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Changes in Bone Mineral Density over Time in Patients with Self-reported Chronic Diseases:

The Tromsø Study

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Abstract

Objective: To examine the total hip (TH) and femoral neck (FN) bone loss in women and men above 50 years of age with self-reported chronic diseases.

Methods: Using data from 'The Tromsø Study', men and women aged 50-74 years were included in this study. Disease status was identified based on self-reports. Bone mineral density (BMD) of TH and FN were measured using DXA (Dual-energy X-ray Absorptiometry). The change in BMD was calculated as the difference between BMD in Tromsø 5 and Tromsø 6. Linear regression analysis was used to assess relationship between the predictor variables (diseases) and the outcome (change in total hip and femoral neck BMD).

Results: Out of 2310 participants, 860 were men and 1450 were women. Men had significantly more cases of heart disease ($p < 0.0001$) and stroke compared to women, ($p = 0.036$) whereas, hypothyroidism was more frequent among women ($p < 0.0001$). Significantly higher levels of baseline TH and FN BMD were measured in men than women ($p < 0.0001$). A significant annual percentage change in TH BMD among women with CVD (-0.23% ; $p = 0.019$) and hypothyroidism (-0.1% ; $p = 0.041$) was observed in models adjusted with several common risk factors. The annual percentage change in FN BMD was significant among men with stroke (-0.46% ; $p = 0.012$).

Conclusion: The results of this study indicate that self-reported chronic diseases are associated with increased deterioration of BMD in elderly men and women. Bone loss was evident in women with CVD or hypothyroidism, and in men with stroke. This highlights the need of careful evaluation of elderly patients with chronic diseases with respect to BMD and thereby fractures risk.

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Abbreviations:

ANCOVA: Analysis of Covariance

ANOVA: Analysis of Variance

BMD: Bone Mineral Density

BMI: Body Mass Index

CHF: Chronic Heart Failure

CVD: Cardiovascular Disease

DALY: Disabilities Adjusted Life Years

DBP: Diastolic Blood Pressure

DM: Diabetes Mellitus

DXA: Dual energy X-ray Absorptiometry

FN: Femoral neck

FRAX: Fracture Risk Assessment

HR: Hazard ratio

MI: Myocardial Infarction

NOREPOS: Norwegian Epidemiological Osteoporosis Studies

OR: Odds ratio

PA: Physical activity

RCT: Randomized Control Trail

RR: Relative risk

SD: Standard deviation

SOF: Study of Osteoporotic Fracture

SRH: Self-reported Health

SXA: Single energy X-ray Absorptiometry

TH: Total hip

TSH: Thyroid Stimulating Hormone

VDR: Vitamin-D receptor

CHAPTER 1: Introduction

1.1 Epidemiology of Osteoporotic Fractures

Osteoporotic fractures constitute a major health problem worldwide (1, 2). Osteoporotic fractures refer to fractures which are associated with low Bone Mineral Density (BMD) and those that increase in incidence with age after the age of 50 years (1). In addition to the hospital costs, for individuals, osteoporotic fractures are the major causes of morbidity and mortality (3).

There were worldwide an estimated 9 million new osteoporotic fractures in the year 2000, of which 1.6 million were at the hip, 1.7 million at the forearm and 1.4 million were clinical vertebral fractures (2). Likewise, 8.9 million fractures secondary to osteoporosis were recorded worldwide with Europe having greatest numbers (2). Significant variation in the trends of fracture incidence is however noted in various regions, countries and cities. The prior decades with increasing trends of hip fracture in North America, Europe and Oceania has been followed by decreasing rates over last two decades, but unexpectedly escalating in Asia (4).

In the European Union, it was recently estimated that approximately 3.5 million new fragility fractures occur annually (5) and the highest incidence of fractures is reported in Scandinavia over a long period of time (6). The lifetime risk of any osteoporotic fracture ranges between of 40-50% in women (7). The 2000 estimate indicated a total of 5.8 million Disabilities Adjusted Life Years (DALYs) lost worldwide, and more than half of which was accounted by Europe and America (2). In Europe, osteoporotic fractures account for 2 million DALYs annually, somewhat more than what is accounted for hypertensive heart disease or rheumatoid arthritis (5). The cost of fractures is apparently expected to rise with an increasing

elderly population. Estimates show that the annual number of hip fractures would increase progressively to 2.6 million by the year 2025 and to 4.5 million by 2050 around the world (8). Therefore, insights about mechanisms causing osteoporotic fractures that can lead to knowledge-based preventive strategies are highly warranted.

1.2 Osteoporosis

Osteoporosis is a disease characterized by low bone mass, micro-architectural deterioration of bone tissue leading to enhanced bone fragility, and a consequent increase in fracture risk (9). The diagnosis of osteoporosis is based on measurement of BMD, g/cm^2 (bone mineral content/area) as measured by Dual-energy X-ray Absorptiometry (DXA). Osteoporosis is defined as a BMD level less than or equal to 2.5 Standard deviations (SD) below that of a young (30–40-year-old), healthy adult women in the reference population. The World Health Organization (WHO) has translated it into T-score and have established the following diagnostic guidelines: Normal as T-score ≥ -1.0 , Osteopenia as T-score between -1 and -2.5 , Osteoporosis as T-score ≤ -2.5 and severe osteoporosis (or established osteoporosis) as T-score ≤ -2.5 with one or more fragility fractures (10).

