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Omega-3 polyunsaturated fatty acid supplementation and the risk of fatal myocardial infarction among Norwegian women: a prospective cohort

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Kim Rist
Norway, December 2020

Abstract

Background: In 2015, around 17.9 million people died from cardiovascular disease worldwide, with myocardial infarction being the most common manifestation. Contemporary research suggests that omega-3 (*n*-3) polyunsaturated fatty acid (PUFA) interventions have less useful cardiovascular outcomes than previously thought. This study aims to examine the association between *n*-3 PUFA intake frequency and the risk of fatal myocardial infarction (FMI) by using food frequency questionnaires and adjust for confounding factors.

Method: The Norwegian Women and Cancer (NOWAC) study is a population-based cohort that utilizes self-reported data obtained from already existing population registries and questionnaires, in which four out of a total of eight pages contained questions regarding dietary habits. Data from 101,316 eligible Norwegian women (mean age: 52.24 years, range: 41–76 years) were analyzed. A total of 22,395 subjects were excluded according to predefined criteria, such as prevalent disease. Data on FMI were obtained from the Norwegian Cause of Death Registry. The participants were divided into three *n*-3 PUFA intake frequency groups: never, intermittent, and daily. The relationship between *n*-3 PUFA supplement intake and FMI was assessed using a Cox proportional hazards model.
A stratified model was constructed according to the median intake of fatty fish (11 g/day) to assess the separate effect within groups of high and low fatty fish intake.

Results: Over an average of 18.41 years of follow-up, 256 cases of FMI were reported. The crude incidence rate was found to be 17 per 100,000, and a nonsignificant inverse association was observed. The estimates for intermittent and daily intake (compared to never) according to the multivariate-adjusted model were respectively hazard ratios (HRs) of 0.95 (95% confidence interval [CI]: 0.72-1.26) and 0.85 (95% CI: 0.60-1.20). The estimates of the association between n-3 PUFA supplement intake and FMI among those with low intake of fatty fish, according to the multivariate-adjusted model, were an HR of 0.65 (95% CI: 0.39–1.09). Hence, the multivariate-adjusted model was statistically insignificant.

Conclusions: More frequent intake of *n*-3 PUFA supplements is not associated with a lower risk of FMI among women in the NOWAC study.

Keywords: Cod liver oil, fish oil, omega-3, myocardial infarction, NOWAC, Norway.

List of abbreviations

ACE	Angiotensin-converting enzyme
ADP	Adenosine diphosphate
AII	Angiotensin II
ALA	Alpha-linolenic acid
AMI	Acute myocardial infarction
AA	Arachidonic acid
BMI	Body mass index
CI	Confidence interval
CVD	Cardiovascular disease
CHD	Coronary heart disease
DHA	Docosahexaenoic acid
EPA	Eicosapentaenoic acid
E%	Energy percent*
FMI	Fatal myocardial infarction
FFQ	Food frequency questionnaire
HR	Hazard ratio
HDL	High-density lipoprotein
LDL	Low-density lipoprotein
MHT	Menopausal hormone therapy
MFA	Monounsaturated fatty acid
MI	Myocardial infarction
n-3	Omega-3
n-6	Omega-6
PCB	Polychlorinated biphenyls
PUFA	Polyunsaturated fatty acid
RCT	Randomized controlled trial
SFA	Saturated fatty acid
STEMI	ST-elevation myocardial infarction
NOWAC	The Norwegian women and cancer study
nSTEMI	Non-ST-elevation myocardial infarction
TFA	Trans-fatty acid
T2DM	Type 2 diabetes mellitus

The proportion of energy from fats, proteins, and carbohydrates or alcohol.

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1 Introduction

Cardiovascular disease (CVD) is a group of interrelated diseases that include coronary heart disease (CHD), hypertension, atherosclerosis, ischemic heart disease, heart failure, and peripheral vascular disease (1). For decades, the mortality rates associated with CVD have been of concern (2). In 2015, around 17.9 million people died from CVD worldwide. Although cancer is currently the most common cause of death, CVD remains the main cause of death among people aged above 70 in Norway (3). Generally, CVD is a noncommunicable disease that is considered to be highly preventable through lifestyle choices, such as smoking cessation, increased physical activity, and healthy dietary habits (2, 4). Myocardial infarction (MI) is the most common manifestation of CVD responsible for deaths (1). According to the Norwegian Myocardial Infarction Registry, 12,393 cases of MI have been reported among 11,772 individuals in 2018, some of whom had multiple events of MI (5).

1.1 Myocardial infarction

MI is defined by the necrosis of myocardial cells as a result of oxygen shortage (ischemia), which can cause tissue damage and cell dysfunction (6). Atherosclerosis, which is the narrowing and loss of elasticity of the blood vessel wall as a result of plaque accumulation, is considered the "silent" precursor to MI because it is often asymptomatic until the first cardiac event (1). In general, MI is most often caused by obstruction due to atherosclerosis and plaque. Clinically, it may manifest either as a minor coronary event or as a life-threatening condition or even sudden death. People with a history of MI are predisposed to repeated events. Age, male sex, loss of estrogen (due to natural or surgical menopause), family history, and genetic susceptibility are some of the important nonmodifiable risk factors of MI (1, 7, 8). Hyperlipidemia, which is the genetic predisposition to a disadvantageous lipid profile, exhibits several known types, such as familial hypercholesterolemia, polygenic familial hypercholesterolemia, familial combined hyperlipidemia, and familial dysbetalipoproteinemia (1). The most important modifiable lifestyle risk factors of MI are smoking, psychosocial factors, diabetes, obesity and overweight, hypertension, metabolic syndrome, and physical inactivity (1, 8). It has been shown that the consumption of fruits and vegetables has

protective effects (8). Triglycerides are the most abundant lipid consumed by humans, and serum levels have been associated with the risk of CHD (9-12). A study also showed that 4 g of *n*-3 PUFA per day decreased plasma triglyceride concentrations by 25-30% (10). Also, saturated fatty acids (SFAs) and cholesterol are associated with CVD (13). Higher intake of SFAs is associated with an increased level of low-density lipoprotein (LDL) cholesterol. Lipoproteins are generally important in the transport of fats as they are insoluble in water. In contrast to LDL cholesterol, high-density lipoprotein (HDL) cholesterol is considered the healthy type of cholesterol. Replacing SFAs with polyunsaturated fatty acids (PUFAs) can reduce the risk of CVD by decreasing the LDL/HDL ratio. CVD has also been associated with higher production of proinflammatory factors, and plasma levels of omega-3 (*n*-3) PUFAs have been inversely associated with inflammatory markers, such as C-reactive protein, interleukin-6, fibrinogen, and homocysteine (1).

1.2 Polyunsaturated fatty acids

Fatty acids are macronutrients that vary in terms of their hydrocarbon chain length as well as the number and position of bonds (12). Identification of a fatty acid depends on the position of the carbon in the double bond relative to the methyl group end of the chain. The term "*n*" indicates the distance from the methyl group end to the first carbon double bond along the chain. Monounsaturated fatty acids (MFAs) should be at least 12 carbon atoms in length, most commonly with double bonds at *n*-7 or *n*-9. Fatty acids with more than one double bond along the chain are called PUFAs. Each following double bond is usually three carbon atoms farther from the previous double bond. However, the total number of double bonds never exceeds six, as this total number depends on the overall chain length. Fatty acids with more than 18 carbon atoms have double bonds at only *n*-3, *n*-6, and *n*-9.

1.3 Omega-3

Notably, *n*-3 and *n*-6 PUFAs can only be synthesized by plants and marine phytoplankton (14). In general, *n*-3 PUFAs are characterized by a chemical structure that includes double bonds three atoms from the terminal methyl group (Figure 1) (15). Two of the most important

types of PUFAs are the very-long-chained fatty eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), which are abundant in different marine sources, such as fish oil and algae. These PUFAs are important precursors to eicosanoids, such as prostaglandins, leukotrienes, and thromboxanes, which are paracrine hormones that modulate several inflammatory processes. Many of their functions are associated with the size of the blood vessels, permeability and activity of membrane-bound enzymes, and receptor and signal transduction (13). They influence several inflammatory processes and the activity of platelets, which in turn causes blood clotting. These are functions that are physiologically associated with heart disease.

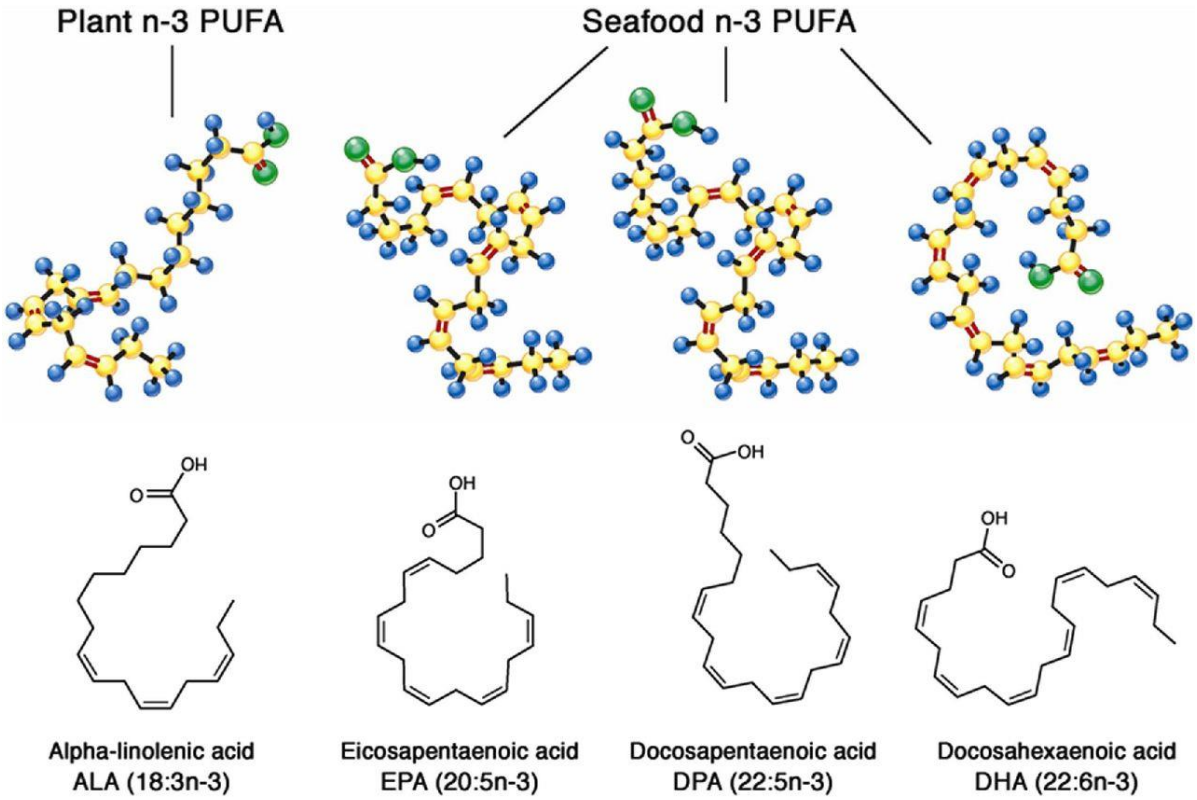

Figure 1. The omega-3 (n-3) structure and source.

Adapted from Mozaffarian et al. (2011) (16).

1.4 Essential fatty acids

Neither humans nor animals can synthesize fatty acids with double bonds less than nine atoms away from the terminal methyl group (12). These fatty acids that humans cannot synthesize, and at the same time need to maintain several important biological functions, are called essential fatty acids, which are *n*-6 linoleic acid (LA) and *n*-3 α-linolenic acid (ALA). In general, *n*-6 LA can be stepwise desaturated and elongated to form arachidonic acid (AA; Figure 2). Notably, AA is a precursor to a vasoconstrictor and potent platelet aggregator [thromboxane (A_2)]; a vasodilator and platelet antiaggregator [prostaglandin (E_2)]; and a leukotriene chemotaxis, adherence, and inflammation inducer [leukotriene (B_4)] (14, 17). Using the same mechanisms, *n*-3 ALA can form DHA and the anti-inflammatory EPA. Furthermore, EPA is a precursor to a weak platelet aggregator and vasoconstrictor [thromboxane (A_3)], a vasodilator and platelet antiaggregator [prostacyclin (PGI_3)], and leukotriene (B_5), which is a weak chemotactic agent and inflammation inducer. Both males and females can convert up to 8% and 21%, respectively, of DHA from ALA (13). The conversion rate is associated with the intake of both EPA and DHA as well as the intake of LA and ALA. It has been shown that 2 g of DHA every day is superior to the same amount of EPA for erythrocyte membrane incorporation of both EPA and DHA. The proportion of longer-chain *n*-3 PUFAs over six weeks does not increase with 4 g of ALA every day. Most human studies using radioactive tracers have not shown any major impact on ALA conversion in diets with different *n*-3 to *n*-6 ratios (13).

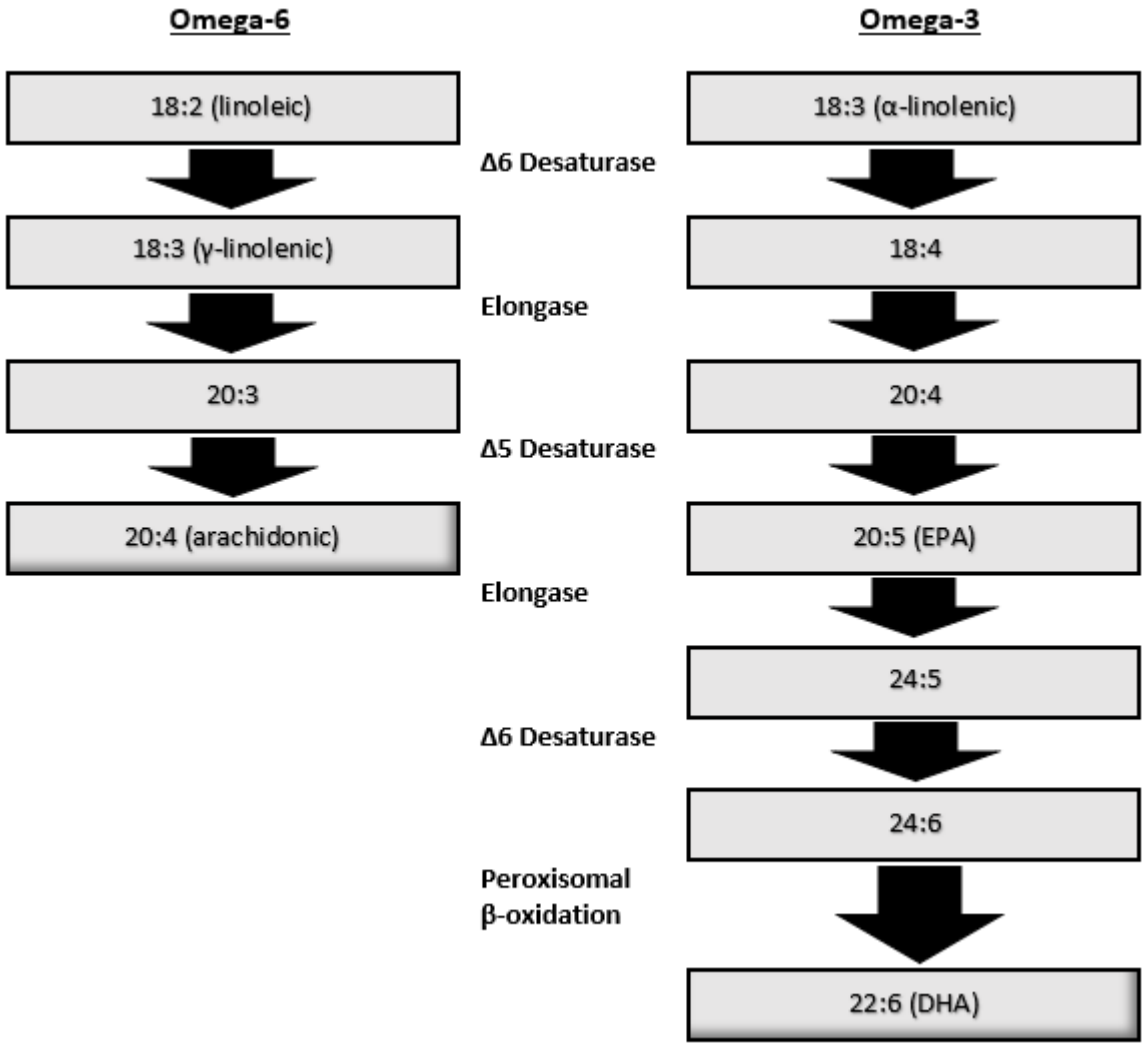

Figure 2. Anabolic pathway of essential fatty acids.

Adapted and modified from Nakamura et al. (2003) (18).

Both *n*-3 and *n*-6 PUFAs compete for the same elongase and desaturase proteins, which is why ratios seem to play a role when assessing the health benefits (Figure 2) (18). Some studies have suggested that balancing between *n*-3 and *n*-6 PUFAs is important to regulate inflammation (19-21). Anti-inflammatory, antiplatelet, and hypotensive effects may be mediated by competition with AA for the synthesis of eicosanoids by cyclooxygenase. Humans have evolved on a diet with an *n*-6/*n*-3 PUFA ratio of 1, while modern western diets are known to be excessively rich in *n*-6 PUFAs, resulting in proinflammatory ratios between 15:1 and 16.7:1 (20). Diets with excessive amounts of *n*-6 PUFAs are more likely to become

prothrombotic and proaggregatory, thus increasing blood viscosity and vasoconstriction. Reduced bleeding times have been found in patients with MI. Higher *n*-6/*n*-3 PUFA ratios in platelet phospholipids have been associated with higher CVD-related mortality rates (20). Ratios of 2:4 to 3:1 have been suggested as optimal (14). It should be noted that the absolute intake levels and ratios are often different between studies, complicating their interpretation (13). It should be noted that the absolute intake levels and ratios are often different between studies, complicating their interpretation (13). However, absolute intake seems to be more important given that the nutritional requirements are otherwise covered. The production of proinflammatory factors decreases with lower *n*-6/*n*-3 PUFA intake ratios. However, excessive total intake of PUFAs provokes several adverse effects, such as impaired immune function, increased bleeding tendency, and lipid peroxidation (22).

1.5 Essential fatty acid deficiency

Essential fatty acids have several important physiological functions, such as the maintenance of the water-permeability function of the skin to avoid excessive transepidermal water loss and preserve energy by decreasing water evaporation (13). Essential fatty acid deficiency in adults is rare, and the minimum requirements are still unknown.

DHA may be important in the development of normal visual function, as high concentrations of DHA have been found in the synapses in the central nervous system and in the rod outer segment of the photoreceptor cells of the retina (13). Studies on preterm infants have also suggested that DHA is important for psychomotor development. Administering long-chain *n*-3 PUFAs during pregnancy improves the *n*-3 PUFA status and mental development of the fetus or newborn.

It has also been suggested that administering <0.05 energy percent (E%) ALA during enteral nutrition and <0.1 E% ALA during parenteral nutrition causes skin changes (13). Moreover, skin changes and growth retardation have been observed among healthy newborns that were fed <1 E% LA.

1.5.1 Dietary sources

ALA is an essential 18-carbon *n*-3 PUFA that is derived from plant sources, with the main source being vegetable oils, such as rapeseed oil, camelina oil, and flaxseed oil (13, 16). Other sources include soybeans, hemp seeds, and walnuts. Eggs may contain long-chain *n*-3 PUFAs, depending on what the animals are fed. LA is another essential 18-carbon *n*-6 PUFA commonly found in nuts and seeds. Seafood is the primary source of long-chain *n*-3 PUFAs (EPA and DHA).

1.5.2 Fatty acid intake recommendations

In Norway, dietary recommendations are mainly based on the Nordic Nutrition Recommendations 2012 (13, 23). The recommended intake of MFAs is 10–20 E%, whereas that of PUFAs is 5–10 E%. The recommended intake of SFAs, trans-fatty acids (TFAs), and *n*-3 PUFAs is <10 E%, as low as possible, and ≥1 E%, respectively. In general, the total fat intake should stay within the range of 25–40 E%. These are the general recommendations for adults and children aged two and above.

In Norway, fish oils have traditionally been classified as a food instead of a supplement (13). Such oils are recommended as a source of marine EPA, DHA, and vitamin D, and various health authorities often recommend their use in specific periods of life, such as during childhood or pregnancy or for frail older individuals. Pregnant women are advised to ingest 10 μg of vitamin D per day during the winter when there is little sunlight in the northern hemisphere (24). Cod liver oil contains vitamin D and is often used instead of other supplements containing vitamin D. In the Norwegian Women and Cancer (NOWAC) study performed by Brustad et al., it has been reported that approximately 35% of Norwegian women consume cod liver oil regularly (25).

1.6 Conflicting evidence on the benefit of omega-3 supplementation

A broad literature search was performed during the spring of 2020 in PubMed, Medline, Cochrane Library, and Google Scholar to assess the current knowledge on the topic. For further details and description of the literature search, see Appendix 1. Updates were made during the fall.

In the early 1970s, the low mortality rates of CHD among Greenland Eskimos sparked an interest in the protective effects of fish consumption (26, 27). Later studies have shown that moderate consumption of fish reduces the overall risk of CVD (28, 29). Moreover, it has been proposed that the two main constituents of marine *n*-3 PUFAs, EPA and DHA, are responsible for the observed beneficial effects, although it has also been suggested that the components exhibit a synergistic effect (high-quality proteins, amino acids, and vitamins). According to the Nurses' Health Study, women who consume more fish and *n*-3 PUFAs are at a lower risk of CHD (30). Hence, fish oil supplements have become of major interest for both primary and secondary prevention of CVD. Some trials on primary prevention have revealed several clinical benefits of *n*-3 PUFA interventions, reducing the rate of CVD-related mortality (31, 32). In a case–control study performed by Yli-Jama et al., the authors showed that the percentage content of *n*-3 PUFAs in serum is inversely associated with the risk of MI (33).

Several contradictory results suggest that *n*-3 PUFA interventions have no protective effect against cardiovascular outcomes (34-39). In a 2018 review performed by Abdelhamid et al., it was concluded that there is little to no evidence that EPA and DHA supplements have a protective effect on cardiovascular health, neither as primary nor as secondary prevention (40). The authors further pointed out that the benefits that have been previously suggested may have been obtained from trials with a high risk of bias. Other studies have found EPA and DHA protective against CVD among high-risk populations (41). Contrary, a 2013 randomized controlled trial (RCT) found no reduction in cardiovascular mortality and morbidity in a group with multiple cardiovascular risk factors who were administered *n*-3 PUFA supplements (42).

In a 2018 meta-analysis performed by Aung et al., the authors found no supporting evidence for the recommendation of using *n*-3 PUFA supplements as a secondary prevention measure

(43). Manson et al. found no reduction in cardiovascular events among those who supplemented *n*-3 PUFAs. There was however a lower incidence of major cardiovascular endpoints (MI, stroke, or death from cardiovascular causes and invasive cancer) among those who supplemented *n*-3 PUFA and had low fish consumption (44).

Generally, RCTs have mainly focused on the benefits of *n*-3 PUFA supplementation as a secondary prevention measure among patients with type 2 diabetes mellitus (T2DM) and prediabetes, as well as those with prevalent heart disease or a history of CVD events (45). However, the literature search suggests that the association between *n*-3 PUFA supplementation and primary prevention of CHD has not yet been investigated using an RCT study design.

