveys HULK (1994) and Riksmaten (1997–98). The foodstuffs chosen also had to be representative of their food group.

Portion sizes were chosen for each food according to Vikttabeller (1999) and consumption frequencies, with an occurrence rate of at least once a month. Portion sizes and frequencies were then adjusted and converted to grams per day. When energy and nutrients were finally added up for all foods, they met the specified energy levels and nutrition recommendations. In total, 71 foodstuffs are included in the basic material. On the basis of this, a food list was compiled with amounts to be consumed per day and per week for both Gretel and Hansel, i.e. for both energy levels (Table 1).

Gretel's food list was drawn up first and the amounts were then multiplied by a factor of approx. 1.25 to meet Hansel's energy level and the recommendations for men. The factor 1.25 is based on the difference in energy between Gretel and Hansel.

To test whether it was possible to prepare menus based on the list, KF Test Kitchen was given the task of drawing up a four-week menu. Omissions in the list were brought to light and adjustments made. In this way, the final food list was developed. The exchangeability of different food groups was tested, as was the range of freedom within the groups.

The menus were refined by the National Food Administration and were eventually tested on subjects. The menus presented in this report should be regarded as examples of the outcome when the food lists are used in planning.

The list and the menus were nutritionally assessed using the programme *MATs den flexible* Version 405a with the National Food Administration database PC-Kost 2002:1. In calculating the energy, we used the factors 17 kJ for 1 g protein and for 1 g carbohydrate, 37 kJ for 1 g fat and 29 kJ for 1 g alcohol. Fibre was assumed to not provide any energy.

# Food list

This conversion of Swedish Nutrition Recommendations into foodstuffs (SNO) is presented as a food list with average consumption amounts specified per day and per week for different groups of foodstuffs (Table 1). When the choice within a food group is significant in terms of fat and fibre content, the group is divided into sub-groups. In the nutritional calculations, each food group is represented by between one and ten foodstuffs or products. Fruit, vegetables, meat, fish and eggs are mainly counted as raw produce, not as cooked dishes. The amounts are given for both Gretel and Hansel, i.e. for the two energy levels. These should not be regarded as portion sizes or as absolute daily intakes. The amount that is consumed in practice can vary from meal to meal and from day to day.

There is usually a difference between the amounts of food for Gretel and Hansel, based on the factor 1.25. However, in some cases the amounts are the same. This applies for example for liver paté, where it is unnecessary to have a larger amount for Hansel, since the iron recommendation is lower for him than for Gretel. High-energy foods containing saturated fats do not increase very much either. Another reason for the amount of a food group not increasing by the factor is that the portions would then have become unrealistically large.

In relative terms, the differences between Gretel and Hansel were small. This is shown in Table 2, where the amounts in the food list are expressed as grams per 10 MJ.

The list also includes foods belonging to the so-called *leeway*, i.e. occasional treats (see p. 29). These foods are included in the nutrition calculations but are not a prerequisite for SNO achieving the recommendations for vitamins and minerals. However, they contribute to the energy distribution due to their high content of sugar and their low content of protein.

**Table 1. Food list. Amounts of food (raw produce) per day and per week for a woman (Gretel) and a man (Hansel) with low physical activity**

	Gretel, 9.1 MJ		Hansel 11.5 MJ	
	g/day	g/week	g/day	g/week
<b>Fruit and vegetables, total</b>	550	3850	673	4711
Vegetables	250	1750	309	2163
Lettuce, tomato, pepper, onion etc.	125	875	180	1260
Carrot, broccoli, white cabbage etc.	125	875	130	910
Fruits and berries	214	1498	250	1750
Fruit juice	86	602	114	798
<b>Pulses, dried</b>	10	70	13	91
<b>Bread, total</b>	165	1155	205	1435
White bread, refined rye	90	630	109	763
Wholemeal bread, crispbread	75	525	96	672
<b>Breakfast cereals, porridge</b>	29	203	43	301
<b>Flour</b>	7	49	9	63
<b>Potatoes</b>	175	1225	210	1470
<b>Rice, couscous</b>	18	126	25	175
<b>Pasta</b>	36	252	43	301
<b>Meat and poultry</b>	95	665	120	840
Lean types	41	287	51	357
Fatty types	54	378	69	483
<b>Sausage</b>	14	98	18	126
<b>Liver paté</b>	15	105	15	105
<b>Blood-based foods</b>	5	35	8	56
<b>Fish and seafood</b>	45	315	64	448
<b>Eggs</b>	21	147	26	182
<b>Milk and yoghurt</b>	320	2240	375	2625
Fat 0.5%	190	1330	210	1470
Fat 1.5%	118	826	148	1036
Fat 3%	13	91	17	119
<b>Cheese</b>	20	140	22	154
Fat ≤ 17%	14	98	15	105
<b>Cottage cheese, whey cheese</b>	5	35	5	35
<b>Cream</b>	13	91	17	119
<b>Total fat (margarine, oil)</b>	38	266	47	329
Margarine spread on bread	19	133	25	175

**Table 2. Amounts of food in grams per 10 MJ for a woman (Gretel) and a man (Hansel) with low physical activity**

	<b>Gretel</b>	<b>Hansel</b>
	<b>g/10 MJ</b>	<b>g/10 MJ</b>
<b>Fruit and vegetables, total</b>	605	585
Vegetables	275	268
Fruits and berries	235	217
Fruit juice	94	99
<b>Pulses, dried</b>	11	11
<b>Bread, total</b>	181	178
White bread, refined rye	99	94
Wholemeal bread, crispbread	82	84
<b>Breakfast cereals, porridge</b>	31	37
<b>Flour</b>	8	7
<b>Potatoes</b>	192	183
<b>Rice, couscous</b>	20	22
<b>Pasta</b>	39	37
<b>Meat and poultry</b>	104	104
Lean types	45	45
Fatty types	60	60
<b>Sausage</b>	16	16
<b>Liver paté</b>	16	13
<b>Blood-based foods</b>	6	7
<b>Fish and seafood</b>	49	56
<b>Eggs</b>	24	22
<b>Milk and yoghurt</b>	352	326
Fat 0.5%	209	183
Fat 1.5%	130	129
Fat 3%	14	15
<b>Cheese</b>	22	22
Fat ≤ 17%	15	15
<b>Cottage cheese, whey cheese</b>	5	4
<b>Cream</b>	14	15
<b>Total fat (margarine, oil)</b>	41	41
Margarine spread on bread	20	22

## **Nutrient content of the food list**

The calculated nutritional values in the food list in general fulfil Swedish Nutrition Recommendations, SNR (1996). The lower energy level (Gretel) is comparable to SNR for women and the higher (Hansel) to SNR for men. The results are considered satisfactory, although some minor deviations occur. In SNR, alcohol is not included in the energy-% recommendation. In SNO, the energy distribution is the same regardless of whether alcohol is included.

Nutrient density, i.e. the amounts of different nutrients given by the list per MJ and day, are the same for Gretel and Hansel.

Tables 4, 5 and 6 show the percentage contribution of each food group to the content of different nutrients. These values are shown only for Gretel, but the food groups contribute in the same range of magnitude for Hansel.

### **Protein and iron**

The Swedish diet contains many sources of protein, which have to be included if SNO is to be realistic. According to SNR, protein must represent between 10 and 15 % of energy intake. The protein level in SNO makes up 16 energy-%, which was considered to be acceptable. Protein intake between 15 and 20 energy-% is not believed to be damaging, but on the other hand it does not confer any obvious benefits (Nordiska näringsrekommendationer, 1996).

The deciding factor for the high protein level is the recommended iron intake for women of childbearing age in combination with low energy level. Meat is an important source of iron, since a quarter of the iron in SNO comes from meat and cured meat products. The amount of protein that consequently accompanies the iron means that the scope for other protein sources such as milk and bread is reduced.

Since the idea was that Gretel and Hansel should be able to eat the same menus, Hansel's contains more iron than is necessary to meet the iron recommendation for men. This also demonstrates that it is easier to achieve a higher iron intake at a higher energy requirement.

### **Fat**

According to SNR, the total fat content of the diet should not provide more than around 30 % of energy. Fat quality is strongly emphasised, which places great demands on diet planning. Saturated fat should be restricted to at most 10 energy-% and the content of polyunsaturated fat should lie between 5 and 10 energy-%. Furthermore, of the polyunsaturated fats, the equivalent of 1 energy-% should be n-3 fatty acids.

Keeping the amount of saturated fat low without the total amount of fat also becoming too low is difficult with Swedish dietary habits. SNO shows that choice

**Table 3. Nutrient content in the food list compared with Swedish Nutrition Recommendations (SNR). Average intake per day for women and men with low physical activity in the age range 19–60 years**

<b>Energy source</b>	<b>SNR ♀</b>	<b>Gretel</b>	<b>SNR ♂</b>	<b>Hansel</b>
Energy, MJ	9.1	9.1	11.5	11.5
Protein, g	–	86	–	107
Protein, E%	10-15	16	10-15	16
Fat, g	–	69	–	87
Fat, E%	≤ 30	28	≤ 30	28
Saturated fatty acids, E%	≤ 10	10	≤ 10	10
Monounsaturated fatty acids, E%	10-15	11	10-15	12
Polyunsaturated fatty acids, E%	5-10	5	5-10	5
n-3 fatty acids, E%	1	1.3	1	1.3
n-6 fatty acids, E%	–	3,6	–	3.6
Carbohydrates, g	–	293	–	369
Carbohydrates, E%	55-60	55	55-65	55
Saccharose, E%	< 10	7	< 10	7
Dietary fibre, g	25-35	28	25-35	34
Alcohol, g	–	4	–	8
Alcohol, E%	< 5	1	< 5	2
<b>Vitamins</b>				
Retinol, µg	–	1150	–	1330
β-carotene, µg	–	2600	–	2810
Vitamin A, RE	800	1620	900	1820
Vitamin D, µg	5	7	5	9
Vitamin E (α-tocopherol), mg	8	11	10	13
Vitamin C, mg	60	155	60	191
Thiamin, mg	1.1	1.7	1.4	2.2
Riboflavin, mg	1.3	2.0	1.6	2.5
Niacin, NE	15	37	19	47
Vitamin B <sub>6</sub> , mg	1.2	2.4	1.5	3.1
Vitamin B <sub>12</sub> , µg	2.0	5.9	2.0	7.4
Folate, µg	300	370	300	460
<b>Minerals</b>				
Calcium, mg	800	910	800	1140
Phosphorus, mg	600	1490	600	1910
Sodium, mg	2000	2000	2000	2510
Potassium, mg	3100	3900	3500	4800
Magnesium, mg	280	360	350	460
Iron, mg	15 (12-18)	14	10	17
Zinc, mg	7	12	9	15
Selenium, µg	40	43	50	55

of spread is critical for whether the recommendation is fulfilled or not. Soft margarine blends, preferably low-fat margarine, and oil or liquid margarine are needed to offset the saturated fats that originate from milk, cheese, meat and cured meat products. Excluding visible fat by not using margarine on bread is therefore not good advice! It is better to reduce the amount of hidden fat, for example by choosing Keyhole-labelled dairy and meat products.