1.3 Low BMD and fracture risk

The relation between BMD and fracture risk is well established, as indicated by Marchall et al in 1996 (11): the risk of any fractures doubles by every SD decrease in BMD. Recently, in a study done to examine the relative contribution of BMD in the Fracture Risk Assessment Tool (FRAX) algorithm, it was found that one standard deviation drop in Femoral neck (FN) BMD was associated with a Hazards ratio (HR) of incident fracture of 1.92 and 1.77 in women and men respectively (12). In a prospective study done in women of Northern Europe, BMD (though measured by single photon absorptiometry) remained as the only independent risk factor with a Relative risk (RR) of 1.36 (1.15, 1.62) per SD decrease in

baseline BMD (13). There is a general consensus that the most reliable way of predicting fracture risk at a given site is to perform a BMD measurement at the fracture site itself (11). However, since osteoporosis is a systemic disease, BMD measurements made at other sites remote from the fracture site are also predictive of fracture risk (14, 15). Therefore BMD plays vital role in fracture prediction and it can also be said that factors that are associated with BMD will also have an impact on fracture risk as indicated in a recent study by Chan *et.al* (16).

1.4 Known risk factors for bone loss

After peak bone mass achievement around the age of 20 years, a net bone loss is observed from the age of 35 years in both sexes (17), whereas the decline in the BMD of the proximal end of the femur is reported to begin immediately after the acquisition of peak bone mass (18). BMD level, thereby fracture risk; in the elderly is therefore a function of bone mass gained during growth and bone mass lost during the ageing process. Any factors that can prevent bone loss may therefore reduce fracture risk. The present chapter will provide an overview of the most important known factors for risk of fracture, BMD and bone loss, respectively.

1.4.1 Age

The mechanism of ageing in bone loss involves a reduction in stem cells differentiating into osteoblasts, an increase in bone marrow adiposity, a shorter life span for mature osteoblasts, and a higher frequency of apoptosis (19). Age is regarded as a significant and independent predictor of fracture (20, 21). Studies have found that the risk of fractures with low BMD increases with advancing age, most evidently for hip fractures (22, 23). Several longitudinal studies in older adults in USA have consistently observed that rates of bone loss increased with advancing age (24-26) with similar pattern in Asia (27) and in Europe (28). However, decreased Physical activity (PA) associated with ageing also contributed to bone loss (29).

Similarly, approximately one third of the decline in BMD with age was explained by the associated age-related decline in weight (30). Age however in itself is the most important and independent determinant of bone loss.

1.4.2 Sex steroids

Sex steroids protect against bone loss not just by slowing the rate of bone remodelling but also exerting effects on the lifespan of mature bone cells (31). The pubertal increase of bone mass is presumed to occur as a result of the coordinated activation of oestrogen and androgen receptors at the bone level in both sexes (32). Postmenopausal estradiol is found to be positively associated with BMD (33) at all sites (34). Premenopausal bone loss is confined to androgens, while in peri-menopausal period and later, estrogens and androgens were found to act independently to slow bone loss (35). Moreover, observations from epidemiological studies indicate that, elderly men with higher testosterone can preserve their BMD better and thus are less prone to fracture (36).

1.4.3 Body Mass Index (BMI)

WHO defines BMI as the weight in kilograms divided by the square of the height in metres (kg/m^2). Basically, the effect of BMI on bone depends on the level of BMI (37, 38). A meta-analysis has shown that when compared with a BMI of 25 kg/m^2 , a BMI of 20 kg/m^2 was associated with a nearly two fold increase in risk ratio for hip fracture while a BMI of 30 kg/m^2 was associated with only a 17% reduction in hip fracture risk (38). Generally, BMI is also regarded as a stronger predictor of BMD (39, 40). In the population based Tromsø study, BMI had the strongest effect on BMD, especially in the oldest age groups, while a BMI above 30 kg/m^2 did not show any additional effect (41). Interestingly, even if a higher BMI protects against bone loss, the rate of bone loss cannot be reversed by weight gain alone (42). Maintenance of stable weight is however expected for optimal bone health (43, 44).

1.4.4 Smoking

Cigarette smoking is a possibly reversible risk factor for osteoporosis and osteoporotic fractures through diverse patho-physiologic mechanisms (45). Various longitudinal studies have found increased risk of fracture among smokers (46-50) of which most are hip fractures (46-48), which increased with the amount of smoking (46, 49). Interestingly, there was no apparent benefit from quitting smoking until 10 years after cessation (46). Likewise, the annualized rate of bone change was greater among smokers than non-smokers in various sites though the inefficient calcium absorption played the role in bone loss (51, 52). To summarize, although the effect size is not evidently clear; smoking definitely seems to exert a negative effect on bone during ageing by increasing the rate of bone loss.

1.4.5 Physical activity (PA)

Literatures suggest that mechanical strain through exercises helps to achieve bone mass (53, 54) while skeletal gains obtained during growth are maintained at advanced age despite a reduction of PA in adulthood (55). Various studies (56, 57) including a meta-analysis (58) reported that PA is beneficial in reducing risk of hip fractures. However, increasing level of PA above moderate was not beneficial in preventing hip fractures (56, 59). Though PA is said to be protective against fractures, the association with BMD are conflicting with both positive (60-62) and negative (63, 64) results. Similarly, when it comes to PA and bone loss, finding varies (65, 66).

1.4.6 Education

Level of education and prevalence of osteoporosis shows an inverse relation (67-69) ranging from 18.6% for the most educated to 34.4% for the no educated women (primary school only) ($p < 0.05$) (67). Using the lowest educational level as reference category, increases in educational status were also associated with a significantly reduced risk for osteoporosis. (69). Additionally, a lower level of education was associated with lower BMD and higher

level was similarly associated with better BMD in the same studies (67, 68). Education level not only directly influences bone status but various modes of education also indirectly influences bone health as it encourages people to maintain healthy lifestyles (70-73) and better patient outcomes after fractures (74).

1.4.7 Health status

The relation between Self-reported Health (SRH) status and bone health is not well established yet, but will be outlined in the present chapter as it may be linked to chronic diseases. While, in a Japanese cohort of women with a mean age of 58.5 years, SRH was not related to hip fracture risk (75), other studies have found significant relation with BMD (76, 77). For e.g. SRH had an independent significant positive association with both femoral neck BMD and lumbar spine BMD. However, in a cross sectional study, a statistically significant association between level of BMD and any of the SRH categories could not be established but statistical interactions between SRH and race/ethnicity and between SRH and BMI were detected (77).