In a 2020 randomized controlled trial (RCT) by Kalstad and Myhre et al., the authors found no reduction in cardiovascular events or all-cause death in elderly patients with recent acute myocardial infarction (AMI) compare to placebo (46). Some researchers have suggested that an additional effect of *n*-3 PUFA supplements may be hard to detect because of the efficiency of modern treatment (34, 43, 44).

2 Research objectives

This study aims to:

- Examine the association between *n*-3 PUFA intake frequency and the risk of fatal myocardial infarction (FMI) in a cohort of the NOWAC study.
- Assess the association between *n*-3 PUFA intake frequency and the risk of FMI within groups of high and low fatty fish intake.

2.1 Research question

The research question is as follows: *Is there any association between n-3 PUFA supplementation frequency and the risk of FMI among healthy female adults (30–70 years of age) in the NOWAC study?*

3 Materials and methods

3.1 Study design

This observational cohort study is based on prospective data from the NOWAC study, which is investigated using a quantitative research methodology.

3.1.1 The Norwegian Women and Cancer Study

The NOWAC study is a population-based cohort study that utilizes self-reported data obtained through questionnaires and already existing population registries (47). The study was initiated in 1991 to investigate the risk factors of breast cancer while paying attention to combined oral contraceptive use (48). The cohort consists of over 165,000 women aged 30–70, randomly sampled from the national population register.

The questionnaires contained two to eight pages of variables, such as smoking, menopause, physical activity, anthropometry, alcohol consumption, screening for breast cancer, socioeconomic status, sunbathing habits and pigmentation, and family history of breast cancer and disease (see Appendix 2). Data were included from questionnaires in which four out of the total number of pages contained questions regarding dietary habits. Food frequency questionnaires (FFQs) contained detailed questions regarding dietary habits during the preceding year across more than 90 different foodstuffs. Portion size was asked for some foods and the Norwegian weights and measures table were used to derive portions and weights (49).

Women recruited in 1991-92 have answered one baseline and up to three follow-up questionnaires (Figure 3). In Figure 3, the blue boxes indicate the timing of enrollment and the number of women who were initially recruited, whereas the green, yellow, and red boxes indicate the second and third follow-up questionnaire mailings, respectively. The figure shows information about the number of participants, year of enrollment, and whether blood samples were obtained. Boxes with black frames represent the questionnaires included in the present study. No repeated measurements are included in the present study. The second

questionnaire was used for some of the participants who have already answered the first questionnaire, because the second questionnaire is more compatible with the later questionnaires, as the questionnaires collected in 1991–94 were shorter and had fewer diet-related questions. The blue box (n=38,000) in the figure includes participants who answered a long questionnaire (Figure 3). The green box (n=29,000) with dotted lines includes participants who answered a shorter version of the questionnaire.

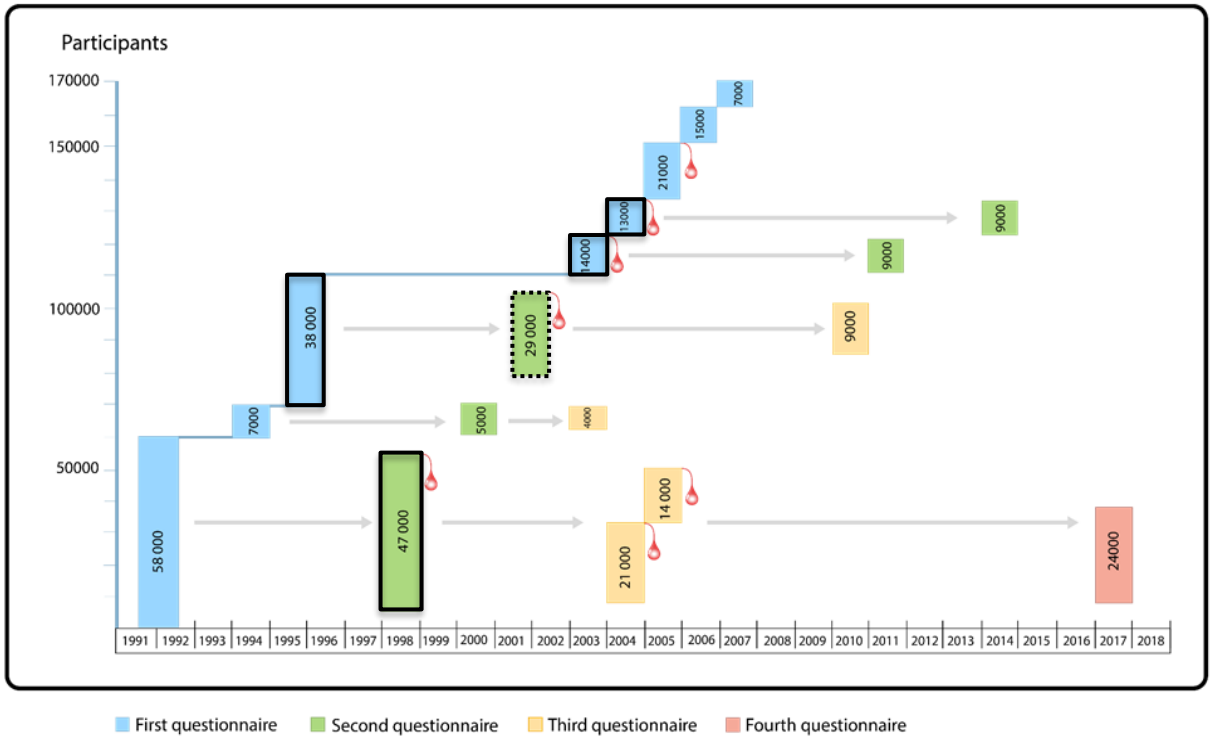

Figure 3. Enrollment in the Norwegian Women and Cancer (NOWAC) study.

3.1.2 Inclusion and exclusion criteria

Women aged 30–70 at baseline, who completed the FFQs, were free of CVD at baseline, and had no history of CVD, were included from the NOWAC study.

Patients with self-reported hypertension, angina pectoris, T2DM, a history of stroke, a history of MI, and cancer at baseline were excluded from the analysis as primary prevention is of interest (Figure 4). The rationale was to exclude those receiving treatment, were likely on medication or had changed their dietary habits. There were 20,875 (289 cases) participants initially excluded due to this criterion. Those with fibromyalgia were, according to protocol, also supposed to be excluded. Data on fibromyalgia were however not obtainable. Another 6 (0 cases) participants were excluded as a result of registered date of death before entry or at entry or emigration. The total lower and upper energy (kJ) intake were set to 2,500 and 15,000 kJ, respectively. An additional 825 (6 cases) participants were therefore removed. This was done to address over- and under reporting of energy intake. The cut-off was chosen based on biological plausibility and NOWAC standards (50). Intake of fish and fish products above the 99th percentile (>292.28 g) was also excluded. This specific cut-off was set to manage overreporting across all fish intake variables and was determined by inspecting percentiles and the stem-and-leaf plot (see Appendix 3). It should be noted that a lower cut-off would exclude too many cases and reduce the statistical power. Hence, another 689 (4 cases) participants were excluded. In total, 22,395 participants were excluded from this study, including 299 cases of FMI.

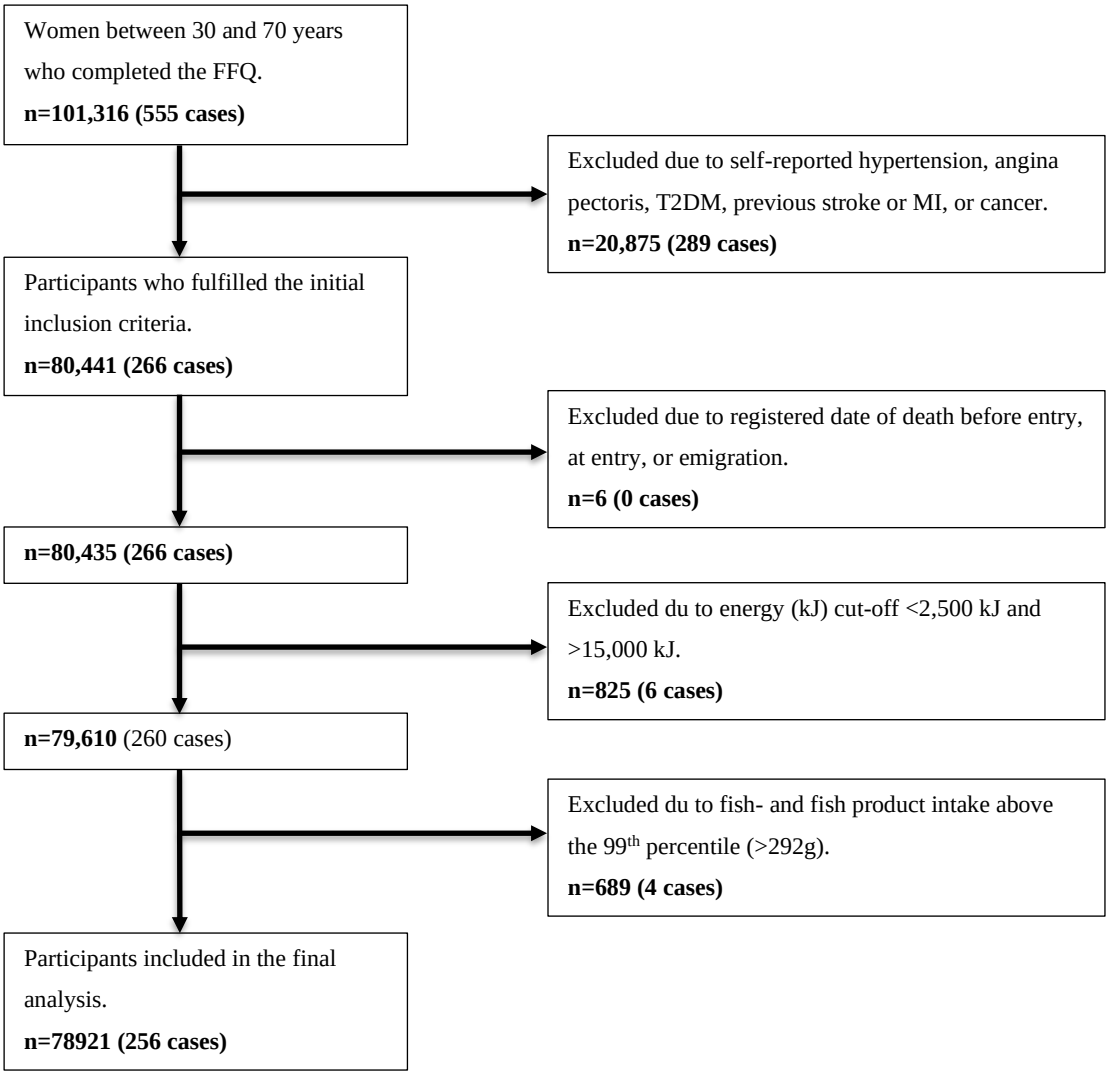

Figure 4. Flowchart of the inclusion/exclusion process.

3.2 Statistical analysis

All statistical analyses were performed using SPSS Statistics (Release 26.0.0.0; IBM Corp., Armonk, NY, USA) on Windows 10 (64-bit edition; Microsoft Corp., Redmond, WA, USA). The association between the incidence of FMI and *n*-3 PUFA supplementation frequency was evaluated using the proportional hazards (Cox) regression model ($h_i(t) = \lambda\,(t)\ \cdot\ e^{(\beta_1 X_1 + \beta_2 X_2 + \ldots)}$). Notably, hazards may vary over time, and the distribution throughout the length of the study represents the hazard function (51). The baseline hazard function is indicated by λ, and the exponentiated linear function contains the covariates (52).

Descriptive statistics were used to find missing data and detect patterns, and to explore and summarize. SPSS tools like frequency tables, descriptive statistics, explore, and crosstabs were used. Percentiles and stem-and-leaf plots were evaluated. Missing data, extreme values/outliers, distribution of intake frequency groups, baseline characteristics, and mean intakes (before and after exclusion) was reported. Single imputations were made for missing values. Non-informative right censoring was applied. Follow-up times were calculated from enrollment till event, lost to follow-up or end of follow-up.

The proportional hazards assumption was evaluated graphically by checking the Log (-log) plot. Tree models were constructed: a crude model (adjusted for age), a smoking adjusted model (adjusted for age and smoking), and a multivariate model that is adjusted for all covariates (age, smoking, BMI, self-reported health, education, menopausal status, breastfed at least one child, dietary covariates: fish and fish products, SFAs, fruit and vegetable intake). Hazard ratios (HRs) and confidence intervals (CIs) are reported for all three models. A trend test was conducted to look at trends across *n*-3 PUFA intake frequency groups within all the models by adding *n*-3 PUFA intake frequency as a continuous variable in each model. P-values are reported for trends. A complete case analysis was conducted to assess the robustness of the model. An interaction term for the main exposure variable (*n*-3 PUFA intake frequency) and time was added. The dataset was also split into two strata to look at the separate effect in high vs. low fatty fish intake groups as *n*-3 PUFA intake was expected to increase with higher fatty fish intakes.

3.2.1 Outcome

FMI was defined as the outcome variable. Cases were defined as participants with International Classification of Diseases, 10th Revision (ICD-10) code I21 on their death certificate, according to the Norwegian Cause of Death Registry: I21.0 (anterior wall ST-elevation myocardial infarction [STEMI]), I21.1 (inferior wall STEMI), I21.2 (STEMI of other sites), I21.3 (STEMI of an unspecified site), I21.4 (non-ST-elevation myocardial infarction [nSTEMI]), and I21.9 (AMI, unspecified) (53). These were considered direct or underlying causes of death. The end of follow-up was on December 31, 2018. All participants were followed up for an average of 18.4 years.

3.2.2 Exposure

The exposure variable, *n*-3 PUFA, is based on the intake frequency of cod liver oil and generic fish oil (Table 1). Some questionnaires contained initial yes/no questions about whether or not the participant consumed an *n*-3 PUFA supplement. Supplements in both liquid and capsule form were included. The questions were stated somewhat differently in the questionnaires, and the participants reported average annual (12 months) and dichotomized seasonal intake (eight months for winter and four months for summer). Questionnaire examples are provided (see Appendix 2)

Table 1. Questions about n-3 PUFA supplements and the original coding of values.

Questions	**Time frame**	**Original values**
How often do you consume liquid cod liver oil in the winter?	Winter (8 months)	0 = Never/seldom 1 = 1–3/month 2 = 1/week 3 = 2-3/week 4 = 4–6/week 5 = Daily
How often do you consume liquid cod liver oil for the rest of the year?	Summer (4 months)	
How often do you consume liquid cod liver oil in the winter?	Winter (8 months)	0 = Never/Seldom 1 = 1-3/month 2 = 1/week 3 = 2-6/week 4 = Daily
How often do you consume liquid cod liver oil for the rest of the year?	Summer (4 months)	
How often do you consume cod liver oil capsules in the winter?	Winter (8 months)	0 = Never/seldom 1 = 1–3/month 2 = 1/week 3 = 2-3/week 4 = 4–6/week 5 = Daily
How often do you consume cod liver oil capsules for the rest of the year?	Summer (4 months)	
How often do you consume cod liver oil capsules in the winter?	Winter (8 months)	0 = Never/Seldom 1 = 1-3/month 2 = 1/week 3 = 2-6/week 4 = Daily
How often do you consume cod liver oil capsules for the rest of the year?	Summer (4 months)	
How often do you consume generic fish oil supplements?	Annually (12 months)	0 = Never/seldom 1 = 1–3/month 2 = 1/week 3 = 2-3/week 4 = 4–6/week 5 = Daily
How often do you consume cod liver oil/fish oil supplements in the winter?	Winter (8 months)	0 = Never/Seldom 1 = 1-3/month 2 = 1/week 3 = 2-6/week 4 = Daily
How often do you consume cod liver oil /fish oil supplements for the rest of the year?	Summer (4 months)	

Abbreviations*: n-3, omega-3; PUFA, polyunsaturated fatty acid.*

All variables were initially standardized to 1 (never/seldom), 2 (1–3/month), 3 (1/week), 4 (2–6/week), and 5 (daily). Winter and summer variables were weighted, respectively, as 0.66 (8 months/12 months) and 0.33 (4 months/12 months) into annual means. The total mean values of all annual variables for each participant were calculated into one variable. All participants who stated that they never consumed *n*-3 PUFA supplements were given the code

1 (never) if also true for dichotomized yes/no variables. All values between 1 and 5 (1.001 through 4.999) were coded as 2 (intermittent), and values of 5 or greater were recoded to 3 (daily).

3.2.3 Covariates

All initial covariates were chosen depending on relevance and available data. These covariates included age (scale: years), parity (scale: number of children), smoking (scale: pack-years, nominal: status combined; 1 = never, 2 = former, 3 = current [1–20 pack-years], 4 = current [21–66 packyears]), physical activity score as ordinal data (1–10 grouped; 1 = inactive [1–3], 2 = moderately inactive [4-5], 3 = moderately active [6-7], 4 = active [8–10]), body mass index (BMI) as ordinal data (1 = underweight [<20 kg/m2], 2 = normal weight [20–25 kg/m2], 3 = overweight [25–30 kg/m2], 4 = obesity [>30 kg/m2]), self-reported health (1 = bad, 2 = good, 3 = very good), educational level as ordinal data (1 = <10 years, 2 = 10–12 years, 3 = >12 years), menopausal hormone therapy (MHT) as ordinal data (1 = never, 2 = former, 3 = current), postmenopausal status as nominal data (yes/no), breastfeeding as nominal data (ever breastfed at least one child, yes/no), and dietary intake variables as continuous data (grams per day; total intake of fatty fish, fish and fish products, lean fish, total fatty acids, SFAs, fruits, and vegetables).

In a 2020 study performed by Kravdal et al., the authors found that parity has a protective effect against CVD in a Norwegian population (54). BMI is known to be associated with MI. In their meta-analysis, Zhu et al. concluded that both overweight and obesity increase the risk of AMI (55). In addition, it has been established that smoking and physical inactivity increase the risk of MI (50) and that higher fruit and vegetable consumption is associated with a lower risk of CVD (8, 56). In a study by Barger et al., the authors found that self-rated health is associated with CVD-related risk of mortality (57). It has also been reported that the educational level is associated with the socioeconomic status (58, 59). Several researchers have found some correlation between CVD and menopausal status, and it has also been pointed out that being breastfed is associated with a lower risk of CVD (60, 61).

In a meta-analysis performed by Zheng et al., the authors concluded that low (one serving per week) or moderate (two to four servings per week) fish consumption has a significant beneficial effect on CHD compared to less than one serving per month or one to three servings per month (29). Moreover, Jayedi et al. revealed potential regional differences in the association between fish consumption and CVD (62). The American Heart Association recommends eating fish at least twice a week and stipulates that consuming oily fish is useful for the heart (63).

With regard to CVD outcomes, it seems that SFA intake is of greater importance than total fatty acid intake. A Cochrane systematic review reported a reduction in all cardiovascular events resulting from reducing the intake of saturated fats (64). A protective effect resulting from the reduction of total fat intake has also been reported, although the effect observed was less pronounced than that of altering the composition (65).

3.2.4 Model building

Predictors were added using the force entry method, which is called *Enter* in SPSS Statistics. All covariates were tested in the proportional hazards model independently against the dependent variable, with a cut-off significance level of $p \leq 0.20$. All independent variables except for MHT and fatty fish intake were statistically significant; therefore, MHT and fatty fish intake were excluded. Covariates were also checked for multicollinearity (see Appendix 4). As suggested by Andy Field, Pearson's correlations of $r \geq 0.80$ are high; therefore, a cut-off of $r = 0.70$ was set to reduce standard errors and avoid untrustworthy *b* coefficients (66).

Notably, parity and physical activity did not contribute to the overall model. However, a correlation between lean fish intake and total fish intake was found (r = 0.73); thus, lean fish intake was excluded as it contributed less to the model. The same was true for total fatty acid intake and SFA which correlated (r = 0.95). SFA was kept in the model as it seems to be more associated with FMI compared to total fatty acid intake (64). Thus, lean fish intake was excluded from the model. The rationale behind excluding physical activity was that its significance vanished once fruit intake was included. This may be the result of physically active women having higher fruit intake, as pointed out by Hjertåker et al. (50).

Three regression models were presented: crude, smoking-adjusted, and multivariate-adjusted. The crude model was adjusted for age, the smoking-adjusted model was adjusted for both age and smoking, and the smoking-adjusted model was included as smoking is significantly associated with MI (56). Pack-years are used, which is the number of packs of cigarettes smoked per day times the number of years smoked (67). The multivariate model includes all the final covariates that contributed to the model: age, smoking, BMI, self-reported health, education, menopausal status, breastfed at least one child, dietary covariates: fish and fish products, SFA, fruit, and vegetable intake. The multivariate model included all the final covariates that contributed to the model: age, smoking, BMI, self-reported health, educational level, menopausal status, breastfeeding at least one child, and dietary covariates (fish and fish products, SFAs, fruit, and vegetable intake).

3.2.5 Missing data

All variables with missing values are reported in tables (Table 2). Single imputation was used for missing variables. Variable means were used as a replacement for missing values of height, weight, physical activity, educational level, and pack-years. Missing information on smoking status was coded as 1 (never). Pack-year mean based on either former, current or both combined were similar and did not affect the grouping on the variable used in the model. As for hypertension, angina pectoris, T2DM, stroke, and MI, missing dichotomous (yes/no) information on a specific health variable was coded as 0 (no disease). The coding of the exposure variable is previously explained (section 3.2.2). Missing values on self-reported health, 1=very bad, 2=bad, 3=good, and 4=very good, was imputed 2=good. Missing values on self-reported health (1 = very bad, 2 = bad, 3 = good, 4 = very good) were coded as 2 (good). Missing information on smoking status, hormone therapy, and breastfeeding was coded as 1 (never).

Table 2. Missing values before imputations and exclusions.

Before exclusion	Mean	Median	SD	Valid	Missing
Height	166.1	166	5.7	100,203	1,113
Weight	68.4	67	11.6	99,185	2,131
Packyears' (former smokers)	6	3	7	34,368	66,948
Packyears' (current smokers)	14.7	14	8.6	29,411	71,905
Education	12	11	3.5	95,414	5,902
Physical activity	5.5	5	1.8	91,615	9,701
Hypertension				86,301	15,015
Angina pectoris				80,059	21,257
Diabetes				80,243	21,073
Stroke				79,769	21,547
MI				79,897	21,419
Self-reported health				85,957	15,359
Physical health				11,731	89,585
Smoking				99,963	1,353
MHT				97,980	3,336
Prevalent cancer				96,900	4,416
Breastfeeding*				92,461	8,855

Abbreviations: *MHT, menopausal hormone therapy; MI, myocardial infarction; T2DM, type 2 diabetes mellitus.*
*******Among those who reported having children*

3.3 Ethical considerations

The NOWAC study was approved by the Norwegian Data Protection Authority and Regional Committees for Medical Health Research Ethics. All the data necessary for this project were provided by the research team of the NOWAC study at the Institute of Community Medicine, Medical Faculty, University of Tromsø. Written informed consent was obtained from each participant, and ethical approval for the study was obtained from the Regional Ethical Committee of North Norway and Norwegian Data Inspectorate.

3.3.1 Privacy and confidentiality

It should be pointed out that the dataset will not contain any patient identifiers and will be kept on a password-protected computer throughout the research period. All data will be safely removed from the computer after the research is published.

3.3.2 Conflict of interest

There are no conflicts of interest.

4 Results

Out of a total of 101,316 eligible Norwegian women, with a mean age of 52.2 years and a range of 41–76 years, 22,395 subjects were excluded.

