

The Role of Diet in Irritable Bowel Syndrome with special reference to Gut Neuroendocrine System

Tarek Ramzi Elia Mazzawi



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Institute of Clinical Medicine, Section for Gastroenterology,

Faculty of Medicine and Dentistry,

University of Bergen, Norway.



Department of Medicine, Section for Gastroenterology,

Stord Hospital, Stord, Norway.

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ABSTRACT

Background: The majority of the patients with irritable bowel syndrome (IBS) believe that diet triggers their symptoms, which affect the quality of their lives. The pathophysiology of IBS is not exactly known, however, the endocrine cells of the gut, which are known to regulate most of the functions of the gastrointestinal tract, are believed to play an important role in the IBS pathophysiology. These cells have been found abnormal in the patients with IBS. These endocrine cells extend their microvilli to the gut lumen and sense its contents, particularly nutrients, and release gut hormones in response to the events taking place in the gut lumen.

Aim: The overall aim has been to investigate the effect of dietary guidance with reduced intake of fermentable oligo-, di-, monosaccharides and polyols (FODMAPs) on:

1. IBS symptoms.
2. The quality of life of IBS patients.
3. To elucidate whether the changes in symptoms and quality of life brought by dietary guidance are accompanied by alterations in the gastrointestinal endocrine cells.

Materials and methods: Forty-six patients who fulfilled the Rome III criteria for the diagnosis of IBS were included in the study. All the patients were asked to complete the following questionnaires to assess their symptoms, quality of life and habitual dietary intake: The Birmingham IBS symptom score questionnaire, the IBS Quality of Life (IBS-QOL) questionnaire, the Short-Form Nepean and Dyspepsia Index (SF-NDI) and the MoBa Food Frequency Questionnaire (MoBa FFQ). They also underwent gastroscopy with biopsies taken from the corpus and the antrum of the stomach and colonoscopy with biopsies taken from the colon and the rectum to exclude other organic diseases. Then the patients attended three sessions,

approximately 45 minutes each, of guidance on dietary management with a registered nurse. Of these patients, only 17 patients remained during the whole study and were asked to strictly follow a diet as prescribed in the dietary guidance for at least 3 months. Thereafter, they were asked to complete a second set of the same questionnaires for comparison. Fourteen out of the 17 patients underwent a second gastroscopy with biopsy samples taken from the corpus and antrum of the stomach and 13 out of the 17 patients underwent a second colonoscopy with biopsy samples taken from the colon and the rectum. As controls, 14 healthy subjects were included and underwent gastroscopy with biopsy sampling same as the patients. Only 13 out of the 14 controls underwent colonoscopy with biopsy sampling similar to the ones taken from the patients. The biopsy samples were immunostained using the Avidin-biotin-Complex method for all of the endocrine cell types in the stomach and the large intestine and were quantified by computerized image analysis.

Results: The findings are summarized as follows:

In paper I, the patients reported an improvement in their quality of life as assessed by IBS-QOL and the SF-NDI questionnaires and a reduction in the total IBS symptoms as assessed by the Birmingham IBS symptom score questionnaire. There was a reduction in the consumption of food items rich with FODMAPs and an increase in the consumption of some minerals and vitamins.

In paper II, IBS patients had low densities of chromogranin A (CgA) in the stomach. These densities increased in these patients following dietary guidance towards the levels of healthy controls.

In paper III, the densities of all the endocrine cells in the stomach of IBS patients were abnormal before receiving dietary guidance. These densities changed towards the values of healthy controls after receiving dietary guidance.

In paper IV, IBS patients represented low densities of CgA in the colon and were increased towards the values of healthy controls following dietary guidance. The

densities of CgA in the rectum were unchanged before and after receiving dietary guidance.

In paper V, the densities of the endocrine cells in the colon of IBS patients were abnormal before dietary guidance. Following dietary guidance, the densities of the endocrine cells tend to normalize in the colon, however, in the rectum; the densities of the endocrine cells remained unchanged.

Conclusions:

Three sessions of dietary guidance reduced the symptoms of IBS patients and improved their quality of life. Through dietary guidance, the patients made correct choices in consuming a FODMAP-poor diet yet maintaining adequate intake of minerals and vitamins that were, otherwise, known to be deficient in IBS patients without guidance. The densities of the endocrine cells in the stomach and the large intestine that were abnormal before dietary guidance tend to normalize following dietary guidance, thus reducing IBS symptoms and improving the quality of life of the patients. The findings emphasized the interactions between food and the endocrine cells of the gut and showed the positive effects of dietary guidance on the symptoms of IBS patients, which may be attributed to changes in the densities of the endocrine cells of the gut.

LIST OF ABBREVIATIONS

CCK	Cholecystokinin
CgA	Chromogranin A
CNS	Central nervous system
DAB	Diaminobenzidine
ENS	Enteric nervous system
FFQ	Food Frequency Questionnaire
FGIDs	Functional gastrointestinal diseases
FODMAPs	Fermentable oligo-, di- and monosaccharides and polyols
FOS	Fructo-oligosaccharides
GI	Gastrointestinal
GIP	Gastric inhibitory peptide
GOS	Galacto-oligosaccharides
HLA	Human leukocyte antigen
HRQoL	Health related quality of life
IBS	Irritable bowel syndrome
IBS-D	IBS-diarrhea
IBS-C	IBS-constipation
IBS-M	IBS-mixed

NES	Neuroendocrine system
NPY	Neuropeptide Y
NO	Nitric oxide
PP	Pancreatic polypeptide
PPI	Proton pump inhibitors
PYY	Polypeptide YY
QOL	Quality of Life
SEM	Standard error of mean
SERT	Serotonin transporter
SF-NDI	Short-Form Nepean and Dyspepsia Index
SIBO	Small intestinal bacterial overgrowth
VIP	Vasoactive inhibitory polypeptide

LIST OF PUBLICATIONS

- I. **Mazzawi T, Hausken T, Gundersen D, El-Salhy M** 2013 Effects of dietary guidance on the symptoms, quality of life and habitual dietary intake of patients with irritable bowel syndrome. *Molecular Medicine Reports* 8(3):845-852

- II. **Mazzawi T, Gundersen D, Hausken T, El-Salhy M** 2014 Increased gastric Chromogranin A cell density following changes in diet intake in patients with irritable bowel syndrome. *Molecular Medicine Reports* 10(5):2322-2336

- III. **Mazzawi T, Hausken T, Gundersen D, El-Salhy M** 2015 Effect of dietary management on the gastric endocrine cells in patients with irritable bowel syndrome. *European Journal of Clinical Nutrition* 69, 519–524

- IV. **Mazzawi T, Gundersen D, Hausken T, El-Salhy M** 2015 Increased chromogranin A cell density in the large intestine of patients with irritable bowel syndrome after receiving dietary guidance. *Gastroenterology research and practice* (ID 823897)

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1. INTRODUCTION

1.1 Irritable bowel syndrome

1.1.1 General

Irritable bowel syndrome (IBS) is a common chronic functional disorder of the gastrointestinal (GI) tract (1-3). It occurs more frequently in women than in men and is more common under the age of 50 (4-10). IBS accounts for approximately 12-14% of the referrals to general practitioners and for 25-28% to gastroenterologists (3, 11-13) and is considered the most common gastrointestinal diagnosis in general practice (14). In fact, IBS is even a more common reason to seek medical care than diabetes, hypertension and asthma (11, 12, 15).

Despite the fact that IBS neither develops into serious diseases such as cancer or inflammatory bowel disease (16, 17) nor is associated with increased mortality (18), IBS can be as morbid as major chronic diseases, such as congestive heart failure (19), hepatic cirrhosis (20), renal insufficiency and diabetes (10). The symptom intensity differs considerably between the patients from mild to severe, and from daily to intermittent (weekly or monthly), thus affecting the patients' daily activities and reducing their quality of life (3, 5, 8, 21-25). IBS has a negative impact on several aspects of the patient's life such as sleep, diet, work, leisure, travel, sexual activity and mood (depression/anxiety) (26). Patients with IBS have lower productivity at work/school due to their frequent absences (5, 12, 26-28), and more frequently change, lose or quit their jobs and turn down promotions (12, 26). In addition to the previously mentioned impaired productivity, the patients generate high cost on health-care sectors for undergoing more diagnostics tests, frequent visits to the doctor's office, recurrent hospitalizations and they consume more medications than those without IBS (26). The annual direct and indirect costs to manage these patients are

estimated at 15-30 billion US dollars (29-33). Hence, IBS imposes an economic burden on the society and the patients (19, 24, 29, 31, 34-36).

1.1.2 Prevalence

Using symptom-based diagnosis, the prevalence of IBS is estimated as 5-20% of the population worldwide (1, 3, 5, 7-9, 21-23, 25, 31, 34, 37). The prevalence of IBS differs depending on the used criteria (highest using Manning, and lowest using Rome II) (8, 38-41) and it shows a geographical variation (8). Using Rome II criteria, the prevalence of IBS in Europe is 11.5% (8), Canada 12.1% (42), USA 4.7% (38), Australia 6.9% (43), Egypt 34% (44) and China 4.6-5.6% (45). In Scandinavia, the prevalence of IBS in Denmark is 10.5% (46) and Sweden 14.5% (47). In Norway, on the other hand, the first population-based survey of IBS was performed in Tromsø in 1980 and showed a prevalence of 8% (48). A later study conducted in southern Norway (Oppland and Hedmark) using Rome II criteria for diagnosing IBS showed a similar prevalence of IBS (8.4%) (49) however, another study performed in northern Norway (Bodø and Sørreisa) using the same criteria resulted in a prevalence of 25.1% (50).

1.1.3 Diagnosis

To date, the diagnosis of IBS is based on the presenting symptoms due to the lack of biochemical, histopathological or radiological diagnostic tests (2, 3, 51, 52). IBS is characterized by a complex of symptoms; including abdominal pain or discomfort, bloating, and alterations of bowel movements (1, 3, 26, 51). Depending on the predominant bowel habit, the patients with IBS are classified into diarrhea-predominant (IBS-D), constipation-predominant (IBS-C) and mixed (diarrhea and constipation, IBS-M) (39, 53).

Several symptom-based diagnostic criteria have been developed for the diagnosis of IBS (51, 54-59) starting with Manning criteria (Table 1) in 1978 (54). The latest

developed criteria are Rome I in 1992 (60), updated to Rome II in 1999 (28) which were then followed by Rome III criteria (Table 2) in 2006 (51).

Table 1. Manning criteria for the diagnosis of irritable bowel syndrome

- Abdominal pain that is improved by defecation
- Stools are more frequent at onset of pain
- Stools are looser at onset of pain
- Visible abdominal distension
- Mucous passing per rectum
- Feeling of incomplete evacuation

Table 2. Rome III criteria for the diagnosis of irritable bowel syndrome

Recurrent abdomen pain/discomfort occurring at least 3 days/month in the past 3 months with symptom onset at least 6 months prior to diagnosis, associated with two or more of the following:

- Relieved with defecation; and/or
- Onset associated with a change in the frequency of the stool; and/or
- Onset associated with a change in the form (appearance) of the stool.

Cumulatively supporting symptoms for the diagnosis of IBS:

- Abnormal frequency of the bowel movements (> 3/day and < 3/week);
- Abnormal form of the stool (lumpy/hard or loose/watery stool);
- Abnormal passage of the stool (straining, urgency, or feeling of incomplete evacuation);
- Mucous passage;
- Bloating or feeling of distention of the abdomen.

1.1.4 Pathogenesis

The pathogenesis of IBS is complex and multifactorial (34). The factors that either solely or through interactions with each other (Fig. 1), seem to play role in the pathogenesis of IBS, are: hereditary, mucosal low-grade inflammation, intestinal microbiota, abnormal endocrine cells of the gut, and diet, as summarized in Table 3.

Food allergy has been suggested to play a role in the pathogenesis of IBS, however, allergic reactions to food are mediated by immunoglobulin E causing acute swelling, itching, hives, diarrhea, wheezing and/or collapse and no consistent evidence has shown such allergic manifestations in IBS (61-64).

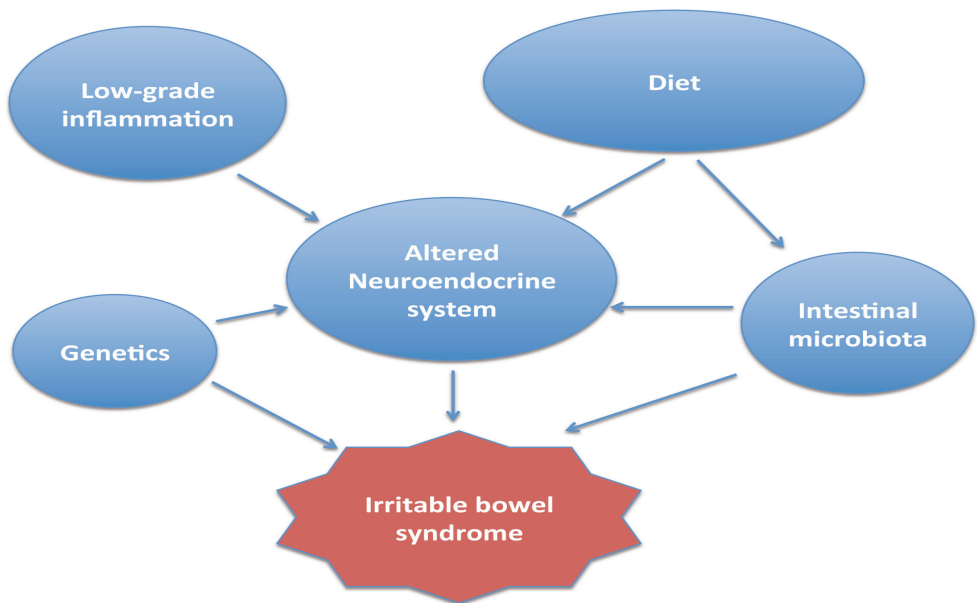


Figure 1. A schematic illustration of possible pathogenesis in irritable bowel syndrome.