1.5 Theoretical explanation to the association between chronic diseases and bone loss

Among several risk factors for bone loss, chronic diseases are one. Chronic diseases are diseases of long duration which progresses slowly. Chronic diseases, such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes, are by far the leading cause of mortality in the world, representing 63% of all deaths (78). There are various literatures on the associations of self-reported chronic diseases with bone status which is discussed below:

1.5.1 Diabetes Mellitus (DM)

WHO projects that diabetes will be the 7th leading cause of death in 2030 (79) which demands global attention. In general, chronic hyperglycaemia has been suggested to impair bone quality. One plausible mechanism relates to increased collagen cross linking by

abundant glucose, raising concentrations of advanced glycation end-products, such as pentosidine, which have been associated with increased fracture risk (80). The exact underlying mechanism is however yet to be understood.

Studies have demonstrated an increased fracture risk among patients with Type 2 DM, but interestingly, patient with Type 2 DM also display higher BMD levels (81-83). There are other numerous studies in support of it (84-86). However, higher risk of falling associated with diabetes (81, 84) and weight loss (82) was partially accounted for this increased risk. Nevertheless, the Rotterdam study has reported lower frequency of non-vertebral fractures in diabetes (87).

Similarly, in a prospective cohort, white women with diabetes lost more Femoral neck (FN) and Total hip (TH) BMD than those with normal glucose in age-adjusted models. After multivariable adjustment, diabetes was associated with greater loss of FN BMD (-0.32%/year; 95% CI: -0.61, -0.02) but not TH BMD (88). Likewise, in the Study of Osteoporotic Fracture (SOF), done on women >65 years, with self-reported DM lost bone more rapidly than those without DM at the FN and TH but not at distal radius (89).

1.5.2 Cardiovascular Diseases (CVD)

Several studies supported an association between CVD and low BMD or osteoporotic fractures. Several common factors have been linked to both CVD and osteoporosis including smoking, older age, DM, physical inactivity, and menopause (90). In addition, there is a growing evidence for a link in the underlying patho-physiology focusing on genetics, vascular calcification (91, 92) as well as statins (93, 94), while vascular calcifications has implications in osteoporotic fractures as well (95, 96).

Various studies have reported increased fracture risk in CVD patients (97-101). It is also mentioned that apart from their vulnerability to fractures through direct influences on bone, subjects with cardiovascular diseases could also have a higher propensity of falls as side effects of medications (99). However, studies showing association between CVD and BMD have conflicting results (102, 103). Self-reported myocardial infarction (MI) was not significantly associated with low BMD in women, but was not significant in men (OR: 1.39, [95% CI, 1.03 to 1.87] p=0.03) (104).

However, a systematic review showed that individuals with prevalent subclinical CVD had higher risk for increased bone loss compared to persons without disease (101). Looking at other CVDs, men with Chronic Heart Failure (CHF) had reduced BMD with significantly higher bone loss over time (105). Similarly, congestive heart failure patients with the vitamin D receptor (VDR FF) genotype had a significantly higher annual rate of decrease in BMD (106).

1.5.3 Stroke

Bone resorption starts early in stroke (107) and immobilization plays a major role in the pathogenesis of osteoporosis after stroke (108, 109). Hip fracture after stroke is an increasingly recognized problem (110). Few case-control studies found that the risk of hip fracture is twice as high among the subjects with stroke (111, 112) with the greater risk in people above 71 years, females and with recent stroke (112). However in a prospective study, there was no increase in the risk of fractures generally or hip fractures specifically compared with controls but among the stroke patients with hemi-paresis or hemiplegia, the majority of fractures occurred on the impaired side (113). Similarly, in a study done among patients hospitalized for stroke, there was a >7-fold increase in fracture risk, including that of hip fracture within the first year after hospitalization (114). Likewise studies have found pronounced decrease in BMD on the paretic side (115) and greater bone loss was (116, 117)

associated with factors like functional deficits, physical fitness, lean mass, mobility, weight bearing early after stroke and grip strength (118-120). On the contrary, another study found that in both acute and chronic stroke patients, BMD of affected and unaffected side femur were not significantly different (121). Thus, the relation between stroke and bone loss is contradicting, though a majority of studies indicating an increased risk of bone loss in stroke patients, particularly at the paretic side.

1.5.4 Hypothyroidism

Thyroid hormone is essential for the normal development of the bone and plays an important role in the linear growth and maintenance of bone mass (122). Thus thyroid function is important for bone status through life. As reported by Vestergaard *et al* in his series of studies (123, 124), the fracture risk in patients with hypothyroidism increases. In the study done among levothyroxine substituted patients, overall fracture risk was higher among patients compared to controls (RR=1.6), though the increase was temporary and limited to the period of the first 2 years after the diagnosis of hypothyroidism (RR = 3.1, 95% CI: 1.4-7.0). Another study done in 2005, showed an increase in the risk of any fracture in the first 10 years after a diagnosis of hypothyroidism, while no effect of levothyroxine on fracture risk was present.

Furthermore, studies looking into hypothyroidism and BMD have yielded contradicting results. Some studies found no significant differences in BMD among hypothyroid cases (125, 126) and levothyroxine substituted ones (127, 128), while there are others indicating that the total BMD was affected by hypothyroid status (129, 130). For example: in the Tromsø study, postmenopausal women with serum Thyroid Stimulating Hormone (TSH) above the 97.5 percentile had significantly higher BMD at the FN than women with serum TSH in the normal range (129). Most (131-134), but not all (135) studies showed a high prevalence of bone loss in patients with subclinical hypothyroidism treated with exogenous

thyroxin. However, in a trial, compared to women with no known thyroid disease, women with low TSH levels had greater annualized, adjusted mean rates of bone loss from the spine (-2.89% +/- 0.65% vs. -1.13% +/- 0.13%, P = 0.009) (136) which might predispose one to increased risk of osteoporotic fractures.