## **Carbohydrate**

Carbohydrates contribute 55 % of energy in SNO. The largest sources of carbohydrate are bread, potatoes/rice/pasta and fruit and vegetables. SNO shows that there is scope for a small amount of added sugar. According to SNR, the proportion of pure refined sugar types should not make up more than 10 energy-%. In SNO, saccharose provides 7 energy-%, which is however not entirely made up of refined sugar types. Around 30 % of the saccharose is made up of natural sugars from fruit and vegetables. The leeway contributes 56 % of all saccharose. A proportion of added sugar is hydrolysed in foodstuffs, e.g. in jam, sugary drinks and sweets. When the hydrolysed sugar in e.g. squash and jam is included, the estimated level of added sugar in SNO is around 5 energy-%.

## **Dietary fibre**

The fibre content in SNO is the recommended 3 g/MJ, or 28 g for Gretel and 34 g for Hansel. Approximately half the fibre comes from bread (33 %) and other cereal products (17 %). Fruit and vegetables contribute around a third. Of the other fibre sources, dried pulses (i.e. beans and peas) are the largest single source, contributing 5 % (Table 4).

To meet the fibre recommendation, it is not sufficient to simply eat white bread and salad. A certain proportion of the bread must be wholemeal and a certain proportion of the vegetables must be high-fibre. See the sections on Bread and Breakfast Cereals and Fruit and Vegetables below.

## **Vitamin A**

The total amount of vitamin A is double the recommended level, which is 800 retinol equivalents (RE) for women and 900 for men (Table 3). Preformed vitamin A (retinol) can have toxic effects and SNR also include an upper limit for retinol intake. This is 7500 microgram ( $\mu\text{g}$ ) for adults and 3000  $\mu\text{g}$  for pregnant women. The amount of retinol in SNO, 1150  $\mu\text{g}$  and 1330  $\mu\text{g}$ , is nowhere close to these limits.

## **B-vitamins**

SNO meets the nutrition recommendations for thiamin, riboflavin, niacin, B<sub>6</sub> and B<sub>12</sub> with a clear margin. Bread is an important source, partly due to enrichment of white

flour. Enrichment of flour with these vitamins is now a declining practice, but SNO fulfils the recommendations even if all the bread is baked from unenriched flour.

## **Folate**

Recommended daily intake of folate is 300 µg for both women and men. Women of childbearing age who are planning pregnancy are recommended to increase their intake to 400 µg. For SNO, the general recommendation of 300 µg is used.

SNO gives Gretel 375 µg and Hansel 460 µg folate per day. In other words, it is easier to achieve 400 µg folate at a higher energy intake.

A value of 400 µg can also be achieved by choosing fruit and vegetables that are particularly rich in folate, without this necessarily increasing the total amount of fruit and vegetables.

## **Sodium**

Intake of salt (NaCl) should be limited to 5 g per day. This is equivalent to approx. 2 g sodium. In the food list, salt is not included as a separate foodstuff. Despite this, Gretel reaches the upper limit for salt and Hansel exceeds it. This is due to the relatively high content of salt in processed products, e.g. bread, cheese and processed meats.

# **Food groups in the list**

## **Fruit and vegetables**

Fruit is calculated on average as a mixture of 12 types of common fruit and berries. Juice is also included in the fruit and vegetables group. Juice contains considerably less fibre than fruit and therefore fruit cannot be replaced by juice. At most 100 g (100 ml) of juice per day can be included in the total amount of fruit and vegetables.

Vegetables are divided into two groups. One group provides more fibre, > 2 g/100 g, and includes e.g. broccoli, white cabbage, beans, peas, spinach, carrots and other root vegetables. The other group contains vegetable with a fibre content < 2 g/100 g, e.g. lettuce, tomatoes (incl. crushed), cucumber, pepper, onion and mushrooms. The fibre content in these two groups is on average 3 g/100 g and 1.5 g/100 g respectively. Around half the vegetables come from the group that contains > 2 percent fibre.

The National Food Administration has previously recommended ½ kg of fruit and vegetables per day. This recommendation is based on the minimum amount at which positive effects on cardiovascular disease and obesity have been observed in epidemiological studies. SNO shows that in practice, larger amounts are needed for a balanced diet. Other carbohydrate-rich foodstuffs, e.g. bread and pasta, also

contribute some protein, which means that cereal products cannot directly replace fruit and vegetables if the recommended energy balance in SNR is to be observed.

For Gretel, the total amount of fruit and vegetables (including juice) is just over ½ kg per day. For Hansel with his higher energy requirement, the amount of fruit and vegetables is considerably larger, closer to 700 g. In the Swedish Dietary Survey (1997-98), only 15 % of women and 5 % of men achieved these levels. According to the Swedish Dietary Survey, average consumption was around half the amount given in SNO.

**Fruit and juice. Portion sizes and frequencies:**

Fruit	2-3 pieces per day (100g/piece)
Juice	3-4 glasses (200 ml) per week

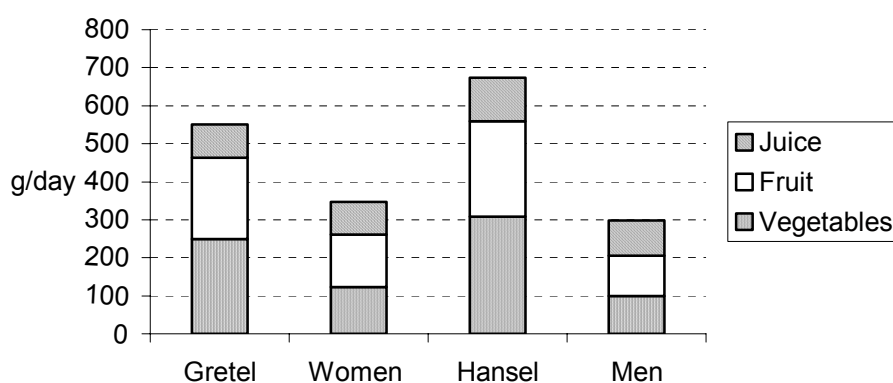
**Vegetables. Amounts per day:**

	<b>Gretel</b>	<b>Hansel</b>
Lettuce, tomato, pepper, onion, etc.	125 g	180 g
Carrot, broccoli, white cabbage, etc.	125 g	130 g

---

2-3 portions

**Figure 1. Average intake (grams per day ) of vegetables, fruit and juice. Swedish Dietary Survey women and men compared with Gretel and Hansel**



## Dried pulses

The SNO calculation does not include dried pulses, i.e. beans and peas, in the vegetable group. Pulses can naturally be included in salads, but they can also be an alternative or complement to meat in a main course. Nutritionally, pulses contribute fibre, iron and carbohydrates (Table 4). They also contribute protein, but insignificant amounts of fat. In SNO, dried pulses provide 4 % of the total iron intake (Table 6).

The amount of pulses is equivalent to a tablespoonful (15 ml) of dried or 50 ml cooked peas/beans per day. The results of the Swedish Dietary Survey (Riksmaten 1997-98) show that Swedes eat considerably smaller amounts, women 8 g/day and men 11 g/day of cooked pulses (e.g. pea soup incl. stock). In SNO, the corresponding amounts are 28 and 31 g/day respectively, i.e. three times as much.

### Dried pulses. Examples of portion sizes for dried and cooked quantities:

	<b>Gretel</b>	<b>Hansel</b>
Peas for soup	60 g = 250 ml soup	75 g = 300 ml soup
Lentils for soup	40 g = 250 ml soup	50 g = 300 ml soup
Salads	10 g = 2 Tbsp cooked	15 g = 3 Tbsp cooked
<hr/>		
Total per week	70 g	90 g

## Bread and breakfast cereals

Two groups of bread are used in the calculations. The fibre-rich group consists of bread with a fibre content of 6 g/100 g and above, e.g. crispbread and wholemeal rye bread. The average fibre content in the fibre-rich bread group is 8 g/100 g. The group with a lower fibre content, less than 6 g/100 g, includes e.g. white bread and refined rye bread. The average fibre content of this group is 3 g/100 g.

Assuming that one slice of bread weighs 25 g, the amount in SNO corresponds to 6 slices per day for Gretel and 8 slices for Hansel. This means that the Swedish Bread Institute campaign 'Six to eight slices of bread a day' in the mid-1970s, a message supported by the National Board of Health and Welfare, still holds true. (Konsumtverket och Socialstyrelsen, 1976; Brödinstitutet, 1987).

Around half the bread must be wholemeal/Keyhole-labelled if the fibre recommendation is to be fulfilled. Bread, particularly wholemeal, also provides a considerable amount of iron (Table 6). This amount of bread is almost double the daily consumption in Sweden (Figure 2). The amount is so large that bread must be included in most meals.

SNO also includes breakfast cereal or porridge five times per week. The breakfast cereal can be replaced by wholemeal bread.

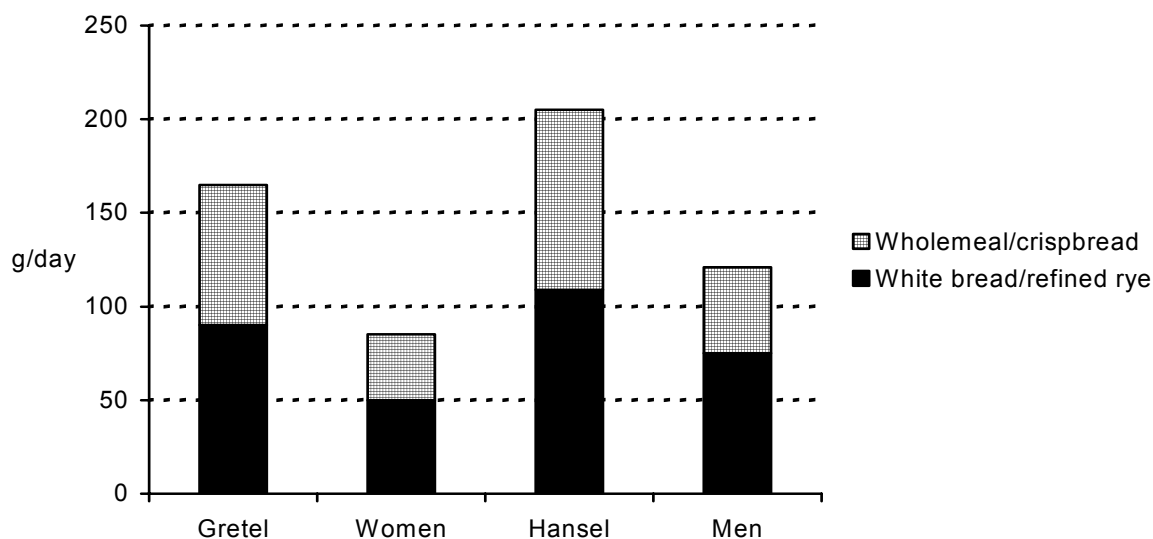
**Bread. Number of slices per week:**

	<b>Gretel</b>	<b>Hansel</b>
White bread @ 25 g	21	22
Refined rye bread @ 30 g	3.5	7
Rye bread @ 30 g	14	18
Crispbread @ 15 g	7	9
	6 slices/day	8 slices/day

**Breakfast cereal. Number of portions per week:**

Cereal/porridge                      5 portions @ 40 g      5 portions @ 60 g

**Figure 2. Average bread intake. Swedish Dietary survey women and men compared with Gretel and Hansel**



## Potatoes, rice and pasta

Potatoes, rice or pasta are included in almost all lunches and dinners. We chose to allow potatoes to occur more often than rice or pasta because potatoes are still the most common staple food. In the Swedish Dietary survey (Riksmaten, 1997-98), potatoes occur on average five times per week, rice twice and pasta twice.