Table 3. Factors believed to play a role in the pathogenesis of irritable bowel syndrome.

Factor	Definition/ Importance	Reason/ Mechanism
Hereditary	Double or triple the risk in first grade relatives (65). Occurs more frequent in monozygote twins (22.4%) than dizygote twins (9.1%) (66).	Over 60 candidate genes are associated with IBS (67).
Low-grade inflammation	<ul style="list-style-type: none"> - Post-infectious IBS due to gastroenteritis caused by different pathogens: C. jejuni, Salmonella enterica, Shigella sonnei, E. coli, Norovirus, and Giardia lamblia.(68, 69). - Inflammatory bowel diseases (ulcerative colitis and Crohn’s disease). 	<ul style="list-style-type: none"> - Post-infectious IBS: rectal biopsies showed increased leucocytes, lymphocytes, mast cells and changes in endocrine cell densities (67). - Occurs in 33-46% of ulcerative colitis in remission (70, 71) and 42-60% of Crohn’s disease in remission (72, 73).
Intestinal microbiota	Crucial for normal physiological and immunological functions of the GI tract (74, 75). Microbiota are affected by diet, antibiotics, stress,	<ul style="list-style-type: none"> - Low Bifidobacteria and Lactobacillus in IBS (76). - Changes in intestinal microbiota can cause visceral hypersensitivity, changed intestinal motility,

Table 3. (Continued)

Factor	Definition/ Importance	Reason/ Mechanism
	genetics, age, infections and climate changes (77).	flatulence and low-grade inflammation (78). - Small intestinal bacterial overgrowth (SIBO) can cause IBS symptoms (79).
Endocrine cells of the gut	Abnormal densities and functions leading to release of different gut hormones, (will be discussed further).	Caused by diet, stress, low-grade inflammation, and genes, (will be discussed further).
Diet	Carbohydrates, fibers and fat, (will be discussed further).	Fermentation causes gas production and increased osmosis into the gut lumen leading to diarrhea, (will be discussed further).

1.2 Diets in IBS

Food plays a vital role in the development of IBS symptoms (61, 80-86) and the majority of IBS patients are primarily interested in knowing what foods to avoid (82, 87). The elapsed time from food consumption until the appearance of IBS symptoms varies between the patients; 28% of the patients experienced symptoms within 15 min of eating and 93% reported symptom worsening between 15 min and 3 h (80). More than two thirds of the IBS patients link their symptoms to specific food items (61, 80, 81), most commonly milk and other dairy products, wheat products, caffeine, certain meat, cabbage, onion, peas/beans, tomatoes, hot spices, fried foods (12, 24, 80, 88),

raw vegetables, raw broccoli, paprika, leeks, garlic, and mushrooms (24). These foods are rich in the poorly absorbed rapidly fermentable oligo-, di- and monosaccharides and polyols (FODMAPs) (12, 24, 89-91).

1.2.1 FODMAPs

Carbohydrates are considered a major source of energy for humans, with intakes ranging from 40% to 80% of total energy requirements (90). Dietary carbohydrates can be divided into short-chain (sugars, polyols and oligosaccharides) and long-chain carbohydrates (starch, resistant starch and non-starch polysaccharides) (89). Long-chain carbohydrates have beneficial effects on fecal bulking, faster colonic transit time and slight acidification of the luminal milieu (89). On the other hand, the short-chain carbohydrates are referred to as prebiotics because they stimulate the growth of beneficial bacteria of the colon, bifidobacteria and lactobacillus. The short-chain carbohydrates include fructans [fructo-oligosaccharides (FOS) and inulin] and galacto-oligosaccharides (GOS), Table 4 (89, 92). These prebiotics have a wide range of benefits including reducing the risk of gastrointestinal infections, improving laxation and calcium absorption, preserving the gut mucosal barrier and stimulating the immune system of the GI tract which may reduce the risk of colon cancer (in animals) (89).

Table 4. FODMAPs found in some food varieties

FODMAPs	Examples of foods
- Lactose	- Milk
- Fructose in excess of glucose	- Pears, apples and honey
- Fructans and FOS	- Artichoke, garlic, onions, rye, wheat, pasta, breads and breakfast cereals
- GOS (stachyose and raffinose)	- Pulses
- Polyols (mannitol and sorbitol)	- Stone fruits and artificial sweeteners

During the fermentation of the long-chain carbohydrates, the intestinal flora in the colon ferments the undigested carbohydrates to produce gases (carbon dioxide, hydrogen and/or methane) and short chain fatty acids (89, 93, 94). In addition, poorly absorbed short-chain carbohydrates increase the volume of fluid in the bowel through osmosis (89, 94, 95), which results in a natural laxative effect in healthy individuals (89). However, in IBS patients, these reactions may cause diarrhea, and in association with the produced gas may lead to luminal distension with symptoms of abdominal pain and bloating (89, 93, 94, 96). It is worth mentioning that the total content of FODMAPs is important in the development of IBS symptoms, not just the presence of specific types (83, 89, 90). Some foods contain several FODMAPs, for example, white onion contains excess fructose, raffinose, nystose, and kestose, which are particularly problematic for people with IBS (90). It is important to note that, in terms of the total content of a major FODMAP, the major clinical problem is likely to generate from fructans in vegetables and from free fructose and sorbitol (to a lesser extent) in fruits (90).

1.2.2 Fibers

Dietary fibers are defined as the sum of indigestible polysaccharides and lignin. They are derived from cell wall contents in most diets and are found in cereals, vegetables, fruits and nuts (97).

Fibers are divided into water-soluble and water insoluble according to their water holding capacity. Fibers with high water holding capacity such as pectin, gums and psyllium are called water-soluble. They account for 4-21% of dietary fiber in cereal bran and 19-59% in legumes, vegetables and fruits. Oat is more highly rich in water-soluble fibers than any other grain. Wheat, rye, rice and most other grains are primarily composed of insoluble fiber, while legumes and beans contain both water-soluble and insoluble fibers (97).

Foods containing a higher proportion of dietary fiber, especially water-soluble fibers, can lead to the prevention of diseases such as coronary heart disease, diabetes, irritable bowel disease, obesity and colon cancer (97). Viscous polysaccharides act in the gastrointestinal tract and decrease the absorption of biliary cholesterol and cholesterol or fatty acids thus reducing blood cholesterol. Dietary fibers increase the secretion of bile acid and cholesterol thus having a hypocholesterolemic effect. Short chain fatty acids, which result from the colonic fermentation of resistant starch, may help in reducing blood cholesterol levels therefore reducing the risk of coronary heart diseases. Resistant starch is found in whole or partly milled grains and seeds, pulses and corn flakes. Fibers have also beneficial effects in diabetes; soluble fibers help in reducing the insulin demand by slowing the absorption and digestion of carbohydrates, and insoluble fibers shortens intestinal transit time therefore allowing less time for the absorption of carbohydrates (97).

Fibers have been used as a bulking agent for treatment of IBS (82, 97); however, the use of soluble fiber has the tendency to improve the symptoms of IBS compared to insoluble fiber (82, 98-100). The use of insoluble fiber may worsen IBS symptoms (82, 98), causing bloating and abdominal discomfort (101). For example, it is recommended to use psyllium (mostly water-soluble fibers) over bran (water insoluble fibers) in IBS patients to alleviate their symptoms (101).

1.2.3 Fat

The lipolysis of triglycerides (>12 carbon atoms) begins in the stomach by gastric lipase and is completed in the duodenum by pancreatic lipase thus releasing fatty acids and monoglycerides. The process of digestion is initiated with the formation of emulsions of finely dispersed lipids that bind to lipase. The lipid components (fatty acids and monoglycerides) then form water-soluble micelles with conjugated bile acids and are absorbed across the enterocyte membrane. Thereafter, triglycerides are reassembled and incorporated into chylomicrons and transported in the lymphatic system. Medium-chain triglycerides (8–12 carbon atoms) are absorbed directly into

the bloodstream without luminal lipolysis and micelle formation. Fat is digested and completely absorbed in the small bowel, thus, normally no dietary fat enters the colon. Colonic bacteria ferment the unabsorbed carbohydrates producing short-chain fatty acids (< 8 carbon atoms), which are an important source of energy for colonocytes, as well as for the colonic microbiota (102).

Fat intake modulates GI function in healthy individuals (102). Different meal types with different caloric contents activate several braking systems in the GI tract at different rates (103-105). In healthy individuals, fat slows gastric emptying and lipid in the duodenum stimulates pyloric pressure (102, 104) and increases the biliopancreatic secretion (106). The consumption of fat-rich meals (102) activates the gastroduodenal brake by inhibiting gastric emptying (102, 107) and decreasing pyloric pressures (108). The presence of fat in the proximal small intestine promotes a jejunal brake to decrease the biliopancreatic secretions (105, 106) and to inhibit the intestinal transit (109). In addition to the jejunal brake, an ileal brake is activated upon the arrival of fat to the ileum (110), thus allowing more time for fat digestion and absorption and avoiding its loss into the colon (109). The jejunal and ileal brakes are mediated by different gut hormones (109, 110), which will be discussed further in other sections of the thesis.

Fat modulates the gut response to different stimuli (102). Patients with functional gastrointestinal diseases (FGIDs) such as IBS, have abnormal lipid-dependent motor dysfunction affecting the small intestine and sparing the colon (111). For example, they have increased sensitivity to lipid exposure in the small intestine, which induces symptoms of bloating (102, 111), fullness and nausea at lower nutrients loads, and enhances gut sensitivity to mechanical distension (102). Intraluminal fat in patients with IBS impairs gas transit and develop gas retention and abdominal distension in the small intestine (especially in the jejunum) rather than the colon (111). The effects of lipids on small intestinal motility and delaying the transit of gas through the intestines are ineffective in healthy individuals but result in gas retention and bloating in IBS

patients (111). Lipids also exacerbate rectal hypersensitivity (102, 112) and increase the perception of rectal distension in IBS patients (102, 113) causing pain in patients with IBS-C but urgency in patients with IBS-D (102).

Although some reports show that a proportion of IBS patients relate their symptoms to fatty foods, no consistent dietary differences in fat consumption have been observed between IBS patients and controls (102).

1.2.4 Protein

The majority of dietary protein is absorbed after being hydrolyzed into amino acids and peptides. Almost 20% of the dietary protein enters and reach the distal colon and is putrefied (fermented) by colonic bacteria producing ammonia, amines, phenols and sulfides (114, 115). Ammonia is essential for the bacterial metabolism and for protein synthesis. In addition, branched chain fatty acids (isovalerate and isobutyrate) (115, 116) and short chain fatty acids (butyrate) from amino acids reductive deamination (115, 117) are produced at the distal colon in the absence of carbohydrate fermentation (which occurs at the proximal colon) (115). Another product of protein putrefaction is sulphur-containing gas (hydrogen sulphide) which gives a foul odor (114). Products of the protein putrefaction are potentially harmful, phenols are carcinogenic for other systems and hydrogen sulphide is toxic to the epithelium. However, concerning IBS, only the malodourous flatus is of concern to the patients and no certain effects of malabsorbed proteins on intestinal motility or visceral hypersensitivity is known (114).

Gluten is a group of proteins found in wheat, barely and rye and is the cause of coeliac disease presenting with symptoms mimicking IBS (114). The intake of gluten causes the activation of the immune system that leads to a change in the mucosal barrier function causing increased intestinal permeability. A gluten-free diet usually reduces bowel frequency in human leukocyte antigen (HLA)-DQ2/8 positive patients with diarrhea-predominant IBS (IBS-D) due to the reduction of the intestinal permeability

(118). In addition, a gluten-free diet improves symptoms of IBS due to the reduction of FODMAPs in wheat rather than gluten in foods where gluten is also a common component (119).

1.2.5 Food chemicals

Natural chemicals such as amines, glutamates and salicylates occur in foods. Salicylates are found in plants whereas amines and glutamates are products of protein breakdown in animal meat (120). Food additives such as glutamates are used as flavor enhancers, and benzoates, sulfites, and nitrates as preservatives (120). These bioactive chemicals interact with the GI luminal chemoreceptors and influence the function of the enteric nervous system of the gut (114). A low food chemical diet may be beneficial in IBS. There is no evidence if reduction of caffeine or ethanol consumption is beneficial in IBS (114).

1.2.6 Dietary guidance

Most IBS patients believe that diet plays a significant role in the development of their symptoms (80, 81). Therefore, they make a conscious choice to avoid certain food items, some of which belong to the FODMAPs group. However, they tend to consume other food items that are rich in FODMAPs and avoid food sources important to their health (24). A Norwegian study on food intolerance and IBS showed that 62% of its subjects limited or excluded some food items from their daily meals and 12% of them made drastic changes in their diet that could result in nutritional deficiencies in the long run (81). Patients with IBS tend to have low intake of calcium, potassium, magnesium, vitamin A, vitamin B₁₂ and riboflavin (vitamin B₂) (24, 121-123). Another Norwegian study, which compared two different groups of IBS patients, where one group received dietary guidance and the other group did not receive guidance, showed that dietary guidance helped in reducing IBS symptoms, improved their quality of life and normalized the patients' consumption of necessary vitamins and minerals thus avoiding deficiencies (24). Several studies were performed based on

a FODMAP-poor diet that resulted in the improvement of the symptoms of IBS patients (86, 93, 94, 124-129).