To summarize, several chronic diseases are associated with increased risk of fracture which in many cases is a consequence of increased bone loss. Increased rate of age related bone loss inevitably leads to decreased BMD and increased susceptibility to fragility fractures. Chronic diseases are therefore expected to put extra burdens to the society for its implication on BMD and consequently fracture risk. However, the association between chronic diseases and bone loss have not been studied much, especially in population based longitudinal studies including both women and men.

Objectives

The aim of this study was to investigate the associations between self-reported chronic diseases; CVD, DM, stroke and hypothyroidism, and Total hip and Femoral neck bone loss in women and men above the age of 50 years (with and without adjustments for risk factors and baseline BMD).

CHAPTER 2: Methods

2.1 Study population, design and setting

Tromsø is a city and a municipality in Troms county, Norway. It is an island and is the largest city of the northern part of Norway inhabited by around 70,000 populations. The Tromsø study is a population-based prospective study which was initiated in 1974. Six consecutive surveys have been carried out, 6-7 years apart, in the municipality of Tromsø from 1974 to 2008. The participants included in our study were subjects in the 5th and 6th surveys of the Tromsø study. Each of the survey included questionnaire data, samples of biological specimens, and clinical measurements. Tromsø 4-6 also included a second visit with a more extensive examination of the participants including bone densitometry of the hip.

2.2 BMD measurements

Tromsø 5 was conducted in 2001 to 2002. Subjects who had previously taken part in the second visit in Tromsø 4 were eligible for a second-visit examination in Tromsø 5. A total of 5939 subjects with ages ranging from 30-89 years participated from which BMD measurement was obtained. Similarly, Tromsø 6 was conducted in 2007-08. A total of 12984 (65.7 % of the invited population) men and women aged 30-87 attended the first visit of Tromsø 6. (137, 138), whereas, of 7958 invited, 7307 (98.1%) attended the second visit among which 3854 provided valid BMD measurement. In the present study, we have included a total number of 2310 men and women aged 55-74 years with valid BMD measurements at hip and femoral neck from Tromsø 5 and Tromsø (Figure 1).

The scans were performed by specially trained technicians after the manufacturer provided protocol. All scans were performed using Lunar Prodigy DXA densitometry (GE Medical systems, Madison, WI, USA) (137, 138). In the present study, scans of the left hip were used

for analysis, but if the left hip measurement was ineligible; the right hip scan was used. We included participants with valid BMD measurements at the total hip and femoral neck in the both surveys, altogether 860 men and 1450 women.

2.3 Ethics

The participants signed a declaration of consent prior to both examinations. The regional committee of Research Ethics recommended the study, with approval by the Norwegian Data Inspectorate.

2.4 Exposure variables and confounders

In the present study, the disease conditions were determined based on self-reports from questionnaires in Tromsø 5. The findings of the questionnaires were not verified by other measures. A participant was considered to have a disease if he or she answered 'yes' to the disease question or its corresponding drug (e.g., anti-diabetic drug for diabetes). We included 4 diseases: DM, CVD, Stroke and Hypothyroidism as exposures. We separated Type 2 DM out of the diabetes diagnosis. Type 2 DM were defined as those who said 'yes' to diabetes question and question for intake of diabetes tablet. In addition to it, a participant who reported 40+ years of age at onset of the disease and answered 'yes' to the diabetes question is regarded as Type 2 DM. Likewise, subgroups of CVD included in this study were Angina and Heart attack. We defined stroke only on the basis of the disease question. Similarly, a participant who said yes to the both; the disease question and the question for thyroxine hormone intake were considered as cases of hypothyroidism.

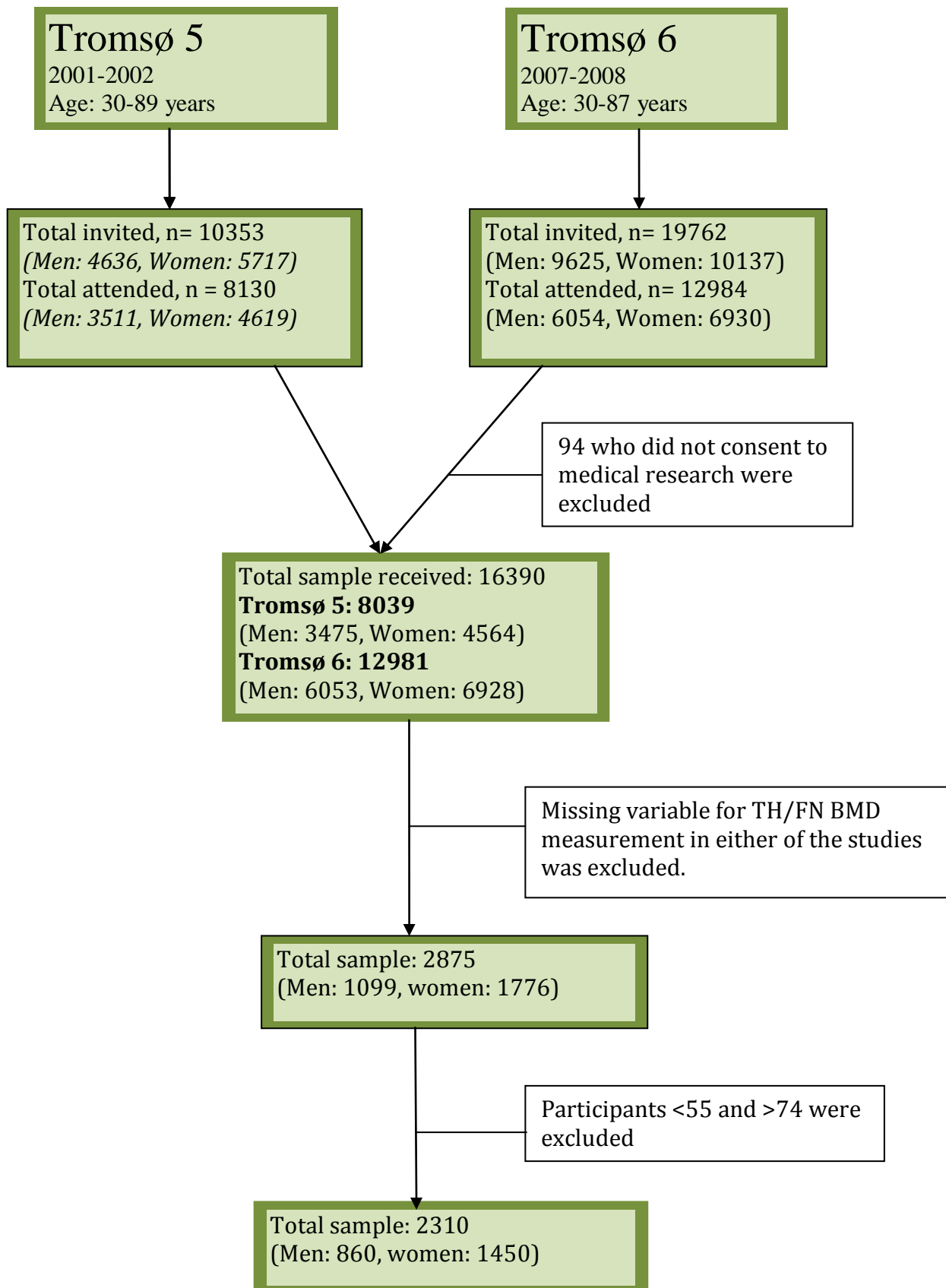
Potential confounding variables included were age, BMI, baseline BMD, smoking, physical activity, education, health status, cholesterol, triglycerides, systolic/diastolic blood pressure and glucose. Height and weight were measured in cm and kg respectively. Based on weight