4.1 Baseline characteristics across omega-3 polyunsaturated fatty acid intake frequency groups

The following is the distribution of participants across *n*-3 intake frequencies: 40%, 38%, and 22% for never, intermittent, and daily, respectively (Figure 5). Most of the participants (40%) reported that they never consumed *n*-3 PUFA supplements. Those who consumed *n*-3 PUFA supplements on a daily basis represented the lowest proportion (22%).

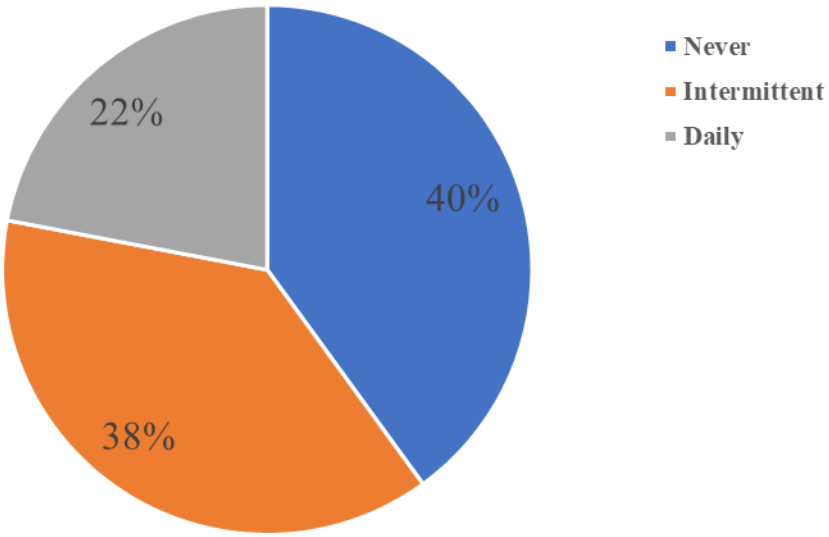

Figure 5. Study population distribution across omega-3 (n-3) polyunsaturated fatty acid (PUFA) intake frequency groups.

The mean age across all *n*-3 PUFA intake frequency groups was 51 years (±6.4; Table 3), and the baseline characteristics were somewhat similar across all groups. Those who never consumed *n*-3 PUFA supplements were younger (51 years) than those with intermittent (52 years) and daily (52.8 years) intake. The body weight values of those who never consumed *n*-3 PUFA supplements were slightly higher than of those with intermittent and daily intake: 68, 67, and 67 kg, respectively.

Postmenopausal status was reported among 42% of the participants, and 85% reported breastfeeding (Table 3). The educational level and self-reported health were also similar across the groups. Those who received education for more than 12 years represented 39% of the total sample.

4.1.1 Dietary characteristics

The energy intake in the intermittent and daily groups was found to be 7,108 and 7,242 kJ, respectively. The lowest energy intake (6,772 kJ) was found among those who never consumed n-3 PUFA supplements (Table 3). Those with daily n-3 PUFA supplement intake reported a mean total fatty acid intake value of 35 E%, which is slightly higher than the values of the never and intermittent groups (i.e., 34 E% and 34 E%, respectively). Although macronutrient intake was similar across all three groups, the fatty acid intake profile in the daily group differed from that in the never and intermittent groups as they consumed less SFAs and TFAs and more MFAs and PUFAs. Moreover, the consumption of fruits, vegetables, and fatty fish was found to be higher among the daily group. Mean consumption of 181, 193, and 228 g of fruits per day was reported among the never, intermittent, and daily groups, respectively. Vegetable intake was found to be 132, 135, and 154 g/day, and fatty fish intake was found to be 14, 16, and 17 g/day.

4.1.2 Lifestyle characteristics

The smoking status for each level of intake frequency was also uniformly distributed, although those who never consumed *n*-3 PUFA supplements comprised the greatest proportion of those who reported 20–66 pack-years (7%; see Table 3). Both the intermittent and daily groups reported values of 6% and 7%, respectively. The proportion of physically

active (score: 7–10) participants was higher in the daily group (17%) than in the never and intermittent groups (13% and 13%, respectively). The daily group also had a low proportion of inactive (score: 1–3) participants compared to the never and intermittent groups: 12%, 10%, and 9%, respectively.

Table 3. Baseline characteristics according to n-3 PUFA intake frequency (never, intermittent and daily) after exclusion.

Characteristics	**Never** (n=31,348)	**Intermittent** (n=29,857)	**Daily** (n=17,716)	**Total** (n=78,921)
N (%)	40	38	22	100
Age (years)	51	52	53	51 ± 6
Height (cm)	166	166	166	166 ± 6
Weight (kg)	68	67	67	67 ± 11
Number of children	2	2	2	2 ± 1
BMI (kg/m2)	25	24	24	24 ± 4
Total energy (kJ/day)	6,772	7,108	7,242	7,004 ± 1867
Education level (%)				
<10 years	24	23	21	23
10-12 years	39	36	38	38
>12 years	37	41	39	39
BMI (kg/m2) (%)				
Underweight (<20)	7	7	7	7
Normal weight (20–25)	60	64	64	62
Overweight (25–30)	25	23	23	24
Obese (>30)	8	6	6	7
Physical activity (%)				
Inactive (1-3)	12	10	9	11
Moderately inactive (3-5)	45	44	40	43
Moderately active (5-7)	31	33	34	32
Active (7-10)	13	13	17	14
Smoking status (%)				
Never	35	38	36	36
Former	33	34	37	34
Current (1-20 packyears)	25	23	21	23
Current (20-66 packyears)	7	6	7	7
Self-reported health (%)				
Bad	6	6	6	6
Good	62	62	63	62
Very good	32	33	30	32

Characteristics	Never (n=31,348)	Intermittent (n=29,857)	Daily (n=17,716)	Total (n=78,921)
MHT status (%)				
Never	70	70	60	68
Former	10	9	15	11
Current	20	21	25	22
Breastfed (%)				
No	15	15	17	15
Yes	85	85	83	85
Menopausal status (%)				
Pre	62	59	49	58
Post	39	41	51	42
Dietary intake (g/day)				
Fish and fish product	88	98	99	94 ± 53
Lean fish	27	31	29	29 ± 27
Fatty fish	14	16	17	15 ± 16
Fruits	181	193	228	196 ± 148
Vegetables	132	135	154	138 ± 89
Macronutrients (E%)				
Total fatty acids	34	34	35	34 ± 12
SFAs	14	14	13	14 ± 5
TFAs	0.7	0.7	0.6	0.7 ± 0.3
MFAs	11	11	11	11 ± 4
PUFAs	6	6	6	6 ± 3

***Abbreviations**: BMI, body mass index; E%, energy percent, MFA, monounsaturated fatty acid; MHT, menopausal hormone treatment; n-3, omega-3; PUFA, polyunsaturated fatty acid; SFA, saturated fatty acid; TFA, trans-fatty acid.*

***Note**: Means (± SD) are presented unless else is indicated.*

4.1.3 Fish consumption

After exclusion, the mean intake of fish and fish products was found to be 94 g (±53; Table 4). The maximum intake of fish and fish products and fatty fish decreased from 893 to 292 g and from 495 to 197 g, respectively, and the maximum intake of total fatty acids decreased from 298 to 194 g. However, the fish and fish products and caloric intake cut-off did not affect the highest reported lean fish, fruit, and vegetable intake.

Table 4. Dietary intake before and after applying the exclusion criteria.

	Before exclusion		**After exclusion**	
Dietary intake (g/day)	**Mean ± SD**	**Max**	**Mean ± SD**	**Max**
Fish and fish product	98 ± 60	893	94 ± 53	292
Lean fish	31 ± 30	245	30 ± 27	245
Fatty fish	16 ± 19	495	15 ± 16	197
Fruits	196 ± 150	972	196 ± 148	972
Vegetables	138 ± 92	983	138 ± 89	983
Total fatty acids	63 ± 23	298	64 ± 22	194
SFAs	25 ± 10	131	26 ± 10	97
TFAs	1.2 ± 0.5	7	1.2 ± 0.5	6
MFAs	20 ± 7	85	20 ± 7	63
PUFAs	12 ± 5	90	12 ± 5	63
Total energy (kJ/day)	6,931 ± 1,994	29,104	7,005 ± 1,867.3	14,984

***Abbreviations**: MFA, monounsaturated fatty acid; PUFA, polyunsaturated fatty acid SFA, saturated fatty acid; TFA, trans-fatty acid.*
***Note**: Participants with fish and fish products intake above the 99th percentile and caloric intake of <2,500 and >15,000kJ were excluded.*
Unit of measurement is gram (g) unless else is indicated.

4.2 Cox proportional hazards: Model assumptions

4.2.1 Proportional hazards over time

It can be concluded that the proportional hazards assumption was fulfilled. The log (–log) graph indicated that there are proportional hazards between groups over time (Figure 6).

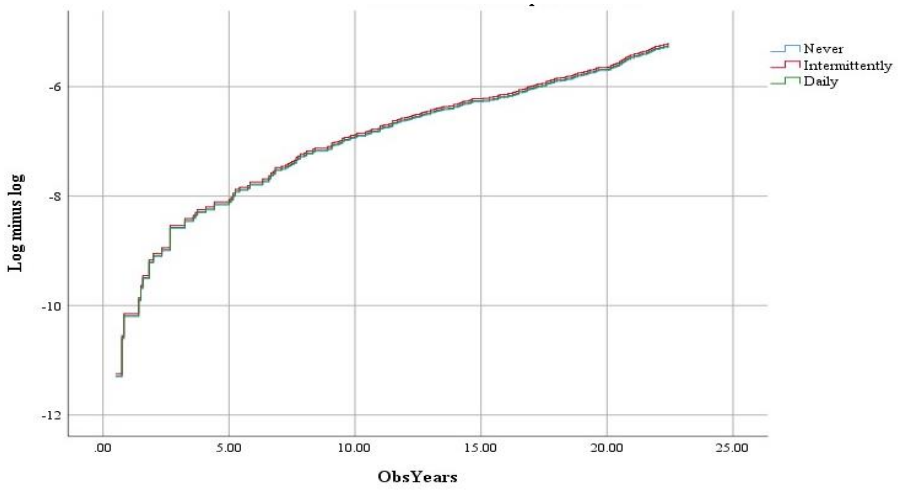

Figure 6. Illustration of the proportional hazards over time (observation years).

4.2.2 Interaction between the main covariate and time

No statistically significant interaction was found between the exposure variable and the time-dependent covariate (p = 0.89; Table 5).

Table 5. Interaction between n-3 PUFA intake frequency and time.

	B	SE	Wald	df	Sig.	Exp(B)
n-3 PUFA intake frequency	-.009	.210	.002	1	.966	.991
n-3 PUFA intake frequency × T_COV_	.002	.015	.018	1	.894	1.002

Abbreviations*: n-3, omega-3; PUFA, polyunsaturated fatty acid.*
Note*: T_COV is the time variable.*

4.3 The association between omega-3 intake frequency and the risk of fatal myocardial infarction

Data from 78,921 women were analyzed. During the 1,453,384 person-years of follow-up (average: 18.4 years), a total of 256 FMI cases were identified. The incidence rate was found to be 17 per 100,000. Hazard ratios (HRs) were estimated using the Cox proportional hazards model by comparing the intake frequencies. Estimates were calculated for intermittent and daily intake, with those who never consumed *n*-3 PUFA supplements as the reference group. Estimates for the crude, smoking-adjusted, and multivariate-adjusted models are presented in Table 6.

Table 6. Cox proportional HRs (95% CI) for the association between n-3 PUFA intake and the risk of FMI.

	HR (95% CI)			
Intake frequency	**Never**	**Intermittent**	**Daily**	**Sig.**
N	31,348	29,857	17,716	
Cases	95	110	51	
Crude model	1 [Ref.]	0.86 (0.65–1.14)	0.71 (0.50–1.00)	0.05
Smoking-adjusted*****	1 [Ref.]	0.89 (0.67–1.17)	0.76 (0.54–1.20)	0.11
Multivariate-adjusted******	1 [Ref.]	0.95 (0.72–1.26)	0.85 (0.60–1.20)	0.39

Abbreviations*: BMI, body mass index; CI, confidence interval; FMI, fatal myocardial infarction; HR, hazard ratio; n-3, omega-3; PUFA, polyunsaturated fatty acid; SFA, saturated fatty acid.*
Note*: p-values for the trend tests are presented in the Sig. column..*
*******Adjusted for age and smoking.*
********Adjusted for age, smoking, BMI, self-reported health, educational level, menopausal status, breastfeeding at least one child, and dietary covariates (fish and fish products, SFAs, fruits and vegetables intake).*

The crude model showed an HR for FMI of 0.86 (95% confidence interval [CI]: 0.65–1.14) in the intermittent group and a borderline statistically significant HR of 0.71 (95% CI: 0.50–1.00) in the daily group (Table 6). The age- and smoking-adjusted models showed HRs of 0.89 (95% CI: 0.67–1.17) and 0.76 (95% CI: 0.54–1.20) for the intermittent and daily intake, respectively, of *n*-3 PUFA supplements. The multivariate model, adjusted for age, smoking, BMI, self-reported health, educational level, menopausal status, breastfeeding at least one

child, and dietary covariates (i.e., fish and fish products, SFAs, fruits, and vegetables intake), showed HRs of 0.95 (95% CI: 0.72–1.26) and 0.85 (95% CI: 0.60–1.20) for intermittent and daily intake, respectively. The overall trend for the crude model was borderline significant (p = 0.05). Trends for the smoking-adjusted and the multivariate-adjusted model are statistically insignificant (p = 0.11 and 0.39, respectively). Figure 7 is a graphical representation of the difference in cumulative survival between the intake frequency groups.

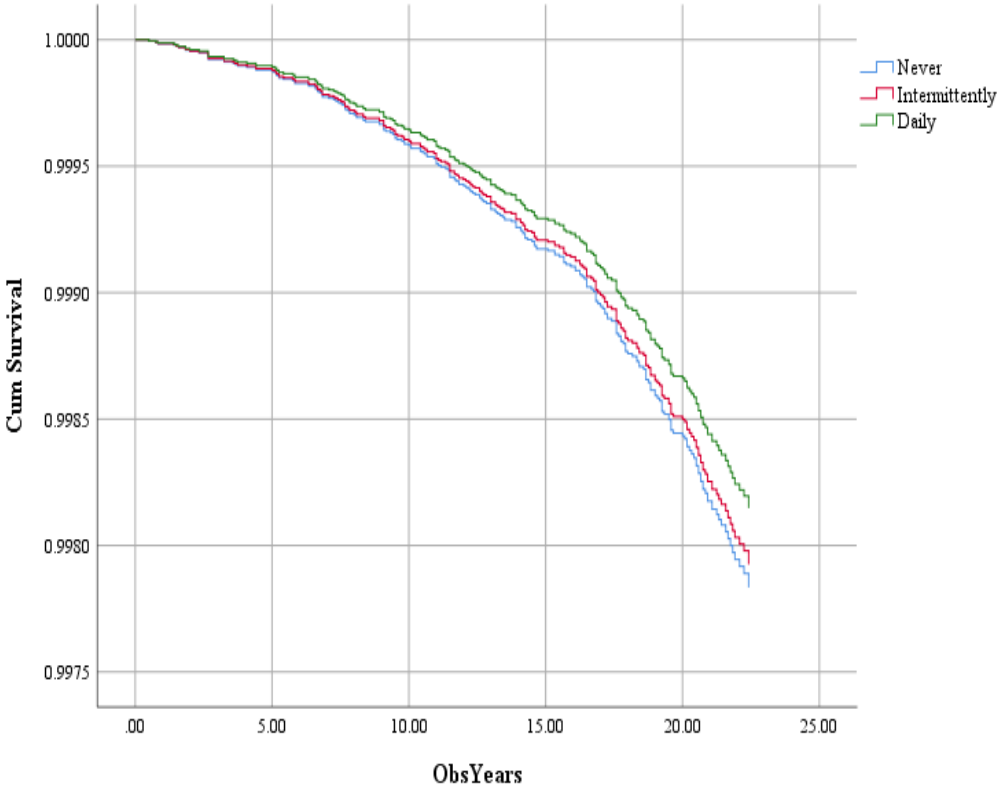

Figure 7. Cumulative survival in omega-3 (n-3) polyunsaturated fatty acid (PUFA) intake groups (never, intermittent and daily), according to the multivariate-adjusted model.

4.3.1 Sensitivity

A complete case analysis with no imputations was also performed to assess the robustness of the primary analysis (68, 69). Estimates for the crude, smoking-adjusted, and multivariate-adjusted models are presented in Table 7. The effect estimates were found to be similar to the results in the previous model with imputations on missing variables.

Table 7. Complete case analysis: Cox proportional HRs (95% CI) for the association between n-3 PUFA intake and the risk of FMI.

	HR (95% CI)			
Intake frequency	**Never**	**Intermittent**	**Daily**	**Sig.**
N	25,989	16,024	14,802	
Cases	70	38	38	
Crude model	1 [Ref.]	0.71 (0.48–1.06)	0.70 (0.47–1.05)	0.06
Smoking-adjusted*	1 [Ref.]	0.76 (0.51–1.14)	0.76 (0.51–1.14)	0.15
Multivariate-adjusted**	1 [Ref.]	0.92 (0.57–1.46)	0.84 (0.52–1.37)	0.49

***Abbreviations**: BMI, body mass index; CI, confidence interval; FMI, fatal myocardial infarction; HR, hazard ratio; n-3, omega-3; PUFA, polyunsaturated fatty acid; SFA, saturated fatty acid.*
Adjusted for age and smoking.
****Adjusted for age, smoking, BMI, self-reported health, educational level, menopausal status, breastfeeding at least one child, and dietary covariates (fish and fish products, SFAs, fruits and vegetables intake).***

4.3.2 Assessing the risk within groups of high and low fatty fish intake

The dataset was divided into two strata according to the median intake of fatty fish (11 g/day; Table 8). Both the crude and smoking-adjusted models showed HRs of 0.54 (95% CI: 0.32–0.90) and 0.57 (95% CI: 0.34–0.95), respectively, for the daily intake of *n*-3 PUFAs among those with low fatty fish intake. The protective effect was, however, statistically insignificant in the multivariate-adjusted model, with an HR of 0.65 (95% CI: 0.39–1.09). The survival curves for those with high fatty fish intake indicate lower survival rates for those with daily *n*-3 PUFA intake than for those in the intermittent and never groups (Figure 8). However, the opposite was found to be true in the low fatty fish intake group (Figure 9).

Table 8. High and low intake of fatty fish: Cox proportional HRs (95% CI) for the association between n-3 PUFA intake and the risk of FMI.

	HR (95% CI)				
Fatty fish intake		**Low**		**High**	
	Never	**Intermittent**	**Daily**	**Intermittent**	**Daily**
N	31,348	14,566	7,962	15,291	9,754
Cases	95	59	20	51	31
Crude model	1 [Ref.]	0.85 (0.59–1.23)	0.54 (0.32–0.90)	0.90 (0.59–1.38)	0.94 (0.58–1.51)
Smoking-adjusted*****	1 [Ref.]	0.88 (0.61–1.27)	0.57 (0.34–0.95)	0.93 (0.60–1.42)	1.02 (0.63–1.66)
Multivariate-adjusted******	1 [Ref.]	0.96 (0.66–1.39)	0.65 (0.39–1.09)	0.98 (0.64–1.51)	1.12 (0.68–1.82)

***Abbreviations**: BMI, body mass index; CI, confidence interval; FMI, fatal myocardial infarction; HR, hazard ratio; n-3, omega-3; PUFA, polyunsaturated fatty acid; SFA, saturated fatty acid.*

***Note**: Low=<11 gram/day, high=>11 gram/day.*

****** Adjusted for age and smoking.*

******* Adjusted for age, smoking, BMI, self-reported health, educational level, menopausal status, breastfeeding at least one child, and dietary covariates (fish and fish products, SFAs, fruits and vegetables intake).*

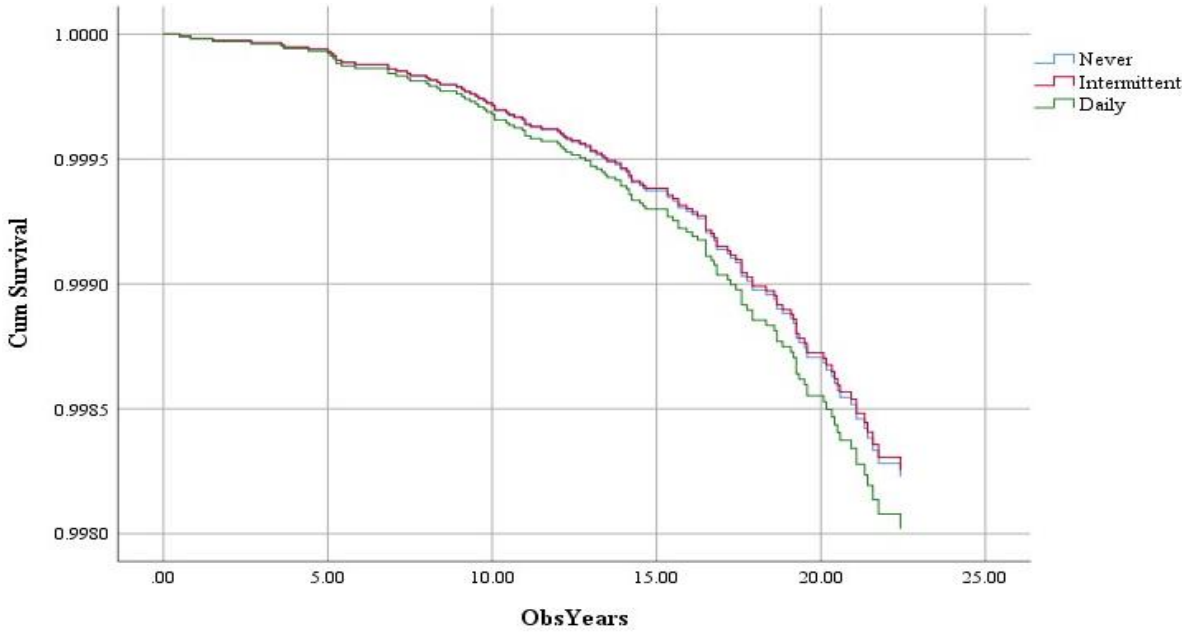

Figure 8. Cumulative survival in omrga-3 (n-3) polyunsaturated fatty acid (PUFA) intake groups (never, intermittent and daily) within the high fatty fish intake group, according to the multivariate-adjusted model.