1.3 Endocrine cells of the gut

Several functions of the gastrointestinal tract, such as motility, secretion, absorption, microcirculation, local immune defense and cell proliferation and food intake, are controlled and regulated by a local regulatory system; the neuroendocrine system (NES) of the gut. This regulatory system is independent of the central nervous system (CNS), but communicate and integrate with it (34, 130-135).

The NES consists of two parts: a) the endocrine cells of the gut and b) the enteric nervous system (ENS) including peptidergic-, serotonergic- and nitric oxide containing nerves in the gut walls, Fig. 2 (12). The different parts of the NES interact and integrate with each other and with the afferent and the efferent neurons of the CNS, particularly the autonomic nervous system (34, 130, 131).

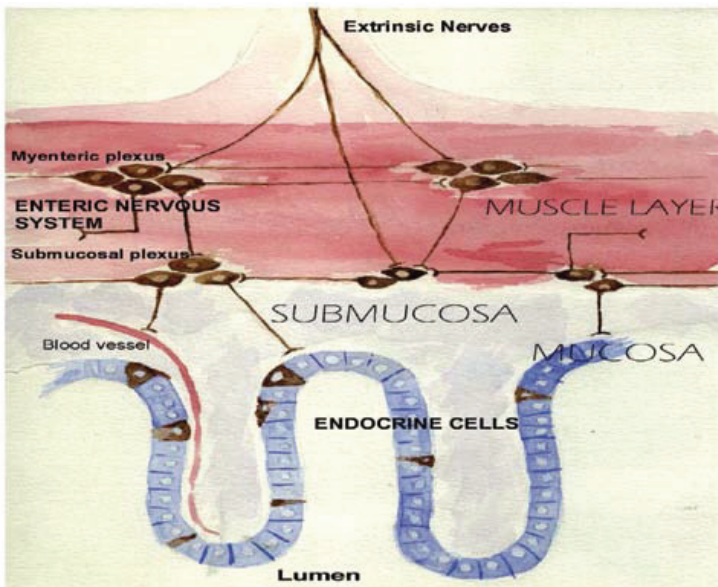


Figure 2: Schematic drawing of the neuroendocrine system (NES). Reproduced from (12) with permission from the authors and the publisher.

The endocrine cells of the gut, which are scattered among the epithelial lining of the gut lumen (135-138), comprise almost one percent of all epithelial cells in the gut and are considered to be the largest endocrine organ in the body (138-140). All epithelial cell types (including the endocrine cells) originate from pluripotent stem cells of an endodermal origin (141-150). The differentiation of stem cells into endocrine cells in the gut is rapid, over a period of 2-4 days (151, 152). The endocrine cells project specialized microvilli into the lumen, which sense the luminal contents (mainly nutrients) and release specific hormones into the lamina propria (135, 136, 153-163). There are at least 15 different types of endocrine cells in the GI tract based on the types of hormones they release (34, 144), Table 5 (12, 34). The types of released hormones depend on the types of sensed nutrients (carbohydrates, fat and proteins) (34, 130, 164), Fig. 3 (164). These hormones exert their effect through different modes of action: endocrine (through blood circulation to distant targets), paracrine/autocrine (locally), synaptic signaling or by neuroendocrine means (being released from synapses into blood circulation) (34, 130, 131, 164).

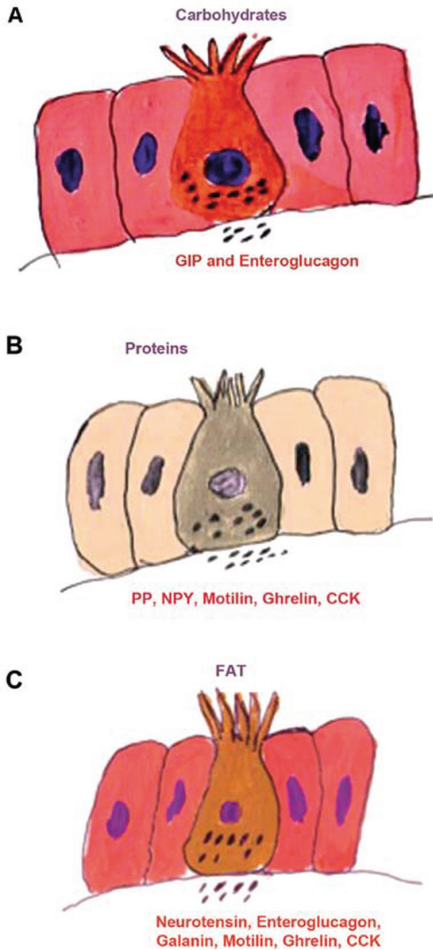


Figure 3. The gut hormones released into the interstitial fluid of the lamina propria in response to intraluminal nutrient content vary according to the proportions of (A) carbohydrates, (B) proteins and (C) fats. These hormones may act in an endocrine/paracrine manner or as neurotransmitters/neuromodulators of neurons in the ENS. Reproduced from (164) with permission from the authors and the publisher.

The different types of endocrine cells are located either in specific areas of the gut or throughout the gut (130, 144, 164, 165). Serotonin- and somatostatin-producing cells are found throughout the GI tract, while ghrelin- and gastrin-producing cells are found in the stomach and those producing polypeptide YY (PYY) and oxyntomodulin (enteroglucagon) are located in the lower small and large intestines (130, 144, 164, 165).

Table 5. Hormones of the endocrine cells of the gastrointestinal tract.

Hormone	Function	Mode of action	Cellular origin	Released by
Gastrin	Stimulates gastric acid secretion and histamine release; trophic action on gastric mucosa and stimulates contraction of lower esophageal sphincter and antrum.	Endocrine.	Gastric G-cell.	Intraluminal peptides; amino-acids; calcium; catecholamines; low pH and prostaglandins.
Ghrelin	Ghrelin increases appetite and feeding; stimulates gastric and intestinal motility.	Endocrine.	Gastric oxyntic X/A cell.	Protein and fat ingestion. Suppressed by carbohydrate ingestion.
Secretin	Stimulates pancreatic bicarbonate and fluid secretion; inhibits gastric emptying; and inhibits contractile activity of small and large intestine.	Endocrine.	Intestinal S cell.	Acidification. Inhibited by somatostatin.

Table 5. (Continued)

Hormone	Function	Mode of action	Cellular origin	Released by
Somatostatin	Inhibits intestinal contraction, gut exocrine and neuroendocrine secretions.	Paracrine, endocrine.	Gastric and intestinal D cell, myenteric and submucosal neurons.	Mixed meal and acidification of the stomach.
Oxyntomodulin (enteroglucagon)	Inhibits gastric and pancreatic secretions.	Endocrine.	Intestinal L cell.	Intraluminal carbohydrates and fat.
Serotonin	Stimulates gastric antrum, small intestinal and colonic motility.	Paracrine mediator, transmitter.	Enterochromaffin cells, myenteric and submucosal neurons.	Noradrenalin; acetylcholine; acidification and intraluminal pressure.
Peptide YY (PYY)	Major 'ileal brake' mediator. Delays gastric emptying; inhibits gastric and pancreatic secretion.	Endocrine, paracrine.	Intestinal H/L cell.	Protein- rich meal.
Pancreatic polypeptide (PP)	Inhibits pancreatic secretion; relaxes gall bladder; and stimulates motility of stomach and small intestine.	Endocrine.	Intestinal PP cell	Protein- rich meal.

Table 5. (Continued)

Hormone	Function	Mode of action	Cellular origin	Released by
Neuropeptide Y (NPY)	Causes vasoconstriction. Inhibits pancreatic and intestinal secretions; reduces gastrointestinal motility.	Transmitter, mediator.	Myenteric and submucosal neurons.	Protein- rich meal.
Motilin	Induces phase III migrating motor complex.	Endocrine.	Intestinal M cell.	Protein and fat.
Cholecystokinin (CKK)	Inhibits gastric emptying; stimulates gall bladder contraction, intestinal motility and pancreatic exocrine secretion; stimulates growth; and regulates food intake.	Endocrine transmitter?	Intestinal I cells, myenteric and submucosal neurons.	Intraluminal protein and fat. Inhibited by somatostatin.
Gastric inhibitory peptide (GIP)	Incretin. Inhibits gastric acid secretion.	Endocrine.	Small intestinal cells.	Intraluminal glucose, amino-acids and fat.

Table 5. (Continued)

Hormone	Function	Mode of action	Cellular origin	Released by
Vasoactive inhibitory polypeptide (VIP)	Causes vasodilation. Stimulates GI and pancreatic secretions; relaxes smooth muscles of the gut.	Transmitter, mediator.	Myenteric and submucosal neurons.	Serotonin.
Neurotensin	Stimulates pancreatic secretion; inhibits gastric secretion; delays gastric emptying; and stimulates colonic motility.	Endocrine transmitter, mediator.	Intestinal N cell, myenteric and submucosal neurons.	Fat.
Galanin	Inhibits gastric, pancreatic and intestinal secretions; delays gastric emptying and intestinal transit; and suppresses postprandial release of some neuroendocrine peptides.	Transmitter, mediator.	Myenteric and submucosal neurons.	Fat.

Table 5. (Continued)

Hormone	Function	Mode of action	Cellular origin	Released by
Substance P	Causes vasodilation. Stimulates smooth muscle contraction; and inhibits gastric acid secretion.	Transmitter, mediator.	Myenteric and submucosal neurons.	Gut distention.
Nitric oxide (NO)	Relaxation of smooth muscle.	Transmitter.	Myenteric and submucosal neurons.	Activation of protein kinase C alpha and/or epsilon.

1.4 Interaction between diet and endocrine cells of the gut

The release of different gut hormones is triggered by different nutrients in the gut lumen. Proteins and fat trigger the release of serotonin, somatostatin, ghrelin and PYY and carbohydrates suppress ghrelin release, while carbohydrates and fat trigger the release of oxyntomodulin (enteroglucagon) (164), Fig. 3. The gut endocrine cells, their locations, mode of action and functions are summarized in Table 5. The endocrine cell types discussed in this thesis shall be touched upon briefly.

Chromogranin A (CgA) is a member of the granin (chromogranin-secretogranin) family and is located within the vesicles of neurons and endocrine cells (166-168). CgA is considered to be a common marker for the endocrine cells of the gut and endocrine tumors (166, 167, 169, 170).

Ghrelin is produced primarily by the endocrine cells in the oxyntic mucosa of the stomach. Ghrelin accelerates gastric as well as small- and large-intestinal motility, stimulates the secretion of gastric acid (136, 164, 171-181) and plays an important

role in releasing growth hormone and in regulating appetite and energy metabolism (164, 182-185).

Gastrin is the main hormonal stimulant of gastric acid secretion (164, 186, 187). It also stimulates histamine release and the contractions of the lower esophageal sphincter and antrum (164). The release of gastrin is inhibited by somatostatin (164).

Serotonin is a paracrine messenger used by the enterochromaffin cells as a sensory transducer. It also activates the submucosal sensory branch (Meissner's plexus) of the enteric nerve, which conveys sensation from the gut to the CNS and modulates the gut's visceral sensitivity (164, 188-193). Serotonin stimulates large intestinal motility, accelerates transit through both the small and large intestines (164, 188-196) and inhibits gastric emptying and gastric acid secretion (164).

Somatostatin inhibits intestinal contraction (major 'ileal brake' mediator) and inhibits gastrointestinal exocrine and neuroendocrine secretion (34, 130, 164). It also delays gastric emptying, inhibits gastric acid secretion and stimulates the absorption of water and electrolytes in the large intestine (164).

PYY is considered a major 'ileal brake' mediator (164, 197). In addition, it stimulates the absorption of water and electrolytes, and delays gastric emptying (164).

There is an increasing body of evidence that IBS may be a disorder of the NES of the GI tract and the densities of different types of endocrine cells throughout the different segments of the GI tract have been found to be abnormal in IBS patients (3, 52, 136, 170, 197-204). An altered NES is responsible for abnormal functions of the GI tract such as sensation (visceral hypersensitivity), dysmotility and abnormal secretion, Table 6, all of which are the characteristics of IBS.

Table 6: Abnormalities of the GI tract functions in IBS.

Abnormality	Definition	Proposed mechanisms
Visceral hypersensitivity	Reduced pain threshold in the bowel during rectal balloon dilatation (rectal hypersensitivity) or other methods that increase pressure in the bowels viscera (205, 206).	<p>1) Gut-brain axis (parasympathetic and sympathetic nervous systems) (52).</p> <p>2) Changes in serotonin metabolism by serotonin transporter (reduced SERT) (207, 208).</p> <p>3) Abnormal endocrine cells of the gut (serotonin cell densities) (52, 209).</p>
Dysmotility	Abnormal bowel motility (transit time and bowel contractions) in IBS (52, 67, 210) that may contribute to pain and changes in stool pattern (67).	<p>- Transit time in small and large bowels increases in IBS-C and decreases in IBS-D (52, 211-217).</p> <p>- Abnormal endocrine cells of the gut (ghrelin, serotonin, CCK and PYY) (52).</p>

Table 6. (Continued)

Abnormality	Definition	Proposed mechanisms
Abnormal secretion	Increased intestinal secretion and decreased pancreatic secretion (functional pancreatic insufficiency) (52).	<ul style="list-style-type: none"> - Increased intestinal secretion due to bile acid perfusion in the ileum (52, 218). - Increased reactivity of the small intestinal sensory component of the migrating motor complex in IBS-D (52, 219) - Abnormal endocrine cells of the gut (CCK and PYY) (52).