and height measurements, BMI was calculated as kg/m². The covariates like smoking, physical-activity, education and health were dichotomised. Those who were currently smoking were considered smokers, the rest being non-smokers. The variable 'education' was categorised into less than 13 years of education and 13 or more years. The variable physical activity was categorised into sedentary, moderate and high on the basis of hours of light and hard activity on leisure. Later for convenience, the moderate and high physical activities were merged into one in regression analysis.

2.5 Statistical analysis

IBM SPSS 21 software was used for statistical analysis of the data. Data are presented stratified by gender. Chi squared (χ^2) test was used for categorical variables (Fisher exact tests for categorical data with low expected cell counts) and independent sample t-test was used for continuous variables. Absolute annual BMD change was calculated as the difference between BMD in Tromsø 5 and Tromsø 6 divided by the number of years between the scans. The annual percentage change in BMD was calculated by dividing the annualized absolute change by the baseline BMD and multiplied by 100. Absolute annual change and annual percentage change in BMD were considered as outcomes in the statistical analysis. Linear regression analysis was used to assess relationship between the predictor variables (diseases) and the outcome (change in TH and FN BMD). The association was adjusted for potential confounding variables where models were constructed based on previous studies on 'risk factors for bone loss' (26, 28, 139). Burden of chronic diseases (number of disease per subject) was also calculated and ANOVA was used to compare baseline BMD and change among each disease ranks (no disease, one disease and two or more diseases). Two sided P-values below 0.05 were considered statistically significant. The Variance Inflation Factor (VIF) was less than 5 for independent variables showing no cause of concern for multicollinearity between variables.

Figure 1: Flowchart showing inclusion and exclusion of participants



CHAPTER 3: Results

3.1 Basic characteristics of participants by sex as displayed in Table 1.

A total of 2310 participants (n= 860 men and n= 1450 women) were included in the analysis of the present study. The mean age \pm SD was 64 \pm 5 years and the majority of participants were 60-64 years old. The mean weight was 75 \pm 13 kg and the mean height was 167 \pm 9 cm. There was a significant difference in height and weight in women and men (p<0.0001). The mean BMI was 27 kg/m² and did not differ between women and men (p=0.359). SRH differed between the sexes (p<0.0001) so that a larger proportion of women reported poor health status. Physical activity level was significantly different between women and men (p<0.0001) where number of participants involved in moderate and high physical activity were higher in men. Baseline serum levels of triglyceride, glucose and diastolic BP were significantly higher among men while, cholesterol was significantly higher among women (p<0.01). Proportion of participants with heart disease (p<0.0001) and stroke (p=0.036) were significantly higher among men, whereas hypothyroidism, osteoporosis and arthrosis were significantly more often reported among women (p<0.0001). The baseline TH and FN BMD was significantly different in men and women with higher levels measured in men. Similarly, the annual percentage change of TH and FN BMD was significantly higher among women, with women losing an average of -0.6% per year at the TH and men losing an average of -0.25% per year at the TH (p<0.0001). The corresponding annual rates of loss were -0.7 % in women and -0.4% in men at the FN (p<0.0001).

3.2 Basic characteristics of participants by sex and disease status.

3.2.1 Basic characteristics of participants by sex and DM status as displayed in Table 2.

Men reporting DM had significantly higher BMI, poorer SRH status, were rarely smokers, had lower cholesterol level but higher triglyceride and glucose level than men without DM.

Baseline TH BMD level was significantly higher among men with DM (0.09 g/cm²) compared to men without DM (1.03 g/cm²). Similarly, women reporting DM had significantly higher BMI, had lower educational level, lower SRH status, and had lower cholesterol level but higher triglycerides and glucose levels than women without DM. Baseline BMD levels were not significantly different among women by DM status.