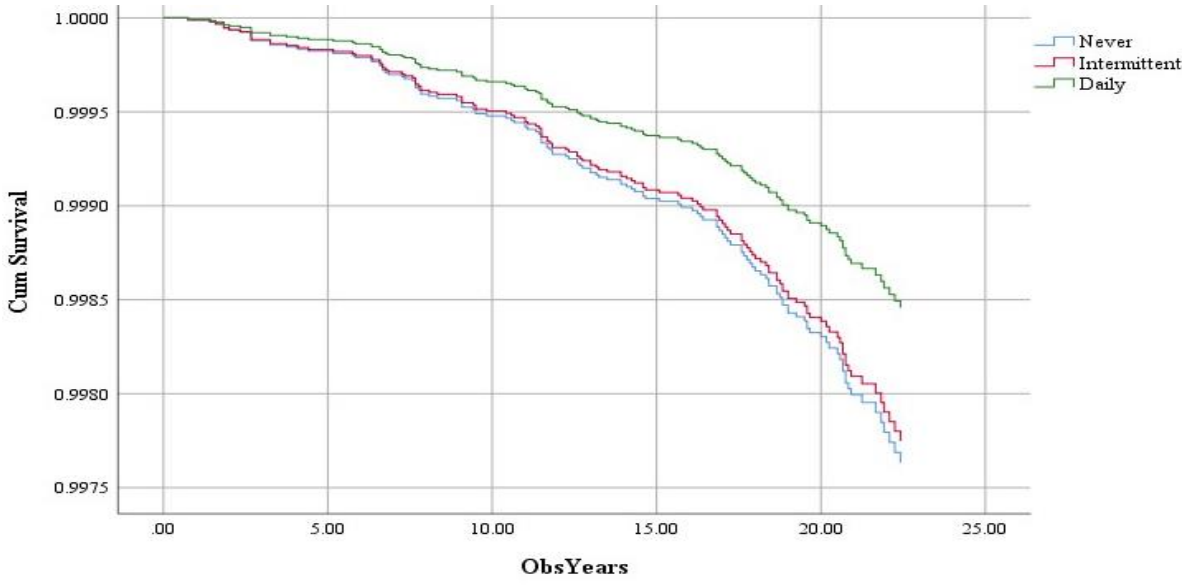

Figure 9. Cumulative survival in omega-3 (n-3) polyunsaturated fatty acid (PUFA) intake groups (never, intermittent and daily) within the low fatty fish intake group, according to the multivariate-adjusted model.

4.3.3 Checking for interaction

Interaction (effect-modification) can be seen if the effect between the primary exposure group and the outcome differs among strata (70). An interaction term was included in the multivariate model to check whether fatty fish intake affects the relationship between the *n*-3 PUFA supplementation frequency and the risk of FMI as an effect modifier (Table 9). The overall interaction effect was found to be statistically insignificant (p = 0.34).

Table 9. Cox proportional HRs (95% CI) with interaction term for n-3 PUFA frequency and fatty fish intake.

	HR (95% CI)			
Intake frequency	**Never**	**Intermittent**	**Daily**	**Sig.**
N	31,348	29,857	17,716	
Cases	95	110	51	
Multivariate-adjusted model	1 [Ref.]	0.83 (0.57–1.20)	0.69 (0.43–1.10)	0.29
Interaction term*****	1 [Ref.]	1.01 (0.99–1.02)	1.01 (0.99–1.03)	0.34

Abbreviations*: BMI, body mass index; CI, confidence interval; FMI, fatal myocardial infarction; HR, hazard ratio; n-3, omega-3; PUFA, polyunsaturated fatty acid; SFA, saturated fatty acid.*

Note: *Interaction term added to the model: n-3 PUFA intake frequency × fatty fish intake (g/day). Adjusted for age, smoking, BMI, self-reported health, educational status, menopausal status, breastfeeding at least one child, and dietary covariates (fish and fish products, fatty fish, SFA, fruits and vegetables intake).*

5 Discussion

Although the potential health benefits of *n*-3 PUFA supplementation have been studied since the 1970s, research has not yet provided enough evidence supporting the claim that *n*-3 PUFA supplements can protect against CVD. This is the first study to assess the association between *n*-3 PUFA intake frequency and FMI among women in the NOWAC study.

5.1 Main findings

No associations between *n*-3 PUFA intake frequency and the risk of FMI in the NOWAC study was found. This evaluation remains after adjusting for necessary confounding factors. The results of this study showed that the baseline characteristics were similar across all three intake groups (never, intermittent, and daily). A gradient was observed due to decreasing effect sizes with increased intake frequency. However, the effect sizes were small, and the confidence intervals contained the point of null effect. Also, the trends for the smoking-adjusted and the multivariate-adjusted models were statistically insignificant ($p = 0.11$ and 0.39, respectively).

The fatty fish intake stratified model showed statistically significant negative associations between daily *n*-3 PUFA supplement intake and FMI in the low fatty fish intake strata, according to both the crude and smoking-adjusted models. The effect, however, disappeared when all the confounders were adjusted for. The difference observed between the fatty fish intake groups (high and low) suggests effect modification. Thus, an interaction term was added to the model, which was statistically insignificant ($p = 0.34$).

5.2 Assessment of the methodological quality

5.2.1 Missing data

The dataset contained missing data on participants. In general, missing data can lead to loss of information and systematic errors in epidemiological studies (68). Researchers usually address missing data by only including participants who have no missing information

regarding the necessary variables. If data are not missing completely at random, complete case analysis on its own may be biased. However, the data in the present study are not missing completely at random. Single and multiple imputations are methods that are often used to account for missing data; however, they may introduce serious bias. Although multiple imputations are computationally demanding, it has the potential to improve the validity of research, given that modeling is performed appropriately. Single imputation methods may lead to systematic errors and underestimation of the true variability of the data (69). Generally, single imputation is performed for each missing value, which means that each missing value is replaced by either the mean or median within the respective variable. This method was chosen to maintain the sample size and statistical power and reduce bias. Multiple imputations were not performed because it requires much more advanced statistical modeling of each variable with a missing value, and the validity would improve only if it is performed properly. Since it is impossible to determine the level of randomness of the missing data as well as the uncertainties tied to the missing input variables, a sensitivity analysis was performed. Effect estimates were, therefore, compared between a complete case analysis and a model with single imputation. The results showed that the impact on the effect estimates was reasonably small, thus improving the prediction of the analysis and confirming the model robustness.

5.2.2 Strengths

The main strength of this study is its longevity and prospective design. Moreover, the data on the outcome (FMI) can be considered reliable, thanks to the national population register. In a study performed by Mahapatra et al., the authors evaluated the quality of civil registration systems. According to that study, the Norwegian death registration data were classified as medium with a completeness level of 70%–90% (83). According to a study by Phillips et al., Norway scored 87.6 out of 100 points, the lowest value between all Nordic countries (84). According to these studies, the use of unspecified codes is the main issue in the Norwegian cause of death registry. Nevertheless, the cause of death is reported by health professionals and the data are considered reliable. In a study by Lund et al., the authors found an almost identical cumulative incidence of all types of cancer when they compared NOWAC and national rates, which is considered a good indicator of reliable data (47).

It has been suggested that effective medication and/or treatment is the reason why modern research has not presented enough evidence supporting the claim that n-3 PUFA supplements have a protective effect against CVD (30, 37, 38). This problem was addressed by excluding subjects with hypertension, angina pectoralis, T2DM, stroke, and MI. Excluding those subjects likely also excluded most of those who consume statins, β-blockers, angiotensin-converting enzyme (ACE) inhibitors, aspirin, and similar preventive medication. Aspirin (acetylsalicylic acid) generally decreases the risk of CHD in part by blocking the cyclooxygenase enzyme that converts AA into thromboxane, which in turn inhibits platelet aggregation (71, 72). Acetylsalicylic acid is primarily used as a secondary prevention method. Jortveit et al. found that 97% of patients with STEMI and 91% of those with nSTEMI who were discharged were prescribed acetylsalicylic acid. Adenosine diphosphate (ADP) receptor inhibitors, β-blockers, statins, ACE inhibitors, and angiotensin II (AII) receptor inhibitors are also commonly used as secondary prevention methods after MI (Table 10). Dale et al. found that 10.1% of women with chronic pain and 4.7% of those without chronic pain use over-the-counter acetylsalicylic acid (73).

Table 10. Medication prescribed for patients with MI.

	STEMI (n = 3,429)		**nSTEMI (n = 8 557)**	
	Number	(%)	Number	(%)
Acetylsalicylic acid	3,250	(97)	7,745	(91)
ADP-receptor inhibitors	3,083	(92)	6,349	(74)
β-blockers	2,754	(82)	6,788	(79)
Statins	3,073	(92)	6,942	(81)
ACE/AII receptor inhibitors	2,047	(61)	4,441	(52)

***Abbreviations**: ACE, angiotensin-converting enzyme; ADP, adenosine diphosphate; AII, angiotensin II; MI, myocardial infarction; STEMI, ST-elevation myocardial infarction; nSTEMI, non-ST elevation myocardial infarction.*
***Note:** The table include cases with MI from all Norwegian hospitals in 2013 and is adapted and modified from Jortveit et al, 2014 (74).*

Reverse causality can be a problem when interpreting the association if subjects have increased their *n*-3 PUFA supplement intake or altered any life-style factors due to a CVD diagnosis (75). The effect of reverse causality was also reduced as a result of the previously mentioned exclusions.

5.2.3 Limitations

One of the limitations of the present study is that exposure is measured by the intake frequency instead of weighted amounts. In a review conducted by Superko et al., the authors argued that including subjects who had *n*-3 PUFA levels below the therapeutic blood levels may decrease the beneficial effect on clinical endpoints (61). In the present study, it is assumed that the intake dosage correlates with the frequency, as fish and *n*-3 PUFA intake has previously shown good correlation with serum phospholipids levels in the NOWAC cohort (76). A positive effect may have been impossible to capture because of the frequency-based groups, as the intake dosage may vary within the higher-level groups. However, it is possible that the daily group comprised participants who take *n*-3 PUFA supplements more than once a day, which is impossible to adjust for due to the nature of the questionnaires. If there is a therapeutic cut-off level, it may as well require higher intake than what is recommended on the package. The general assumption is that most people follow the recommended dose.

Another limitation was the limited amount of cases. A total of 256 FMI cases were kept in the analysis. Approximately 52% (289 cases) of all cases (total: 555) were excluded, mainly due to prevalent disease among participants. This limited the overall statistical power of the analysis. FMI was chosen instead of non-fatal MI to ensure reliable case reports. With self-reported MI as the outcome variable, there would have been more events, but the necessary methodology would introduce a greater risk of systematic errors.

5.2.4 Systematic error and validity

Longitudinal cohort studies are considered among the superior epidemiological study designs because it is less prone to bias compared to other epidemiological designs (77). To what

degree a test measures what it is designed to test is called validity. Systematic and random error should therefore be kept as low as possible. The internal validity is an expression for the representability of an observation in the studied group. External validity is to what extent an observation is generalizable to a similar group outside the study population.

Abdelhamid et al. argued that the benefits that have been suggested may have stemmed from trials with a high risk of bias (40). However, both information and selection bias were of little concern thanks to the prospective nature of the cohort. Nevertheless, not all the invited women returned the follow-up questionnaires (47). Low response rates may introduce selection bias, with a healthy volunteer effect. However, there was no reason to believe that there is a significant difference between the intake frequency of *n*-3 PUFA supplements and the risk FMI between those who returned the questionnaires and those who did not.

The study population was randomly selected with the national identification number (47). Notably, the central population register in Norway contains samples of everyone living in the country for a short or long period of time and is continuously updated. Sampling bias was of little concern because of the highly desirable sampling framework. Approximately 99.5% of the eligible women received an invitation, and only 0.5% of the invitations were returned because of unknown residence. The results revealed a response rate of about 60% in the age groups of 30–34 years up to 55–59 years, with a response rate of 44.7% among those aged 65–70. These, in general, are considered to be good response rates and are similar to what has been found in other population-based cohorts (47).

Moreover, the external validity of the NOWAC study have been evaluated (47). Although the results revealed some differences in parity and education, no statistically significant difference was observed between respondents and nonrespondents regarding lifestyle factors. Privacy concerns and lack of time were reported among nonrespondents in a postquestionnaire survey. Lund et al. argued that the relationship between any of the reasons for not responding regarding specific lifestyle factors should be strong to cause selection bias. Several validation studies have shown that the distribution of exposure is independent of the response rate, which suggests high external validity (78, 79).

Self-reported data on *n*-3 PUFA intake were utilized. Self-reported data are often necessitated by economic reasons but can otherwise be practical, effective, and reliable. In general,

subjective measurements, such as this one, are often considered inferior to objective ones, especially if they are not validated. Hence, longer follow-up durations are needed when assessing outcomes that take years to manifest and a large number of participants are needed to maintain statistical power. As a result, more objective measurements, such as blood samples and interviews, are not always feasible. In 2003, a validation study was performed, in which the internal validity of FFQs was evaluated (80). Four repeated 24 h recalls (telephone interviews with 238 women each season) were compared with FFQ data. It has been shown that the intake of fish and *n*-3 PUFAs is well correlated with serum phospholipid levels (76). Menopausal status and hormonal replacement therapy have also been validated against biomarkers of hormonal levels (81). Self-reported physical activity have also been reported as valid (82). There is some under-reporting of BMI among overweight and obese women, but otherwise valid (83). One of the drawbacks of self-reported data is over- and underestimation, including unlikely intake values. Outliers can potentially increase the variability and, therefore, reduce statistical power. Hence, the precision of the data in the present study was likely improved once exclusion criteria based on caloric intake and fish and fish products were applied (66).

Overall, the methodology has been selected to reduce bias and maintain internal validity. The study population should also be reasonably representative of the general Norwegian female population between 30 and 70 years (47). The results of this study should not be generalized across different populations due to possible unknown effects of a variety of factors such as age, sex, ethnicity, lifestyle, biological predispositions, and climate.

5.2.5 Model building

Selection of confounders is driven by theory, on the basis of previous findings. Confounders are usually selected with regard to model contribution and correlation. Force entry was used because some research supports the initial selection of covariates. One disadvantage in the force entry method is that it heavily relies on good theoretical reasons for including the covariates. However, one of its strengths is that no hierarchical structure needs to be made, which is prone to random variation in the data. This method is considered to be superior and is commonly recommended (66). All covariates were tested in the proportional hazards model

independently against the dependent variable (with a cut-off significance level of $p \leq 0.20$) to avoid overfitting the model with predictors with little contribution. A correlation cut-off ($r = 0.73$) was set to reduce standard errors and avoid untrustworthy *b* coefficients (66). Overall, parsimony heuristics were followed to keep the model simple and robust. Important covariates could, on the other hand, have been left out. However, information regarding cholesterol levels, stress, and family history was not obtainable.

5.2.6 Residual confounders

Generally, it is important to identify gene function variations only when they are consistently and systematically varying in the population (84). As briefly mentioned in the Introduction, there are several genetic predispositions to a disadvantageous lipid profile, which are the following hyperlipidemias: familial hypercholesterolemia, polygenic familial hypercholesterolemia, familial combined hyperlipidemia, and familial dysbetalipoproteinemia (5). Subjects with any of these conditions should have been excluded from the analysis, but no information regarding these conditions was obtainable. It is reasonable to assume that many of the subjects with these conditions were excluded because of hypertension, angina pectoralis, T2DM, stroke, and MI at baseline. Part of the population were also likely to have undiagnosed genetic conditions. A family history does not, however, equate to having the genetic condition itself or being susceptible to it (84). There are also studies suggesting that genetic variations could be responsible for different lipid responses (85-87). A study by Melarba et al. suggested that susceptibility to CVD could vary because polymorphisms of the FADS1 and FADS2 genes were associated with variations in EPA, LA, ALA, and AA serum levels. Most noteworthy was AA which is especially associated with inflammation (88). Genetic variations may contribute to inconsistent findings (87). Genetic variation may explain why there are positive findings in high-risk populations (41, 87). In contrast, study population homogeneity may cause an effect to be undetectable. There have also been reported gender differences in response to EPA and DHA. A 2008 RCT found that EPA and DHA (supplementing with 0.7 gram/day) had a greater effect on lowering triglycerides in males compared to females, which could make it harder to detect a protective effect against FMI among females (89). In addition to variations in lipid response, different n-3 PUFA products

may also contain different amounts of total n-3 PUFAs, as well as varying distributions of EPA and DHA, which could also confound the results.

In the Seven Countries Study, it was concluded that not smoking and a healthy diet are prerequisites for low CHD rates (90). However, high intake of fish was not sufficient to lower the CHD rates in countries with high rates of smoking and diets with more saturated fat content and fewer antioxidants. As previously mentioned, western diets are rich in *n*-6 PUFAs, which are associated with proinflammatory ratios (20). Western diets can, therefore, become prothrombotic and proaggregatory, which increases the blood viscosity and vasoconstriction (20). On this premise, high *n*-6 PUFA levels may prevent a potential prophylactic effect as LA and ALA compete for the same elongase and desaturase proteins. The Norwegian diet represents a western diet and may therefore be excessive in *n*-6 PUFA. On the other hand, some reports have concluded that the absolute *n*-3 PUFA intake is more important than the intake ratio (13). Perhaps there are other dietary, biological, and chemical factors affecting the bioavailability of *n*-3 PUFAs in the diet, thus ultimately affecting the blood levels of EPA and DHA (91).

Cod liver oil and *n*-3 PUFA supplements contain vitamin D. The intake of these supplements usually varies from one season to another. Some people consume only *n*-3 PUFA supplements in the winter to maintain sufficient blood 25(OH)D levels. In a 2017 systematic review conducted by Huang et al., the authors found significantly lower levels of blood 25(OH)D in patients with MI (92). Hence, they concluded that sufficient 25(OH)D levels may have a protective effect against MI. In the present study, some of the individuals who exclusively consume *n*-3 PUFA supplements in the winter may have been categorized as intermittent users. Hjartåker et al. found that 44% of women used cod liver oil or capsules and that 7% used other fish oil capsules in the NOWAC study (50). It was also observed that the proportion of those using cod liver oil increased with age. However, no age trends were found for those who have reported using other fish oil products. All models are age-standardized in the present study, but vitamin D status could potentially be an important confounder unadjusted for.

Generally, environmental contaminants, such as persistent organic pollutants, and heavy metals, such as methylmercury, may potentially diminish the health benefits associated with

n-3 PUFA (93). However, in a Norwegian project commissioned by the Norwegian Food Safety Authority and performed at the Institute of Marine Research, the researchers analyzed seven fish oils, one mixed fish and plant oil, one seal oil, and one microalgal oil for dioxin-like polychlorinated biphenyls (PCBs), dioxins, non-dioxin-like PCBs, polybrominated flame retardants, and the elements arsenic, cadmium, mercury, lead, and selenium (94). Large variations were observed in the levels of organic contaminants between different oils. However, none of the oils exceeded the maximum levels set by the European Union.

Some studies have also pointed out the possible negative effects of consuming oxidized lipids, although to our knowledge no human interventional studies on this issue have yet been conducted (95, 96). Several animal studies have shown that oxidized lipids may cause inflammation and advanced atherosclerosis. In general, *n*-3 PUFAs are easily oxidized by light, air, and temperature over time because of the unstable nature of double bonds. During this process, different primary oxidation products (peroxides) form, which are unstable and prone to further degradation into secondary oxidation products. Further degradation may lead to potential harmful compounds. Ingesting over-the-counter *n*-3 PUFA supplements involves some risk of exposure to oxidized oils. In an RCT, Ottestad et al. found that a variety of markers of lipid peroxidation, oxidative stress, and inflammation were not significantly affected in healthy individuals who consume 8 g of highly oxidized fish oil daily (for three and seven weeks) (97). However, little is currently known regarding the oxidation status in other marine *n*-3 PUFA products and the extent to which this would have a negative effect (95, 97). On the other hand, antioxidants are often added to reduce oxidation; however, they do not prevent it (96).

6 Conclusions and recommendations for future research

In this prospective cohort study, the aim was to investigate whether a higher intake frequency of *n*-3 PUFA supplements is useful as a primary prevention method against FMI among women in the NOWAC study. The results are correlational, meaning that it does not show any causal relationships, but can nevertheless contribute to future research.

The results are in line with some of the previous findings (34-40, 42-44, 46). Researchers have suggested that an effect may be hard to detect due to effective treatment (34, 43, 44). Most participants who were likely receiving treatment related to CVD were excluded from the present study. Similar results were found by Manson et al. in an RCT, where there was a lower incidence of CVD among those who supplemented with *n*-3 PUFAs and had low fish consumption (44). However, no associations were found once the models were adjusted for confounding factors.

Future research should assess if there is a higher cut-off dosage where *n*-3 PUFA supplements have a prophylactic effect against CVD within different fish intake groups in healthy populations.

In summary, more frequent intakes of *n*-3 PUFA supplements are not associated with a lower risk of FMI among women in the NOWAC-study.

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Appendix 1

Literature search

PubMed

The literature search was conducted 22. October 2019 with 104 items found. All myocardial infarction mesh terms were combined with omega-3 or fish oils ("Myocardial Infarction"[Mesh]) AND ("Fatty Acids, omega-3"[Mesh] OR "Fish Oils"[Mesh]). Filters: full text, published in the last 10 years, humans and English. There were 27 randomized controlled trials among these.

Medline

The literature search was conducted in Medline database 24. October 2019 with 82 items found. All myocardial infarction mesh terms were combined with all fish oil terms. Booleans for detecting myocardial infarction in title (ti), abstract (ab) and keywords (kw) were used. The ADJ3 operator was used to find myocardial infarction in any order with two words or fewer between them. The following search was done: (Myocardial adj3 infarction).ti,ab,kw AND exp Fish Oils/. Filters: published between 2009 and 2019 (past 10 years), humans, all journals and all publication types.

Cochrane library

The literature search was conducted in Cochrane Library 1. November 2019 with 29 items found. All myocardial infarction mesh terms were combined with all fish oil terms. Line one: MeSH descriptor: [Fish Oils] explode all trees, line two: MeSH descriptor: [Myocardial Infarction] explode all trees, line tree: #1 AND #2, limits: Cochrane Reviews, Trials and Between Jan. 2009 and Oct. 2019 (10 years).

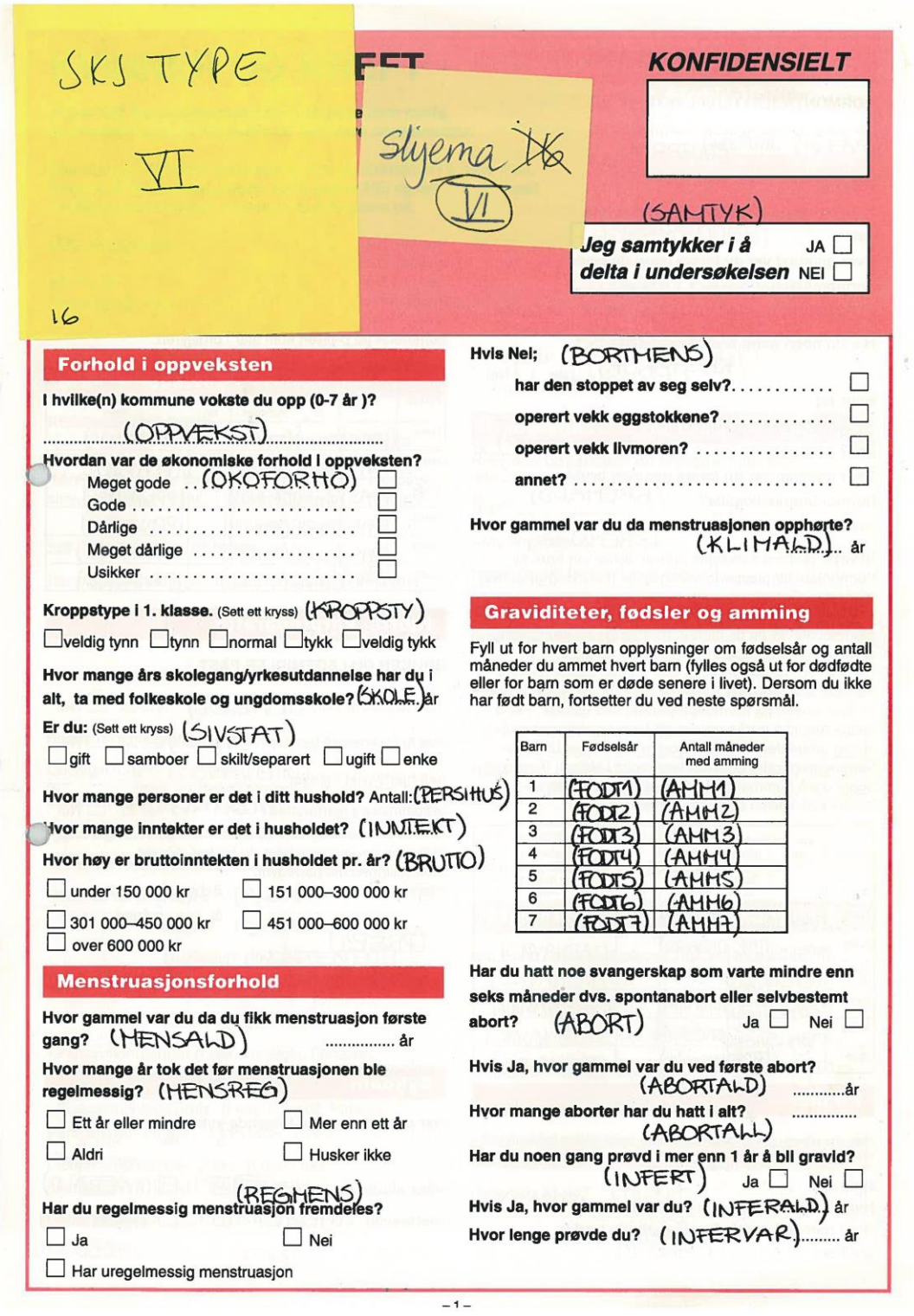
Google Scholar

A literature search was done in Google Scholar 1. November 2019 with 34 items found. The following combination was used: allintitle: "myocardial infarction" AND "fish oil" OR "omega 3", Filter: Time period 2009-2019.