In principle, potatoes, rice and pasta are interchangeable with respect to nutrient content. However, potatoes and rice provide less energy per portion than pasta.

### Potatoes, rice, pasta. Frequencies (per week) and portion sizes:

	<b>Gretel</b>	<b>Hansel</b>
Potatoes, 7 times	175 g	210 g
Rice, 2.25 times	50 g	70 g
Couscous, 0.25 times	50 g	65 g
Pasta, 2.5 times	100 g	120 g

---

Total 12 times per week

**Table 4. Percentage contribution from different food groups to Gretel's intake of energy, energy-providing nutrients and fibre**

	Energy	Protein	Fat	Carbo- hydrate	Satu- rated fat	Polyunsatu- -rated fat	Fibre
<b>Fruit and vegetables, total</b>	10	7	1	16	1	4	36
Vegetables	3	5	1	3	0	2	18
Fruits and berries	6	1	1	10	1	1	18
Fruit juice	2	1	0	3	0	0	0
<b>Dried pulses</b>	1	3	0	2	0	1	5
<b>Bread, total</b>	19	16	6	28	2	12	33
White bread, refined rye	11	9	3	15	1	6	11
Wholemeal/crispbread	9	7	3	13	1	6	22
<b>Breakfast cereal, porridge</b>	5	4	2	7	1	4	8
<b>Flour</b>	1	1	0	2	0	0	1
<b>Potatoes</b>	6	4	0	10	0	1	9
<b>Rice, couscous</b>	3	2	0	5	0	0	1
<b>Pasta</b>	6	5	1	9	0	1	4
<b>Meat and poultry</b>	8	21	15	0	19	8	0
<b>Sausage</b>	1	2	4	0	4	2	0
<b>Liver paté</b>	1	2	2	0	2	2	0
<b>Blood-based food</b>	1	1	1	0	1	0	0
<b>Fish and seafood</b>	2	8	2	0	2	4	0
<b>Eggs</b>	1	3	3	0	3	2	0
<b>Milk and yoghurt</b>	6	13	5	5	9	1	0
<b>Cheese</b>	3	6	6	0	12	1	0
<b>Cottage/whey cheese</b>	0	0	0	0	0	0	0
<b>Cream</b>	1	0	3	0	5	0	0
<b>Total fat (margarine, oil)</b>	11	0	39	0	25	52	0
<b>Leeway</b>	13	3	9	16	14	4	3

**Table 5. Percentage contribution from different food groups to Gretel's intake of vitamins**

	Retinol	Vit D	Vit E	Vit C	Thia- mine	Ribo- flavin	Niacin	Vit B <sub>6</sub>	Vit B <sub>12</sub>	Folate
<b>Fruit and vegetables, tot.</b>	0	0	19	85	15	15	10	28	0	46
Vegetables	0	0	9	41	9	10	7	12	0	36
Fruits and berries	0	0	9	24	4	4	2	12	0	7
Fruit juice	0	0	1	19	3	1	1	3	0	3
<b>Dried pulses</b>	0	0	0	0	4	1	2	1	0	7
<b>Bread, total</b>	2	3	9	0	22	10	18	16	0	15
White bread, refined rye	1	2	4	0	13	6	11	10	0	7
Wholemeal/crispbread	1	1	5	0	8	4	7	6	0	8
<b>Breakfast cereal, porridge</b>	0	0	2	0	11	7	5	2	0	3
<b>Flour</b>	0	0	0	0	2	1	1	1	0	0
<b>Potatoes</b>	0	0	0	12	7	4	10	14	0	9
<b>Rice, couscous</b>	0	0	0	0	1	0	2	2	0	1
<b>Pasta</b>	0	0	2	0	2	1	4	1	0	1
<b>Meat and poultry</b>	1	9	5	0	18	11	22	18	18	2
Sausage	0	0	0	0	1	1	1	1	3	0
Liver paté	43	1	1	0	1	7	3	1	18	1
<b>Blood-based foods</b>	0	0	0	0	0	0	0	0	0	0
<b>Fish and seafood</b>	1	7	7	0	2	2	7	6	25	1
<b>Eggs</b>	4	4	4	0	1	5	2	1	5	3
<b>Milk and yoghurt</b>	12	16	1	2	7	23	7	5	21	6
Cheese	3	0	1	0	0	3	3	0	5	2
Cottage/whey cheese	0	0	0	0	0	2	0	0	0	0
Cream	1	0	0	0	0	1	0	0	1	0
<b>Total fat (margarine, oil)</b>	29	39	45	0	0	0	0	0	1	0
<b>Leeway</b>	3	3	3	0	3	4	3	2	2	1

**Table 6. Percentage contribution from different food groups to Gretel's intake of minerals**

	Cal- cium	Phos- phorus	Sodium	Potass- ium	Magnes- -ium	Iron	Zinc	Selen- ium
<b>Fruit and vegetables, total</b>	14	10	4	30	23	16	8	5
Vegetables	10	7	4	16	13	10	7	4
Fruits and berries	3	2	0	10	8	4	2	1
Fruit juice	1	1	0	4	3	3	0	0
<b>Dried pulses</b>	1	3	0	3	4	4	3	0
<b>Bread, total</b>	6	16	30	9	17	17	15	4
White bread, refined rye	3	7	19	3	4	6	6	2
Wholemeal/crispbread	3	9	11	6	13	12	9	2
<b>Breakfast cereal, porridge</b>	1	6	4	2	7	10	5	1
<b>Flour</b>	0	1	0	0	0	1	0	0
<b>Potatoes</b>	1	4	0	21	12	6	6	0
<b>Rice, couscous</b>	0	2	0	1	2	2	2	1
<b>Pasta</b>	1	4	0	2	5	3	3	1
<b>Meat and poultry</b>	1	11	17	7	6	12	28	19
Sausage	0	1	6	1	0	1	2	1
Liver paté	0	2	4	1	1	6	4	7
<b>Blood-based foods</b>	0	0	1	0	0	7	1	0
<b>Fish and seafood</b>	2	6	6	3	3	2	2	27
<b>Eggs</b>	1	3	1	1	1	3	1	12
<b>Milk and yoghurt</b>	41	20	7	14	11	1	12	13
Cheese	17	7	4	1	2	0	5	5
Cottage/whey cheese	1	1	1	1	0	1	0	0
Cream	2	1	0	0	0	0	0	1
<b>Total fat (margarine, oil)</b>	0	0	9	0	0	0	0	0
<b>Leeway</b>	10	5	4	4	5	7	2	2

## Meat and cured meat products

Meat (including all luncheon meats except sausage and liver pat ) are divided into two groups – lean meats and fatty meats. The fatty group has an average fat content of 15 % and the lean 5 %. The lean meat group includes all meats with a fat content of 10 % or less. Around half the meat comes from the lean group in order to ensure that the recommendations regarding saturated fat and total fat are not exceeded. In total, meat and cured meat products contribute one quarter of the saturated fat and an equal proportion of the protein.

SNO includes six to seven portions of meat per week, including sandwich meats. The average portion size is 95 g for Gretel and 120 g for Hansel. In the Swedish Dietary Survey (Riksmaten, 1997-98), meat or poultry occurred every day and the average amounts consumed were 97 g/day for women and 129 g/day for men. These amounts refer to cooked meat and include complete dishes and are thus not directly comparable with the amounts of raw products given in SNO.

Sausage is included once a week. It is Keyhole-labelled (max 15 % fat) to keep the saturated fat low. In the Swedish Dietary Survey (Riksmaten, 1997-98), both women and men consumed double the amount of sausage included in SNO.

To meet the high iron recommendation for women, black pudding is included once a month and liver pat  every day. Reindeer or other game meat also contains high amounts of iron and is therefore included once a month. Another way to increase iron intake is to allow liver or black pudding to replace one portion of meat a week, in which case liver pat  is not needed.

### Meat, poultry and cured meat products. Frequencies and portion sizes:

	Gretel		Hansel	
Lean types, fat < 10%	3 times/week	95 g	3 times/week	120 g
Fatty types	4 times/week	95 g	4 times/week	120 g
Sausage	1 times/week	100 g	1 times/week	125 g
Black pudding	1 time/month	150 g	1 time/month	225 g
Liver pat�	7 times/week	15 g		

## Fish, seafood and eggs

Fish is a mixture of half lean fish and half oily fish and seafood. Fish is included twice to three times per week, including that in sandwiches. In the Swedish Dietary Survey (Riksmaten, 1997-98), consumption of fish and seafood, including dishes such as fish au gratin, was on average 35 g/day, which is nearly half that of Hansel in SNO.

Fish contributes considerable proportions of selenium, vitamin D, vitamin B<sub>12</sub> and iodine. One quarter of the selenium comes from fish. Since Swedish soils are selenium-deficient, fish is an important source. Fish is also clearly the largest

source of long-chain fatty acids with 20 or 22 carbon atoms and 5 or 6 double bonds.

Three eggs are included per week. Eggs contribute around 20 % of the selenium intake (Table 6) and also provide vitamin D.

**Fish, seafood and eggs. Frequencies and portion sizes:**

	<b>Gretel</b>	<b>Hansel</b>
Fish and seafood	2.5 times/week 125 g	3 times/week 150 g
Eggs	3 per week	3 per week

**Milk, cheese and other dairy products**

The recommendation from the National Food Administration (Expertgruppen för kost och hälsofrågor, 1990) is that ½ litre milk per day is sufficient still holds true. If one assumes that 10–15 g of cheese are equivalent to 100 ml of milk, the total amount of milk for Hansel is over 500 ml per day. A precondition is that low-fat milk and cheese (17 % fat or less) are chosen on most occasions.

If the total amount of dairy products is less than the equivalent of 400 ml milk, the amount of calcium becomes too low.