3.2.2 Basic characteristics of participants by sex and CVD status as displayed in Table 3.

Men reporting CVD were significantly older, had higher BMI, had lower educational level, lower SRH status, were less often smokers, and had lower diastolic BP and cholesterol levels than men without CVD. Baseline BMD levels were not significantly different. Likewise, women reporting CVD were significantly older, had higher BMI, had lower educational, lower SRH status, had lower cholesterol level and higher triglycerides level than women without CVD. Baseline BMD level were not significantly different also among women.

3.2.3 Basic characteristics of participants by sex and cerebral stroke as displayed in Table 4.

Men reporting cerebral stroke reported significantly poorer SRH status than men without. Similarly, women reporting cerebral stroke had poorer SRH status than women without cerebral stroke. As with the other variables, baseline BMD levels were not significantly different by stroke status among both sexes.

3.2.4 Basic characteristics of participants by sex and hypothyroidism status as displayed in Table 5.

None of the variables were significantly different between men reporting hypothyroidism and men without hypothyroidism. However, women reporting hypothyroidism had better SRH status than women without hypothyroidism.

3.3 Relation between chronic disease and bone loss

3.3.1 The relation between DM and bone loss as displayed in Table 6-Table 9.

There was no evidence for an association between DM and bone loss at any site in neither women nor men. The lack of association persisted after adjusting for potential confounders: age, BMI, baseline BMD, physical activity, education, smoking, education and further with cholesterol, triglycerides, BP, glucose.

3.3.2 The relation between CVD and bone loss as displayed in Table 6-Table 9.

In men, there was no association between CVD and bone loss at any site and the lack of association persisted in the multivariate models. However, in women, there was a significant annual percentage change in TH BMD (-0.23%; $p < 0.05$) in the model adjusted for potential confounders: age, BMI, baseline BMD, physical activity, education, smoking, education, and a borderline significance (-0.20%; $p = 0.05$) upon further adjustment for variables such as cholesterol, BP and triglycerides. These associations were not observed at the FN.

3.3.3 The relation between stroke and bone loss as displayed in Table 6-Table 9.

There was no significant association between stroke and bone loss at TH in neither women nor men. However, the annual percentage change in FN BMD was significant (-0.47 %; $p < 0.05$) among men in the models adjusted for age, baseline BMD, BMI, smoking, physical activity, education, health status with similar changes after further adjustment for cholesterol, BP and triglycerides. These associations were not observed at the FN in women.

3.3.4 The relation between hypothyroidism and bone loss as displayed in Table 6-Table 9.

There was no significant association between hypothyroidism and bone loss at FN in neither women nor men. But, a significant decrease in TH BMD was observed among women in a multivariate models (-0.15 to -0.16%; $p < 0.05$).

3.3.5 The relation between disease category and bone loss as displayed in Table 13Table 15.

Addressing the association between the burdens of disease, we observed no significant differences in baseline TH and FN BMD among participants with no disease, one disease or two diseases in both sexes (**Table 10 Table 11**).

In women, a significant bone loss was observed at the TH in women with two diseases compared to the no-disease category in the model adjusted for age, baseline BMD, BMI, smoking, physical activity, education and health status (-0.43; $p < 0.05$) and with further adjustment for cholesterol, BP and triglycerides (-0.44; $p < 0.05$). However, the annual percentage change in TH BMD among men was not significant. At FN, there was no significant bone loss, neither in women nor in men.

CHAPTER 4: Discussion

In the present study, a significant bone loss was observed at TH in women with CVD and hypothyroidism. Similarly, a significant bone loss was observed at FN in men with stroke compared to those without. However, there was no significant annual percentage change in BMD at any site in women and men with DM compared to those without. In participants with CVD, there was no sign of bone loss at the TH in men, and at the FN, we did not observe bone loss in any of the sexes which was higher than in participants without CVD. In participants with stroke, there was no significant bone loss at the FN in women and at the TH, no sign of loss in any of the sexes. We observed no significant bone loss at TH among men with hypothyroidism, whereas at FN, bone loss was significant neither in women nor in men.

When we looked at the association between burden of disease and bone loss, a significant annual percentage change in TH BMD was observed among women with two diseases compared to women with no disease. However, the loss at TH was not significant among men. Neither women nor men with one or two diseases had a significant bone loss at FN compared to their counterparts with no disease.

Previous studies examining the change in BMD in chronic diseases like CVD, DM, stroke and hypothyroidism vary because of heterogeneity in study designs and populations, and in the following we will discuss our results with other studies in the field.

Bone loss in DM

This study showed a slight decrease in BMD among DM in a univariate analyses with a gradual increasing BMD in multivariate models. However, the changes were not statistically

significant. In line with our findings, a prospective study, from the USA in 2007 displayed in a multivariate model similar changes in hip BMD for participants with diabetes and normal glucose though, there was a nominal loss of femoral neck BMD (-0.32%/year; 95% CI: -0.61, -0.02) (88). Several studies (81, 82) have reported that patients with Type 2 DM display an increased fracture risk despite high BMD. In contrast to the present study, the ‘Study of Osteoporotic Fracture’ with similar setting found that women with prevalent DM lost bone more rapidly than those without DM at the femoral neck (-0.96 vs. -1.40%/yr, p=0.005), total hip (-0.98 vs. -0.70%/yr, p= 0.033) (89). However, only few confounders were added to the model. Our results showing higher BMD at baseline among patient with DM are further consistent with a meta-analysis which reported higher BMD associated with Type 2 DM (140). Anabolic effect of drugs is reported to induce renewed modeling, increase periosteal apposition and repair trabecular microstructure (141). It can therefore be assumed that the present non-significant association between DM and bone change support an anabolic effect of insulin on bone as suggested by Weinstock *et al* and Thrailkill *et al* (142, 143). The insulin resistant phase in Type 2 DM which leads to a phase of hyperinsulinemia (144, 145) is reported to contribute to BMD in several studies (80, 146, 147). However, a study done on normal subjects found no association between insulin levels and BMD (148). The decrease in sex hormone-binding globulin secondary to hyperinsulinemia (149) is another plausible mechanism for degradation in bone mass (150). Besides their bone-anabolic actions, androgens and estrogens both exert anti-resorptive effects which down-regulates the production of cytokines involved in bone resorption subsequently decreasing the number and activity of osteoclasts as mentioned in a review by Vekken and colleagues (151). Protective effects of sex hormones against fracture and bone loss have been explained in various prospective studies (152, 153). While, substantial alterations in BMD values were found among different races and ethnic (154), another survey reported a modest role of estradiol in