Due to the fact that the release of different gut hormones is triggered by food, food quantity and composition would be expected to influence the development of IBS symptoms. To date, the interaction between food intake and the GI endocrine cells has not yet been explored.

2. AIMS OF THE STUDY

The overall aim of this PhD thesis was to investigate the effect of dietary guidance including a FODMAP-poor diet on the symptoms and quality of life of IBS patients and to verify whether this effect is accompanied by changes in the endocrine cells in the stomach and the large intestine.

The specific aims of the papers included in this thesis were:

Paper I

To investigate the effect of dietary guidance by shifting from a typical Norwegian diet to a FODMAP-poor diet, on the symptoms and quality of life and habitual diet of IBS patients.

Paper II

To investigate the effect of dietary guidance outlined above on the total gastric endocrine cells as detected by CgA in IBS patients.

Paper III

To identify which gastric endocrine cell types are affected after receiving dietary guidance in the same cohort of IBS patients.

Paper IV

To investigate the effect of dietary guidance mentioned above on the total endocrine cells in the large intestine as detected by CgA in the same cohort of IBS patients.

Paper V

To determine which types of large intestinal endocrine cells are affected after receiving dietary guidance in the same cohort of IBS patients.

3. MATERIALS AND METHODS

3.1 Patients and controls

Patients who were referred to the section of gastroenterology at Stord Helse-Fonna Hospital (Stord, Norway), who fulfilled the Rome III criteria for the diagnosis of IBS were included in the study. Patients of both genders and aged between 18 and 70 years were included. Exclusion criteria comprised the presence of organic gastrointestinal or other systemic diseases, women who were pregnant or lactating, drug abuse, serious psychiatric diseases and cooperation issues. In addition, patients who had undergone abdominal surgery were excluded except for appendectomy, cesarean section and hysterectomy.

Six patients were regularly using one or a combination of several medications. Four patients consumed proton pump inhibitors (PPI), one used an antihypertensive (angiotensin II receptor antagonist), three patients used medications against allergies, two consumed contraceptive pills, two took thyroxin substitution tablets, one used an inhalator against asthma, and two used antidepressants/anxiolytics. These patients were informed not to take any kind of PPI during the study.

The control group consisted of patients with gastrointestinal bleeding, where the source of bleeding was identified as hemorrhoids ($n=3$) or angiodysplasia ($n=1$), or healthy subjects who underwent endoscopy due to health worries caused by family member(s) having been diagnosed with gastrointestinal cancer ($n=10$). The control group included 14 subjects (nine females and five males with a mean age of 54 years [range 26-70 years]) who underwent gastroscopy. One male of the control subjects with a familial history of gastrointestinal cancer did not consent to colonoscopy, therefore; only 13 control subjects (nine females and four males) underwent colonoscopy.

3.2 Study design

Forty-six patients were included in the study. This included 35 females and 11 males with a mean age of 35 years (range, 18-69 years). Of these, 21 reported diarrhea (IBS-D), 18 reported constipation (IBS-C) and seven reported a mixture of both symptoms (IBS-M) as the predominant symptom of IBS. The patients underwent a complete physical examination, a gastroscopy with duodenal biopsies (to exclude celiac disease), a colonoscopy with segmental biopsies (to exclude microscopic colitis) and several blood tests to exclude other organic causes for their symptoms. Each patient received three 45-min sessions of individualized dietary guidance with a registered nurse with a specific education in IBS diet, at intervals of at least 2 weeks. The patients were asked to complete the following questionnaires before and 3–9 months (median, 4 months) after receiving the last session of the dietary guidance: The Birmingham IBS symptom score questionnaire, the IBS-Quality of Life (IBS-QOL) questionnaire, the Norwegian version of the Short-Form Nepean and Dyspepsia Index (SF-NDI) questionnaire and the MoBa Food Frequency Questionnaire (MoBa FFQ). The patients also underwent a second gastroscopy and colonoscopy with new biopsy sampling 3–9 months (median, 4 months) after receiving the last session of dietary guidance.

3.3 Individualized dietary guidance

Dietary guidance was delivered orally with the help of charts and written illustrations. During the first session, the patients received general information about IBS. The patients were informed about the importance of keeping a regular and healthy eating pattern, and to avoid consuming food items rich in FODMAPs and insoluble dietary fibers that worsen IBS symptoms. During the study, the patients were supposed to test alternating diets that were rich in protein followed by protein-poor diet each for 2-3 days, then fat-rich/poor and carbohydrates-rich/poor diets in the same manner as for proteins. The patients were asked to register for 2 weeks in a diary the time and type

of food and fluids they consumed daily along with any associated symptoms, including the frequency and degree of abdominal pain and distension, and the stool frequency and consistency. The consumption of food supplements containing probiotics, antibiotics and other medications such as PPI was prohibited during the study.

In the second session, the information given during the first session was briefly repeated and the patients' diary was used to identify the food items that triggered IBS symptoms. Based on the obtained information, the patients were asked to alter their diet proportions of protein, fat and carbohydrates, and to consume vegetables and fruits that were low in FODMAPs and contained soluble fibers instead of foods rich in FODMAPs as well as insoluble fibers, Table 7.

During the third session, each patient gave his/her feedback about the dietary guidance to the nurse, and together with the nurse designed a suitable diet for the patient to follow until the end of the study.

Table 7. Examples of food items rich with FODMAPs (not allowed) and FODMAP-poor items (allowed).

FODMAP-rich (not allowed)	FODMAP-poor (allowed)
Wheat	Spelt and spelt products
Pasta	Meat
Maize	Fish
Mushrooms	Chicken
Onion	Fat and oil
Garlic	Rice
Paprika	Potato
Banana	Carrots
Beans	Apples and pears (peeled)
Peas	Citrus fruits

Table 7. (Continued)

FODMAPs-rich (not allowed)	FODMAPs-poor (allowed)
Grapes	Tomato
Cauliflower	Lactose-free milk
Broccoli	Lactose-free dairy products
Carbonated drinks	Coffee and tea
Artificial sweeteners	Chocolate
	Alcohol

3.4 Assessments and investigations

3.4.1 Questionnaires

3.4.1.1 The Birmingham IBS symptom score questionnaire

This questionnaire was developed for assessing the symptoms of IBS patients. The dimensions of the questionnaires are reliable, sensitive, and with good external validity (220). The questionnaire consists of 11 questions focusing on 3 domains: pain (3 items), diarrhea (5 items) and constipation (3 items), and the responses to the questions are measured on a six-point Likert scale, ranging from 0 (none of the time) to 5 (all of the time) (Appendix I). Lower scores indicate improved symptoms.

3.4.1.2 The IBS-Quality of Life (IBS-QOL) questionnaire

This 34-item questionnaire, which is validated in IBS, measures specifically the quality of life of IBS patients by assessing physical and psychosocial functioning as a result of IBS (221, 222). It comprises eight domains; dysphoria, interference with activity, body image, health concerns, food avoidance, social reaction, sexual function and impact on relations. The following five-point Likert scale is used in the questionnaire's responses: not at all, slightly, moderately, quite a lot and extremely

(Appendix II). Lower scores indicate reduction in the quality of life related to these domains.

3.4.1.3 The Norwegian version of the Short-Form Nepean Dyspepsia Index (SF-NDI) questionnaire

The questionnaire consists of five subscales scores with two items each, and is a disease-specific measure of the health-related quality of life (HRQoL). The five subscales are: tension, interference with daily activities, disruption to regular eating/drinking, knowledge towards/control over disease symptoms and interference with work/study. The answer to each question consists of five options, ranging from 1 (not at all) to 5 (extremely); and the total score ranges from 10-50. Higher scores indicate worse functioning or symptoms (quality of life). This questionnaire was constructed and validated originally for patients with dyspepsia (223). A Norwegian translation of the questionnaire was validated for patients with IBS (224) (Appendix III).

3.4.1.4 The MoBa Food Frequency Questionnaire (MoBa FFQ)

A semi-quantitative, self-administered questionnaire used to assess dietary intake. The MoBa FFQ reports the frequency of consumption of line items (225 food items/ beverages, grouped according to typical Norwegian meal patterns) and their portion size over a defined period of time. It is designed to capture the dietary habits and the meal patterns of the participant. The analysis of the questions is done using software for nutrient calculations. This questionnaire was developed and validated by the Norwegian Institute of Public Health in Oslo, Norway (225, 226) (Appendix IV).

3.4.2 Tissue sampling

Following an overnight fast and bowel preparation, both the patients and controls were examined with gastroscopies with biopsy samples taken from the corpus and the antrum of the stomach, and colonoscopies with biopsy samples taken from each

segment of the colon and the rectum. These investigations were performed before the first session and at 3–9 months (median, 4 months) following the third session of dietary guidance.

3.4.3 Histopathology and immunohistochemistry

The biopsy samples were fixed in 4% buffered paraformaldehyde overnight, embedded in paraffin wax, and then were cut into 5- μ m sections. Biopsy samples from the stomach and duodenum underwent histopathological examinations. Biopsy samples from the stomach (paper II and III) and large intestine (paper IV and V) were stained with hematoxylin and eosin and immunostained with the avidin-biotin complex method using a Vectastain ABC kit (Vector laboratories, Burlingame, CA, USA) and the chromogen 3,3'-diaminobenzidine peroxidase substrate (DAB) kit (Vector Laboratories) as described in the papers.

3.4.4 Computerized image analysis

The density of the different endocrine cells in the stomach and large intestine in patients with IBS and controls were measured using Olympus Cell^D software, Olympus, (Tokyo, Japan). The number of immunoreactive positive cells and the area of the epithelial cells were measured in 10 randomly selected fields, using the magnification $\times 40$. At this magnification each field represented a tissue area of 0.14 mm². The cell density was expressed as the number of cells/mm² of the epithelium. The quantifications were performed by one and same person (Tarek Mazzawi), who was blinded to the identity of the sections. Computer image analysis was used for quantifying endocrine cells and for studying the changes in the number of endocrine cells (227).

3.5 Ethics

All studies were performed according to the Declaration of Helsinki and were approved by local ethics committees. Oral and written consents to participate in the studies were obtained from the patients.

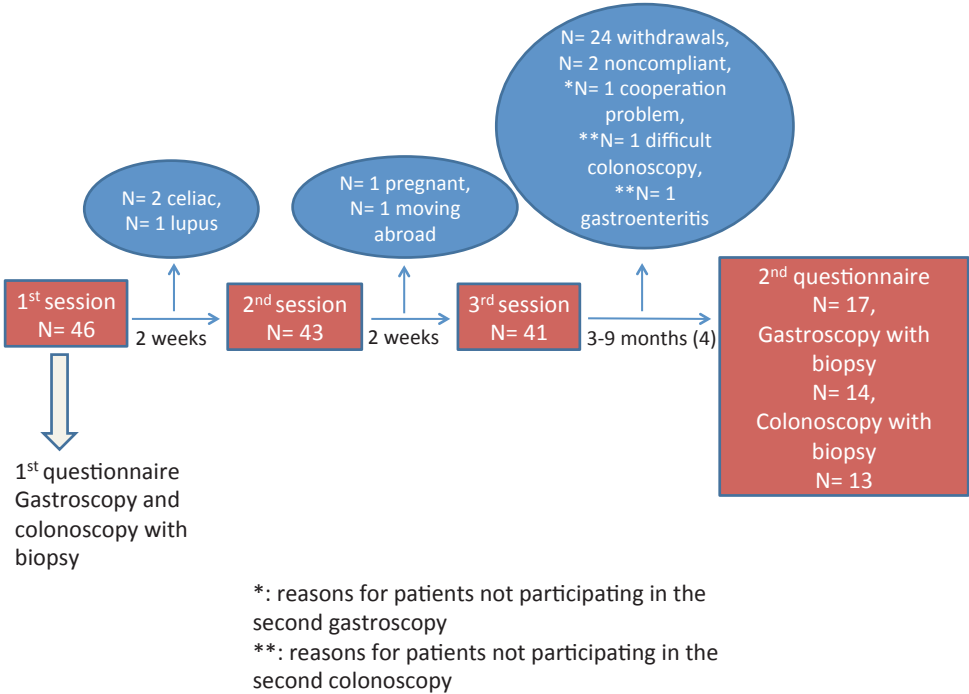
3.6 Statistical analysis

The paired *t*-test was used to analyze the data of the patients before and after receiving dietary guidance and the unpaired *t*-test was used to analyze the data of the patients who fulfilled the entire study and those who did not. The data are presented as the mean \pm standard error of mean (SEM). $P < 0.05$ was considered to indicate a statistically significant difference.

4. RESULTS

Forty-six patients were included in the study; some did not complete the entire study and withdrew their consents or were excluded at different stages of the study due to different reasons, as shown in the flow chart, Fig. 4.

Figure 4. Flow chart of the patients during the study.