Database	Search terms	Filters	Results	Date
PubMed	("Myocardial Infarction"[Mesh]) AND ("Fatty Acids, Omega-3"[Mesh] OR "Fish Oils"[Mesh])	Full text, published in the last 10 years, humans and English.	- A total 104 items found. - 37 RCTs.	22. October 2019
Medline	(Myocardial adj3 infarction).ti,ab,kw AND exp Fish Oils/	Published between 2009 and 2019 (past 10 years), humans, all journals and all publication types.	- A total 82 items found.	24. October 2019
Cochrane Library	MeSH descriptor: [Fish Oils] explode all trees, line two: MeSH descriptor: [Myocardial Infarction] explode all trees, line tree: #1 AND #2	Cochrane Reviews, Trials and Between Jan. 2009 and Oct. 2019 (10 years).	- A total 29 items found.	1. November 2019
Google Scholar	allintitle: "myocardial infarction" AND "fish oil" OR "omega 3"	Time period 2009-2019.	- A total 34 items found.	1. November 2019

Appendix 2

Questionnaire Example 1 (with six n-3 PUFA intake frequencies)



SKJ TYPE

VI

16

Skjema IKke

VI

KONFIDENSIELT

(SAMTYK)

Jeg samtykker i å delta i undersøkelsen JA ☐ NEI ☐

Forhold i oppveksten

I hvilke(n) kommune vokste du opp (0-7 år)?

(OPPVEKST)

Hvordan var de økonomiske forhold i oppveksten?

Meget gode (OKOFORHO) ☐
Gode ☐
Dårlige ☐
Meget dårlige ☐
Usikker ☐

Kroppstype i 1. klasse. (Sett ett kryss) (KROPPSTY)

☐veldig tynn ☐tynn ☐normal ☐tykk ☐veldig tykk

Hvor mange års skolegang/yrkesutdannelse har du i alt, ta med folkeskole og ungdomsskole? (SKOLE) år

Er du: (Sett ett kryss) (SIVSTAT)

☐gift ☐samboer ☐skilt/separert ☐ugift ☐enke

Hvor mange personer er det i ditt hushold? Antall: (PERSHUS)

Hvor mange inntekter er det i husholdet? (INNTEKT)

Hvor høy er bruttoinntekten i husholdet pr. år? (BRUTTO)

☐ under 150 000 kr ☐ 151 000–300 000 kr
☐ 301 000–450 000 kr ☐ 451 000–600 000 kr
☐ over 600 000 kr

Menstruasjonsforhold

Hvor gammel var du da du fikk menstruasjon første gang? (MENSALD) ..... år

Hvor mange år tok det før menstruasjonen ble regelmessig? (MENSREG)

☐ Ett år eller mindre ☐ Mer enn ett år
☐ Aldri ☐ Husker ikke

(REGMENS)

Har du regelmessig menstruasjon fremdeles?

☐ Ja ☐ Nei
☐ Har uregelmessig menstruasjon

Hvis Nei; (BORTMENS)

har den stoppet av seg selv? ☐
operert vekk eggstokkene? ☐
operert vekk livmoren? ☐
annet? ☐

Hvor gammel var du da menstruasjonen opphørte?

(KLIMALD) .. år

Graviditeter, fødsler og amming

Fyll ut for hvert barn opplysninger om fødselsår og antall måneder du ammet hvert barn (fylles også ut for dødfødte eller for barn som er døde senere i livet). Dersom du ikke har født barn, fortsetter du ved neste spørsmål.

Barn	Fødselsår	Antall måneder med amming
1	(FODT1)	(AMM1)
2	(FODT2)	(AMM2)
3	(FODT3)	(AMM3)
4	(FODT4)	(AMM4)
5	(FODT5)	(AMM5)
6	(FODT6)	(AMM6)
7	(FODT7)	(AMM7)

Har du hatt noe svangerskap som varte mindre enn seks måneder dvs. spontanabort eller selvbestemt abort? (ABORT) Ja ☐ Nei ☐

Hvis Ja, hvor gammel var du ved første abort? (ABORTALD) .....år

Hvor mange aborter har du hatt i alt? ..... (ABORTALL)

Har du noen gang prøvd i mer enn 1 år å bli gravid? (INFERT) Ja ☐ Nei ☐

Hvis Ja, hvor gammel var du? (INFERALD) år

Hvor lenge prøvde du? (INFERVAR) ..... år

– 1 –

Hormonbruk i overgangsalderen

HORMONTABLETTER/PLASTER/KREM/STIKKPILLER

Har du noen gang brukt hormontabletter/plaster? (TABBRUK) ☐ Ja ☐ Nei

Hvis Ja;

Hvor lenge har du brukt hormontabletter/plaster i alt? (TABAAR) ..... år

Hvor gammel var du første gang du brukte hormontabletter/plaster? (TABALDER) ..... år

HORMONPREPARAT TIL LOKAL BRUK I SKJEDEN

Har du noen gang brukt krem/stikkpille? (KREMBRUK) ☐ Ja ☐ Nei

Hvis Ja;

Hvor lenge har du brukt krem/stikkpille i alt? (KREMAAR) ... år

Hvor gammel var du første gang du brukte hormonkrem/stikkpille? (KREMALD) ..... år

Bruker du krem/stikkpille nå? (KREMNAA) ☐ Ja ☐ Nei

Vi vil be deg om å besvare spørsmålene om bruk av hormontablett/ plaster/krem/stikkpille (hormonpreparater) mer nøye. For hver periode med sammenhengende bruk av samme hormonpreparat håper vi du kan si oss hvor gammel du var da du startet, hvor lenge du brukte det samme hormonpreparatet og navnet på dette.
Dersom du har tatt opphold eller skiftet merke, skal du besvare spørsmålene for en ny periode. Dersom du ikke husker navnet på hormonpreparatet sett usikker. For å hjelpe deg til å huske navnet på hormonpreparatene ber vi deg bruke den vedlagte bjosjyre som viser bilder av hormonpreparater som har vært solgt i Norge. Vennligst oppgi også nummer på hormontabletten/plasteret/-kremen/stikkpillen som står i brosjyren.

Periode	Alder ved start	Brukt samme hormon-tablett/plaster/krem/ stikkpille Sammenhengende år	måned	Nr.	Hormontablett/ plaster/krem stikkpille (se brosjyre) Navn
Første	(TABALD1)	(TAB-LAR1)	(TABMND1)		(TABNAVN1)
Andre	(TABALD2)	(TAB-LAR2)	(TABMND2)		(TABNAVN2)
Tredje	(TABALD3)	(TAB-LAR3)	(TABMND3)		(TABNAVN3)
Fjerde	(TABALD4)	(TAB-LAR4)	(TABMND4)		(TABNAVN4)
Femte	(TABALD5)	(TAB-LAR5)	(TABMND5)		(TABNAVN5)
Sjette	(TABALD6)	(TAB-LAR6)	(TABMND6)		(TABNAVN6)

P-Piller

Har du noen gang brukt p-piller, minipiller inkludert? (PPILLE) ☐ Ja ☐ Nei

Hvis Ja;

Hvor lenge har du brukt p-piller i alt? (PPDUR) ...år

Hvor gammel var du første gang du brukte p-piller? (PPALDER) .....år

Bruker du p-piller nå? (PPNAA) ☐ Ja ☐ Nei

Vi vil be deg om å besvare spørsmålene om p-pille bruk mer nøye. For hver periode med sammenhengende bruk av samme p-pille merke håper vi du kan si oss hvor gammel du var da du startet, hvor lenge du brukte det samme p-pille merket og navnet på p-pillene.

Dersom du har tatt opphold eller skiftet merke, skal du besvare spørsmålene for en ny periode. Dersom du ikke husker navnet på p-pille merket, sett usikker. For å hjelpe deg til å huske navnet på p-pille merkene ber vi deg bruke den vedlagte brosjyre som viser bilder av p-pille merker som har vært solgt i Norge. Vennligst oppgi også nummeret på p-pillen som står i brosjyren.

Periode	Alder ved start	Brukt samme p-pille sammenhengende år	måneder	Nr.	P-pillene (se brosjyren) Navn
Første	(PPA1)	(PPAR1)	(PPMND1)		(PPNAVN1)
Andre	(PPA2)	(PPAR2)	(PPMND2)		(PPNAVN2)
Tredje	(PPA3)	(PPAR3)	(PPMND3)		(PPNAVN3)
Fjerde	(PPA4)	(PPAR4)	(PPMND4)		(PPNAVN4)
Femte	(PPA5)	(PPAR5)	(PPMND5)		(PPNAVN5)
Sjette	(PPA6)	(PPAR6)	(PPMND6)		(PPNAVN6)

Hjerte- karpreparater

BRUKER DU LEGEMIDLER FAST

mot høyt blodtrykk? (HOYTBLOD) ☐ Ja ☐ Nei

mot hjertekrampe (angina)? (ANGINA) ☐ Ja ☐ Nei

mot hjertesvikt og/eller

uregelmessig hjerterytme? (SVIKT) ☐ Ja ☐ Nei

Hvis ja ved ett aller flere av spørsmålene, vennligst angi hvilke hjerte-karpreparater du bruker, og når behandlingen ble påbegynt.

Preparat	Behandlingsstart år	måned
(PREP1)	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

Sykdom

Har du hatt noen av følgende sykdommer?

	Ja	Nei	Hvis Ja: Alder ved start
Høyt blodtrykk (HYPERTE)	☐	☐	(HYPERALD)
Hjertesvikt (HJERTE)	☐	☐	(HJERTALD)
Årebetennelse (AREBET)	☐	☐	(AREBEALD)

Blodpropp i legg eller lår (BLODPR) ☐ (BLODPRAL) ☐
Hjerteinfarkt (INF) ☐ (INFAILD) ☐
Slag (SLAG) ☐ (SLAGAILD) ☐
Migrene (MIGRENE) ☐ (MIGREAILD) ☐
Epilepsi (EPILEPSI) ☐ (EPILAILD) ☐
Kreft (KREFT) ☐ (KREFTAILD) ☐
Sukkersyke (diabetes) (DIAB) ☐ (DIABAILD) ☐

Oppfatter du din egen helse som; (Sett ett kryss) (EGENHELS)
☐ meget god ☐ god ☐ dårlig ☐ meget dårlig

Bruk av smertestillende midler

REGELMESSIG BRUK
Har du det siste året periodevis brukt smertestillende midler daglig eller nesten daglig? Angi hvor mange måneder du brukte dem og sett **0** hvis du ikke har brukt smertestillende midler. (SMERTE) .....måneder

SISTE 14 DAGERS PERIODE
Har du brukt smertestillende midler siste 14 dager? (DAGER)
☐ Ja ☐ Nei

Hvis Ja;

Var dette resepbelagte smertestillende midler?

	Ja	Nei
Brukte du Paralgin forte? (PARALGIN)	☐	☐
Codalgin forte? (CODALGIN)	☐	☐
Codacetyl? (CODACETY)	☐	☐
Andre reseptbelagte smertestillende: (RESEPT)		

Var dette reseptfrie smertestillende midler? Ja Nei

Hvis Ja, var det Albyl-E? (ALBYLE)	☐	☐
Dispril? (DISPRIL)	☐	☐
Globentyl? (GLOBENTYL)	☐	☐
Globoid? (GLOBOID)	☐	☐
Novid? (NOVID)	☐	☐
- Fenozonpreparater (f.eks. Fanalgin, Fenazon, Fenazon-koffein, Antineuralgica)? (FENOZON)	☐	
- Paracetamolpreparater (f.eks. Panodil, Paracet, Paracetamol, Pinex)? (PARACET)	☐	☐
- Ibuprofenpreparatet (f.eks. Brufen, Ibux, Ibumetin)? (IBUPROFE)	☐	☐

Annet preparat? (PRIRES) .....
Bruker du acetylsalisyltabletter fast? ☐ Ja ☐ Nei (ACETYL)

Hvis Ja, angi navn: (ACENAVN) .....
hvor mange pr. dag? (ACEPRDAG) tabletter
hvor lenge har du brukt i alt? .....mnd .....år (ACEHND) (ACEAAR)

Allergi

Er du allergisk overfor bestemte typer mat (MATALLER)	Ja	Nei
	☐	☐
Hvis Ja, angi:		
Melk o.l. (MELKALL)	☐	☐
Sitrus (appelsin o.l.) (SITRUALL)	☐	☐
Skalldyr (SKALLALL)	☐	☐
Annet (ANNENALL)	☐	☐

Undersøkelser for kreft

Hvor ofte undersøker du brystene dine selv? (Sett ett kryss) (EGENUS)
Aldri ☐
Uregelmessig ☐
Regelmessig (omtrent hver måned) ☐

Går du til regelmessig undersøkelse av brystene dine med mammografi? (Sett ett kryss) (MAMMOGRA)
Nei ☐
Ja, med 2 års mellomrom eller mindre ☐
Ja, med mer enn 2 års mellomrom ☐

Har du tatt kreftprøve fra livmorhalsen regelmessig?
Aldri (CYTOLOGI) ☐
Sjeldnere enn hvert 3. år ☐
Hvert 3. år eller oftere ☐

Brystkreft i nærmeste familie

Har noen nære slektninger hatt brystkreft;

	Ja	Nei	Vet ikke
mor (MOR)	☐	☐	☐
mormor (MORMOR)	☐	☐	☐
farmor (FARMOR)	☐	☐	☐
søster (SOSTER)	☐	☐	☐

Høyde og vekt

Hvor høy er du? (HOYDE) ..... cm

Hvor mye veier du i dag? (VEKTANA) ..... kg

Hvor mye veide du da du var 18 år? (VEKT18) ..... kg

Har du i løpet av kort tid (noen måneder) uten å være gravid, endret din vanlige vekt med mer enn fem kilo? (ENDRING) ☐ Ja ☐ Nei

Hvis Ja, angi din laveste vekt (LAVVEKT) ..... kg

angi din høyeste vekt (HOYVEKT) ..... kg

Gjør du noe forsøk på å endre kroppsvekten din?

☐ Nei

☐ Ja, jeg ønsker å legge på meg

☐ Ja, jeg ønsker å gå ned i vekt (VEKTRED)

Røykevaner

	Ja	Nei
Har du noen gang røkt? (EVERROK)	☐	☐

Hvis Ja, ber vi deg om å fylle ut for hver aldersgruppe i livet hvor mange sigaretter du i gjennomsnitt røkte pr. dag i den perioden.

	Antall sigaretter hver dag						
Alder	0	1-4	5-9	10-14	15-19	20-24	25+
15-19	(ROYKANT1)						
20-29	(ROYKANT2)						
30-39	(ROYKANT3)						
40-49	(ROYKANT4)						
50-59	(ROYKANT5)						
60-69	(ROYKANT6)						

	Ja	Nei
Røker du daglig nå? (ROYKNAA)	☐	☐

Bor du sammen med noen som røker? (ROKBOR)

Hvis Ja, hvor mange sigaretter røker de til sammen pr. dag? (ROKBORNO) .....

Fysisk aktivitet

Vi ber deg angi din fysiske aktivitet etter en skala fra svært lite til svært mye ved 14 og 30 års alder og i dag. Skalaen nedenfor går fra 1-10. Med fysisk aktivitet mener vi både arbeid i hjemmet og i yrkeslivet, samt trening og annen fysisk aktivitet som turgåing o.l. Sett ring rundt det tallet som best angir ditt nivå av fysisk aktivitet.

Alder	Svært lite									Svært mye
(AKT14) 14 år	1	2	3	4	5	6	7	8	9	10
(AKT30) 30 år	1	2	3	4	5	6	7	8	9	10
(AKTIDAG) I dag	1	2	3	4	5	6	7	8	9	10

Har du drevet konkurranseidrett? (KONKURRA) ☐ Ja ☐ Nei

Hvis Ja, hvor mange år i alt? (KONKAAR) ..... år

Kosthold

Vi er interessert i å få kjennskap til hvordan kostholdet ditt er **vanligvis.** Kryss av for hvert spørsmål om hvor ofte du **i gjennomsnitt siste året** har brukt den aktuelle matvaren, og hvor mye du pleier spise/drikke hver gang. Dersom du aldri/sjelden bruker matvaren, trenger du ikke krysse av for mengde.

Drikker du melk? (MELK) Ja ☐ Nei ☐

Hvis Ja, kryss av for hvor mange glass du vanligvis pleier å drikke av hver melketype. (Sett ett kryss pr. linje)

		aldri/ sjelden	1-4 pr. uke	5-6 pr. uke	1 pr. dag	2-3 pr. dag	4+ pr. dag
Helmelk	(søt, sur)	(MELKHEL)	☐	☐	☐	☐	☐
Lettmelk	(søt, sur)	(MELKLETT)	☐	☐	☐	☐	☐
Skummet	(søt, sur)	(MELKSKOM)	☐	☐	☐	☐	☐

Drikker du kaffe? (DRIKKAFF) ☐ Ja ☐ Nei

Hvis Ja, hvor mange kopper drikker du vanligvis av hver sort? (Sett ett kryss for hver linje)

	aldri/ sjelden	1-6 pr. uke	1 pr. dag	2-3 pr. dag	4-5 pr. dag	6-7 pr. dag	8+ pr. dag
Kokekaffe (KAFFEKOK)	☐	☐	☐	☐	☐	☐	☐
Traktekaffe (KAFFETRA)	☐	☐	☐	☐	☐	☐	☐
Pulverkaffe (KAFFEPUL)	☐	☐	☐	☐	☐	☐	☐

Hvor ofte spiser du yoghurt (1 beger)? (Sett ett kryss) (YOUGHURT)

☐ aldri/sjelden ☐ 1-3 pr. mnd ☐ 1 pr. uke ☐ 2-3 pr. uke ☐ 4-6 pr. uke ☐ daglig

Hvor ofte har du i gjennomsnitt siste året spist kornblanding, havregryn eller müsli? (Sett ett kryss) (MUSLI)

☐ aldri/nesten aldri ☐ 1-3 pr. uke ☐ 4-6 pr. uke ☐ 1 pr. dag

Dersom du spiser kornblanding e. l., hvor stor porsjon pleier du vanligvis å spise hver gang? (Sett ett kryss) (PORSJON)

☐ mindre enn 1 dl ☐ 1 dl ☐ 1,5 dl ☐ 2+ dl

Hvor mange skiver brød/rundstykker og knekkebrød/skonrokker spiser du vanligvis?
(1/2 rundstykke = 1 brødskive) (Sett ett kryss for hver linje)

	aldri/ sjelden	1-4 pr. uke	5-7 pr. uke	2-3 pr. dag	4-5 pr. dag	6+ pr. dag
Grovt brød	(BRODGROV)					
Fint brød	(BRODFIN)					
Knekkebrød o.l.	(BRODKNEK)					

Nedenfor er det spørsmål om bruk av ulike påleggstyper. Vi spør om hvor mange brødskiver med det aktuelle pålegget du pleier å spise. Dersom du også bruker matvarene i andre sammenhenger enn til brød (f. eks. til vafler, frokostblandinger, grøt), ber vi om at du tar hensyn til dette når du besvarer spørsmålene.

På hvor mange brødskiver bruker du? (Sett ett kryss pr. linje)

	0 pr. uke	1-3 pr. uke	4-6 pr. uke	1 pr. dag	2-3 pr. dag	4+ pr. dag
Syltetøy og annet søtt pålegg	(SYLTETOY)					
Brun ost, helfet	(BRUNOST)					
Brun ost, halvfet/mager	(MAGBRUN)					
Hvit ost, helfet	(HVITOST)					
Hvit ost, halvfet/mager	(MAGHVIT)					
Kjøttpålegg, leverpostei	(POSTEI)					
Salater med majones	(MAJONES)					

Videre kommer spørsmål om fiskepålegg.
På hvor mange brødskiver pr. uke har du i gjennomsnitt siste året spist? (Sett ett kryss pr. linje)

	0 Pr. uke	1 Pr. uke	2-3 Pr. uke	4-6 Pr. uke	7-9 Pr. uke	10+ Pr. uke
Makrell i tomat, røkt makrell	(ITOMAT)					
Sardin (olje, tomat)	(SARDIN)					
Sursild, sildesalat	(SURSILD)					
Kaviar	(KAVIAR)					
Tunfisk	(TUNFISK)					
Laks, røykt/gravet	(GRAVLAKS)					
Annet fiskepålegg	(PAALEGG)					

Dersom du bruker fett på brødet, hvor tykt lag pleier du smøre på? (En kuvertpakke med margarin veier 12 gram).
(Sett ett kryss) (TYKTLAG)

☐ skrapet (3 g) ☐ tynt lag (5 g) ☐ godt dekket (8 g)

☐ tykt lag (12 g)

Hva slags fett bruker du vanligvis på brødet?
(Sett gjerne flere kryss) (FETTBROD)

☐ bruker ikke fett på brødet
☐ smør
☐ hard margarin (f. eks. Per, Melange)
☐ myk margarin (f. eks. Soft)
☐ smørblandet margarin (f. eks. Bremykt)
☐ Brelett
☐ lettmargarin (f. eks. Soft light, Letta)

Hva slags fett blir vanligvis brukt til matlaging i din husholdning? (Sett gjerne flere kryss) (MATLAG)

☐ smør
☐ hard margarin (f. eks. Per, Melange)
☐ myk margarin (f. eks. Soft)
☐ smørblandet margarin (f. eks. Bremykt)
☐ soyaolje ☐ olivenolje ☐ maisolje

Hvor ofte spiser du frukt? (Sett ett kryss pr. linje)

	aldri/ sjelden	1-3 pr. mnd	1 pr. uke	2-4 pr. uke	5-6 pr. uke	1 pr. dag	2+ pr. dag
Epler/pærer	(FARER)						
Appelsiner o.l.	(SITRUS)						
Bananer	(BANANER)						
Annen frukt (f.eks. druer, fersken)	(FRUKTOM)						

Hvor ofte spiser du ulike typer grønnsaker?
(Sett ett kryss pr. linje)

	aldri/ sjelden	1-3 pr. mnd	1 pr. uke	2 pr. uke	3 pr. uke	4-5 pr. uke	6-7 pr. uke
Gulrøtter	(GULROTER)						
Kål	(KAALHODE)						
Kålrot	(KALROTER)						
Broccoli/blomkål	(BLOMKAAL)						
Blandet salat	(SALATER)						
Grønnsakblanding (frossen)	(BLANDING)						
Andre grønnsaker	(GRONNSAK)						

For de grønnsakene du spiser, kryss av for hvor mye du spiser hver gang. (Sett ett kryss for hver sort)

- gulrøtter (SPISGUL) ☐ 1/2 stk. ☐ 1 stk. ☐ 1 1/2 stk. ☐ 2+ stk.
- kål (SPISHODE) ☐ 1/2 dl ☐ 1 dl ☐ 1 1/2 dl ☐ 2+ dl
- kålrot (SPISROT) ☐ 1/2 dl ☐ 1 dl ☐ 1 1/2 dl ☐ 2+ dl
- broccoli/blomkål (SPISBLOM) ☐ 1/2 buketter ☐ 3/4 buketter ☐ 5+ buketter
- blandet salat (SPISBLAND) ☐ 1 dl ☐ 2 dl ☐ 3 dl ☐ 4+ dl
- grønnsakblanding (SPISGRON) ☐ 1/2 dl ☐ 1 dl ☐ 2 dl ☐ 3+ dl

Hvor mange poteter spiser du vanligvis (kokte, stekte, mos)? (Sett ett kryss) (POTATIS)

☐ spiser ikke/spiser sjelden poteter
☐ 1-4 pr. uke ☐ 5-6 pr. uke
☐ 1 pr. dag ☐ 2 pr. dag
☐ 3 pr. dag ☐ 4+ pr dag

Hvor ofte bruker du ris og spaghetti/makaroni ?
(Sett ett kryss pr. linje)

	aldri/ sjelden	1-3 pr. mnd	1 pr. uke	2 pr. uke	3+ pr. uke
Ris	(RISGRYN)				
Spaghetti, makaroni	(MAKARONI)				

Hvor ofte spiser du risengrynsgrøt? (Sett ett kryss) (RISGROT)

☐ aldri/sjelden ☐ 1 pr. mnd ☐ 2-3 pr. mnd ☐ 1+ pr. uke

Vi vil gjerne vite hvor ofte du pleier å spise fisk, og ber deg fylle ut spørsmålene om fiskeforbruk så godt du kan.