race and ethnic differences in BMD (155). However, in the present analysis, we could not account for the effect of hormone levels. The third mechanism that associates DM with high BMD is obesity. Simply, obesity could be related to BMD through the mechanism of skeletal loading but the biological effects of fat mass tissue is also reported to play a role in this association (156). The present study found that the baseline BMI were significantly higher among patients with DM in both sexes. A number of studies have shown the beneficial effect of high BMI on BMD (39, 41, 42). However, there was no interaction between DM and BMI in our study. We can therefore only speculate on the mechanisms underlying BMD in Type 2 DM. Nevertheless, from this study, it is interesting to know that the patients with Type 2 DM who have a high BMD at the baseline are not losing more bone over time, they are indeed gaining bone. Therefore, the increased risk of fracture among DM patients could be through another mechanism or pathway other than direct effect of DM on bone.

Bone loss in CVD

As mentioned, we observed a significant bone loss at TH among women with CVD. In agreement with our study, a systematic review (101) along with some prospective studies (105, 106) have found a significant relation of one or other type of CVD with bone loss, although there was a substantial diversity with respect to age, sex, ethnicity, and baseline risk for CV events and fractures. The mechanism of association between CVD and BMD can be attributed to the shared risk factors including: BMD, bone loss rate, current smoking, daily drinking, diabetes, hypertension, hyperlipidemia, and higher plasma osteoprotegerin (OPG) and leptin levels (90). Most importantly, estrogen plays a role in both CVD and OP through their effects on cytokines, such as IL-1, IL-6 and TNF-alpha and OPG (93). The lack of estrogens induces an increase in these cytokines and a decrease in OPG, both implicated in the mechanisms of bone loss and atherogenesis. In the present analysis, the association between CVD and BMD was present in women after controlling for age and other common

etiological factors for CVD and bone loss (93). Common pathological factors may therefore be at play in this association. In an age-matched case control study, men with CHF demonstrated reduced BMD, compared to subjects without CHF where reduced serum total testosterone and free estradiol ($p < 0.0001$) at baseline predicted the bone loss (105). Moreover, the significant association between CVD and bone loss only among women in our study suggests that the potential patho-physiological mechanisms involved in the association between CVD and bone loss have an impact that may vary by gender, it can also point to the presence of other shared risk factors for the two conditions in women which we could not account for.

Bone loss in stroke

In the present study, there was, as mentioned a significant bone loss at FN among men with stroke. Contrary to our findings, female, but not male stroke patients had lower BMD than controls in the Tromsø' study where BMD were measured immediately after the stroke (157). Studies have shown contradictory results regarding which site is affected. Some studies have found pronounced decrease in BMD on the paretic side (115); the decrease in BMD being attributed to the factors like functional deficits, physical fitness, lean mass, mobility, weight bearing early after stroke and muscle grip (116-120), while another found that the BMD of affected side (ward's region) was significantly higher compared to the normal side in chronic stroke patients (121). However, the present study cannot confirm the association in relation to the site involved as the data on stroke-affected site was not available.

Immobilization in stroke increases the bone resorption which consequently leads to reduction in BMD (107, 109). Along with bone resorption, the increased bone metabolism as evidenced by the high serum concentrations of ICTP; a bone resorption marker and a normal or low BGP; a bone formation marker affects the bone after stroke (108). Immobilization basically works through two mechanisms: clinical which includes hypercalciuria causing suppression

of parathyroid-1,25-dihydroxyvitamin D axis, and radiological which involves activation of remodeling loci, and a decrease of the osteoblastic stimulus ultimately causing reduction in bone mass (158, 159). Moreover, in long-standing hemiplegic stroke patients, hypovitaminosis D appeared to be the dominant cause of immobilization-induced osteopenia (160). The supplementation of vitamin D could possibly reduce the risk of bone loss among stroke patients. The non-significant association between stroke and bone loss in this study could be due to lack of power after stratification.

Bone loss in hypothyroidism

In the present study, we found significant bone loss at TH in women with hypothyroidism compared to women without, while there was no significant loss in men. Most (131-134) but not all (135) studies indicate a high prevalence of bone loss in patients with subclinical hypothyroidism treated with exogenous thyroxin. The lack of significant associations in men may be explained by the lower prevalence of hypothyroidism among men (2%) compared to women (12%). The mechanism of BMD changes in thyroid diseases is coordinated by the level of TSH and thyroid hormone. It is known that thyroid hormone influences growth and development of bone and cartilages. Hypothyroid patients with deficient thyroid hormone are therefore seemingly at risk of bone loss. In hypothyroidism a parallel reduction in osteoclastic and osteoblastic activity leads to an overall prolongation of remodeling cycle, whereas, in hyperthyroid state, bone formation by osteoblasts, though increased, involves less absolute bone volume than the previous volume of bone absorbed by osteoclasts (122, 161). Thus, both deficiency and excess of thyroxine hormone could predispose a person to bone loss. Nevertheless, the results are conflicting in various epidemiological studies. For example: thyroxine-treated women with low TSH levels lost bone mineral from the spine more rapidly than women without known thyroid disease (136). Similarly, after more than six months of hormone treatment in hypothyroid patients, there was a significant loss of trabecular and

cortical bone with hyper-remodeling (133). In contrary, Grimnes *et al.* in The Tromsø study reported that postmenopausal women with serum TSH above 97.5 percentile had significantly higher BMD at the femoral neck than women with serum TSH in the normal range (129). The present significant association between hypothyroidism and bone loss in women is suggestive of further exploration of BMD changes among post-menopausal women with hypothyroidism, with appropriate titration of hormone therapy.