**Milk and yoghurt. Portion sizes:**

	<b>Gretel</b>	<b>Hansel</b>
With tea/coffee	40 ml	40 ml
Warm with coffee	150 ml	150 ml
Milk as drink	200 ml	200 ml
Milk with porridge/cereal	200 ml	250 ml
Yoghurt	200 ml	250 ml
<b>Milk and yoghurt total</b>	<b>11 glasses/week</b>	<b>13 glasses/week</b>

The amount of cheese, around 20 g/day, is the maximum possible and is the equivalent of a cheese sandwich every day. Larger amounts of cheese affect the energy distribution, particularly with regard to protein and saturated fat, and mean that other foodstuffs such as meat have to be limited. The amount of cheese is maximised in order to minimise the difference with current consumption (Riksmaten, 1997-98), 28 g/day for women and 31 g/day for men. Apart from the total amount being slightly lower in SNO, the greatest difference from current consumption is the lower fat content. A very small proportion of the cheese consumed today is Keyhole-labelled. The amount of cheese also includes a small amount of soft cheese.

The cream included in the food list is cooking cream (15 % fat) and equivalent products with a low fat content. Whipping cream is only included in cakes and in other words forms part of the leeway (see p. 28). Cooking cream can of course be exchanged for half whipping cream, half milk.

## Margarine and oil

Margarine and oil for spreading, cooking and salad dressing contribute around 38 % of fat for both Gretel and Hansel. Around 40 % of margarine and oil is intended for spreading and the rest for cooking and salad dressing. One slice of bread is assumed to use 5 g. If a spread with 60 % fat is chosen, it means that Gretel is allowed 3-4 slices with spread per day and Hansel five. This means in principle one slice of bread without spread or other topping every day, e.g. eaten with food. Sandwiches with a spreadable filling such as liver paté or whey cheese are assumed to not include margarine.

Spread fat can be varied in a number of ways as regards type of product. The important factor is to keep the total amount of fat originating from spread constant and to choose a margarine that includes a high content of unsaturated fatty acids. There is therefore no place for butter on bread. Some variations for Gretel are shown in Table 7.

Fat for cooking is mainly liquid margarine or oil. Solid margarine is only used for baking. It is difficult to make room for butter due to its high content of saturated fat, but it can replace the solid cooking margarine.

### Margarine and oil per week:

	<b>Gretel</b>	<b>Hansel</b>
Liquid margarine	7 x 8 g	7 x 9.5 g
Oil	10 x 5 g	10 x 6 g
Cooking margarine, fat 80%	3 x 8 g	3 x 10 g
Margarine spread, fat 80%	11 x 5 g	15 x 5 g
Low-fat margarine, fat 40%	15 x 5 g	20 x 5 g

**Table 7. Number of slices of bread per week with and without spread and with only filling, e.g. liver paté. Five alternatives for Gretel**

<b>Margarine spread*</b>	Alt. 1	Alt. 2	Alt 3	Alt.4	Alt.5
Fat 30%	0	0	0	0	47
Fat 40%	15	37	0	0	0
Fat 60%	0	0	26	0	0
Fat 80% (not butter)	11	0	0	19	0
Without spread	15	4	15	22	0
Only topping	8	8	8	8	2
<b>Total number of slices</b>	<b>49</b>	<b>49</b>	<b>49</b>	<b>49</b>	<b>49</b>

\*Portion size 5 g.

## The leeway

One of the starting points of SNO was that the food list should also include nutritionally less desirable foods. It is an important principle that there should be scope for all kinds of foods, even those normally considered unhealthy. In SNO (and in previous Swedish health targets), such foods are referred to as the *leeway*. We have included items such as savoury snacks, pastries, cakes, ice cream, jam, fizzy drinks, sweets and alcoholic drinks in the leeway. In SNO, the leeway contributes around 13 % of energy for Gretel and 14 % for Hansel.

The leeway contributes 9 % of fat and 14 % of saturated fat. However, the leeway may not simply be filled without restriction. The main deciding factor is the content of alcohol, sugar and saturated fat, which to a large extent affects the energy distribution. This means that within the framework of the scope, sweet foods should be chosen in preference to fatty foods.

The foods included in the leeway may of course be replaced with other foods, e.g. cheese instead of chocolate, juice instead of fizzy drinks, but the fact remains that the leeway food affects the energy distribution, so the choices made must still be in favour of carbohydrate-rich foodstuffs.

Table 8 shows options for the leeway, with examples taken from both the list and the menus. They differ slightly, but also show that the majority are sweet foods. Alcoholic drinks are also included in the leeway and are converted to pure alcohol in the table to make the amounts comparable. Alcohol contributes 1–2 % of the total energy.

**Table 8. Composition of the leeway for the list and the menus (grams/week)**

	Gretel		Hansel	
	List	Menus	List	Menus
Savoury snacks	7	10	7	11
Buns, pastries, cakes	95	120	150	134
Ice cream	50	31	50	31
Desserts	70	78	88	90
Sweets	123	98	140	160
Jam	165	138	195	179
Fizzy drinks	231	248	231	330
Sugar	15	16	20	20
Alcohol	4	6	8	7

# Menus for four weeks

The menus presented in this report (pp. 34-41) provide examples of how the food list can be used for planning. They show that the list is realistic and that the amounts of the different foodstuffs can be combined to provide a varied and 'normal' diet that meets SNR. In other words, the menus confirm that it is possible to eat according to SNR without the diet becoming extreme. Each day follows the recommended meal pattern with breakfast, lunch and dinner, plus 2-3 snacks. The energy intake is distributed across the different meals according to SNR (Table 9). However, on certain weekends lunch consists of a simple breakfast-type meal, i.e. open sandwiches and yoghurt or equivalent. Gretel and Hansel eat the same menus. The menus are based in principle on the portion sizes and frequencies reported on pp.18-28.

The menus must be considered together. Each day is not self-sufficient, i.e. each individual day does not meet the nutrition recommendations. This is particularly apparent for calcium, iron, selenium and thiamine. In certain regards, each week is not self-sufficient either. For example, black pudding only occurs once a month, but contributes towards increasing the average iron intake for the four-week period.

The plate model (Lindvall, 1992) recommends that each meal contain some fruit. This is not always the case in the menus. This is one example of how each meal is not self-sufficient. It also illustrates that there is a difference between composing an individual meal in a good way and what is necessary in practice for a four-week period to be nutritionally sound. In actual life, it is not realistic to demand that individual meals always be self-sufficient. The menus also show that this is not necessary.

The amounts stated in the food list are the average amounts for a day and for a week. The portion sizes used in calculating the list are not always adapted for all types of dish. For example, a portion of potatoes varies depending on whether it is boiled, fried, baked or mashed. This means that the average amount in the menu does not correspond exactly with the list. Portion sizes in the menus are adjusted to the dish chosen.

The differences between the list and the menus (Table 10) show that the list is an instrument for planning, a guide for different food groups, and not an absolute recommendation.

A large proportion of the milk in the menus is taken with tea/coffee. The amount of milk is either 40 ml in tea/coffee or 150 ml warm skimmed milk in latte. When the menus state *margarine*, this refers to spreads with 80 % fat, while when they say *low-fat margarine*, this means with 40 % fat.

The menus for Gretel contain a larger proportion of vegetables with a low fibre content (< 2 g/100 g) than stated in the list. This is because the vegetables in the menus are more fibre-rich on average than those on the list.

The menus fulfil SNR in the same way as the food list (Table 11). However, the proportion of carbohydrates is slightly lower and the proportion of fat slightly higher. The quantities used in preparing dishes were those normally given in cookbooks, which resulted in a total salt content of 7–10 g/day. This is clearly in excess of the recommendation, which is 5 g/day.

**Table 9. Percentage distribution of energy across different types of meals in the menus. Averages per week and per four-week period**

<b>Gretel</b>	Breakfast	Snack 1	Lunch	Snack 2	Dinner	Snack 3
Week 1	22	6	30	6	32	4
Week 2	24	9	27	8	32	0
Week 3	24	6	24	10	33	3
Week 4	19	5	30	8	28	10
Weeks 1-4	23	6	28	8	31	4

<b>Hansel</b>	Breakfast	Snack 1	Lunch	Snack 2	Dinner	Snack 3
Week 1	26	5	28	7	30	5
Week 2	25	8	26	7	31	3
Week 3	24	6	24	8	33	6
Week 4	19	5	31	6	30	9
Weeks 1-4	23	6	27	7	31	6

## Breakfast

The four weeks have different typical breakfasts. The cornerstones of breakfast are milk and cereals. The first week has a porridge breakfast, the second yoghurt and müsli, the third yoghurt and cornflakes and the fourth milk and sandwiches. The breakfasts are low-fat and carbohydrate-rich.

Breakfast must provide 20–25 energy-%. In the menus, the weekly average ranges between 19 energy-% (milk & sandwich breakfast) and 26 energy-% (porridge breakfast) (Table 9). If porridge and milk is chosen for breakfast, Gretel should supplement this with one open sandwich and Hansel with two. Breakfast based on yoghurt and corn-flakes becomes complete for both with two open sandwiches and reaches the energy level recommended for breakfast. If neither cornflakes nor porridge are included in breakfast, Gretel must eat three open sandwiches and Hansel four. The breakfasts also often include juice, fruit and a little vegetable garnish on the sandwiches.

## Snacks

Two to three snacks per day together contribute almost 20 % of daily energy intake. These snacks are simple and consist of fruit and/or a sandwich, usually bread with only margarine, and some milk. Sometimes cinnamon rolls or sweets occur. Hansel's snacks consist of sandwiches more often than Gretel's, since Hansel needs to eat a larger quantity of bread. The idea of the simple snack is to show that it does not have to comprise bulky sandwiches, which are considered by many to be complicated and excessive.

## Lunch and dinner

According to SNR, lunch and dinner should each provide 25–35 % of daily energy intake. In SNO, the lunches contribute 28 energy-% on average and the dinners 31 energy-% (Table 9). Lunch and dinner contain more fat than breakfast, as well as more protein. Most lunches and dinners contain either potatoes, rice or pasta. Each week includes a lunch or dinner with dried pulses as its main ingredient.

The menus show that it is not necessary to include both boiled and raw vegetables with every meal in order to achieve the amounts stated in the food list. However, vegetables in some form must be eaten with every main meal. Around half the vegetables are 'concealed' by being included in dishes, e.g. spaghetti Bolognese, where the sauce contains crushed tomatoes, onions and carrots. Root vegetable casserole, pasta with spinach sauce and fish stew are other examples.

Bread is included in principle with all meals, usually with margarine (often low-fat), sometimes as chunks with food, i.e. without spread. The menus obey the basic principle for choice of margarine, i.e. Alternative 1 in Table 7.

Fruit is sometimes included with main meals, as whole fruit or in desserts such as fruit salad and pies.