Tilgangen på fisk kan variere gjennom året. Vær vennlig å markere i hvilke årstider du spiser de ulike fiskeslagene.

	aldri/ sjelden	like mye hele året	vinter	vår	sommer	høst
Torsk, sei, hyse, lyr	(LYR)					
Steinbit, flyndre, uer	(UER)					
Laks, ørret	(ORRET)					
Makrell	(MAKRVAAR)					
Sild	(SILDVAAR)					

Med tanke på de periodene av året der du spiser fisk, hvor ofte pleier du spise følgende? (Sett ett kryss pr. linje)

	aldri/ sjelden	1 pr. mnd	2-3 pr. mnd	1 pr. uke	2 pr. uke	3+ pr. uke
Kokt torsk, sei, hyse, lyr	(KOKTFISK)					
Stekt torsk, sei, hyse, lyr	(STEKTFIS)					
Steinbit, flyndre, uer	(STEINBIT)					
Laks, ørret	(LAKS)					
Makrell	(MAKRELL)					
Sild	(SILD)					

Dersom du spiser fisk, hvor mye spiser du vanligvis pr. gang? (1 skive/stykke = 150 gram)
(Sett ett kryss for hver linje)

- kokt fisk (skive) (KOKTFISKIV) ☐ 1,5 ☐ 2 ☐ 3+
- stekt fisk (stykke) (STEKTSTM) ☐ 1,5 ☐ 2 ☐ 3+

Hvor mange ganger pr. år spiser du fiskeinnmat?
(Sett ett kryss pr. linje)

	0	1-3	4-6	7-9	10+
Rogn (ROGN)	☐	☐	☐	☐	☐
Fiskelever (LEVER)	☐	☐	☐	☐	☐

Dersom du spiser fiskelever, hvor mange spiseskjeer pleier du spise hver gang? (Sett ett kryss) (FISKELEV)

☐ 1 ☐ 2 ☐ 3-4 ☐ 5-6 ☐ 7+

Hvor ofte bruker du følgende typer fiskemat?
(Sett ett kryss pr. linje)

	aldri/ sjelden	1 pr. mnd	2-3 pr. mnd	1 pr. uke	2+ pr. uke
Fiskekaker, fiskepudding	(FISKKAKE)				
Fiskeboller	(FISKBOLL)				
Plukkfisk, fiskegrateng	(PLUKKFIS)				
Frityrfisk, fiskepinner	(FRITYR)				
Fiskesuppe	(FISKSUPP)				
Andre fiskeretter	(ANDREFIS)				

Hvor stor mengde pleier du vanligvis å spise av de ulike rettene? (Sett ett kryss for hver linje)

- fiskekaker, fiskepudding (stk.) (KAKMENGD) ☐ 1-2 ☐ 3-4 ☐ 5-6 ☐ 4+
- fiskeboller (stk.) (BOLMENGD) ☐ 1-2 ☐ 3-4 ☐ 5-6 ☐ 7+
- plukkfisk, fiskegrateng (dl) (PLUKMENGD) ☐ 1-2 ☐ 3-4 ☐ 5+
- frityrfisk, fiskepinner (stk.) (FRIMENGD) ☐ 1-2 ☐ 3-4 ☐ 5-6 ☐ 7+
- fiskesuppe (dl) (SUPMENGD) ☐ 1-2 ☐ 3-4 ☐ 5+

I tillegg til informasjon om fiskeforbruk er det viktig å få kartlagt hvilket tilbehør som blir servert til fisk. Vi ber deg derfor krysse av for hvor ofte du pleier bruke ulike typer tilbehør til fisk.

Hvor ofte spiser du følgende til fisk? (Sett ett kryss pr. linje)

	aldri/ sjelden	1 pr. mnd	2-3 pr. mnd	1 pr. uke	2+ pr. uke
Smeltet eller fast margarin/fett	(SMELTET)				
Baconfett	(BACON)				
Remulade	(REMULADE)				
Seterrømme (35%)	(SETER)				
Lettrømme (20%)	(LETT20)				
Saus med fett (hvit/brun)	(SAUSFETT)				
Saus uten fett (hvit/brun)	(IKKEFETT)				

For de ulike typene tilbehør du bruker til fisk, vær vennlig å kryss av for hvor mye du vanligvis pleier spise.

- smeltet/fast fett (ss) (SMELTSS) ☐ 1/2 ☐ 1 ☐ 2-3 ☐ 4+
- baconfett (ss) (BACONSS) ☐ 1/2 ☐ 1 ☐ 2 ☐ 3+
- remulade (ss) (REMULSS) ☐ 1/2 ☐ 1 ☐ 2 ☐ 3+
- seterrømme (ss) (SETERSS) ☐ 1/2 ☐ 1 ☐ 2-3 ☐ 4+
- lettrømme (ss) (LETT20SS) ☐ 1/2 ☐ 1 ☐ 2-3 ☐ 4+
- saus med fett (dl) (SAUSFETT) ☐ 1/2 ☐ 3/4 ☐ 1 ☐ 2+
- saus uten fett (dl) (IKKEFETTSS) ☐ 3/4 ☐ 1 ☐ 2+

Spiser du etter egen oppfatning nok fisk? (NOKFISK)

☐ Ja ☐ Nei

Hvis nei,

hvorfor spiser du ikke mer fisk

	Lite viktig	Viktig	Meget viktig
– for høy pris (HOYPRIS)	☐	☐	☐
– for lite utvalg (LITEUTV)	☐	☐	☐
– for ujevn tilgang (TILGANG)	☐	☐	☐
– kvaliteteten varierer (KVALITET)	☐	☐	☐
– uten tilgang på ferdigretter (FERDIG)	☐	☐	☐
– lukt ved tilberedning (LUKT)	☐	☐	☐
– vanskelig å tilberede (TILBERED)	☐	☐	☐
– smaken (SMAK)	☐	☐	☐
– familien liker ikke fisk (FAMILIE)	☐	☐	☐
– annet, angi (ANNET)			

Hvor ofte pleier du bruke følgende kjøtt- og jærkreretter? (Sett ett kryss for hver rett)

	aldri/ sjelden	1 pr. mnd	2-3 pr. mnd	1 pr. uke	2+ pr. uke
Steik (okse, svin, får)	(STEIK)				
Koteletter	(KOTELETT)				
Biff	(BIFF)				
Kjøttkaker, kårbonader	(KARBONAD)				
Kjøttpølser	(KJOTTPOL)				
Wienerpølser	(WIENER)				
Gryterett, lapskaus	(LAPSKAUS)				
Pizza m/kjøtt	(PIZZA)				
Kylling	(KYLLING)				
Andre kjøttretter	(KJOTT)				

Dersom du spiser steik eller koteletter, hvor mye pleier du å spise? (Sett ett kryss for hver linje)

Steik (skiver) ☐ (MYESTEIK) ☐ 3 ☐ 4+

Koteletter (stk.) ☐ (MYEKOTE) ☐ 1 1/2 ☐ 2+

Dersom du spiser følgende retter, oppgi mengden du vanligvis spiser: (Sett ett kryss for hver linje)

- kjøttkaker, karbonader (stk.) (KARBMENGD) ☐ 3 ☐ 4+
- kjøttpølser (stk.) (POLSMENG) ☐ 2 ☐ 3+
- wienerpølser (stk.) (WIENMENG) ☐ 3 ☐ 4+
- gryterett, lapskaus (dl) (GRYTMENGD) ☐ 5+
- pizza m/kjøtt (stykke à 100 g) (PIZZMENG) ☐ 4+

Hvor mange egg spiser du vanligvis i løpet av en uke (stekte, kokte, eggerøre, omelett)? (Sett ett kryss) (EGG)

☐ 0 ☐ 1 ☐ 2 ☐ 3-4 ☐ 5-6 ☐ 7+

Vi ber deg fylle ut hovedrettene til middag en gang til som en oppsummering.

Kryss av i den ruten som passer hvor ofte du i gjennomsnitt i løpet av siste år har spist slik mat til middag

	5+ pr. uke	4 pr. uke	3 pr. uke	2 pr. uke	1 pr. uke	2-3 pr. mnd	1 pr. mnd	nesten aldri
Rent kjøtt	☐	(RENHIDD)				☐	☐	☐
Oppmalt kjøtt	☐	(HALVHIDD)				☐	☐	☐
Fet fisk (makrell, laks o.l.)	☐	(FETHIDD)				☐	☐	☐
Mager fisk (torsk o.l.)	☐	(MAGHIDD)				☐	☐	☐
Fiskemat	☐	(FISKHIDD)				☐	☐	☐

Hvor ofte spiser du bakervarer som boller, kaker, wienerbrød, vafler, småkaker?
(Sett ett kryss for hvert slag)

	aldri/ sjelden	1 pr. mnd	2-3 pr. mnd	1 pr. uke	2-3 pr. uke	4-6 pr. uke	7+ pr. uke
Bakervarer	(BAKEVARE)						

Hvor ofte spiser du iskrem (til dessert, krone-is osv.)?
(Sett ett kryss for hvor ofte du spiser iskrem om sommeren, og ett kryss for resten av året)

	aldri/ sjelden	1-3 pr mnd	1 pr. uke	2-3 pr. uke	4+ pr. uke
– om sommeren (SOMMERIS)				☐	☐
– resten av året (AARETIS)				☐	☐

Hvor mye is spiser du vanligvis pr. gang? (Sett ett kryss) (IS)

☐ 1 dl ☐ 2 dl ☐ 3 dl ☐ 4+ dl

Hvor ofte spiser du sjokolade? (SJOKO)
(Sett ett kryss)

☐ aldri/sjelden ☐ 1-3 pr. mnd ☐ 1 pr. uke
☐ 2-3 pr. uke ☐ 4-6 pr. uke ☐ 1+ pr. dag

Dersom du spiser sjokolade, hvor mye pleier du vanligvis å spise hver gang? Tenk deg størrelsen på en Kvikk-Lunsj sjokolade, og oppgi hvor mye du spiser i forhold til den.
(Sett ett kryss) (MYESJOKO)

☐ 1/4 ☐ 1/2 ☐ 3/4 ☐ 1 ☐ 1,5 ☐ 2+

Kosttilskudd

Hvor ofte tar du følgende kosttilskudd? For tran og tranpiller vær vennlig å sette ett kryss for vinteren og ett kryss for resten av året; også om du bruker det like ofte gjennom hele året.

	aldri/ sjelden	1-3 pr. mnd	1 pr. uke	2-3 pr. uke	4-6 pr. uke	daglig
Tran,						
- om vinteren (TRANVINT)	☐	☐	☐	☐	☐	☐
- resten av året (TRANAAR)	☐	☐	☐	☐	☐	☐
Tranpiller,						
- om vinteren (VINPILLE)	☐	☐	☐	☐	☐	☐
- resten av året (SOMPILLE)	☐	☐	☐	☐	☐	☐
Fiskeolje -kapsler (FIKAPSEL)	☐	☐	☐	☐	☐	☐
Andre kosttilskudd (TILSKUDD)	☐	☐	☐	☐	☐	☐

Navn (TILNAVN) .....

Dersom du tar tran, hvor mye pleier du ta hver gang?
☐ 1 ts ☐ 1/2 ss ☐ 1+ ss (SSTRAN)

Dersom du tar tranpiller/kapsler, hva heter de og hvor mange tar du hver gang?
navn: .... (TRANNAVN) ..... stk. pr. gang: (TRANANT)

Dersom du tar fiskeoljekapsler, hva heter de og hvor mange tar du hver gang?
navn: .... (FISKNAVN) ..... stk. pr. gang: (FISKANT)

Hvor ofte spiste du fisk til middag som barn?
(Sett ett kryss) (BARNFISK)

aldri/sjelden	1 pr. mnd.	2-3 pr. mnd	1 pr. uke
☐	☐	☐	☐
2 pr. uke	3 pr. uke	4+ pr. uke	
☐	☐	☐	

I hvilken grad mener du kostholdet ditt har betydning for helsa? (KOSTHELS)
☐ ingen/svært liten ☐ noen ☐ stor ☐ svært stor

Alkohol

Er du total avholdskvinne? (AVHOLD) ☐ Ja ☐ Nei

Hvis Nei, hvor ofte og hvor mye drakk du i gjennomsnitt siste året? (Sett ett kryss for hver linje)

	aldri/ sjelden	1 pr. mnd	2-3 pr. mnd	1 pr. uke	2-4 pr. uke	5-6 pr. uke	1+ pr. dag
Øl (½ L) (OLGLASS)	☐	☐	☐	☐	☐	☐	☐
Vin (glass) (VINGLASS)	☐	☐	☐	☐	☐	☐	☐
Brennevin (drinker) (DRINKER)	☐	☐	☐	☐	☐	☐	☐

Mikrobølgeovn

Har du mikrobølgeovn? (MIKRO) ☐ Ja ☐ Nei

Hvis Ja; hvor mange ganger pr. uke bruker du mikrobølgeovnen til
ganger pr. uke
middagslaging? (MIKROMID) .....
annet? (ANNENMAT) .....

Hvor mange ganger pr. måned spiser du på:
ganger pr. mnd.
kafeteria/kantine (KANTINE) .....
pizza/hamburger restaurant (PIZZABAR) .....
hvitduks-restaurant (HVITDUK) .....

Kosthold som barn

Hvor mye melk drakk du som barn hver dag? (BARNMELK)
☐ drakk ikke ☐ 1-3 glass ☐ 4-6 glass
☐ 7 glass eller mer

Hvor ofte spiste du grønnsaker til middag som barn? (BARNGRON)
☐ aldri ☐ 1 gang i uken eller mer sjelden
☐ 2-3 ganger i uken ☐ 4 eller flere ganger pr. uke

Solvaner

Dersom du i begynnelsen av sommeren soler deg kraftig, blir huden din; (sett ett kryss) (SOLSTART)
☐ brun uten først å være rød ☐ rød
☐ rød med svie ☐ rød med svie og blemmer

Hvor mange ganger pr. år er du blitt forbrent av solen slik at du har fått svie og blemmer med avflassing etterpå? (ett kryss for hver aldersgruppe)

Alder	Aldri	Høyst 1 gang pr. år	2-3 g. pr. år	4-5 g. pr. år	6 eller flere ganger
Før 10 år	(SOLB18)				
10-19 år	(SOLB28)				
20-49 år	(SOLB38)				
50+ år	(SOLB48)				

Hvor mange uker i gjennomsnitt pr. år har du vært på badeferie i syden eller i Norge?

Alder	Aldri	1 uke	2-3 uker	4-5 ukerr	7 ukerr eller mer
Før 10 år	(SYDEN18)				
10-19 år	(SYDEN28)				
20-49 år	(SYDEN38)				
50+ år	(SYDEN48)				

Hvor ofte har du solt deg i solarium?

Alder	Aldri	Sjelden	1 gang pr. mnd.	2 ganger pr. mnd.	3-4 ganger pr. mnd	oftere enn1 gang pr. uke
Før 10 år	(SOLAR18)					
10-19 år	(SOLAR28)					
20-49 år	(SOLAR38)					
50+ år	(SOLAR48)					

Hvilken solfaktor bruker du?

	Påske	Sommer
I dag	(PAASKE)	(SOMMER)
For 10 år siden	(PAASK10)	(SOMMER10)

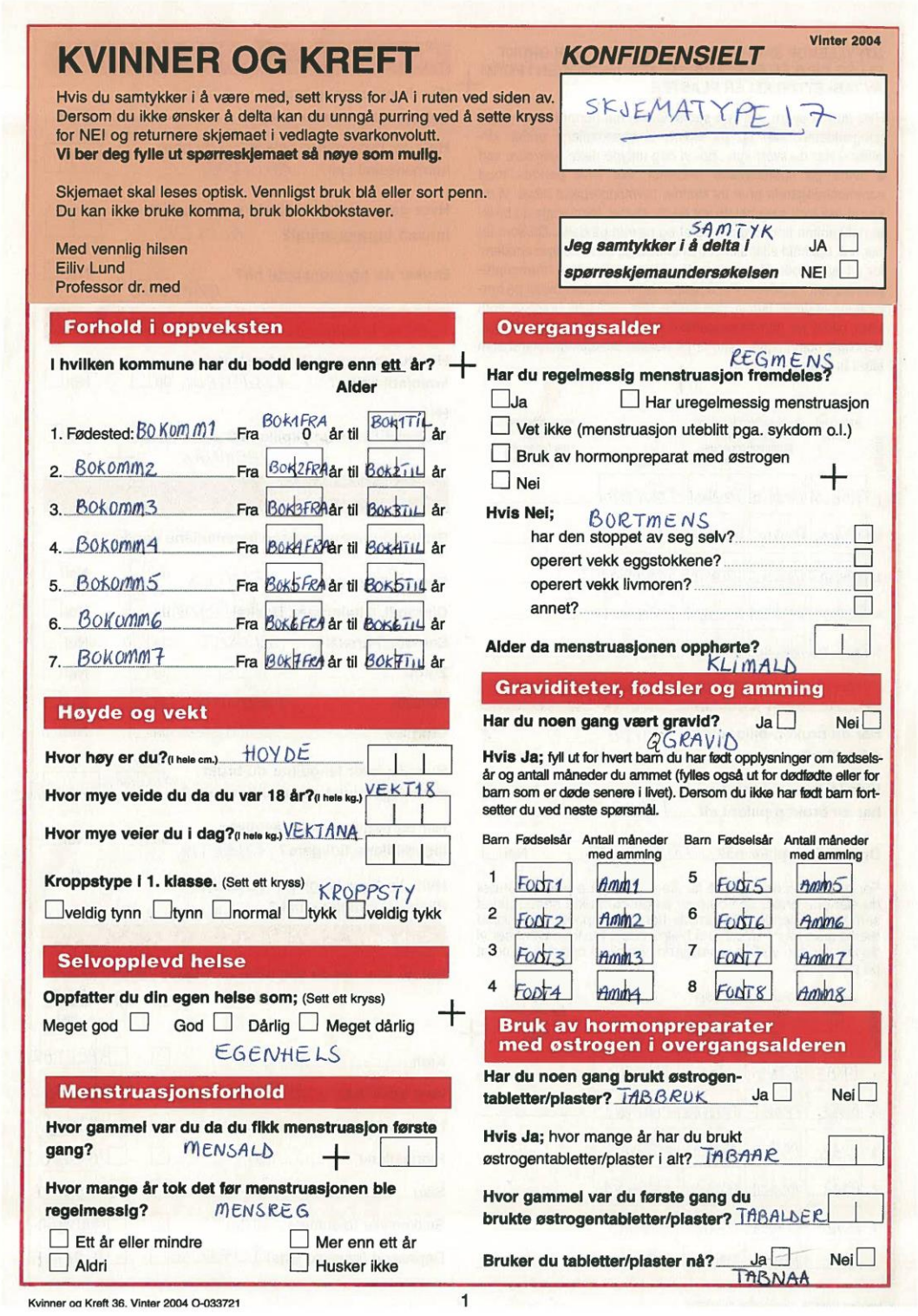
Hvor ofte dusjer eller bader du?

	Mer enn 1 g dagl	1 g dagl	4-6 g pr. uke	2-3 g pr. uke	1 g pr. uke	2-3 g pr. mnd.	Sjelden aldri
Med såpe/shampo	(MEDSAAPE)						
Uten såpe/shampo	(UTENSAAP)						

Takk for at du ville delta i undersøkelsen

LUNDBLAD GRAFISK AS, TROMSØ - TLF. 77 67 51 01 - Hormen 8

Questionnaire Example 2 (with five n-3 PUFA intake frequencies)



KVINNER OG KREFT

Vinter 2004

KONFIDENSIELT

SKJEMATYPE 17

Hvis du samtykker i å være med, sett kryss for JA i ruten ved siden av. Dersom du ikke ønsker å delta kan du unngå purring ved å sette kryss for NEI og returnere skjemaet i vedlagte svarkonvolutt.
Vi ber deg fylle ut spørreskjemaet så nøye som mulig.

Skjemaet skal leses optisk. Vennligst bruk blå eller sort penn.
Du kan ikke bruke komma, bruk blokkbokstaver.