4.1 Paper I

Seventeen patients (12 females and five males, mean age of 34 years; range, 20-45 years) completed the four questionnaires before and 3-9 months (median 4 months) after dietary guidance:

1) *Birmingham IBS symptom score questionnaire*. The total scores of the Birmingham IBS symptom score questionnaires before and 3-9 months after receiving dietary guidance were significantly reduced from 41.47 ± 1.62 and 35.71 ± 1.12 , respectively, ($P=0.001$). The questionnaire's dimensions; abdominal pain and diarrhea were also significantly reduced following dietary guidance ($P=0.003$, 0.018 , respectively), however, the reduction for constipation was not statistically significant ($P=0.06$). By comparing the Birmingham's total-, abdominal pain-, diarrhea-, and constipation-scores between the patients who fulfilled the entire study and those who did not, we found that there were not significant differences between them ($P=0.9$, 0.5 , 0.5 , 0.9 , respectively).

2) *IBS-QOL*. The total IBS-QOL score increased significantly from 125.4 ± 4.2 to 136.8 ± 3.8 following dietary guidance ($P=0.003$). This improvement was statistically significant in all domains, with the exception of the impact on relations. There was no significant difference between the patients who completed the entire study and those who did not ($P=0.3$).

3) *SF-NDI*. The total SF-NDI scores (which reflect the reduction in health related quality of life (HRQoL)) before and following dietary guidance were 29.1 ± 2.2 and 20.2 ± 1.5 , respectively. This improvement in HRQoL was statistically significant ($P=0.002$). No significant difference was found between the patients who completed the entire study and those who did not ($P=0.4$).

4) *MoBa FFQ*. The dietary guidance did not affect the meal pattern in the patients with IBS. There were no statistically significant differences in the intake of calories,

carbohydrate (total and starch), fiber, protein, fat (total, saturated and trans-, mono- and polyunsaturated), sugar or alcohol in the patients with IBS who received dietary guidance. There was a statistically insignificant increase in the consumption of various dairy products, but the consumption of dairy products with probiotic supplements was reduced, which is in line with our recommendation during the study. Although the intakes of β -carotene, retinol equivalents, calcium and riboflavin were increased, only the increase in vitamin B12 was statistically significant. A significant reduction was noted in the daily total consumption of fruits and vegetables rich in FODMAPs from 16.2 ± 5.3 g before receiving dietary guidance to 9.2 ± 3.2 g after receiving dietary guidance ($P=0.02$). However, no significant difference was found in the daily consumption of fiber before receiving dietary guidance (27.4 ± 2.5 g) compared to after receiving dietary guidance (23.1 ± 2.2 g, $P=0.09$).

4.2 Paper II

Only 14 patients completed the study and underwent a second gastroscopy as illustrated in Fig. 4. They were nine females and five males with a mean age of 34 years (range, 20-45 years). The esophagus, stomach and duodenum had normal macroscopic and microscopic findings. CgA immunoreactive cells were identified in the mucosa of the stomach in both groups. An immunoreactive endocrine cell was either basket- or flask-shaped with/without a long basal cytoplasmic process, Fig. 5. The densities of the CgA-immunoreactive cells in the corpus in patients with IBS prior to and following dietary guidance were increased significantly ($P=0.0064$), however, there was no significant increase in the densities of CgA-immunoreactive cells in the antrum of these patients ($P=0.2$), Table 8.

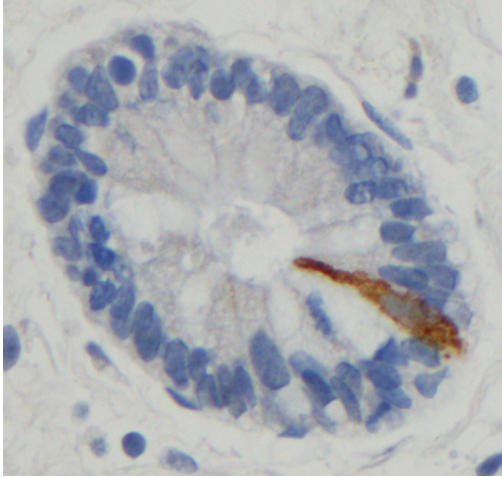


Figure 5. A flask-shaped intestinal PYY immunoreactive cell (brown color). Note that the cell extended in the crypt to the gut lumen.

4.3 Paper III

Of the 46 patients included in the study only 14 patients (nine females and five males with a mean age of 34 years; range, 20-45 years) completed the study and underwent a second gastroscopy as illustrated in the flow chart, Fig. 4.

Upper endoscopy of the esophagus, stomach and duodenum revealed a normal appearance, and histopathological examinations of these structures were normal. Ghrelin-positive cells were found only in the oxyntic mucosa of the corpus, and gastrin-positive cells were found exclusively in the antrum, whereas serotonin- and somatostatin-immunoreactive cells were found in the mucosa of both the corpus and antrum in the patients and controls. The number of histamine immunoreactive cells in the biopsy samples used in the study was low and did not allow reliable quantification. The quantification of gastric endocrine cells showed that only somatostatin immunoreactive cells in the corpus in IBS patients increased significantly after receiving dietary guidance ($P = 0.02$). The rest of the gastric endocrine cell densities are shown in Table 8.

Table 8. Densities of immunoreactive endocrine cells in the corpus and antrum in the stomach of control subjects and of IBS patients before and after receiving dietary guidance.

Hormone (location)	Endocrine cell densities (cells/mm²)			P-value
	Control	Before guidance	After guidance	
Chromogranin A (corpus)	147.9±15.8	62.6±9	102.0±14.0	0.006 ^b
Chromogranin A (antrum)	87.7±20.3	28.5±6.5	46.5±11.0	0.2
Ghrelin (corpus)	149.6±36.2	114.5±32.7	161.8±37.8	0.09
Gastrin (antrum)	155.8±21.0	159.4±24.3	211.6±28	0.26
Serotonin (corpus)	18.2±3.9	10.6±3.4	14.0±2.0	0.4
Serotonin (antrum)	44.6±12.2	1.7±0.5	14.7±6.3	0.06
Somatostatin (corpus)	40±7.7	23±3	37.3±4.2	0.02 ^a
Somatostatin (antrum)	138.9±22	95.6±15.9	86±16.9	0.6

Data are presented as the mean±SEM. a: $P < 0.05$, b: $P < 0.01$

4.4 Paper IV

Of the 46 patients recruited in the study, only 13 patients completed the study and underwent a second colonoscopy; these patients comprised 8 females and 5 males with a mean age of 34 years (range 20–45 years) as illustrated in the flow chart, Fig. 4.

The colon and rectum were macroscopically normal and the histopathological examinations revealed normal structures in both patients and controls. CgA-immunoreactive cells were found in the mucosa of both the colon and rectum of the patients and controls.

The densities of CgA cells in the total, right and left colon of IBS patients were statistically significantly increased after receiving dietary guidance ($P=0.0032$, 0.0157 and 0.0039 , respectively) as shown in Table 9. However, the cell density in the rectum did not differ significantly before and after receiving dietary guidance in the IBS patients ($P=0.47$), Table 10.

4.5 Paper V

Thirteen of the original 46 patients completed the study, comprising 8 females and 5 males with a mean age of 34 years (range 20–45 years) and underwent a second colonoscopy, as illustrated in the flow chart, Fig. 4. The colonoscopies indicated that the colon and rectum were normal both macroscopically and microscopically in both patients and controls. Immunoreactive endocrine cells were found in the mucosa of both the colon and rectum of the patients and controls. The numbers of pancreatic polypeptide- and, oxyntomodulin (enteroglucagon)-immunoreactive cells in the biopsy samples of the colon and rectum used in the study were too low to allow reliable quantification. There were also too few somatostatin cells in the colon to allow reliable quantification.

The density of serotonin cells in the total colon and the right colon of IBS patients increased significantly ($P=0.007$ and $P<0.0001$, respectively) after receiving dietary guidance. The density of serotonin cells in the left colon also increased after receiving dietary guidance, but this increase was not statistically significant ($P=0.53$). The endocrine cell densities in the colon in the control subjects and patients are shown in Table 9.

The densities of PYY cells in the controls and patients are summarized in Table 9. The density of PYY cells of IBS patients increased significantly ($P=0.04$) in the left colon but did not increase significantly in the total colon and the right colon ($P= 0.06$ and $P= 0.1$, respectively) after receiving dietary guidance.

In the rectum, the densities of serotonin, PYY and somatostatin cells in controls and patients are reported in Table 10. The densities of PYY- and serotonin-immunoreactive cells in the rectum of IBS patients did not change significantly ($P=0.13$ and $P=0.06$, respectively) after receiving dietary guidance. However, the somatostatin cell density of IBS patients increased significantly ($P= 0.01$) after receiving dietary guidance.

Table 9. The densities of chromogranin A-, serotonin- and PYY-immunoreactive cells in the total colon, right colon, and left colon in control subjects and in IBS patients before and after receiving dietary guidance.

Hormone/location	Endocrine cell densities (cells/mm ²)			P-value
	Control	Before guidance	After guidance	
Chromogranin A				
Total colon	83.3±10.1	38.6±3.7	64.7±4.2	0.0004 ^b
Right colon	33.7±5.3	16.7±1.9	24.4±2.1	0.0157 ^b
Left colon	49.6±6.0	21.9±2.7	40.3±3.6	0.0039 ^b
Serotonin				
Total colon	46.8± 8.9	10.5±2.1	22.6±3.2	0.007 ^b
Right colon	25.9±5.4	1.2±0.8	10.7±1.6	<0.0001 ^c
Left colon	20.9±4.8	8.9±1.7	10.6±1.9	0.53
PYY				
Total colon	11.6±1.8	10.8±1.7	16.8±2.1	0.06
Right colon	3.9±0.8	2.9±0.8	5.5±1.1	0.1
Left colon	7.7±1.4	7.9±1.0	11.5±1.1	0.04 ^a

Data are presented as the mean±SEM. a $P<0.05$, b $P<0.01$ and c $P<0.0001$.

Table 10. Densities of chromogranin A, serotonin-, PYY-, and somatostatin-immunoreactive cells in the rectum of control subjects and of IBS patients before and after receiving dietary guidance.

Hormone	Endocrine cell densities (cells/mm²)			<i>P</i> -value
	Control	Before guidance	After guidance	
Chromogranin A	49.0±7.9	42.7±6.5	47.6±5.0	0.47
Serotonin	37.7±10.5	31.9±6.4	19.6±4.5	0.06
PYY	32.5±5.1	38.4±5.0	31.5±3.7	0.13
Somatostatin	13.5±3.0	13.2±3.0	22.3±3.2	0.01 ^a

Data are presented as the mean±SEM. a *P*<0.05.

5. GENERAL DISCUSSION

5.1 Patients

There was no significant difference regarding age ($P= 0.8$), gender ($P=0.7$), symptoms and quality of life (see Results section) between the patients who completed the whole study and those who did not. This means that the results obtained from the remaining small sample are non-selective and representative of the entire group of patients who were originally included.

5.2 Diet

Diet is considered to be one of the important factors for the development of IBS symptoms as the majority of the patients relate their symptoms to certain foods (61, 80, 81), so choosing the right kind of food is important for reducing these symptoms (84). FODMAPs have positive effects on the colonic microbiota, therefore, colonic health (228-230). Butyrate, a short chain fatty acid and a product of colonic bacterial fermentation of carbohydrates, is the major energy element for colonic epithelium (231, 232), also a regulator of colonocyte proliferation and apoptosis and has an immunomodulatory effect (228, 233). Thus, fermentable carbohydrates in the colon have potential anti-carcinogenic and anti-inflammatory effects (228, 234). The FODMAP-poor diet is proven to be efficient in reducing IBS symptoms (24, 83, 125, 128, 235). The problem with this kind of diet resides in following it for a long time without previously receiving proper guidance, which can cause health problems, for example lack of nutrients (24) (especially calcium (127)) and reduction of luminal bifidobacteria (127) and fecal microbiota (228). Therefore, avoiding such adverse effects of long-term usage of a FODMAP-poor diet requires the administration of dietary guidance (83).

5.3 Dietary guidance

Due to the impact of IBS on the patients' health and economy, educating patients facilitate changes in their behavior for the purpose of disease management and prevention (87). The lack of evidence-based guidelines for dietary management of IBS in practice (84, 236) is probably the reason for the absence of an effective educational model for IBS patients (87). However, guidance has been recently developed for improving the dietary approach available (114, 237). The patients are mainly interested in learning about dietary modifications, coping strategies and the causes of IBS (87). In the individual dietary guidance given during this study, information was delivered orally as well as written illustrations. Patients often tend to select parts of any diet that appeal to them and ignore the rest, which could compromise the ability of using only written information to achieve efficacy (83). Therefore, caution must be practiced by clinicians when using such an approach as the ability of using written information only to achieve efficacy has not been studied (83).

The patients received individual dietary guidance and were instructed to try food rich/poor in proteins, fat and carbohydrates and were provided with a list showing some of the foods containing lower FODMAPs they could use in exchange for item rich in FODMAPs, Table 7. This mild dietary restriction did not include all the food items that were rich in FODMAPs with the purpose of providing the patients with dietary instructions that they could adhere to in the future. The patients were asked to register their symptoms in a diary. After reviewing the diaries, we noticed that the symptoms of the patients improved after they reduced their consumption of FODMAP-rich products ($P= 0.02$), Table 11. In spite of the alternating types of diet composition (protein-, fat-, carbohydrates- rich/poor diets), the patients favored using a FODMAP-poor diet primarily to reduce their IBS symptoms, which is in line with previous studies (24, 83, 125, 235).

Table 11. FODMAPs consumed by the patients before and after receiving dietary guidance.