**Table 10. Comparison of the food quantities in the food list and in the menus (grams/day)**

	Gretel		Hansel	
	List	Menus	List	Menus
<b>Fruit and vegetables, total</b>	550	553	673	659
Vegetables	250	251	309	310
Lettuce, tomato, pepper, onion, etc.	125	142	180	174
Carrot, broccoli, white cabbage, etc.	125	108	130	136
Fruit and berries	214	215	250	234
Fruit juice	86	87	114	116
<b>Dried pulses</b>	10	11	13	14
<b>Bread, total</b>	165	168	205	200
White bread, refined rye	90	94	109	108
Wholemeal/cripsbread	75	72	96	90
<b>Breakfast cereal, porridge</b>	29	27	43	41
<b>Flour</b>	7	6	9	9
<b>Potatoes</b>	175	165	210	212
<b>Rice, couscous</b>	18	16	25	23
<b>Pasta</b>	36	33	43	42
<b>Meat and poultry</b>	95	95	120	119
Lean types	41	67	51	84
Fatty types	54	29	69	36
<b>Sausage</b>	14	14	18	18
<b>Liver paté</b>	15	17	15	17
<b>Blood-based products</b>	5	5	8	8
<b>Fish and seafood</b>	45	47	64	50
<b>Eggs</b>	21	19	26	23
<b>Milk and yoghurt</b>	320	320	375	379
Fat 0.5%	190	189	210	213
Fat 1,5%	118	118	148	148
Fat 3%	13	13	17	18
<b>Cheese</b>	20	21	22	29
Fat ≤ 17%	14	13	15	19
<b>Cottage/whey cheese</b>	5	4	5	4
<b>Cream</b>	13	14	17	18
<b>Total fat (margarine and oil)</b>	38	38	47	49
Margarine spread on bread	19	19	25	25

**Table 11. Average nutrient content per day in the menus for Gretel and Hansel compared with Swedish Nutrition Recommendations (SNR)**

<b>Energy source</b>	<b>SNR ♀</b>	<b>Gretel</b>	<b>SNR ♂</b>	<b>Hansel</b>
Energy, MJ	9.1	9.1	11.5	11.5
Protein, E%	10-15	16	10-15	16
Fat, E%	≤ 30	29	≤ 30	28
Saturated fatty acids, E%	≤ 10	10	≤ 10	10
Monounsaturated fatty acids, E%	10-15	11	10-15	11
Polyunsaturated fatty acids, E%	5-10	5	5-10	5
Carbohydrates, E%	55-60	53	55-60	54
Saccharose, E%	< 10	7	< 10	7
Fibre, g	28	28	35	34
Alcohol, E%	< 5	2	< 5	2
<b>Vitamins</b>				
Retinol, µg	–	1120	–	1280
β-carotene	–	3230	–	4030
Vitamin A, RE	800	1700	900	2000
Vitamin D, µg	5	7	5	9
Vitamin E (α-tocopherol), mg	8	11	10	13
Vitamin C, mg	60	150	60	180
Thiamin, mg	1.1	1.6	1.4	2.1
Riboflavin, mg	1.3	2.1	1.6	2.6
Niacin, NE	15	37	19	46
Vitamin B <sub>6</sub> , mg	1.2	2.4	1.5	3.0
Vitamin B <sub>12</sub> , µg	2.0	7	2.0	7.9
Folate, µg	300	380	300	470
<b>Minerals</b>				
Calcium, mg	800	970	800	1160
Phosphorus, mg	600	1540	600	1890
Sodium, g	2000	3000	2000	3760
Potassium, g	3100	3800	3500	4760
Magnesium, mg	280	360	350	450
Iron, mg	15 (12-18)	14	10	18
Zinc, mg	7	12	9	15
Selenium, µg	40	44	50	53

# Menus

## Gretel Week 1

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<b>B R E A K F A S T</b>	Oat porridge with low-fat milk, jam 1 slice ryebread with liver paté Juice	Oat porridge with low-fat milk, jam 1 slice ryebread with liver paté Juice	Oat porridge with low-fat milk, jam 1 slice ryebread with liver paté Juice	Oat porridge with low-fat milk, jam 1 slice ryebread with liver paté Juice	Oat porridge with low-fat milk, jam 1 slice ryebread with liver paté Juice	Low-fat yoghurt with cornflakes + ½ grated apple 2 slices ryebread with low-fat margarine, sliced meats Juice	Caffe latte (low-fat milk) 1 slice ryebread with liver paté 2 crispbreads with low-fat margarine, sliced meats Juice
	Coffee with low-fat milk 1 crispbread with low-fat margarine Orange	Coffee with low-fat milk 1 crispbread with low-fat margarine	Coffee with low-fat milk 1 crispbread with low-fat margarine, tomato	Coffee with low-fat milk Banana 1 crispbread with low-fat margarine	Coffee with low-fat milk 1 crispbread with low-fat margarine	Apple	Coffee with low-fat milk 3 biscuits 1 cinnamon roll
<b>L U N C H</b>	Fish stew with potatoes, saffron Greek yoghurt Lettuce, tomato, cucumber, vinagrette 2 slices white bread with low-fat margarine	Pasta, tomato and pepper sauce, feta cheese, black olives Chinese cabbage, vinagrette 2 slices white bread with low-fat margarine	Sausage Stroganoff, rice, broccoli 2 slices white bread with low-fat margarine	Beef stew, boiled potatoes, pickled beet White cabbage salad with parsley, vinagrette 1 slice white bread with low-fat margarine	Omelette with potatoes, cheese and broccoli Tomato, iceberg lettuce, vinagrette 2 slices white bread with margarine	2 tacos with minced beef, beans and vegetables Rice Cider	Rösti with melted cheese Green salad, kidney beans, red onion, vinagrette 2 slices white bread
	1 slice ryebread with low-fat margarine, cucumber	Orange	Peach Chocolate 75 g	Pear	Banana	Grapes	Peach
<b>D I N N E R</b>	Pea soup with ham, mustard 1 slice ryebread with low-fat margarine Carrot 2 pancakes, jam	Pork chop, pressed potatoes, vegetable stir-fry 2 slices white bread with low-fat margarine 1 low-alcohol beer	Fishballs in white sauce, boiled potatoes, green peas 1 slice ryebread with low-fat margarine Apple	Spaghetti Bolognese, grated Parmesan cheese Tomato 1 slice white bread with low-fat margarine	Baked herrings with cooking cream and mustard, boiled potatoes Grated carrots 1 slice ryebread with low-fat margarine, cheese 17%	Smoked ham, potato salad with red onion, sugarsnap peas and vinagrette 1 slice white bread with low-fat margarine Pear 1 glass wine Crisps	Beef Burgundy Couscous Green salad, vinagrette 1 slice white bread with low-fat margarine Fruit salad with raisins, nuts
	Tea 1 slice refined ryebread with low-fat margarine, cheese 17%	Tea 1 slice refined ryebread with low-fat margarine, cheese 17%	Tea 1 slice refined ryebread with low-fat margarine, cheese 17%	Tea 1 slice refined ryebread with low-fat margarine, cheese 17%	Tea 1 slice refined ryebread with low-fat margarine, cheese 17%		

## Gretel Week 2

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<b>B R E A K F A S T</b>	Plain yoghurt 1.5%, müesli, banana 1 crispbread with liver paté 14%, cucumber 1 slice ryebread with margarine, cheese 17%	Plain yoghurt 1.5%, müesli, banana 1 crispbread with liver paté 14%, cucumber 1 slice ryebread with margarine, cheese 17%	Plain yoghurt 1.5%, müesli, banana 1 crispbread with liver paté 14%, cucumber 1 slice ryebread with margarine, cheese 17%	Plain yoghurt 1.5%, müesli, banana 1 crispbread with liver paté 14%, cucumber 1 slice ryebread with margarine, cheese 17%	Plain yoghurt 1.5%, müesli, banana 1 crispbread with liver paté 14%, cucumber 1 slice ryebread with margarine, cheese 17%	Plain yoghurt 1.5%, müesli, banana 1 slice white bread with margarine and cheese 1 slice ryebread with liver paté 14% Juice	Plain yoghurt 1.5%, müesli, banana 1 slice white bread with margarine, marmalade, cheese 1 slice ryebread with liver paté 14% Juice
	Coffee with low-fat milk and sugar 1 slice ryebread with margarine	Coffee with low-fat milk and sugar 1 slice ryebread with margarine Plums	Coffee with low-fat milk and sugar Plums Cinnamon roll	Coffee with low-fat milk and sugar 1 slice ryebread with margarine Orange	Coffee with low-fat milk and sugar 1 slice ryebread with margarine Pear	1 Coca cola Sweets	
<b>L U N C H</b>	Game casserole with cooking cream, rice White cabbage, pepper, vinagrette 2 slices white bread with low-fat margarine	Poached cod with egg and parsley sauce, boiled potatoes Carrot salad 2 slices white bread with margarine Grapes	Baked chicken drumsticks, pan-fried root vegetables, mustard Iceberg lettuce, vinagrette 2 slices white bread with low-fat margarine Low-alcohol beer	Curried eggs with peanuts, rice Leaf lettuce, carrot, pepper, lemon vinagrette 2 slices white bread with low-fat margarine	Baked salmon, cooked spinach, potato wedges Lemon wedge Tomato 2 slices white bread	1 slice ryebread with margarine, sliced meats 1 slice ryebread with processed cheese Tomato, pepper Low-fat fruit yoghurt Orange Coffee with milk	1 slice ryebread with margarine, tomato and cottage cheese 1 slice ryebread with margarine, mackerel in tomato sauce Apple
	Coffee with low-fat milk and sugar Plums	Caffe latte with sugar 1 slice refined ryebread with margarine Apple	Caffe latte with sugar 1 slice refined ryebread with margarine Orange	Coffee with low-fat milk and sugar 1 slice refined ryebread= with margarine Pear	Coffee with low-fat milk and sugar 1 slice refined ryebread with margarine Apple		Caffe latte Piece of chocolate Cinnamon roll
<b>D I N N E R</b>	Vegetarian lasagne Kidney beans, onions, vinagrette 2 slices white bread with margarine	Hamburger with bread roll, potato wedges, onions, tomato, dressing, ketchup and cheese 1 glass low-alcohol beer	Pork chop in tomato sauce, pasta Lettuce and cucumber, vinagrette 2 slices white bread	Boiled sausage, wedge of white cabbage, boiled potatoes, mustard sauce 2 slices white bread with margarine 1 glass low-alcohol beer	Indian soup with red lenses and potatoes White bread (chapati) with margarine Baked apple with flaked almonds and ice cream	Roast lamb, gravy, mashed potato, haricots verts, jelly 1 slice white bread 2 glasses red wine 1 digestive biscuit with Blå Castello 40%	Risotto with mushrooms and pepper Cold lamb Tomato sauce 2 slices white bread with margarine