Med vennlig hilsen
Eiliv Lund
Professor dr. med

SAMTYK
Jeg samtykker i å delta i spørreskjemaundersøkelsen JA ☐ NEI ☐

Forhold i oppveksten

I hvilken kommune har du bodd lengre enn ett år? **Alder**

1. Fødested: BOKOMM1 Fra BOK1FRA 0 år til BOK1TIL år
2. BOKOMM2 Fra BOK2FRA år til BOK2TIL år
3. BOKOMM3 Fra BOK3FRA år til BOK3TIL år
4. BOKOMM4 Fra BOK4FRA år til BOK4TIL år
5. BOKOMM5 Fra BOK5FRA år til BOK5TIL år
6. BOKOMM6 Fra BOK6FRA år til BOK6TIL år
7. BOKOMM7 Fra BOK7FRA år til BOK7TIL år

Høyde og vekt

Hvor høy er du? (i hele cm.) HOYDE

Hvor mye veide du da du var 18 år? (i hele kg.) VEKT18

Hvor mye veier du i dag? (i hele kg.) VEKTANA

Kroppstype i 1. klasse. (Sett ett kryss) KROPPSTY

☐veldig tynn ☐tynn ☐normal ☐tykk ☐veldig tykk

Selvopplevd helse

Oppfatter du din egen helse som; (Sett ett kryss)

Meget god ☐ God ☐ Dårlig ☐ Meget dårlig ☐

EGENHELS

Menstruasjonsforhold

Hvor gammel var du da du fikk menstruasjon første gang? MENSALD

Hvor mange år tok det før menstruasjonen ble regelmessig? MENSREG

☐ Ett år eller mindre ☐ Mer enn ett år
☐ Aldri ☐ Husker ikke

Overgangsalder

Har du regelmessig menstruasjon fremdeles? REGMENS

☐Ja ☐ Har uregelmessig menstruasjon
☐ Vet ikke (menstruasjon uteblitt pga. sykdom o.l.)
☐ Bruk av hormonpreparat med østrogen
☐ Nei

Hvis Nei; BORTMENS
har den stoppet av seg selv? ☐
operert vekk eggstokkene? ☐
operert vekk livmoren? ☐
annet? ☐

Alder da menstruasjonen opphørte? KLIMALD

Graviditeter, fødsler og amming

Har du noen gang vært gravid? Ja ☐ Nei ☐ GGRAVID

Hvis Ja; fyll ut for hvert barn du har født opplysninger om fødselsår og antall måneder du ammet (fylles også ut for dødfødte eller for barn som er døde senere i livet). Dersom du ikke har født barn fortsetter du ved neste spørsmål.

Barn	Fødselsår	Antall måneder med amming	Barn	Fødselsår	Antall måneder med amming
1	FODT1	AMM1	5	FODT5	AMM5
2	FODT2	AMM2	6	FODT6	AMM6
3	FODT3	AMM3	7	FODT7	AMM7
4	FODT4	AMM4	8	FODT8	AMM8

Bruk av hormonpreparater med østrogen i overgangsalderen

Har du noen gang brukt østrogen-tabletter/plaster? TABBRUK Ja ☐ Nei ☐

Hvis Ja; hvor mange år har du brukt østrogentabletter/plaster i alt? TABAAR

Hvor gammel var du første gang du brukte østrogentabletter/plaster? TABALDER

Bruker du tabletter/plaster nå? Ja ☐ Nei ☐ TABNAA

Kvinner og Kreft 36. Vinter 2004 O-033721

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UTFYLLENDE SPØRSMÅL TIL ALLE SOM HAR BRUKT ELLER BRUKER PREPARATER MED ØSTROGEN I FORM AV TABLETTER ELLER PLASTER.

Hvis du har svart «nei» på spørsmålene om hormonbruk i overgangsalderen, kan du gå videre til spørsmålene under «**P-piller**». Har du svart «ja», ber vi deg utdype dette nærmere ved å svare på spørsmålene nedenfor. For hver periode med sammenhengende bruk av samme hormonpreparat håper vi du kan si oss hvor gammel du var da du startet, hvor lenge du brukte det samme hormonpreparatet og navnet på dette. Dersom du har hatt opphold eller skiftet merke skal du besvare spørsmålene for en ny periode. Dersom du ikke husker navnet på hormonpreparatet, sett «usikker». For å hjelpe deg til å huske navnet på hormonpreparatene ber vi deg bruke den vedlagte brosjyre som viser bilder av hormonpreparater som har vært solgt i Norge. Vennligst oppgi også nummer på hormontabletten/plasteret som står i brosjyren.

Periode	Alder ved start	Brukt samme hormontablett/plaster/ sammenhengende år	måned	Nr.	Hormontablett/ plaster/ (se brosjyre) Navn
1.	TABALD1	TABLAR1	TABMND1	TABNAVN1	
2.	TABALD2	TABLAR2	TABMND2	TABNAVN2	
3.	TABALD3	TABLAR3	TABMND3	TABNAVN3	
4.	TABALD4	TABLAR4	TABMND4	TABNAVN4	
5.	TABALD5	TABLAR5	TABMND5	TABNAVN5	

P-pillebruk

Har du brukt p-piller eller minipiller? PPILLE Ja ☐ Nei ☐

Hvis ja, hvor mange år har du brukt p-piller i alt PPTOT PPAAR

Bruker du p-piller nå? PPNAA Ja ☐ Nei ☐

For p-pillebruk ønsker vi å få vite navnet på p-pillen, årstallet du startet å bruke den og hvor lenge du brukte dette merket sammenhengende. Dersom du har hatt opphold eller skiftet merke start på ny linje. For å hjelpe deg å huske navnet ber vi deg bruke den vedlagte brosjyren. Vennligst oppgi nummeret på p-pillen.

Periode	Alder ved start	Brukt samme p-piller sammenhengende år	måned	Nr.	P-piller (se brosjyre) Navn
1.	PPA1	PPAR1	PPMND1	PPNAVN1	
2.	PPA2	PPAR2	PPMND2	PPNAVN2	
3.	PPA3	PPAR3	PPMND3	PPNAVN3	
4.	PPA4	PPAR4	PPMND4	PPNAVN4	
5.	PPA5	PPAR5	PPMND5	PPNAVN5	
6.	PPA6	PPAR6	PPMND6	PPNAVN6	

Hormonspiral

Har du noen gang brukt hormonspiral (Levonova)? LEVONOVA Ja ☐ Nei ☐

Hvis Ja; hvor mange hele år har du brukt hormonspiral i alt? ANTLEVO

Hvor gammel var du første gang du fikk innsatt hormonspiral? ALDLEVO

Bruker du hormonspiral nå? Ja ☐ Nei ☐ NAALEVO

Østrogenpreparat til lokal bruk i skjeden

Har du noen gang brukt østrogen-krem/stikkpille? KREMBRUK Ja ☐ Nei ☐

Hvis Ja; bruker du krem/stikkpille nå? Ja ☐ Nei ☐ KREMNAA

Andre legemidler

Bruker du noen av disse legemidlene daglig nå?

Fontex, Fluoxetin	FONTEX	Ja ☐	Nei ☐
Cipramil, Citalopram, Desital	CIPRAM	Ja ☐	Nei ☐
Seroxat, Paroxetin	SEROXAT	Ja ☐	Nei ☐
Zoloft	ZOLOFT	Ja ☐	Nei ☐
Fevarin	FEVARIN	Ja ☐	Nei ☐
Cipralex	CIPRALEX	Ja ☐	Nei ☐

Hvis Ja; hvor lenge har du brukt dette legemidlet sammenhengede? Måneder LYKKEMND År LYKKEAAR

Har du benyttet noen av disse legemidlene tidligere? LYKKETID Ja ☐ Nei ☐

Hvis Ja; hvor lenge har du benyttet disse legemidlene i alt? LYKKETOT År

Sykdom

Har du eller har du hatt noen av følgende sykdommer?

		Ja	Nei	Hvis ja: Alder ved start
Kreft	KREFT	☐	☐	KREFTALD
Høyt blodtrykk	HYPERTE	☐	☐	HYPERALD
Hjertesvikt/hjertekrampe	HJERTE	☐	☐	HJERTALD
Hjerteinfarkt	INF	☐	☐	INFALD
Slag	SLAG	☐	☐	SLAGALD
Sukkersyke (diabetes)	DIAB	☐	☐	DIABALD
Depresjon (oppsøkt lege)	DEPRLEGE	☐	☐	DEPRALD

Røykevaner

Har du i løpet av livet røykt mer enn 100 sigaretter til sammen? SIGROYK _____ Ja ☐ Nei ☐

Hvor gammel var du da du tok din første sigarett? SIGALDER ☐☐

Hvis Ja, ber vi deg om å fylle ut for hver aldersgruppe i livet hvor mange sigaretter du i gjennomsnitt røykte pr. dag i den perioden.

Antall sigaretter hver dag

Alder	0	1-4	5-9	10-14	15-19	20-24	25+
10-14	☐	ROYKANT		1014		☐	☐
15-19 01	☐	ROYKANT		1519		☐	☐
20-29 02	☐	ROYKANT		2029		☐	☐
30-39 03	☐	ROYKANT		3039		☐	☐
40-49 04	☐	ROYKANT		4049		☐	☐
50+ 05	☐	ROYKANT		50MM		☐	☐

	Ja	Nei
Røyker du daglig nå? ROYKNAA	☐	☐
Røykte noen av dine foreldre da du var barn? ROKBARN	☐	☐

Hvis Ja, hvor mange sigaretter røykte de til sammen pr. dag? ROKBANT ☐☐

Brystkreft i nærmeste familie

Har noen nære slektninger hatt brystkreft?

	Ja	Nei	Vet ikke	Alder ved start
Datter DATTER	☐	☐	☐	ALDDAT
Mor MOR	☐	☐	☐	ALDMOR
Søster SOSTER	☐	☐	☐	ALDSOST

Mammografiundersøkelse

Har du vært til undersøkelse av brystene med mammografi MAMMO Ja ☐ Nei ☐

Hvis Ja; MAMMOALD
hvor gammel var du første gangen? (hele år) ☐☐

Hvor mange ganger har du vært undersøkt?

-etter invitasjon fra Mammografiprogrammet MAMMOPRO ☐☐

-etter henvisning fra lege MAMLEGE ☐☐

-uten henvisning fra lege MAMULEGE ☐☐

Fysisk aktivitet

Vi ber deg angi din fysiske aktivitet etter en skala fra svært lite til svært mye. Skalaen nedenfor går fra 1-10. Med fysisk aktivitet mener vi både arbeid i hjemmet og i yrkeslivet, samt trening og annen fysisk aktivitet som turgåing o.l. Sett kryss over det tallet som best angir ditt nivå av fysisk aktivitet.

Alder	Svært lite									Svært mye
14 år AKTI4	1	2	3	4	5	6	7	8	9	10
30 år AKT30	1	2	3	4	5	6	7	8	9	10
I dag AKTIDAG	1	2	3	4	5	6	7	8	9	10

Hvor mange timer pr. dag i gjennomsnitt går eller spaserer du utendørs?

	sjelden/ aldri	mindre enn 1/2 time	1/2-1 time	1-2 timer	mer enn 2 timer
Vinter GAUTVINTER	☐	☐	☐	☐	☐
Vår GAUTVAAR	☐	☐	☐	☐	☐
Sommer GAUTSOM	☐	☐	☐	☐	☐
Høst GAUTHOST	☐	☐	☐	☐	☐

For hver av følgende aktiviteter du deltar i, ber vi deg oppgi hvor mange minutter pr. dag du bruker i gjennomsnitt til hver av aktivitetene.

Fritidsaktivitet	Vinter	Vår	Sommer	Høst
Se på TV	TVMIN MVIN	TVMIN MVAR	TVMIN MSOM	TVMIN MHOS
Lesing	LESMIN MVIN	LESMIN MVAR	LESMIN MSOM	LESMIN MHOS
Håndarbeid/hobby	HAND MVIN	HAND MVAR	HAND MSOM	HAND MHOS
Hagearbeid	HAGE MVIN	HAGE MVAR	HAGE MSOM	HAGE MHOS
Dusj/bad/egenpleie	DUSJM MVIN	DUSJ MVAR	DUSJ MSOM	DUSJ MHOS
Trening/jogging	JOGG MVIN	JOGG MVAR	JOGG MSOM	JOGG MHOS
Sykling	SYKL MVIN	SYKL MVAR	SYKL MSOM	SYKL MHOS

Hvor mange hele timer pr. dag bruker du på arbeidsplassen i gjennomsnitt til å

Sitte	SITTE	☐,
Stå	STAA	☐,
Gå	GAA	☐,
Løfte	LOFTE	☐,
Tunge løft/pleie	TUNGPLEI	☐,

Hvor mange trapper (hele etasjer) går du i gjennomsnitt pr. dag. TRAPPER ☐,

Kosthold

Påvirker noen av følgende forhold kostholdet ditt?
(sett gjerne flere kryss)

KOST1 ☐ Er vegetarianer/veganer ☐ Har anoreksi KOST2
2 ☐ Spiser ikke norsk kost til daglig KOST3
3 ☐ Har allergi/intoleranse KOST5 ☐ Har bulimi KOST4
4 ☐ Kronisk sykdom KOST7 ☐ Prøver å gå ned i vekt KOST6

Vi er interessert i å få kjennskap til hvordan kostholdet ditt er vanligvis. Kryss av for hvert spørsmål om hvor ofte du i gjennomsnitt siste året har brukt den aktuelle matvaren, og hvor mye du pleier å spise/drikke hver gang.

Hvor mange glass melk drikker du vanligvis av hver type? (Sett ett kryss pr. linje)

	aldri/ sjelden	1-4 pr. uke	5-6 pr. uke	1 pr. dag	2-3 pr. dag	4+ pr. dag
Helmelk (søt, sur)	☐ MELKHEL	☐	☐	☐	☐	☐
Lettmelk (søt, sur)	☐ MELKLETT	☐	☐	☐	☐	☐
Ekstra lettmelk	☐ MELKEKT	☐	☐	☐	☐	☐
Skummet (søt, sur)	☐ MELKSKUM	☐	☐	☐	☐	☐

Hvor mange kopper kaffe/te drikker du vanligvis av hver sort? (Sett ett kryss for hver linje)

	aldri/ sjelden	1-6 pr. uke	1 pr. dag	2-3 pr. dag	4-5 pr. dag	6-7 pr. dag	8+ pr. dag
Kokekaffe	☐ KAFFEKOK	☐	☐	☐	☐	☐	☐
Traktekaffe	☐ KAFFETRA	☐	☐	☐	☐	☐	☐
Pulverkaffe	☐ KAFFEPUL	☐	☐	☐	☐	☐	☐
Svart te	☐ SVARTE	☐	☐	☐	☐	☐	☐
Grønn te	☐ GRONNTE	☐	☐	☐	☐	☐	☐

Bruker du til kaffe eller te følgende:

	Kaffe		Te	
Sukker (ikke kunstig søtstoff)	☐ Ja SUKAFFE	☐ Nei	☐ Ja SUKTE	☐ Nei
Melk eller fløte	☐ Ja MELKAFFE	☐ Nei	☐ Ja MELTE	☐ Nei

Hvor mange glass vann drikker du vanligvis?
(Sett ett kryss for hver linje)

	aldri/ sjelden	1-3 pr. uke	4-6 pr. uke	1 pr. dag	2-3 pr. dag	4+ pr. dag
Springvann/flaskevann	☐ SPRINGVI	☐	☐	☐	☐	☐

Hvor mange glass appelsinjuice, saft og brus drikker du vanligvis? (Sett ett kryss for hver linje)

	aldri/ sjelden	1-3 pr. uke	4-6 pr. uke	1 pr. dag	2-3 pr. dag	4+ pr. dag
Appelsinjuice	☐ JUICE	☐	☐	☐	☐	☐
Saft/brus med sukker	☐ SUKKBRUS	☐	☐	☐	☐	☐
Saft/brus sukkerfri	☐ SUKKFRI	☐	☐	☐	☐	☐

Hvor ofte spiser du yoghurt (1 beger)? (Sett ett kryss)

☐ Aldri/sjelden ☐ 1 pr. uke ☐ 2-3 pr. uke ☐ 4+ pr. uke
YOGHURT

Hvor ofte spiser du kornblanding, havregryn eller müsli? (Sett ett kryss) MUSLI

☐ Aldri/sjelden ☐ 1-3 pr. uke ☐ 4-6 pr. uke ☐ 1 pr. dag

Hvor mange skiver brød/rundstykker og knekkebrød/skonrokker spiser du vanligvis?
(1/2 rundstykke = 1 brødskive) (Sett ett kryss for hver linje)

	aldri/ sjelden	1-4 pr. uke	5-7 pr. uke	2-3 pr. dag	4-5 pr. dag	6+ pr. dag
Grovt brød	☐ BRODGROV	☐	☐	☐	☐	☐
Kneipp/halvfint	☐ BRODHALV	☐	☐	☐	☐	☐
Fint brød	☐ BRODFIN	☐	☐	☐	☐	☐
Knekkebrød o.l.	☐ BRODKNEK	☐	☐	☐	☐	☐

Nedenfor er det spørsmål om bruk av ulike påleggstyper. Vi spør om hvor mange brødskiver med det aktuelle pålegget du pleier å spise. Dersom du også bruker matvarene i andre sammenhenger enn til brød (f. eks. til vafler, frokostblandinger, grøt), ber vi om at du tar med dette når du besvarer spørsmålene.

På hvor mange brødskiver bruker du? (Sett ett kryss pr. linje)

	0 pr. uke	1-3 pr. uke	4-6 pr. uke	1 pr. dag	2-3 pr. dag	4+ pr. dag
Syltetøy	SYLTETOY	☐	☐	☐	☐	☐
Brun ost, helfet	BRUNOST	☐	☐	☐	☐	☐
Brunost, halvfet/mager	MAGBRUN	☐	☐	☐	☐	☐
Hvitost, helfet	HVITOST	☐	☐	☐	☐	☐
Hvitost, halvfet/mager	MAGHVIT	☐	☐	☐	☐	☐
Kjøttpålegg, Leverpostei	POSTEI	☐	☐	☐	☐	☐
Rekesalat, italiensk o.l.	ITALIENSK	☐	☐	☐	☐	☐

På hvor mange brødskiver pr. uke har du i gjennomsnitt siste året spist? (Sett ett kryss pr. linje)

	0 pr. uke	1 pr.uke	2-3 pr.uke	4-6 pr.uke	7-9 pr.uke	10+ pr.uke
Makrell i tomat, røkt makrell	ITOMAT	☐	☐	☐	☐	☐
Kaviar	KAVIAR	☐	☐	☐	☐	☐
Sild/Ansjos	PAASILD	☐	☐	☐	☐	☐
Laks (gravet/røkt)	PAALAKS	☐	☐	☐	☐	☐
Annet fiskepålegg	PAALEGG	☐	☐	☐	☐	☐

Hva slags fett bruker du vanligvis på brødet?
(Sett gjerne flere kryss)

☐ Bruker ikke fett på brødet IKKE2
☐ Smør SMOR2
☐ Hard margarin (f. eks. Per, Melange) PER2
☐ Myk margarin (f. eks. Soft, Vita, Solsikke) SOFT2
☐ Smørblandet margarin (f.eks. Bremyk) BREM2
☐ Brelett LETT2
☐ Lettmargarin (f. eks. Soft light, Letta) LIGHT2
☐ Middels lett margarin (f. eks. Olivero, Omega) MIDLIGHT2

Dersom du bruker fett på brødet, hvor tykt lag pleier du å smøre på? (En kuvertpakke med margarin veier 12 gram).
(Sett ett kryss) TYKTLAG

☐ Skrapet (3 g) ☐ Tynt lag (5 g) ☐ Godt dekket (8 g) ☐ Tykt lag (12 g)

Hvor ofte spiser du frukt? (Sett ett kryss pr. linje)

	aldri/ sjelden	1-3 pr.mnd.	1 pr.uke	2-4 pr.uke	5-6 pr.uke	1 pr.dag	2+ pr. dag
Epler/pærer		PARER					
Appelsiner o.l.		SITRUS					
Bananer		BANANER					
Annen frukt		FRUKT01					

Hvor ofte spiser du ulike typer grønnsaker? (Sett ett kryss pr. linje)

	aldri/ sjelden	1-3 pr.mnd.	1 pr.uke	2 pr.uke	3 pr.uke	4-5 pr.uke	6-7 pr. uke
Gulrøtter		GULROTER					
Kål		KAALHODE					
Kålrot		KALROTER					
Brokkoli/blomkål		BLOMKAAL					
Blandet salat		SALATER					
Tomat		TOMAT					
Grønnsakblanding (frossen)		BLANDING					
Andre grønnsaker		GRONNSAK					

For de grønnsakene du spiser, kryss av for hvor mye du spiser hver gang. (Sett ett kryss for hver sort)

- gulrøtter SPISGUL	1/2 stk.	1 stk.	1 1/2 stk.	2+ stk.
- kål SPISHODE	1/2 dl	1 dl	1 1/2 dl	2+ dl
- kålrot SPISROT	1/2 dl	1 dl	1 1/2 dl	2+ dl
- brokkoli/blomkål	1-2 buketter	3-4 buketter	5+ buketter	
- blandet salat SPISBLOM	1 dl	2 dl	3 dl	4+ dl
- tomat SPISBLAN	1/4	1/2	1	2+
- grønnsakblanding SPISTOM	1/2 dl	1 dl	2 dl	3+ dl
SPISGRON				

Hvor mange poteter spiser du vanligvis (kokte, stekte, mos)? (Sett ett kryss) POTATIS

- ☐ Spiser ikke/spiser sjelden poteter
- ☐ 1-4 pr. uke
- ☐ 5-6 pr. uke
- ☐ 1 pr. dag
- ☐ 2 pr. dag
- ☐ 3 pr. dag
- ☐ 4+ pr. dag

Hvor ofte bruker du ris og spagetti/makaroni ? (Sett ett kryss pr. linje)

	aldri/ sjelden	1-3 pr. mnd.	1 pr. uke	2 pr. uke	3+ pr. uke
Ris RISGRYN					
Spagetti, makaroni, nudler MAKARONI					

Hvor ofte spiser du grøt ? (Sett ett kryss pr. linje)

	aldri/ sjelden	1 pr. mnd.	2-3 pr. mnd.	1 pr. uke	2-6 pr. uke	1+ pr. dag
Risengrynsgrøt RISGROT2						
Annen grøt (havre o.l.) ANNGROT						

Fisk

Vi vil gjerne vite hvor ofte du pleier å spise fisk, og ber deg fylle ut spørsmålene om fiskeforbruk så godt du kan. Tilgangen på fisk kan variere gjennom året. Vær vennlig å markere i hvilke årstider du spiser de ulike fiskeslagene.

	aldri/ sjelden	like mye hele året	vinter	vår	sommer	høst
Torsk, sei, hyse, lyr	LYR1	LYR2	3	4	5	6
Steinbit, flyndre, uer	UER1	UER2	3	4	5	6
Laks, ørret	ORRE1	ORRE2	3	4	5	6
Makrell	MAKRVAAR1	2	3	4	5	6
Sild	SILDVAAR1	2	3	4	5	6
Annen fisk	ANNVAAR1	2	3	4	5	6

Med tanke på de periodene av året der du spiser fisk, hvor ofte pleier du å spise følgende til middag? (Sett ett kryss pr. linje)

	aldri/ sjelden	1 pr. mnd.	2-3 pr. mnd.	1 pr. uke	2+ pr. uke
Kokt torsk, sei, hyse, lyr KOKTFISK					
Stekt torsk, sei, hyse, lyr STEKTFIS					
Steinbit, flyndre, uer STEINBIT					
Laks, ørret LAKS					
Makrell MAKRELL					
Sild SILD					
Annen fisk ANNENFIS					

Dersom du spiser fisk, hvor mye spiser du vanligvis pr. gang? (1 skive/stykke = 150 gram)

Kokt fisk (skive) ☐1 ☐1,5 ☐2 ☐3+
KOKTSKIV

Stekt fisk (stykke) ☐1 ☐1,5 ☐2 ☐3+
STEKTSTY

Hvor mange ganger pr. år spiser du fiskeinnmat? (Sett ett kryss pr. linje)

	0	1-3	4-6	7-9	10+
Rogn ROGN					
Fiskelever LEVER					

Dersom du spiser fiskelever, hvor mange spiseskjeer pleier du å spise hver gang? (Sett ett kryss)

	1	2	3-4	5-6	7+
FISKELEV					

Hvor ofte bruker du følgende typer fiskemat? (Sett ett kryss pr. linje)

	aldri/ sjelden	1 pr. mnd.	2-3 pr. mnd.	1 pr. uke	2+ pr. uke
Fiskekaker/pudding/boller FISKEKAKE					
Plukkfisk/fiskegrateng PLUKKFISK					
Frityrfisk/fiskepinner FRITYR					
Andre fiskeretter ANDREFIS					

Hvor stor mengde pleier du vanligvis å spise av de ulike rettene? (Sett ett kryss for hver linje)

- fiskekaker/pudding/boller (stk.) (2 fiskeboller=1 fiskekake) KAKMENGD ☐ 1 ☐ 2 ☐ 3 ☐ 4+
- plukkfisk, fiskegrateng (dl) ☐ 1-2 ☐ 3-4 ☐ 5+
- frityrfisk, fiskepinner (stk.) PLUMENGD FRIMENGD ☐ 1-2 ☐ 3-4 ☐ 5-6 ☐ 7+

I tillegg til informasjon om fiskeforbruk er det viktig å få kartlagt hvilket tilbehør som blir servert til fisk. Hvor ofte bruker du følgende til fisk? (Sett ett kryss pr. linje)

	aldri/ sjelden	1 pr. mnd.	2-3 pr. mnd.	1 pr. uke	2+ pr. uke
Smeltet smør	SMELSMOR ☐	☐	☐	☐	☐
Smeltet eller fast margarin/fett	SMELTET ☐	☐	☐	☐	☐
Seterrømme (35%)	SETER ☐	☐	☐	☐	☐
Lettrømme (20%)	LETT20 ☐	☐	☐	☐	☐
Saus med fett (hvit/brun)	SAUSFETT ☐	☐	☐	☐	☐
Saus uten fett (hvit/brun)	IKKEFETT ☐	☐	☐	☐	☐

For de ulike typene tilbehør du bruker til fisk, vær vennlig å kryss av for hvor mye du vanligvis pleier å spise.