FODMAP-rich items	Before guidance	After guidance
Artificial sweeteners (mg)	0.02	0.01
Soft drinks (sweetened) (ml)	71.3	53.5
Soft drinks (unsweetened) (ml)	91.7	37.5
Dark bread (g)	85.4	48
White bread (g)	3.4	4.4
Pasta (g)	15.1	13.4
Onion, leak or garlic (g)	11.5	1.7
Paprika (raw) (g)	4.9	1.8
Paprika (cooked) (g)	3.3	0.7
Cabbage (raw) (g)	1.5	0.1
Cabbage (cooked) (g)	2.3	0.2
Cauliflower (raw) (g)	1.4	0.7
Cauliflower (cooked) (g)	4.9	4.9
Broccoli (raw) (g)	1.5	1.2
Broccoli (cooked) (g)	5.2	5.4
Banana (g)	24.1	4.7
Beans (g)	0.3	0.3
Peas (g)	2.1	0.4
Grapes (g)	16.2	2.6
Pears (g)	16.5	4.5
Apples (g)	29.3	34.7
Peaches (g)	8.9	6.7
Grapefruit (g)	1.4	0.6
Mushrooms (g)	1.7	1.4
Green beans (g)	0.3	0.3

The patients were advised to replace wheat with spelt and spelt products. Spelt is low in FODMAPs, contains less galactans and fructans than wheat (89) and thus allows the patients to continue consuming food items, such as bread and pasta. In addition, the patients were allowed to consume rice, which is also low in FODMAPs (89), and is completely absorbed in the small intestine thus producing little amount of intestinal gas and is well tolerated by patients with functional GI disorders (238). This could explain why there was not a significant decrease in the consumption of total carbohydrates and rather a significant decrease in FODMAPs after receiving dietary guidance. Furthermore, the patients were told to consume lactose-free milk and lactose-free dairy products that are major sources of calcium and to avoid products containing lactose (82, 83, 122, 236). As a result, three 45-min sessions of dietary guidance provided by a nurse, improved the symptoms and the quality of life of patients with IBS, and improved their vitamin and mineral intake. This indicates that dietary guidance is important in the treatment of IBS.

5.4 Diet and endocrine cells

Despite the fact that delivering dietary FODMAPs to the distal small intestine and proximal colon is physiologically normal, it generates symptoms if the underlying bowel response is exaggerated or abnormal (83). The endocrine cells of the gut are part of the ENS and are found to be abnormal in IBS patients (3, 52, 136, 170, 197-204, 207-209, 239-246). Such abnormalities may explain the abnormal functions in the GI tract in IBS patients namely; visceral hypersensitivity, dysmotility and abnormal secretion (52, 247-249).

CgA is a common marker for the endocrine cells of the gut and is proposed as a biomarker for diagnosis of IBS (170, 239). The densities of CgA immunoreactive cells, representing the total endocrine cells, were abnormal in the gastric corpus and antrum as well as in the colon, but not the rectum, in IBS patients before receiving dietary guidance, which is in accordance with previous studies (170, 201, 241). However, after receiving dietary guidance, the densities of CgA immunoreactive cells

in the stomach and the colon, except for the rectum, changed towards the values of healthy controls. The specific endocrine cell types that have changed towards the values of healthy controls following dietary guidance were gastrin, ghrelin, serotonin and somatostatin cells in the stomach, and serotonin and PYY in the colon. Considering the effect of the hormones secreted by these cells, it is conceivable to conclude that changes in these cells towards normal levels following dietary guidance may contribute to improvements in IBS symptoms associated with disturbed gut motility, visceral hypersensitivity and abnormal gastrointestinal secretion. As for the rectum, such changes did not occur. This is most probably due to fact that the rectum acts only as a fecal reservoir prior to defecation (201) and is not involved in the functions disturbed in IBS patients.

The endocrine cells of the gut play a major role in the regulation of the GI functions and are important players in the pathogenesis of IBS (13, 52, 67, 170, 250, 251). These cells exert their effects through microvilli that extend into the gut lumen to sense the gut's luminal contents, especially nutrients, and respond by releasing specific gut hormones (34, 135, 136, 153-163). The endocrine cells originate from 4-6 pluripotent stem cells in each intestinal crypt. The stem cells differentiate through a series of cellular precursors (progenitors) into all the epithelial cells including endocrine cells (252-261). This differentiation is rapid (approximately 2-4 days) (151, 152). A change in diet may affect the differentiation of stem cells into endocrine cells in a way similar to that in healthy subjects. The observation that dietary guidance can restore the density of endocrine cells in IBS patients to approach the level of healthy subjects, suggests that these changes may be one of the causes for the reduction of IBS symptoms and the improvement in the quality of life of these patients.

6. LIMITATIONS

The main limitation of this study is the low number of the patient cohort studied and the hazard of selecting a sample of patients that does not present the IBS patient population. Clinical studies involving IBS patients are known to suffer a high drop out rate ranging from 33% to 48% (24, 125, 262-264). In this study, 72% of the patient did not complete the entire study. This could be mostly explained by the demanding design of the study, which required adherence to a strict diet for at least 3 months and included a total of four endoscopic examinations (two gastroscopies and two colonoscopies). Of this high percentage, 52% of the patients withdrew their consent to participate due to symptom improvement following dietary guidance, non-compliance or unwillingness to go through four endoscopic examinations. The remaining 20% were excluded after being diagnosed with celiac disease or lupus, becoming pregnant, moving abroad and technical difficulties experienced during some endoscopies. There was no significant difference between the patients who completed the study and those who did not regarding age, gender, symptoms, and quality of life. Thus, a bias sample selection is highly improbable.

7. CONCLUSION AND FURTHER PERSPECTIVES

Individual dietary guidance reduced the symptoms of IBS patients and improved their quality of life. This improvement was accompanied by changes in the densities of the gastrointestinal endocrine cells to normal levels. Regardless of the small sample size, we showed, for the first time, a clear effect of individual dietary guidance on the densities of the endocrine cells in the stomach and the large intestine in IBS patients.

These results strengthen the practice of using dietary guidance in the management of IBS as a first line treatment (84). In addition, the results support that the endocrine cells of the gut are major players in the pathogenesis of IBS. The interactions between these cells and specific types of food result in changing their densities, which either worsen or alleviate IBS symptoms. Further studies on a larger cohort of IBS patients are needed. Moreover the effect of dietary guidance on the small intestinal endocrine cells remains to be determined.

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9. APPENDIX I-IV

- Appendix I** **The Birmingham IBS symptom score questionnaire**
- Appendix II** **The IBS-Quality of Life (IBS-QOL) questionnaire**
- Appendix III** **The Norwegian version of the Short-Form Nepean Dyspepsia Index (SF-NDI) questionnaire**
- Appendix IV** **The MoBa Food Frequency Questionnaire (MoBa FFQ)**

Appendix I The Birmingham IBS symptom score questionnaire

		Hele tida	Det meste av tida	Ein heil del av tida	Av og til	Ein liten del av tida	Ikkje i det heile tatt
1.	Kor ofte har du ubehag eller smerte i magen?						
2.	Kor ofte har du problem med laus, eller vatn tynn avføring?						
3.	Kor ofte har du problem med diaré?						
4.	Kor ofte har du hard avføring?						
5.	Kor ofte har du behov for å presse, for å få ut avføring?						
6.	Kor ofte har du problem med forstoppelse?						
7.	Kor ofte har du ubehag eller smerte etter at du har spist?						
8.	Kor ofte har du vanskar med å sove eller har du våknet på grunn av magesmerte?						
9.	Kor ofte har du problem med å halde på avføring?						
10.	Kor ofte må du springe til toalettet fordi det er vanskelig å halde seg?						
11.	Kor ofte har du slim i avføringen?						

Appendix II The IBS-Quality of Life (IBS-QOL) questionnaire

IBS-QOL- helse undersøking

Ver venleg og svar på alle spørsmål. Nokre spørsmål verkar like, men dei er ulike.

Navn persnr. Dato

1. **Eg kjenner meg hjelpelaus på grunn av mageplagene mine:**

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

2. **Eg føler at lukta som kjem av tarmproblema mine plagar meg:**

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

3. **Eg synest eg brukar for mykje tid på toalettet:**

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

4. Eg føler eg har lett for å bli sjuk på grunn av magetarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

5. Eg kjenner meg oppblåst på grunn av tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

6. Eg føler eg ikkje har kontroll over livet mitt på grunn av tarmproblema:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

7. Eg føler livskvaliteten er nedsatt på grunn av tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

8. Eg føler det ubehageleg å snakke om tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

9. Eg føler meg deprimert på grunn av tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

10. Eg føler meg isolert frå andre på grunn av tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

11. Eg må ta hensyn til mykje av maten eg et på grunn av tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

12. Seksuell aktivitet er vanskeleg for meg på grunn av tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

13. Eg er sint fordi eg har tarmproblem:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

14. Eg føler at eg irriterer andre på grunn av tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

15. Eg er redd for at tarmproblema mine skal bli verre:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

16. Eg er irritert på grunn av tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

17. Eg er redd for at andre synest eg overdriv tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

18. Eg føler at eg gjer lite på grunn av tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

19. Eg må unngå stress-situasjonar på grunn av tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

20. Tarmproblema mine reduserer min seksuelle lyst:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

21. Mine klesval blir begrensa på grunn av tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

22. Eg må unngå tunge aktivitetar på grunn av tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

23. **Eg må vera nøyen med kva eg et på grunn av tarmproblema mine:**

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

24. **På grunn av tarmproblema mine, er det vanskeleg for meg å vera med andre som eg ikkje kjenner godt:**

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

25. **Eg kjenner meg trøyt på grunn av tarmproblema mine:**

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

26. **Eg føler meg urein på grunn av tarmproblema mine:**

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

27. Eg kan ikkje ta lange turar eller lange reiser på grunn av tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

28. Eg er frustrert over at eg ikkje kan eta kva eg vil på grunn av tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

29. Det er viktig å vera i nærleiken av toalett på grunn av tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

30. Livet mitt er sentrert om tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

31. Eg er redd for å miste kontroll over tarmen min:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

32. Eg er redd for at eg ikkje vil kunna tømme tarmen min:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

33. Tarmproblema mine påverker mine næraste forhold:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

34. Eg føler at ingen forstår seg på tarmproblema mine:

- Aldri
- Av og til
- Ofte
- Svært ofte
- Alltid

Appendix III The Norwegian version of the Short-Form Nepean Dyspepsia Index (SF-NDI) questionnaire

SF-NDI (Spørreskjema om livskvalitet) (sett kryss ved ett tall)

Spenning

1. Har ditt følelsesmessige velvære vært forstyrret av dine mageplager i løpet av de siste to ukene?

1 p - ikke i det hele tatt

2 p - litt

3 p - en del

4 p - ganske mye

5 p - svært mye

2. Har du vært irritabel, anspent eller frustrert på grunn av dine mageplager i løpet av de siste to ukene?

1 p - ikke i det hele tatt

2 p - litt

3 p - en del

4 p - ganske mye

5 p - svært mye

Innflytelse på daglige aktiviteter

3. Har din evne til å holde på med fritidsaktiviteter (rekreasjon, hobbyer, idrett, sosialt samvær osv.) vært forstyrret av dine mageplager i løpet av de siste to ukene?

1 p - ikke i det hele tatt

2 p - litt

3 p - en del

4 p - ganske mye

5 p - svært mye

4. Har gleden ved dine fritidsaktiviteter (rekreasjon, hobbyer, idrett, sosialt samvær osv.) vært forstyrret av dine mageplager i løpet av de siste to ukene?

1 p - ikke i det hele tatt

2 p - litt

3 p - en del

4 p - ganske mye

5 p - svært mye

Spising/drikkig

5. Har mageplagene dine forstyrret deg i hva du har kunnet spise og drikke (inkludert når, hva og hvor mye) i løpet av de to siste ukene?

1 p - ikke i det hele tatt

2 p - litt

3 p - en del

4 p - ganske mye

5 p - svært mye

6. Har din mulighet til å nyte mat og drikke vært forstyrret på grunn av dine mageplager i løpet av de to siste ukene? (Vennligst ta i betraktning din matlyst og hvordan du føler deg etter at du har spist eller drukket.)

1 p - ikke i det hele tatt

2 p - litt

3 p - en del

4 p - ganske mye

5 p - svært mye

Kunnskap/kontroll

7. Har du, i løpet av de to siste ukene, lurt på om du alltid kommer til å ha disse mageplagene?

1 p - ikke i det hele tatt

2 p - litt

3 p - en del

4 p - ganske mye

5 p - svært mye

8. Har du, i løpet av de to siste ukene, lurt på om mageproblemene dine kan skyldes en svært alvorlig sykdom (for eksempel kreft eller hjerteproblemer)?