### Gretel Week 3

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<b>B R E A K F A S T</b>	Plain yoghurt, cornflakes 1 slice refined ryebread with liver paté 14% 1 crispbread with margarine and cheese 17% Juice	Plain yoghurt, cornflakes 1 slice refined ryebread with liver paté 14% 1 crispbread with margarine and cheese 17% Juice	Plain yoghurt, cornflakes 1 slice refined ryebread with liver paté 14% 1 crispbread with margarine and cheese 17% Juice	Plain yoghurt, cornflakes 1 slice refined ryebread with liver paté 14% 1 crispbread with margarine and cheese 17% Juice	Plain yoghurt, cornflakes 1 slice refined ryebread with liver paté 14% 1 crispbread with margarine and cheese 17% Juice	Hot chocolate 1 slice ryebread with liver paté 14% and cucumber 1 slice white bread with margarine, cheese 17% and marmalade	Scrambled egg, tomato 2 slices white bread with margarine, cheese 17% and marmalade Coffee with low-fat milk Juice
	Coffee with low-fat milk 1 slice ryebread with margarine Kiwi	Coffee with low-fat milk 1 slice ryebread with margarine	Tea or coffee with low-fat milk Ginger cake	Coffee with low-fat milk 1 slice ryebread with margarine Pear	1 slice ryebread with margarine Fizzy drink	Apple	
<b>L U N C H</b>	Meat and horseradish sauce with carrot, leek and boiled potatoes White cabbage, vinagrette 2 slices white bread with low-fat margarine	Bean soup 2 slices white bread with cream cheese light Orange	Stew with potatoes, root vegetables and sausage, mustard 2 slices white bread with low-fat margarine Orange	Smoked pork loin with spinach in cooking cream and sambal oelek, boiled potatoes White cabbage, vinagrette 2 slices white bread with low-fat margarine	Baked pike-perch fillet, cream sauce, lemon, boiled potatoes Green beans, tomato 2 slices white bread with low-fat margarine	Kebab with yoghurt sauce and tomato 1 Coca cola	Milk 2 slices ryebread with whey cheese Pear
	1 slice ryebread with whey cheese	1 slice ryebread with whey cheese Banana	Pear Sweets (100 g)	1 slice ryebread with whey cheese Apple	Caffe latte Apple	Caffe latte	Caffe latte Cheesecake
<b>D I N N E R</b>	Pasta with Bolognese sauce Lettuce and cucumber with vinagrette 2 slices white bread with margarine	Cod with almonds, boiled potatoes, broccoli 2 crispbread with margarine	Stirfry with egg noodles, beef strips, onions, sugarsnap peas Tomato 2 slices white bread	Pan-fried root vegetables, potatoes and mushrooms Fried egg 1 crispbread with margarine Low-alcohol beer	Chicken casserole with kidney beans and tomato, rice Lettuce, tomato and cucumber with vinagrette	Sirloin steak, baked onions, bearnaise sauce, pressed potatoes, haricots verts Red wine Fruit pie and vanilla custard	Sautéed prawns with courgette, onion and pepper, tomato sauce, pasta 2 slices white bread with margarine
					2 Finn Crisp with Blå Castello 40% Grapes Wine		Sherry

=

## Gretel Week 4

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<b>B R E A K F A S T</b>	Low-fat milk 2 slices ryebread with liver paté 14% and pepper 1 slice white bread with low-fat margarine, cheese 17% and marmalade	Low-fat milk 2 slices ryebread with liver paté 14% and pepper 1 slice white bread with low-fat margarine, cheese 17% and marmalade	Low-fat milk 2 slices ryebread with liver paté 14% and pepper 1 slice white bread with low-fat margarine, cheese 17% and marmalade	Low-fat milk 2 slices ryebread with liver paté 14% and pepper 1 slice white bread with low-fat margarine, cheese 17% and marmalade	Low-fat milk 2 slices ryebread with liver paté 14% and pepper 1 slice white bread with low-fat margarine, cheese 17% and marmalade	Caffe latte 1 slice ryebread with low-fat margarine and sliced meats 2 slices white bread with low-fat margarine and marmalade Grapefruit	Caffe latte 1 slice ryebread with low-fat margarine, sliced meats 2 slices white bread with low-fat margarine, marmalade Juice
	Tea 1 slice refined ryebread with margarine Apple	Tea Apple	Tea Kiwi	Tea Banana	Tea Apple	Tea 1 slice ryebread with low-fat margarine	Tea Cinnamon roll
<b>L U N C H</b>	Macaroni in white sauce, fried sausage, mustard, ketchup Carrot, white cabbage with vinagrette 1 slice white bread with low-fat margarine	Beef Stroganoff, rice and broccoli Mixed salad with vinagrette 2 slices white bread with low-fat margarine	Salmon pudding, dill sauce Lettuce, cucumber, red onion with vinagrette 2 slices white bread	Vegetable soup 2 slices ryebread with low-fat margarine, sliced meats Apple pie with vanilla custard	Chickpea casserole with Indian bread and cucumber + yoghurt relish	Natural yoghurt with cornflakes, banana and raisins and linseed 2 slices ryebread with liver paté 14% and pickled gherkin	Pasta with pesto Frisée lettuce with kidney beans, vinagrette 1 slice white bread
	Caffe latte 2 crisp rolls Kiwi	Tea 2 crisp rolls Banana	Tea 2 crisp rolls Banana Piece of chocolate	Tea 1 slice ryebread with low-fat margarine, cheese 17%	Caffe latte Piece of gateau		Apple
<b>D I N N E R</b>	Meatloaf with tomato and leek, boiled potatoes, brown sauce Carrot, white cabbage with vinagrette 1 slice white bread with low-fat margarine	Black pudding with lingon jam White cabbage and carrot salad, squeezed lemon 1 crispbread with low-fat margarine	2 stuffed cabbage leaves, boiled potatoes, brown sauce, lingon jam 1 slice white bread with low-fat margarine	Pasta, spinach and cheese sauce, smoked pork loin Tomato, leek with vinagrette 1 slice white bread	Chicken in lemon sauce, rice, boiled beetroot Green salad with onion and vinagrette 1 slice white bread with low-fat margarine 1 low-alcohol beer	Avocado with Greek yoghurt and caviar Roast pork with onion, apple, gravy and cooking cream, boiled potatoes Frisée lettuce, pepper, vinagrette 1 slice white bread	Fried cod fillet, broccoli, pressed potatoes Lemon wedge Raspberries, blueberries, walnuts with vanilla ice cream
		Cider Chocolates	Coffee with low-fat milk 1 slice ryebread with low-fat margarine, tomato	Fruit salad		Pear Digestive biscuit with Blå Castello Wine	

## Hansel Week 1

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<b>B R E A K F A S T</b>	Oat porridge with low-fat milk, jam 1 slice ryebread with liver paté 14% 1 slice ryebread with low-fat margarine, cheese 17% Juice	Oat porridge with low-fat milk, jam 1 slice ryebread with liver paté 14% 1 slice ryebread with low-fat margarine, cheese 17% Juice	Oat porridge with low-fat milk, jam 1 slice ryebread with liver paté 14% 1 slice ryebread with low-fat margarine, cheese 17% Juice	Oat porridge with low-fat milk, jam 1 slice ryebread with liver paté 14% 1 slice ryebread with low-fat margarine, cheese 17% Juice	Oat porridge with low-fat milk, jam 1 slice ryebread with liver paté 14% 1 slice ryebread with low-fat margarine, cheese 17% Juice	Low-fat yoghurt with cornflakes, ½ grated apple 2 slices ryebread with low-fat margarine and sliced meats 1 crispbread with low-fat margarine Juice	Café au lait on low-fat milk 2 slices ryebread with liver paté 14% 2 crispbread with low-fat margarine, sliced meats Juice
	Coffee with low-fat milk 1 crispbread with low-fat margarine Orange	Coffee with low-fat milk 1 crispbread with low-fat margarine	Coffee with low-fat milk 1 crispbread with low-fat margarine and tomato	Coffee with low-fat milk Banana 1 crispbread with low-fat margarine	Coffee with low-fat milk 1 crispbread with low-fat margarine	Apple	Coffee with low-fat milk 3 biscuits 1 cinnamon roll
<b>L U N C H</b>	Fish stew with potatoes and saffron Greek yoghurt Lettuce, tomato, cucumber, vinaigrette 2 slices white bread with low-fat margarine	Pasta, tomato and pepper sauce, feta cheese, black olives Chinese cabbage, vinaigrette 2 slices white bread with low-fat margarine	Sausage Stroganoff with rice and broccoli 2 slices white bread with low-fat margarine	Beef stew, boiled potatoes, pickled beets White cabbage salad with parsley, vinaigrette 1 slice white bread with low-fat margarine	Omelette with potatoes, cheese and broccoli Tomato, iceberg lettuce, vinaigrette 2 slices white bread with low-fat margarine	3 tacos with minced beef, beans and vegetables Rice Cider	Rösti with melted cheese Green salad, kidney beans, red onion, vinaigrette 2 slices white bread
	1 slice ryebread with low-fat margarine and cucumber	Orange	Peach Chocolate 75 g	Pear	Banana Sweets	Grapes	Peach
<b>D I N N E R</b>	Pea soup with ham, mustard 2 slices ryebread with low-fat margarine Carrot 3 pancakes with jam	Pork chop, pressed potatoes, vegetable stir-fry 2 slices white bread with low-fat margarine 1 low-alcohol beer	Fishballs in white sauce, boiled potatoes, green peas 1 slice ryebread with low-fat margarine Apple	Spaghetti Bolognese, grated Parmesan cheese Tomato 1 slice white bread with low-fat margarine	Baked herrings with cooking cream and mustard, boiled potatoes Grated carrots 1 slice ryebread with low-fat margarine and cheese 17%	Smoked ham, potato salad with red onion, sugarsnap peas and vinaigrette 1 slice white bread with low-fat margarine Pear Potato crisps 1 glass wine	Beef Burgundy, couscous Green salad, vinaigrette 1 slice white bread with low-fat margarine Fruit salad with raisins, nuts
	Tea 1 slice refined ryebread with low-fat margarine and cheese 17%	Tea 1 slice refined ryebread with low-fat margarine and cheese 17%	Tea 1 slice refined ryebread with low-fat margarine and cheese 17%	Tea 1 slice refined ryebread with low-fat margarine and cheese 17%	1 slice refined ryebread with low-fat margarine and cheese 17% 400 ml strong beer		