- smeltet smør (ss) SMORSS ☐ 1/2 ☐ 1 ☐ 2 ☐ 3 ☐ 4+
- smeltet margasin (ss) ☐ 1/2 ☐ 1 ☐ 2 ☐ 3 ☐ 4+
- seterrømme (ss) SMELLSS ☐ 1/2 ☐ 1 ☐ 2 ☐ 3 ☐ 4+
- lettrømme (ss) SETERSS ☐ 1/2 ☐ 1 ☐ 2 ☐ 3 ☐ 4+
- saus med fett (dl) LETT20SS ☐ 1/4 ☐ 1/2 ☐ 3/4 ☐ 1 ☐ 2+
- saus uten fett (dl) SAUSFESS ☐ 1/4 ☐ 1/2 ☐ 3/4 ☐ 1 ☐ 2+

IKKEFESS

Hvor ofte spiser du skalldyr (f. eks. reker, krabbe og skjell)? (Sett ett kryss) SKALLDYR

☐ Aldri/sjelden ☐ 1 pr. mnd ☐ 2-3 pr. mnd ☐ 1+ pr. uke

Andre matvarer

Hvor ofte spiser du reinkjøtt? REINKJO

☐ Aldri/sjelden ☐ 1 pr. mnd. ☐ 2-3 pr. mnd. ☐ 1 pr. uke ☐ 2-3 pr. uke ☐ 4+ pr. uke

Hvor ofte spiser du følgende kjøtt- og fjærkreretter? (Sett ett kryss for hver rett)

	aldri/ sjelden	1 pr.mnd.	2-3 pr.mnd.	1 pr.uke	2+ pr.uke
Steik (okse, svin, får) STEIK	☐	☐	☐	☐	☐
Koteletter KOTELETT	☐	☐	☐	☐	☐
Biff BIFF	☐	☐	☐	☐	☐
Kjøttkaker, karbonader KARBONAD	☐	☐	☐	☐	☐
Pølser POLSER	☐	☐	☐	☐	☐
Gryterett, lapskaus LAPSKAUS	☐	☐	☐	☐	☐
Pizza med kjøtt PIZZA	☐	☐	☐	☐	☐
Kylling KYLLING	☐	☐	☐	☐	☐
Andre kjøttretter KJOTT	☐	☐	☐	☐	☐

Dersom du spiser følgende retter, oppgi mengden du vanligvis spiser: (Sett ett kryss for hver linje)

- steik (skiver) MYESTEIK ☐ 1 ☐ 2 ☐ 3 ☐ 4+
- koteletter (stk.) MYEKOTE ☐ 1/2 ☐ 1 ☐ 1,5 ☐ 2+
- kjøttkaker, karbonader (stk.) KARBMENGD ☐ 1 ☐ 2 ☐ 3 ☐ 4+
- pølser (stk. à 150g) POLSERME ☐ 1/2 ☐ 1 ☐ 1,5 ☐ 2+
- gryterett, lapskaus (dl) GRYTMENG ☐ 1-2 ☐ 3 ☐ 4 ☐ 5+
- pizza m/kjøtt (stykke à 100 g) PIZZMENG ☐ 1 ☐ 2 ☐ 3 ☐ 4+

Hvor mange egg spiser du vanligvis i løpet av en uke? (stekte, kokte, eggerøre, omelett) (Sett ett kryss) EGG

☐ 0 ☐ 1 ☐ 2 ☐ 3-4 ☐ 5-6 ☐ 7+

Hvor ofte spiser du iskrem? (til dessert, krone-is osv.) Sett ett kryss for hvor ofte du spiser iskrem om sommeren, og ett kryss for resten av året)

	aldri/ sjelden	1 pr. mnd.	2-3 pr. mnd.	1 pr. uke	2+ pr. uke
-Om sommeren SOMMERIS	☐	☐	☐	☐	☐
-Resten av året AARETIS	☐	☐	☐	☐	☐

Hvor mye is spiser du vanligvis pr. gang? (Sett ett kryss) IS

☐ 1dl ☐ 2 dl ☐ 3 dl ☐ 4+ dl

Hvor ofte spiser du bakevarer som boller kaker, wienerbrød eller småkaker (Sett ett kryss pr. linje)

	aldri/ sjelden	1-3 pr. mnd.	1 pr. uke	2-3 pr uke	4-6 pr. uke	1+ pr. dag
Gjærbakst (boller o.l.)	BOLLEBAKST	☐	☐	☐	☐	☐
Wienerbrød, kringle	WIENERBR	☐	☐	☐	☐	☐
Kaker	KAKER	☐	☐	☐	☐	☐
Pannekaker	PANNEKA	☐	☐	☐	☐	☐
Vafler	VAFLER	☐	☐	☐	☐	☐
Småkaker, kjeks	SMOKAKER	☐	☐	☐	☐	☐

Hvor ofte spiser du dessert? (Sett ett kryss pr. linje)

	aldri/ sjelden	1-3 pr. mnd.	1 pr. uke	2-3 pr uke	4-6 pr. uke	1+ pr. dag
Pudding sjokolade/karamell	KARAMELL	☐	☐	☐	☐	☐
Riskrem, fromasj	FROMASJ	☐	☐	☐	☐	☐
Kompott, fruktgrøt, hermetisk frukt	KOMPOTT	☐	☐	☐	☐	☐
Jordbær (friske, frosne)	JORDBÆR	☐	☐	☐	☐	☐
Andre bær (friske, frosne)	ANNSÆR	☐	☐	☐	☐	☐

Hvor ofte spiser du sjokolade? (Sett ett kryss)

	aldri/ sjelden	1-3 pr. mnd.	1 pr. uke	2-3 pr uke	4-6 pr. uke	1+ pr. dag
Mørk sjokolade	MORKSJOK	☐	☐	☐	☐	☐
Lys sjokolade	LYSSJOK	☐	☐	☐	☐	☐

Dersom du spiser sjokolade, hvor mye pleier du vanligvis å spise hver gang? Tenk deg størrelsen på en Kvikk-Lunsj sjokolade, og oppgi hvor mye du spiser i forhold til den.

MYESJOK

☐ 1/4 ☐ 1/2 ☐ 3/4 ☐ 1 ☐ 1,5 ☐ 2+

Hvor ofte spiser du snacks? (Sett ett kryss)

	aldri/ sjelden	1-3 pr. mnd.	1 pr. uke	2-3 pr. uke	4-6 pr. uke	7+ pr. uke
Potetchips CHIPS	☐	☐	☐	☐	☐	☐
Peanøtter PEANOTT	☐	☐	☐	☐	☐	☐
Andre nøtter NOTTANN	☐	☐	☐	☐	☐	☐
Annen snacks SNACKANN	☐	☐	☐	☐	☐	☐

Tran og fiskeoljekapsler

Bruker du tran (flytende)? TRAN Ja ☐ Nei ☐

Hvis ja; hvor ofte tar du tran?
Sett ett kryss for hver linje.

	aldri/ sjelden	1-3 pr. mnd.	1 pr. uke	2-6 pr. uke	daglig
Om vinteren TRANVINT	☐	☐	☐	☐	☐
Resten av året TRANVAAR	☐	☐	☐	☐	☐

Hvor mye tran pleier du å ta hver gang? SSTRAN

☐ 1 ts. ☐ 1/2 ss. ☐ 1+ ss.

TFPILLE

Bruker du tranpiller/fiskeoljekapsler? Ja ☐ Nei ☐

Hvis ja; hvor ofte tar du tranpiller/fiskeoljekapsler?
Sett ett kryss for hver linje.

	aldri/ sjelden	1-3 pr. mnd.	1 pr. uke	2-6 pr. uke	daglig
Om vinteren TFPILVIN	☐	☐	☐	☐	☐
Resten av året TFPILAAR	☐	☐	☐	☐	☐

Hvilken type tranpiller/fiskeoljekapsler bruker du vanligvis, og hvor mange pleier du å ta hver gang?

Navn TFNAVN Antall TFANT

Kosttilskudd

Bruker du kosttilskudd? KOSTILL Ja ☐ Nei ☐

Hvis ja, hvor ofte bruker du kosttilskudd?
(Sett ett kryss pr. linje)

KOSTOFTE 1-4

Navn på vitamin/mineraltilskudd:	aldri/ sjelden	1-3 pr. mnd.	1 pr. uke	2-6 pr. uke	daglig
KOSTOFTE1	☐	☐	☐	☐	☐
KOSTOFTE2	☐	☐	☐	☐	☐
KOSTOFTE3	☐	☐	☐	☐	☐
KOSTOFTE4	☐	☐	☐	☐	☐

Bruker du soyapreparater mot plager i overgangsalderen? Ja ☐ Nei ☐

Varm mat

Hvor mange ganger i løpet av en måned spiser du varm mat? Antall

Til frokost VARMFROK	☐
Til lunsj VARMLUNC	☐
Til middag VARMMIDD	☐
Til kvelds VARMKVEL	☐

Alkohol

Er du totalavholdskvinne? AVHOLD Ja ☐ Nei ☐

Hvis Nei; hvor ofte og hvor mye drakk du i gjennomsnitt siste året? (Sett ett kryss for hver linje)

	aldri/ sjelden	1 pr. mnd.	2-3 pr. mnd.	1 pr. uke	2-4 pr. uke	5-6 pr. uke	1 pr. dag	2+ pr. dag
Øl (1/2 l.) OLGLASS	☐	☐	☐	☐	☐	☐	☐	☐
Vin (glass) VINGLASS	☐	☐	☐	☐	☐	☐	☐	☐
Brennevin (drink) DRINKER	☐	☐	☐	☐	☐	☐	☐	☐
Likør/Hetvin LIKER	☐	☐	☐	☐	☐	☐	☐	☐

Sosiale forhold

Er du: (Sett ett kryss)

☐ gift SIVGIFT ☐ samboer SIVSAMB ☐ ugift SIVUGIFT ☐ skilt SIVSKILT ☐ enke SIVENKE

Hvor mange års skolegang/yrkesutdannelse har du i alt, ta med folkeskole og ungdomsskole? SKOLE ☐

Hvor mange personer er det i ditt hushold? PERSHUS ☐

Hvor høy er bruttoinntekten i husholdet pr. år? BRUTTO

under 150.000 kr.	☐	151.000-300.000 kr.	☐
301.000-450.000 kr.	☐	451.000-600.000 kr.	☐
601.000-750.000 kr.	☐	over 750.000 kr.	☐

Hva er din arbeidssituasjon? (sett kryss)

☐ Arbeider heltid YRKE1 ☐ Arbeider deltid YRKE2 ☐ Pensjonist YRKE3
☐ Hjemmearbeidende YRKE4 ☐ Under utdanning YRKE5 ☐ Uføretrygdet YRKE6
☐ Under attføring YRKE7 ☐ Arbeidssøkende YRKE8

Yrke: YRKE

Hvordan var de økonomiske forhold i oppveksten? OKOFORHO

☐ Meget gode ☐ Gode ☐ Dårlige ☐ Meget dårlige

Arbeider du utendørs i yrkessammenheng? ARBUTE Ja ☐ Nei ☐

Hvis Ja;
hvor mange timer pr. uke? .....Sommer ARBUTSOM .....vinter ARBUTVIN

Solvaner

Får du fregner når du soler deg? Ja ☐ Nei ☐ FREGNER

Hvilken øyefarge har du? (sett ett kryss) OYEFARGE
☐ brun ☐ grå, grønn eller blanding ☐ blå

Hva er din opprinnelige hårfarge? (sett ett kryss) HARFARGE
☐ mørkbrun, svart ☐ brun ☐ blond, gul ☐ rød

For å kunne studere effekten av soling på risiko for hudkreft ber vi deg gi opplysninger om hudfarge
Sett ett kryss på det tallet under fargen som best passer din naturlige hudfarge (uten soling) HUDFARGE

1	2	3	4	5	6	7	8	9	10

Hvor mange ganger pr. år er du blitt forbrent av solen slik at du har fått svie og blemmer med avflassing etterpå? (ett kryss for hver aldersgruppe)

Alder	Aldri	Høyst 1 gang pr. år	2-3 g. pr. år	4-5 g. pr. år	6 eller flere ganger
Før 10 år (SOLB10)	☐	☐	☐	☐	☐
10-19 år (SOLB1019)	☐	☐	☐	☐	☐
20-29 år (SOLB2029)	☐	☐	☐	☐	☐
30-39 år (SOLB3039)	☐	☐	☐	☐	☐
40+ år (SOLB40MM)	☐	☐	☐	☐	☐

Hvor mange uker soler du deg pr. år i syden?

Alder	Aldri	1 uke	2-3 uker	4-5 uker	7 uker eller mer
Før 10 år (SYD10)	☐	☐	☐	☐	☐
10-19 år (SYD1019)	☐	☐	☐	☐	☐
20-29 år (SYD2029)	☐	☐	☐	☐	☐
30-39 år (SYD3039)	☐	☐	☐	☐	☐
40+ år (SYD40MM)	☐	☐	☐	☐	☐
Siste 12 mnd. (SYDSIS12)	☐	☐	☐	☐	☐

Hvor mange uker pr. år soler du deg i Norge eller utenfor syden?

Alder	Aldri	1 uke	2-3 uker	4-5 uker	7 uker eller mer
Før 10 år (NORG10)	☐	☐	☐	☐	☐
10-19 år (NORG1019)	☐	☐	☐	☐	☐
20-29 år (NORG2029)	☐	☐	☐	☐	☐
30-39 år (NORG3039)	☐	☐	☐	☐	☐
40+ år (NORG40MM)	☐	☐	☐	☐	☐
Siste 12 mnd. (NORGSIS12)	☐	☐	☐	☐	☐

Hvor ofte dusjer eller bader du?

	mer enn 1 g. dagl.	1 g. dagl.	4-6 g. pr. uke	2-3 g. pr. uke	1 g. pr. uke	2-3 g. pr. mnd	sjel-den/ aldri
Med såpe/shampo MEDSAAPE	☐	☐	☐	☐	☐	☐	☐
Uten såpe/shampo UTENSAAP	☐	☐	☐	☐	☐	☐	☐

Når bruker du krem med solfaktor? (sett evt. flere kryss):
☐ i påsken SOLFAKT ☐ i Norge eller utenfor syden NO ☐ solferie i syden SY
☐ aldri SOLFALD

Hvilken solfaktor bruker du i disse periodene?

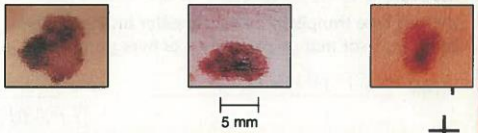
	påsken	i Norge eller utenfor syden	solferie i syden
I dag	PAASKE	SOMMER	SYDEN
For 10 år siden	PAASKE10	SOMMER10	SYDEN10

Hvor ofte har du solt deg i solarium?

Alder	Aldri	Sjelden	1 gang pr. mnd.	2 ganger pr. mnd.	3-4 ganger pr. mnd	oftere enn1 gang pr. uke
Før 10 år (SOLAR10)	☐	☐	☐	☐	☐	☐
10-19 år (SOLAR1019)	☐	☐	☐	☐	☐	☐
20-29 år (SOLAR2029)	☐	☐	☐	☐	☐	☐
30-39 år (SOLAR3039)	☐	☐	☐	☐	☐	☐
40+ år (SOLAR40MM)	☐	☐	☐	☐	☐	☐
Siste 12 mnd. (SOLARSIS12)	☐	☐	☐	☐	☐	☐

Hvor mange uregelmessige føflekker større enn 5 mm har du sammenlagt på begge beina (fra tærne til lysken)? Tre eksempler på føflekker større enn 5 mm med uregelmessig form er vist i nedenfor.

☐ 0 ☐ 1 ☐ 2-3 ☐ 4-6 ☐ 7-12 ☐ 13-24 ☐ 25+



Hvor ofte bruker du følgende hudpleiemidler?
(Sett ett kryss pr. linje)

	aldri/ sjelden	1-3 pr.mnd.	1 pr.uke	2-4 pr.uke	5-6 pr.uke	1 pr.dag	2+ pr. dag
Ansiktskrem ANSKREM	☐	☐	☐	☐	☐	☐	☐
Håndkrem HANDKREM	☐	☐	☐	☐	☐	☐	☐
Body lotion BODYLOT	☐	☐	☐	☐	☐	☐	☐
Parfyme PARFYME	☐	☐	☐	☐	☐	☐	☐

Til slutt vil vi spørre deg om ditt samtykke til å kontakte deg på nytt pr. post. Vi vil hente adressen fra det sentrale personregister.

Ja ☐ Nei ☐ NYSAMTYK

Er du villig til å avgi en blodprøve?

Ja ☐ Nei ☐ BLODPROV

Takk for at du ville delta i undersøkelsen

Appendix 3

Stem-and-Leaf Plot

```
2114.00      0 . 000000000133334567889 9&
2214.00      1 . 00112233445566677788899 9
3715.00      2 . 000111122223333444455556666777778888899999
5383.00      3 . 0000011111122222233333344444455555666666777777888888899999999
6917.00      4 . 00000001111111222222233333334444444555555556666666777777778888888899999999
7943.00      5 . 000000001111111122222222333333333444444444555555556666666667777777778888888889999999 9
8558.00      6 . 0000000001111111111222222222333333333444444444555555555666666666677777777788888888899999999 9
8180.00      7 . 000000000111111111222222223333333334444444445555555556666666667777777778888888889999999 9
7840.00      8 . 00000000111111112222222223333333334444444445555555566666666777777778888888899999999
7415.00      9 . 0000000011111111222222223333333344444444555555556666666777777778888888899999999
6545.00     10 . 000000011111112222222333333344444445555555666666677777778888888899999999
5833.00     11 . 00000001111111222222333333444444455555566666677777778888888999999
4936.00     12 . 0000001111122222233333344444555556666677777888889999 9
4167.00     13 . 000001111222223333344444555556666677778888899999
3505.00     14 . 00001111222233334444555566667778888999 9
2926.00     15 . 0001112223334445556667778888999
2375.00     16 . 000111223334455566677788 99
2018.00     17 . 00112233445566778899
1653.00     18 . 0011223344556678 89
1297.00     19 . 001223445678 9
1064.00     20 . 012345678 9
 821.00     21 . 012345678 9
 693.00     22 . 012345678 9
 112.00     23 . 0&
3092.00 Extremes    (>=232)
```

Fish intake percentiles

		Fatty fish	Fish and fish products	Lean fish
N	**Valid**	101316	101316	101316
	Missing	0	0	0
Mean		15.96	97.59	30.51
Median		11.44	87.15	23.66
Std. Deviation		19.260	60.041	29.664
Variance		370.965	3604.930	879.944
Range		495	893	245
Minimum		0	0	0
Maximum		495	893	245
Percentiles	**5**	0.00	22.39	0.00
	10	0.00	34.15	0.00
	15	0.00	42.74	4.13
	20	1.60	49.90	6.27
	25	4.12	56.38	9.69
	30	4.95	62.46	12.54
	35	6.60	68.36	15.77
	40	7.84	74.51	16.53
	45	9.65	80.73	20.38
	50	11.44	87.15	23.66
	55	12.87	93.77	27.17
	60	14.82	100.76	28.26
	65	16.60	108.43	32.21
	70	19.31	116.76	39.43
	75	21.86	126.56	40.76
	80	25.03	138.09	50.16
	85	28.68	152.82	54.34
	90	35.44	172.90	67.93
	95	48.36	206.55	81.51
	96	53.54	217.58	95.10
	97	58.03	232.63	108.68
	98	67.93	254.10	108.68
	99	85.80	292.29	135.85
	99.1	88.11	298.43	138.04
	99.2	91.21	305.33	145.92
	99.3	96.41	312.90	163.02
	99.4	102.70	323.47	163.02
	99.5	109.96	333.92	163.02
	99.6	115.82	350.43	163.02
	99.7	127.40	372.34	163.02
	99.8	147.46	402.75	176.61
	99.9	181.39	454.04	203.78

Appendix 4

Correlation (Pearson r) matrix: Covariates.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	**Age**																
2	**BMI**	0.08															
3	**Smoking**	-0.08	-0.06														
4	**Physical activity**	-0.05	-0.16	-0.05													
5	**Self-reported health**	-0.09	-0.11	-0.12	0.24												
6	**Education**	-0.22	-0.09	-0.15	0.05	0.17											
7	**Menopause**	0.54	0.06	0	-0.01	-0.06	-0.13										
8	**Breastfed**	-0.04	-0.01	-0.02	0.03	0.03	0.01	-0.03									
9	**Parity**	0.13	0.06	-0.06	0.01	-0.02	-0.15	0.06	0.46								
10	**Fatty fish intake**	0.1	0	0.01	0.06	0.03	0.07	0.06	0	-0.03							
11	**Fish intake**	0.12	0.03	0.04	0.06	-0.03	-0.06	0.07	0.02	0.05	0.54						
12	**Lean fish intake**	0.15	0.04	0.02	0.01	-0.06	-0.16	0.08	0.02	0.1	0.17	0.73					
13	**Total fatty acids**	-0.09	-0.09	0.05	0.08	0.02	0.05	-0.02	0.05	0.03	0.2	0.31	0.12				
14	**Saturated fatty acids**	-0.09	-0.09	0.04	0.06	0.01	0.04	-0.03	0.04	0.04	0.1	0.22	0.09	0.95			
15	**Fruit intake**	0.08	0.02	-0.15	0.12	0.08	0.11	0.07	0.01	-0.02	0.14	0.12	0.02	0.07	0.04		
16	**Vegetable intake**	-0.02	0.01	-0.02	0.13	0.05	0.14	0.02	0.02	-0.03	0.23	0.26	0.08	0.17	0.1	0.32