1 p - ikke i det hele tatt

2 p - litt

3 p - en del

4 p - ganske mye

5 p - svært mye

Arbeid/studier

9. Har din evne til å arbeide eller studere vært forstyrret av dine mageplager i løpet av de siste to ukene?

1 p - ikke i det hele tatt

2 p - litt

3 p - en del

4 p - ganske mye

5 p - svært mye

10. Har mageproblemene dine forstyrret trivselen i ditt arbeide eller i dine studier i løpet av de to siste ukene?

1 p - ikke i det hele tatt

2 p - litt

3 p - en del

4 p - ganske mye

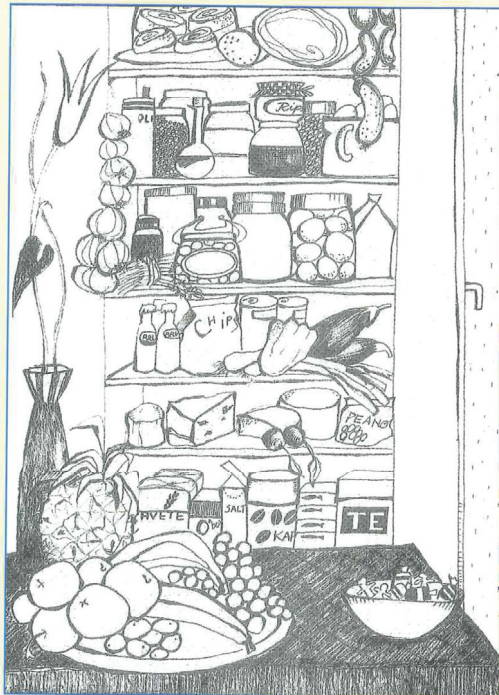
5 p - svært mye

Appendix IV The MoBa Food Frequency Questionnaire (MoBa FFQ)

1



Kostholdet ditt



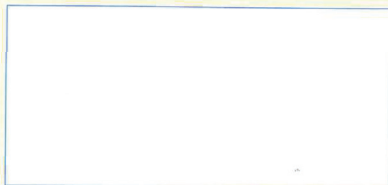
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+



+

Veiledning for utfylling av kostskjemaet

+

I dette skjemaet spør vi hva du har spist det siste året. Dette innebærer at vi ber deg tenke tilbake på hva du har spist i de 12 siste månedene.

Vi takker for at du vil hjelpe oss med denne undersøkelsen.

Skjemaet skal leses av en maskin. Det er derfor viktig at du legger vekt på følgende ved utfyllingen:

- Bruk blå eller sort kulepenn.
- I de små avkrysningsboksene setter du *et* kryss for det svaret som du mener passer best, slik:
- Du skal sette *ett* kryss på hver linje.
- Skriver du feil, kan du ta bort krysset ved å fylle boksen helt, slik: og deretter fylle i det riktige alternativet.

Eksempel:

Ost	Antall brødskeer med dette pålegg									eller pr. måned			
	6+	5	4	3	2	1	5-6	3-4	1-2	3	2	1	0
Brunost (Gudbrandsdalsost o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Hvor det står et + betyr dette "og flere enn". Eksempel: 6+ betyr 6 og flere enn 6
- Når du fyller ut skjemaet skal du tenke på hva du har spist det siste året og angi et gjennomsnitt.
Eksempel: Hvis du spiste torsk, sei mm til middag 1 gang i uken i 6 måneder på rad, det første halve året, men ikke har spist torsk, sei med mer etter dette, har du totalt spist torsk og sei 24 ganger. I gjennomsnitt blir dette 2 ganger per måned og du setter da kryss i boksen for 2 ganger per måned slik;

Middag med fjørfe	Antall middager					eller pr. måned			
	5+	4	3	2	1	3	2	1	0
Grillet kylling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Enkelte steder kan du skrive tekst
 - Skriv tydelig
 - Skriv bare tekst når du blir bedt om det

Så snart du har fylt ut dette skjemaet, ber vi om at du sender det tilbake til oss i den vedlagte, frankerte svarkonvolutten.

Avdeling for miljømedisin
Nasjonalt folkehelseinstitutt
Postboks 4404 Nydalen
0403 Oslo

+

+

Oppgi dag, måned og år for utfylling av skjemaet

dag

måned

år

(skriv årstall med 4 tall, f.eks. 2006)

Kostvaner

1. Hvordan vil du beskrive dine kostvaner det siste året?

Kostvaner	+	Sett bare ett kryss
1. I mitt kosthold inngår kjøtt og fisk		<input type="checkbox"/>
2. Jeg unngår kjøtt, men spiser fisk		<input type="checkbox"/>
3. Jeg unngår fisk, men spiser kjøtt		<input type="checkbox"/>
4. Jeg er vegetarianer og inkluderer melkeprodukter og egg i kosten (ovolakto-vegetarianer)		<input type="checkbox"/>
5. Jeg er vegetarianer og inkluderer melkeprodukter, men ikke egg i kosten (lakto-vegetarianer)		<input type="checkbox"/>
6. Jeg er vegetarianer og utelater alle melkeprodukter og egg fra kosten (veganer)		<input type="checkbox"/>

2. Har du brukt økologiske matvarer det siste året? (Sett bare ett kryss på hver linje.)

Økologisk matvare	Sjeldent/aldri	Noen ganger	Ofte	For det meste
1. Melk, melkeprodukter og ost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Brød og kornprodukter (f. eks. mel, müsli)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Egg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Grønnsaker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Frukt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Kjøtt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Antall måltider

3. Hvor ofte har du i gjennomsnitt spist følgende måltider per uke det siste året?

Et mellommåltid er et mindre måltid som for eksempel kan bestå av frukt, kjeks, bolle, yoghurt eller godteri. Mellommåltider som bare består av drikke skal ikke tas med da det blir spurt etter drikke senere. (Sett bare ett kryss på hver linje.)

	Antall måltider pr. uke							
	7	6	5	4	3	2	1	0
1. Frokost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Mellommåltid, formiddag	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Formiddagsmat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Mellommåltid, ettermiddag	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Middag	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Mellommåltid, kveld	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Kveldsmat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Nattmat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Brød, knekkebrød, kjeks

4. Hvor mange skiver brød/knekkebrød/kjeks har du spist i gjennomsnitt per dag/uke det siste året?

Når du svarer på spørsmålene, skal du tenke på brød til alle måltider i løpet av dagen. Et halvt rundstykke = 1 skive brød, 1 baguett = 4 skiver brød, 1 ciabatta = 3 skiver brød. (Sett bare ett kryss på hver linje.)

Brødtype	Antall brødskiver/knekkebrød/kjeks											eller pr. uke					
	13+	9-12	8	7	pr. dag						5-6	3-4	1-2	0			
1. Fint brød (loff, baguetter, ciabatta o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Mellomgrovt brød (kneipp, husholdn.brød)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Grovt brød (fiberkneipp, rugbrød o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Klibrød, kli-knekkebrød, rugspør	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Knekkebrød, sknonkk grov o.l.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Smerbrødkjeks (Kaptein kjeks o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Bruker du smør/margarin på brød/knekkebrød/kjeks?

Ja Nei (gå til spørsmål 8)

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6. Hvis du bruker smør/margarin, på hvor mange skiver i gjennomsnitt og hvilken type smør/margarin bruker du?
(Sett bare ett kryss på hver linje.)

Type smør/margarin	Antall brødskiver										eller pr. uke			
	13+	9-12	8	7	pr. dag		4	3	2	1	5-6	3-4	1-2	0
1. Smør/Bremyk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Hard margarin (Per, Melange)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Brelett	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Myk margarin (Soft, Vita, Olivero o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Lett margarin (Soft light, Vita lett, o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. Hvor tykt lag med smør/margarin smører du på brødskivene?

Rikelig Middels Skrapet*

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Pålegg på brød, knekkebrød, kjeks

8. Hvor mange brødskiver med de følgende påleggstypene har du spist i gjennomsnitt det siste året?
(Sett bare ett kryss på hver linje.)

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Ost	Antall brødskiver med dette pålegg										eller pr. måned			
	6+	5	pr. dag		2	1	eller pr. uke			3	2	1	0	
1. Brunost (Gudbrandsdalsost o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Brunost lettvarianter, prim	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Hvit ost, kremost, smøreost o.l.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Lettvarianter av hvit ost, smøreost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Muggoster (Camembert, Norzola o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Annet ostepålegg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fiskepålegg														
7. Kaviar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Makrell/sardin i tomat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Sardin i olje	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10. Røkt laks/ørret/makrell	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
11. Sild (sursild o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12. Reker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13. Krabbe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14. Tunfisk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15. Svulvørpostei (postei av fiskelever/rogn)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16. Annet fiskepålegg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Kjøttpålegg														
17. Magert kjøttpålegg (skinke, roast biff o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
18. Servelat, lammerull, kalverull	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
19. Salt pølse, spekepølse, salami	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
20. Kalkun- og kyllingpålegg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
21. Leverpostei	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
22. Annet kjøttpålegg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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forts.

Andre typer pålegg	Antall brødskiver med dette pålegg												
	6+	5	pr. dag		2	1	eller pr. uke			eller pr. måned			
			4	3			5-6	3-4	1-2	3	2	1	0
23. Salater med majones (rekesalat o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Frokostsalat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Majones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Syltetøy +	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Honning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Peanøttsmør	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Annet nottepålegg (Nugatti o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Annet søtt pålegg (Sjokolade, Hapå o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Vegetabiliske posteier (Tartex o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Frukt (banan, eple o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Grønnsaker (tomat, agurk o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Egg

9. Hvor mange egg har du spist i gjennomsnitt det siste året? Ta med egg til alle måltider! Egg i bakverk skal ikke tas med! (Sett bare ett kryss på hver linje.)

Egg	-	pr. dag		eller pr. uke			eller pr. måned		
		2+	1	5-6	3-4	1-2	2-3	1	0
Egg, stekt, kokt, eggerøre, omelett	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Antall måsegg spist siste 12 måneder		0 <input type="checkbox"/>	1-5 <input type="checkbox"/>	6-10 <input type="checkbox"/>	mer enn 10 <input type="checkbox"/>				

Frokostgryn, grøt

10. Hvor ofte har du spist frokostgryn eller grøt i gjennomsnitt det siste året? Dersom du har spist disse matvarene til andre måltider enn frokost skal du også ta det med her. (Sett bare ett kryss på hver linje.)

Grøt, frokostgryn		Hvor ofte									+
		pr. dag		eller pr. uke			eller pr. måned				
		2+	1	5-6	3-4	1-2	2-3	1	0		
1. Usøtete kornblandinger (4-korn, All-Bran Flakes o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Søtet müsli og müsli med frukt, nøtter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Havregrøt, annen grøt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Cornflakes, Frosties o.l.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Sukker på frokostgryn/grøt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Syltetøy på frokostgryn/grøt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Drikke

11. Hvor mange glass/kopper av følgende har du drukket i gjennomsnitt det siste året? Ta også med melk/yoghurt til frokostgryn/grøt. 1 krus = 1 glass = 2 kopper = 2,5 dl, 1/2 liters plastflaske = 2 glass. (Sett bare ett kryss på hver linje.)

Melk og yoghurt		Hvor mange glass/beger										
		8+	6-7	pr. dag		1	eller pr. uke			eller pr. måned		
				4-5	2-3		5-6	3-4	1-2	2-3	1	0
1. H-melk, kefir, kulturmelk (1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Lettmelk (1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Ekstra lett lettmelk (1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Skummet melk søt, sur (1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Cultura, alle typer (1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Biola drikke, Biola yoghurt (1 glass/beger)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Yoghurt, naturell/frukt (1 glass/beger)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Lettyoghurt (1 glass/beger)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

forts.

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		Hvor mange glass/beger										
		pr. dag					eller pr. uke			eller pr. måned		
		8+	6-7	4-5	2-3	1	5-6	3-4	1-2	2-3	1	0
+												
Melk og yoghurt												
9. Go'morgen yoghurt	(1 beger)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Sjokolademelk, Litago	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Soyamelk	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Ris-, havremelk	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
+												
		Hvor mange glass										
		pr. dag					eller pr. uke			eller pr. måned		
		8+	6-7	4-5	2-3	1	5-6	3-4	1-2	2-3	1	0
Juice/saft/brus/vann/alkohol												
13. Appelsinjuice	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Annen fruktjuice, most, nektar	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Tomat og grønnsakjuice	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Saft med sukker	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Saft, kunstig søtet	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Coca Cola/Pepsi med sukker	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Annen brus med sukker	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Coca Cola-light/Pepsi-light	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Annen lettbrus	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Energidrikk, Battery o.l.	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Springvann (vann fra kran)	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Flaskevann, uten kullsyre	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Farris og annet vann med kullsyre	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Alkoholritt øl, vøtterøl, lettøl	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Pilsnerøl	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Vin	(1 glass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Brennevin, likør	(1 dram)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
+												
		Hvor mange kopper/krus										
		pr. dag					eller pr. uke			eller pr. måned		
		8+	6-7	4-5	2-3	1	5-6	3-4	1-2	2-3	1	0
Kaffe/te												
30. Filterkaffe	(1 kopp)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Pulverkaffe	(1 kopp)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Kokekaffe/ presskanne kaffe	(1 kopp)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Kaffe latte, cappucino	(1 kopp)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Espresso	(1 kopp)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Kaffeintri kaffe	(1 kopp)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Fiken/ korn kaffe	(1 kopp)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Te (vanlig te, Lipton fruktte o.l.)	(1 krus)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Grønn te	(1 krus)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Nypete, urtete	(1 krus)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I hvor mange kopper kaffe og te bruker du melk/fløte/sukker?												
		pr. dag					eller pr. uke			eller pr. måned		
		8+	6-7	4-5	2-3	1	5-6	3-4	1-2	2-3	1	0
Melk/fløte/sukker i kaffe og te												
1. Melk/fløte i kaffe/te		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Sukker/ honning i kaffe/te		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Kunstig søtstoff i kaffe/te		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
+												

Middagsmat (varm mat)

Først ber vi deg svare på et generelt spørsmål om ulike grupper av varm mat. Deretter ber vi deg svare mer i detalj på de ulike typene av varm mat du har spist det siste året. Når du svarer på disse spørsmålene, ber vi deg å tenke på både middagsmat og annen varm mat du eventuelt spiser i løpet av dagen.