## Hansel Week 2

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<b>B R E A K F A S T</b>	Plain yoghurt, müsli, banana 1 crispbread with liver paté 14%, cucumber 1 slice ryebread with margarine, cheese 17%	Plain yoghurt, müsli, banana 1 crispbread with liver paté 14%, cucumber 1 slice ryebread with margarine, cheese 17%	Plain yoghurt, müsli, banana 1 crispbread with liver paté 14%, cucumber 1 slice ryebread with margarine, cheese 17%	Plain yoghurt, müsli, banana 1 crispbread with liver paté 14%, cucumber 1 slice ryebread with margarine, cheese 17%	Plain yoghurt, müsli, banana 1 crispbread with liver paté 14%, cucumber 1 slice ryebread with margarine, cheese 17%	Plain yoghurt, müsli, banana 1 slice white bread with margarine, cheese 17% 1 slice ryebread with margarine, sliced meats Juice	Plain yoghurt, müsli, banana 2 slices ryebread with smoked herring paté Juice
	Coffee with low-fat milk and sugar 1 slice ryebread with margarine	Coffee with low-fat milk and sugar 1 slice ryebread with margarine Plums	Coffee with low-fat milk and sugar Plums Cinnamon roll	Coffee with low-fat milk and sugar 1 slice ryebread with margarine Orange	Coffee with low-fat milk and sugar 1 slice ryebread with margarine Pear	1 Coca cola Sweets	
<b>L U N C H</b>	Game casserole with cooking cream, rice White cabbage, pepper, vinagrette 2 slices white bread with low-fat margarine	Poached cod with egg and parsley sauce, boiled potatoes Carrot salad 2 slices white bread with margarine Grapes	Baked chicken drumsticks, pan-fried root vegetables, mustard Iceberg lettuce, vinagrette 2 slices white bread with low-fat margarine Low-alcohol beer	Curried eggs with peanuts, rice Leaf lettuce, carrot, pepper, lemon vinagrette 2 slices white bread with low-fat margarine	Baked salmon, cooked spinach, potato wedges Lemon wedge Lettuce, tomato, cucumber, vinagrette 2 slices white bread	2 slices ryebread with smoked herring paté 1 slice ryebread with processed cheese Tomato, pepper Low-fat fruit yoghurt Orange Coffee with low-fat milk	1 slice ryebread with margarine, tomato and cottage cheese 1 slice ryebread with margarine, mackerel in tomato sauce 1 slice white bread with margarine and cheese marmalade Apple
	Coffee with milk and sugar Plums	Café au lait with sugar 1 slice refined ryebread with margarine Apple	Caffe latte with sugar 1 slice refined ryebread with margarine Orange	Coffee with low-fat milk and sugar 1 slice refined ryebread with margarine Pear	Coffee with low-fat milk and sugar 1 slice refined ryebread with margarine Apple		Caffe latte Piece of chocolate Cinnamon roll
<b>D I N N E R</b>	Vegetarian lasagne Kidney beans, onions, vinagrette 2 slices white bread with margarine	Hamburger with bread roll, potato wedges, onions, tomato, dressing, ketchup and cheese 1 glass low-alcohol beer	Pork chop in tomato sauce, pasta 2 slices white bread	Boiled sausage, wedge of white cabbage, boiled potatoes, mustard sauce 2 slices white bread with margarine 1 glass low-alcohol beer	Indian soup with red lenses and potatoes White bread (nan) with margarine Baked apple with flaked almonds and ice cream	Roast lamb, gravy, mashed potato, haricots verts, jelly 1 slice white bread 2 glasses red wine 1 digestive biscuit with Blå Castello 40%	Roast lamb, risotto with mushrooms and pepper, tomato sauce 2 slices white bread with margarine
	1 crispbread with liver paté 14%	1 crispbread with liver paté 14%	1 crispbread with liver paté 14%	1 slice ryebread with margarine, cheese 17% and cucumber	1 slice ryebread with margarine, cheese 17% and cucumber		

### Hansel Week 3

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<b>B R E A K F A S T</b>	Plain yoghurt, cornflakes 1 slice refined ryebread with liver paté 14% 1 crispbread with margarine, cheese 17% Juice	Plain yoghurt, cornflakes 1 slice refined ryebread with liver paté 14% 1 crispbread with margarine, cheese 17% Juice	Plain yoghurt, cornflakes 1 slice refined ryebread with liver paté 14% Juice	Plain yoghurt, cornflakes 2 slices refined ryebread with margarine, sliced meats Juice	Plain yoghurt, cornflakes 2 slices refined ryebread with margarine, sliced meats Juice	Hot chocolate 1 slice ryebread with liver paté 14% and cucumber 2 slices white bread with margarine, cheese 17% and marmalade	Scrambled egg, tomato 2 slices white bread with margarine, cheese 17%, marmalade 1 crispbread with margarine, caviar Coffee with low-fat milk Juice
	Coffee with low-fat milk 1 slice ryebread with margarine and cheese 17% Kiwi	Coffee with low-fat milk 1 slice ryebread with margarine and cheese 17%	Coffee with low-fat milk Ginger cake	Coffee with low-fat milk 1 slice ryebread with margarine, cheese 17% Pear	1 slice ryebread with margarine and cheese 17% Fizzy drink	Apple	
<b>L U N C H</b>	Meat and horseradish sauce with carrot, leek and boiled potatoes White cabbage, vinagrette 2 slices white bread with margarine 1 crispbread with margarine	Bean soup 2 slices white bread with cream cheese light 1 crispbread with margarine Orange Low-alcohol beer	Stew with potatoes, root vegetables and sausage, mustard 2 slices white bread with margarine Orange	Smoked pork loin with spinach in cooking cream and sambal oelek, boiled potatoes White cabbage, vinagrette 2 slices white bread with margarine	Baked pike-perch fillet, cream sauce, lemon, boiled potatoes Green beans, tomato 2 slices white bread with low-fat margarine	Kebab with yoghurt sauce and tomato 1 Coca cola	Milk 2 slices ryebread with whey cheese Pear
	1 slice ryebread with whey cheese	1 slice ryebread with whey cheese Banana	Pear Sweets (100 g)	1 slice ryebread with whey cheese Apple	Caffe latte Apple	Caffe latte	Caffe latte Cheesecake
<b>D I N N E R</b>	Pasta with Bolognese sauce Green salad, cucumber with vinagrette 2 slices white bread with margarine	Cod with almonds, boiled potatoes, broccoli 2 crispbread with margarine	Stirfry with egg noodles, beef strips, onions, sugarsnap peas Tomato 2 slices white bread with margarine	Pan-fried root vegetables, potatoes and mushrooms Fried egg 2 crispbread with margarine Low-alcohol beer	Chicken casserole with kidney beans and tomato, rice Lettuce, tomato and cucumber with vinagrette 1 crispbread with margarine	Sirloin steak, baked onions, bearnaise sauce, pressed potatoes, haricots verts Red wine Fruit pie and vanilla custard	Sautéed prawns with courgette, onion and pepper, tomato sauce, pasta 2 slices white bread with margarine
	Sweets (100g)		2 crispbread with margarine and cheese 17%		2 Finn Crisp with Blå Castello 40% Grapes Wine		Sherry

## Hansel Week 4

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<b>B R E A K F A S T</b>	Low-fat milk 2 slices ryebread with liver paté 14%, pepper 2 slices white bread with low-fat margarine, marmalade	Low-fat milk 2 slices ryebread with liver paté 14%, pepper 2 slices white bread with low-fat margarine, marmalade	Low-fat milk 2 slices ryebread with liver paté 14%, pepper 2 slices white bread with low-fat margarine, marmalade	Low-fat milk 2 slices ryebread with liver paté 14%, pepper 2 slices white bread with low-fat margarine, marmalade	Low-fat milk 2 slices ryebread with liver paté 14%, pepper 2 slices white bread with low-fat margarine, marmalade	Caffe latte 2 slices ryebread with low-fat margarine, sliced meats 2 slices white bread with low-fat margarine, marmalade Grapefruit	Caffe latte 2 slices ryebread with low-fat margarine, sliced meats 1 slice white bread with low-fat margarine, marmalade Juice
	Tea 1 slice refined ryebread with margarine Apple	Tea Apple	Tea Kiwi	Tea Banana	Tea Apple Biscuits	Tea 1 slice ryebread with low-fat margarine	Tea Cinnamon roll
<b>L U N C H</b>	Macaroni in white sauce, fried sausage, mustard, ketchup Carrot, white cabbage with vinagrette 2 slices white bread with low-fat margarine	Beef Stroganoff, rice and broccoli Mixed salad with vinagrette 2 slices white bread with low-fat margarine 1 low-alcohol beer	Salmon pudding, dill sauce Lettuce with cucumber, red onion with vinagrette 2 slices white bread	Vegetable soup 2 slices ryebread with low-fat margarine, sliced meats Apple pie with vanilla custard	Chickpea casserole with Indian bread and cucumber + yoghurt relish Fizzy drink	Natural yoghurt with cornflakes, banana and raisins and linseed 2 slices ryebread with liver paté 14% and pickled gherkin	Pasta with pesto Frisée lettuce with kidney beans, vinagrette 2 slices white bread with low-fat margarine
	Café au lait 2 crisp rolls Kiwi	Tea 2 crisp rolls Banana	Tea 2 crisp rolls Banana Piece of chocolate	Tea 1 slice ryebread with low-fat margarine, cheese 17%	Caffe latte Piece of gâteau		Apple
<b>D I N N E R</b>	Meatloaf with tomato and leek, brown sauce and potatoes Carrot, white cabbage with vinagrette 2 slices white bread with low-fat margarine	3 slices black pudding with lingon jam White cabbage and carrot salad, squeezed lemon 2 crispbread with low-fat margarine	2 stuffed cabbage leaves, boiled potatoes, brown sauce, lingon jam 1 slice white bread with low-fat margarine 1 low-alcohol beer	Pasta, spinach and cheese sauce, smoked pork loin Tomato, leek with vinagrette 2 slices white bread	Chicken in lemon sauce, rice, boiled beetroot Green salad with onion and vinagrette 1 slice white bread with low-fat margarine 1 low-alcohol beer	Avocado with Greek yoghurt and caviar Roast pork with onion, apple, gravy and cooking cream, boiled potatoes Frisée lettuce and pepper with vinagrette 1 slice white bread	Fried cod fillet with yoghurt sauce, broccoli, pressed boiled potatoes Lemon wedge Raspberries, blueberries, walnuts with vanilla ice cream
		Cider Sweets (chocolates)	Tea with low-fat milk 1 slice ryebread with low-fat margarine and tomato	Fruit salad		Pear, Digestive biscuits with Blue Castello Wine	

=

# Final word

This SNO conversion of the Swedish nutrition recommendations both confirms and contradicts previous knowledge and food recommendations. SNO as a whole is a complex balance between food groups contributing different combinations of nutrients, some of which are required in large amounts and some others that need to be restricted. A possible criticism of work such as SNO is that it is actually not possible to describe a general recommendation in such detail. There are many options and the nutrition recommendations can be fulfilled using innumerable combinations of foods. However, one conclusion that can be drawn from the work on SNO is that all roads do not lead to Rome. SNO shows, at least for the conditions specified, that the range of choices is to a certain extent limited. The main limiting factors are the recommendations on saturated fats, fibre, protein and iron. The least flexible aspect is the relative proportions of different food groups. Within the respective groups, the range of choices is considerably greater.

Testing the practical applications of the nutrition recommendations in this way provides important information for when they come to be reviewed.

However, the main aim of the SNO conversion work was to produce material that could be used with other knowledge to form the basis for general messages. Therefore it may be appropriate to also reflect somewhat on the dietary advice and general messages that can emerge from SNO.

The knowledge that it is in principle impossible to achieve the higher iron recommendation despite the inclusion of iron-rich foods such as liver paté and black pudding raises the question of how realistic the recommendation is. The Nordic nutrition recommendations show that the lower recommendation of 12 mg per day for women meets the iron requirement of 50 % of all women. Using a well-planned diet with high accessibility, it has been estimated that the iron requirement of 94 % of women of childbearing age can be met by an intake of 14 mg per day (Nordiska Näringsrekommendationer, 1996). SNO can be expected to increase the potential for a well-planned diet, but the fact remains that women with an extra high iron requirement require a specific diet with e.g. black pudding more frequently and in certain cases iron tablets may also be necessary.

People often make the comment 'I walk home from work so I can allow myself a cream cake'. SNO shows that it is considerably easier to achieve the vitamin and mineral recommendations at a higher energy intake. Therefore 'exercise more' is good advice for women with a high iron requirement. Higher energy intake also provides slightly greater scope for saturated fats, but the relative proportions of different quality fats must remain the same, i.e. still only 10 % of energy may come from saturated fats. Therefore one cannot meet an increased energy requirement solely with cream cakes or other *leeway* foods.

The menus show that each individual meal does not have to fulfil the nutrition recommendations. However, this does not apply when one is planning food in large-scale kitchens, e.g. lunch canteens, which serve single meals and do not have control over people's total intake. In the recommendations for large-scale kitchens, the demands on meals must therefore be higher than those in the menus.

In a comparison with the latest Swedish national diet survey (Riksmaten, 1997–98), some areas distinctly emerge as being particularly important in achieving better public health. The greatest difference between SNO and the current Swedish diet is fruit and vegetable consumption. The recommendation for ½ kg fruit and vegetables per day should be interpreted as *at least* ½ kg. This is shown by the higher energy level in SNO-Hansel, where a considerably larger amount of fruit and vegetables is required to maintain the energy balance.

Bread consumption should increase. The old advice to eat 6-8 slices of bread per day still holds true. A general message should be that bread must be included in most meals and that sweet breads such as cinnamon rolls should be replaced by plain bread.

Another important area is fat quality. According to comparisons with the Swedish diet survey carried out at the end of the 1990s, the Swedish population has decreased its fat intake, but intake of saturated fats is still considerably above the recommended 10 energy-%. A general message regarding fat quality must include the Keyhole food quality label, reduced intake of cheese and processed meats and the importance of choosing the right type of spread. SNO shows that soft spreads and oils are needed in the diet to get a good fat balance. Excluding visible fat by not using margarine on bread is not good advice.

In addition, the so-called *leeway* foods occupy far too much space in general in the Swedish diet. A message that deals with snacks and what these should consist of would be one way to approach this problem.

Through SNO, we have had the old recommendations on less fat and more fibre quantified and we can hopefully formulate the long-awaited general dietary advice, which should deal with the issues discussed above. SNO shows the overall picture, but dietary advice should deal with only a few areas, namely those that are most important in improving the dietary habits of the Swedish people.

# References

- Becker W. 1996. Vilket fett ska vi välja? *Vår Föda* 48(1): 5–18.
- Becker W & Hagman U. 1999. Mer frukt och grönt bra för hälsan. *Vår Föda* 51(6):24–8.
- Brödinstitutet. 1987. 6–8 för ett friskare liv. Williamssons Offsettryck AB
- Centrum för tillämpad näringslära. 1989. Från energiprocent till mat. Huddinge sjukhus.
- Danfors S. 1991. Den nya matcirkeln. *Vår Föda* 43 (4–5):216–8.
- Expertgruppen för kost och hälsofrågor. 1990. Mjölakens och mejeriprodukternas betydelse för energi- och näringstillförseln. *Vår Föda* 42 (3):186–91.
- FAO. 1996. Preparation and use of food-based dietary guidelines. Report of a joint FAO/WHO consultation, Nicosia, Cyprus. Nutrition Programme, World Health Organisation, Geneva.
- HULK. 1994. Befolkningens kostvanor och näringsintag i Sverige 1989. Metod- och resultatanalys. Uppsala: Statens livsmedelsverk.
- Konsumentverket och Socialstyrelsen. 1976. Prisvärd mat. AB Grafiska Gruppen/Egnellska, Stockholm.
- Kost, Motion & Hälsa. 1992. Socialstyrelsen, Statens livsmedelsverk, Allmänna Förlaget. Gotab Stockholm.
- Lindvall C. 1992. Tallriksmodellen - ett bra instrument för kostrådgivning. *Vår Föda* 44 (6):238–41.
- Lindvall C, Enghardt H & Becker W. 1992. Hur används nyckelhålmärkningen av konsumenterna. *Vår Föda* 44 (5):199–205.
- Matcirkeln. 1991. En hjälp att välja rätt. *Vår Föda* 43 (4–5):219–22.

Nationella mål och strategier för nutrition 1999–2004. Folkhälsoinstitutet och Livsmedelsverket, 1999.

Nordiska näringsrekommendationer. 1996. Nordiska ministerrådet. Nord 1996; 28.

Reviderade råd om fiskkonsumtion. 1995. Gravida, ammande och storkonsumenter bör undvika vissa fiskar. Vår Föda 47 (2):7–9.

Riksmaten 1997–98 [Swedish Diet Survey 1997-98]. Kostvanor och näringsintag i Sverige. Metod- och resultatanalys. Livsmedelsverket, 2002.

SLVFS. 1989. Statens livsmedelsverks föreskrifter och allmänna råd om användning av viss symbol 2.

Svenska Näringsrekommendationer. 1997. Rekommendationer för planering av kost till olika grupper. Normer vid värdering av näringsintag. Livsmedelsverket.

Vikttabeller. 1999. Livsmedelsverket.

1. Utvärdering av Livsmedelsverkets Riksprojekt 2002–2003 av R Lindqvist och E Hay.
2. Proficiency Testing. Food Microbiology – January 2004– by C Normark.
3. Proficiency Testing – Food Chemistry, Nutritional Components, Round 33, March-April 2004 by L Merino.
4. Examination of Residues in Live Animals Products – Results of the Control 2003 by I Nordlander.
5. Proficiency Testing – Food Chemistry, Trace Elements in Food, Round T–9 by C Åstrand and L Jorhem.
6. Riksprojekt 2002. Salmonella i frukt och grönsaker.
7. Projektinriktad kontroll 2003–2004. Granskning av salmonellaförekomst i köttberedningar införda till Sverige från annat EU-land av A Brådenmark.
8. Proficiency testing. Food microbiology – April 2004 – by Å Rosengren and C Normark.
9. Proficiency Testing. Drinking water microbiology – 2004:1, March – by T Šlapokas and M Ljung.
10. Rapportering om livsmedelstillsyn 2003 – Kommunernas rapportering om livsmedelstillsyn av D Rosling.
11. Rapportering av dricksvattentillsyn 2003 – Kommunernas rapportering om dricksvattentillsyn av D Rosling.
12. The Swedish Monitoring of Pesticide Residues in Food of Plant Origin: 2003, EC and National Report by A Andersson, A Jansson and G A Eskhult.
13. Mat och hälsa i undervisningen – skolan och lärarutbildningen av M Rosén.
14. Riksprojekt 2003 – Temperaturer i storhushåll och butik av M Lindblad och M Boysen.
15. Synen på tillsyn – utvärdering av tillsyn vid anläggningar med Livsmedelsverkets som tillsynsmyndighet av M Ljung.
16. Dioxins and PCBs in fish oil – a survey of fish oils and fish liver oils sold on the Swedish market in February 2003 by S Wallin, P O Darnerud, R Bjerselius, A Glynn, M Aune and A Andersson.
17. Proficiency Testing – Food Chemistry, Nutritional Components, Round 34, September–October 2004 by L Merino.
18. Nationella mål och strategier för nutrition 1999–2004 – utvärdering av P Hagling och M Ljung.
19. ”Du blir vad du äter” – studie om barns matvanor och fysiska aktivitet av M Jansson.
20. Proficiency Testing – Food Chemistry, Vitamins in Foods, Round V-2 by H S Strandler and A Staffas.
21. Validitet av enkätfrågor om kost och fysisk aktivitet bland vuxna – underlag till urval av frågor i befolkningsinriktade enkäter av H Sepp, U Ekelund och W Becker.
22. Risk profile. Virus in food and drinking water in Sweden – Norovirus and Hepatitis A virus by F Lund and R Lindqvist.
23. Proficiency Testing. Drinking water microbiology – 2004:2, September – by T Šlapokas, C Gunnarsson and A Gidlund.
24. Proficiency testing. Food microbiology – October 2004 – by C Normark.

1. Verksamhetsplan 2005.
2. Collaborative study of method for detection of *Escherichia coli* O157 in food – NMKL no 164, 1999, by C Normark.
3. Proficiency Testing – Food Chemistry, Trace Elements in Food, Round T-10 by C Åstrand and L Jorhem.
4. Utvärdering av första etappen av projektet God livsmedelskvalitet i Västernorrland av H Nordenfors och U Fäger.
5. Lunchmat i Uppsala 2001 – Undersökning av matens energi- och fettinnehåll av H Karlén Nilsson, M Arnemo och W Becker.
6. Projektinriktad kontroll 2004. Ursprung och identitet av kött infört från annat EU-land av U Evans Cederlund.
7. Interkalibrering av laboratorier. Mikrobiologi – Livsmedel, januari 2005 av C Normark och C Gunnarsson.
8. Proficiency Testing – Food Chemistry, Nutritional Components in Food, Round N-35, by L Merino.
9. Normerande inspektioner av storhushåll 2002–2003. Resultat från normerande inspektioner av storhushåll i samband med kommuninspektion av U Lantz och D Rosling.
10. A Risk Assessment of Uranium in Drinking Water by K Svensson, P O Darnerud and S Skerfving.
11. The Component Aspect Identifier – A Tool for Handling Food Component Information in a Food Database Management System by I Unwin and W Becker.
12. Rapportering om livsmedelstillsyn 2004 – Tillsynsmyndigheternas rapportering om livsmedelstillsyn av D Rosling.
13. Interkalibrering av laboratorier. Mikrobiologi – Dricksvatten 2005:1, mars av T Šlapokas och C Gunnarsson.
14. Interkalibrering av laboratorier. Mikrobiologi – Livsmedel, april 2005 av C Normark, K Mykkänen och C Gunnarsson.
15. Campy-SET, Campylobacter: Smittspårning, epidemiologi och typning.
16. Kontroll av rests substanser i animalier och animaliska livsmedel av I Nordlander och H Green.
17. The Swedish Monitoring of Pesticide Residues in Food of Plant Origin: 2004, EC and National Report by A Andersson and A Jansson.
18. Riksprojekt 2004: Patogen *Yersinia enterocolitica* – i obehandlade och behandlade fläskprodukter av S Thisted Lambertz.
19. Rapportering av dricksvattentillsyn 2003 – Tillsynsmyndigheternas rapportering om dricksvattentillsyn av D Rosling.
20. Swedish Nutrition Recommendations Objectified (SNO) – Basis for general advice on food consumption for healthy adults by H Enghardt Barbieri and C Lindvall.