13. Hvor ofte har du i gjennomsnitt spist følgende type varm mat det siste året? (Sett bare ett kryss på hver linje.)

Generelle spørsmål	+	pr. uke						eller pr. måned			
		6+	5	4	3	2	1	3	2	1	0
1. Kjøtt og kjøttprodukter		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Kjøtt og kjøttprodukter, grillet		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Innmat		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Kylling, kalkun		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Fisk, fiskeretter, kokt, ovnsbakt		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Fisk, fiskeretter, stekt		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Vegetarretter		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Mer detaljerte spørsmål om hver enkelt middagsrett

14. Hvor ofte har du i gjennomsnitt spist følgende typer varm mat det siste året? (Sett bare ett kryss på hver linje.)

Middagsrett	+	Hvor ofte						eller pr. måned			
		6+	5	4	3	2	1	3	2	1	0
Middag med blandingsprodukter av kjøtt											
1. Kjøttpølser, medisterpølser		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Grillpølser, wienerpølser		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Kyllingpølser, kalkunpølser		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Kjøttkaker, medisterkaker, kjøttpudding		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Hamburgere, karbonader		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Kjøttdeig i saus el. gryteretter		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Middag med okse-/kalvekjøtt											
7. Oksestek, kalvestek		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Biff (indrefilet, løvbiff, mørbrad, entrecote)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. T-bone stek, kalvekotelett		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Kjøttgryte, lapskaus, kjøttsuppe		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Middag med svinekjøtt											
11. Kotelett, nakkekotelett, skinkestek		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Indrefilet, flatbiff		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Sommerkotelett, hamburgerrygg		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Flesk, ribbe, "spare ribs"		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Bacon		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Gryterett		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Middag med lam/sau											
17. Lammestek, lammekotelett		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Gryteretter med lam/sau (Får i kål o.l.)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Middag med viltkjøtt											
19. Reinsdyrstek		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Stek av elg, hjort, rådyr		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Reinsdyrkaker, gryterett av reinsdyr		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Karbonader, gryterett (elg, hjort, rådyr)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Middag med Innmat											
23. Lever, nyre fra okse, gris		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Lever, nyre fra sau		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Lever, nyre fra vilt		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Blodmat, lungemos		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

forts.

	+	Hvor ofte									
		6+	5	pr. uke			eller pr. måned				
				4	3	2	1	3	2	1	0
Middag med fjørfe											
27. Kyllingfilet, kalkunfilet		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Grillet kylling		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Stekt/kokt kylling, høne og kalkun		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Kyllingschnitzel, nuggets		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Villtugl (rype, orrfugl o.l.)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Annet fjørfe (and, gås, struts)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Middag med fisk/sjømat											
33. Torsk, sei, kolje, lyr (kokt/steckt/røkt)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Makrell, sild (kokt/steckt/røkt)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Laks, ørret		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Flyndrefisker (kveite, rødspette o.l.)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Tunfisk (f.eks. i salat)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Abbor, gjedde, gjeddekaker		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Annen ren fisk		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Fiskekaker, fiskepudding, fiskeboller		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Fiskepinner, fiskepanetter, panert fisk		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Fiskegryte, fiskegrateng, suppe med fisk		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Reker		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Skjell		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Krabbe		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Rogn		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Fiskelever	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pastaretter											
48. Pastarett med kjøtt (spaghetti med kjøttsaus, Lasagne o.l.)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Pastarett med fisk/reker/skjell		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. Pastarett med grønnsaker		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Pastarett med bare tomat saus/ketchup		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. Ost (Parmesan o.l.) på pastarett		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annen varm mat											
53. Pizza		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. Taco, burritos o.l.	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. Pannekaker		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56. Grøt (ikke frokostgrøt)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57. Suppe, hjemmelaget og posesuppe		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grønnsaksrett som hovedrett											
58. Bare med grønnsaker		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59. Med bønner/linser		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60. Med soyaprodukter (pølser, o.l.)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Tilbehør til varm mat

15. Hvor ofte har du i gjennomsnitt spist følgende matvarer det siste året? (Sett bare ett kryss på hver linje.)

	+	pr. dag	Hvor ofte			eller pr. måned		
			1	5-6	3-4	1-2	2-3	1
Poteter/ris/spaghetti								
1. Poteter (kokte, bakte, potetstappe)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Pommes frites, stekte poteter		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Potetsluing, gratinerte poteter		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Spaghetti, makaroni, nudler		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Ris		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Hirse, couscous o.l.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

forts.

Saus/tilbehør	pr. dag		Hvor ofte eller pr. uke			eller pr. måned			+
	1		5-6	3-4	1-2	2-3	1	0	
7. Smeltet smør	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Smeltet margarin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Brun/hvit saus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10. Bearnaisesaus o.l.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
11. Majones, remulade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12. Selerrømme, Crème Fraîche	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13. Lettrømme	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14. Ketchup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	+
15. Sennep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Type fett til matlaging

16. Hvor ofte har du i gjennomsnitt brukt følgende typer fett i matlagingen det siste året? (Sett bare ett kryss på hver linje.)

Type fett til matlaging	pr. dag		Hvor ofte eller pr. uke			eller pr. måned			+
	2+	1	5-6	3-4	1-2	2-3	1	0	
1. Smør	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Brømyk, Smørgod	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Melange, Per	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Soft soymargarin (pakke, beger)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Olivero	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Annen margarin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Soyaolje	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Matolje	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Olivenolje	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10. Maisolje	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
11. Andre oljer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Grønnsaker

Først ber vi deg svare på et generelt spørsmål. Deretter ber vi deg svare mer i detalj om de enkelte grønnsakene du har spist.

17. Hvor ofte har du i gjennomsnitt spist grønnsaker det siste året? (Sett bare ett kryss på hver linje.)

Oversiktsspørsmål	pr. dag		Hvor ofte eller pr. uke			eller pr. måned			+
	2+	1	5-6	3-4	1-2	2-3	1	0	
1. Rå grønnsaker i (salat, råkost o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Grønnsaker i gryteretter, supper, wok o.l.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Kokte grønnsaker som tilbehør	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Mer detaljert om hver enkelt grønnsak

18. Hvor ofte har du i gjennomsnitt spist følgende grønnsaker det siste året? (Sett bare ett kryss på hver linje.)

Grønnsaker	pr. dag		Hvor ofte eller pr. uke			eller pr. måned			+
	2+	1	5-6	3-4	1-2	2-3	1	0	
1. Grønnsaksblandinger, frosne	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Agurk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Aubergine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Avocado	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	forts.

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Grønnsaker	pr. dag		Hvor ofte eller pr. uke			eller pr. måned			+
	2+	1	5-6	3-4	1-2	2-3	1	0	
5. Blomkål, rå	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Blomkål, kokt/i gryteretter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Brokkoli, rå	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Brokkoli, kokt/i gryteretter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Bønner (grønne-, aspargesbønner)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10. Erter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
11. Gulrot, rå	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12. Gulrot, kokt/i gryteretter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13. Hodekål, rå	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
14. Hodekål, kokt/stuing/i gryteretter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15. Hvitlek	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16. Kålrot, rå	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
17. Kålrot, kokt/stappe/i gryteretter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
18. Løk, purre, vårløk, rå	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
19. Løk, purre, vårløk, stekt/i gryteretter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
20. Mais	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
21. Paprika, rå	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
22. Paprika i gryteretter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
23. Rosenkål, kokt/i gryteretter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
24. Salatblandinger, ferdig i pose	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
25. Salat (bladsalat, issalat, kinakål o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
26. Selleri, stilkselleri	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
27. Sjampinjong, rå	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
28. Sjampinjong, stekt/i gryteretter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
29. Skogsopp, annen sopp	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
30. Spinat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
31. Squash (Zucchini)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
32. Tomat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
33. Andre grønnsaker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	+

19. Hvor ofte har du i gjennomsnitt brukt dressing og annet tilbehør til salat og råkost det siste året? (Sett bare ett kryss på hver linje.)

Dressing/annet tilbehør	pr. dag		Hvor ofte eller pr. uke			eller pr. måned		
	2+	1	5-6	3-4	1-2	2-3	1	0
1. Dressing (Thousand island o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Lett dressing, yoghurt dressing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Oliven, sorte/ grønne	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Fetaost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hjemmelaget dressing								
5. Med olje	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Uten olje	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Med rømme/yoghurt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Hva er omtrentlig vektforhold av kjøtt/grønnsaker i gryterettene. (Sett bare ett kryss på hver linje.)

	Har ikke spist	Mer grønnsaker enn kjøtt	Like mye kjøtt og grønnsaker	Mer kjøtt enn grønnsaker
1. Gryteretter med helt kjøtt/fisk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Gryteretter med innmat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Gryteretter med kjøttdeig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Frukt

21. Hvor mange friske frukter har du spist i gjennomsnitt det siste året?

Frisk frukt	+	pr. dag					eller pr. uke			eller pr. måned		
		8+	6-7	4-5	2-3	1	5-6	3-4	1-2	2-3	1	0
Frisk frukt		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22. Hvor ofte har du i gjennomsnitt spist følgende friske frukter det siste året? (Sett bare ett kryss på hver linje.)

Frisk frukt		pr. dag				Hvor ofte eller pr. uke			eller pr. måned		
		4+	3	2	1	5-6	3-4	1-2	2-3	1	0
1. Appelsin, mandarin	(1 stykk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Banan	(1 stykk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Druer	(8-10 stykk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Eple	(1 stykk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Fersken, nektarin	(1 stykk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Grapefrukt	(½ stykk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Jordbær	(¼ kurv)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Andre bær (blåbær o.l.)	(¼ kurv)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Mango	(½ stykk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Melon	(1 skive)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Papaya	(½ stykk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Plomme	(1 stykk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Pære	(1 stykk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Annen frukt		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

23. Hvor ofte har du i gjennomsnitt spist tørt frukt og nøtter det siste året? (Sett bare ett kryss på hver linje.)

Tørt frukt/nøtter	+	pr. dag				Hvor ofte eller pr. uke			eller pr. måned		
		4+	3	2	1	5-6	3-4	1-2	2-3	1	0
1. Aprikoser		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Rosiner		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Svsker, fiken, dadler		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Peanøtter		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Mandler, hasselnøtter, cashewnøtter o.l.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Dessert, is, kaker, godteri

24. Hvor ofte har du i gjennomsnitt spist dessert og is det siste året? (Sett bare ett kryss på hver linje.)

Dessert/is	+	pr. dag		Hvor ofte eller pr. uke			eller pr. måned		
		2+	1	5-6	3-4	1-2	2-3	1	0
1. Puddinger (sjokolade, karamell o.l.)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Hermelisk frukt, fruktgrøt		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Fruktsalat med frisk frukt		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Fløteis		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Yoghurtis, lettis		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Saftis, sorbet		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Vaniljesaus	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Pisket krem, fløte		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Varm mat fra kiosk, bensinstasjon eller gatekjøkken

30. Hvor ofte har du i gjennomsnitt spist varm mat fra kiosk, bensinstasjon eller gatekjøkken det siste året?

Mat fra	pr. dag			Hvor ofte eller pr. uke			eller pr. måned		
	4+	2-3	1	5-6	3-4	1-2	2-3	1	0
1. Kiosk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Bensinstasjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Gatekjøkken, McDonald's o.l.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Kostendringer i livet ditt

31. Nedenfor ber vi deg angi om du spiser/drikket mer, mindre eller samme mengde sammenliknet med for 30 år siden, eventuelt da du var barn (for fylt 18 år).

Matvare	Spiste/drokk det heller ikke før	Som før	Mer	Mindre	Sluttet helt
1. Krabbe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Røker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Skjell (for eksempel blåskjell)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Fiskelever (ikke tran)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Tunfisk eller Kveite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Flyndre/annen flatfisk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Gjedde (kaker) eller abbor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Annen ferskvannsfisk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Reinsdyr	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Sau / lammekjøtt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Lever eller nyre fra vilt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Viltvoksende sopp	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Måsegg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

+

+

+

Kosttilskudd

39. Bruker du eller har du brukt kosttilskudd det siste året? Ja Nei

40. Hvis ja, ber vi deg å angi hvilken type og mengde nedenfor.
(ts = teskje, bs = barneskje, ss = spiseskje)

Flytende kosttilskudd	Antall ganger pr. uke										Mengde pr. gang		
	7	6	5	4	3	2	1	<1	0	1 ts	1 bs	1 ss	
1. Tran	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Omega-3 tran +	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Sanasol	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Biovit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Flytende jernmixtur (Floradix o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annet flytende kosttilskudd													
6. Navn:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Produsent:													
8. Navn:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Produsent:													
Kapsler/tabletter	Antall ganger pr. uke								Antall pr. gang				
	7	6	5	4	3	2	1	<1	0	1	2	3	4+
10. Trankapsler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Fiskeoljekapsler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Vitaplex, B-vitaminer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Kostpluss Collett/Nycovit kostpluss	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Nyco plus folsyre 0,4 mg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Spektro (Solaray)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Hemofor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Duroferon durretter, Ferro Retard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Andre kosttilskudd	+												
18. Navn:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Produsent:													
20. Navn:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Produsent:													
22. Navn:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Produsent:													
22. Navn:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Produsent:													

Har du husket å fylle ut dato for utfylling av skjema på side 2?

Tusen takk for hjelpen!

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