Strength and limitations

Our study has various strengths and limitations. At first, DXA is regarded as an ideal method of BMD measurement (162). Secondly, BMD predicts bone fractures better (11, 163) than other common risk factors. This study included a large numbers of men and women with a wide age range at baseline. The potential for selection bias was limited with the population-based prospective design of the study. However, the limited power for different diseases constitutes a major limitation in this study. Moreover, the validity of self-reported disease in this study cannot be fully relied on. In a prospective cohort study of 34,616 Finnish public-sector employees, the specificity of self-reports was equally high for the prevalent and incident diseases (range, 93%-99%), but the sensitivity of self-reports was considerably lower for incident than for prevalent diseases: hypertension (55% vs. 86%), diabetes (62% vs. 96%), coronary heart disease (62% vs. 78%), and rheumatoid arthritis (63% vs. 83%) (164). Though, physiological assessment or correction (165) and use of medical records (166) are suggested to validate self-reported disease. Because of the self-reported nature of the diseases, we also do not have information on the duration and onset of disease, which might have weakened the association between chronic diseases and bone loss.

Internal and external validity

Major biases such as selection bias, is probably not a major issue in this study, although information bias may be present as we lack information on various covariates which we could not account for, such as: sex steroids. It is also said that the reliance on self-reported disease indeed depends on participants to recall and evaluate different covariates. However, it can be assumed that, this study should have a good internal validity compared to others. Moreover, the participants of our study reflects the Tromsø population in general and are not substantially different from other western population in terms of social and lifestyle factors, education and the prevalence of different chronic diseases. Therefore, we feel that our findings could be generalizable to other similar populations.

CHAPTER 5: Conclusion

We conclude that patients with chronic diseases may have higher bone loss rates than their counterparts of the same age without disease. In particular, TH BMD among women with CVD and hypothyroidism, and FN BMD among men with stroke seem affected. In addition, increasing disease burden indicated a significant decrease in TH BMD among women. Therefore, although with limitations, we conclude that, the results of our investigation highlight the need for careful evaluation of elderly patients with different chronic diseases for possible bone loss and thereby increases fracture risk. Further prospective studies with validated chronic diseases are needed to explain this association.

Table 1: Comparison of baseline characteristics of 2310 included participants from Tromsø V 2001-2002 by gender

Variables	Population	Men (n=860)	Women (n=1450)	P
Baseline characteristics				
Age, Years	63.97 (5.02)	64.97 (4.88)	63.37 (5.02)	0.000
Weight,kg	75.08 (13.18)	82.84 (11.18)	70.46 (12.07)	0.000
Height,cm	166.84 (8.74)	174.98 (6.25)	161.99 (5.99)	0.000
BMI, kg/m ²	27.07 (4.01)	27.17 (3.18)	27.01 (4.43)	0.359
Education				
<13 years	1870 (83.3%)	684 (82.0%)	1186 (84.1%)	0.197
≥13 years	374 (16.7%)	150 (18.0%)	224 (15.9%)	
Personal history				
Health Status				
Good	1410 (61.9%)	577 (67.3%)	833 (58.6%)	0.000
Poor	869 (38.1%)	280 (32.7%)	589 (41.4%)	
Alcohol				
Yes	288 (13.4%)	69 (8.5%)	219 (16.3%)	0.000
No	1863 (86.6%)	740 (91.5%)	1123 (83.7%)	
Smoking				
Yes	549 (23.9%)	195 (22.8%)	354 (24.6%)	0.326
No	1744 (76.1%)	660 (77.2%)	1084 (75.4%)	
Physical Activity				
Sedentary	436 (25.2%)	132 (19.3%)	304 (29.0%)	0.000
Moderate	1175 (67.8%)	479 (70.1%)	696 (66.3%)	
High	121 (7.0%)	72 (10.5%)	49 (4.7%)	
Measurement				
Systolic BP, mmHg	140.80 (20.25)	140.94(19.30)	140.72(20.80)	0.799
DiastolicBP, mmHg	81.03 (11.88)	82.86 (11.01)	80.24 (12.29)	0.000
Cholesterol	6.36 (1.15)	6.10 (1.14)	6.52 (1.13)	0.000
Triglycerides	1.50 (0.83)	1.61 (0.98)	1.43 (0.72)	0.000
Glucose	5.49 (1.33)	5.64 (1.46)	5.40 (1.25)	0.000
Chronic diseases				
TypeII DM				
Yes	61 (2.7%)	29 (3.4%)	32 (2.3%)	0.110
No	2196 (97.3%)	823 (96.6%)	1373 (97.7%)	
Heart disease				
Yes	250 (11.0%)	156 (18.2%)	94 (6.7%)	0.000
No	2018 (89.0%)	700 (81.8%)	1318 (93.3%)	
Stroke				
Yes	50 (2.2%)	26 (3.1%)	24 (1.7%)	0.036
No	2198 (97.8%)	823 (96.9%)	1375 (98.3%)	
Hypothyroid				
Yes	169 (8.1%)	15 (1.9%)	154 (12%)	0.000
No	1921 (91.9%)	791 (98.1%)	1130 (88%)	
Osteoporosis				
Yes	88 (3.9%)	9 (1.1%)	79 (5.6%)	0.000
No	2173 (96.1%)	844 (98.9%)	1329 (94.4%)	
Arthrosis				
Yes	527 (25.4%)	131 (16.6%)	396 (30.8%)	0.000
No	1550 (74.6%)	660 (83.4%)	890 (69.2%)	
BMD				
TH BMD T5, gm/cm ²	0.96 (0.14)	1.03 (0.13)	0.92 (0.13)	0.000
TH BMD T6, gm/cm ²	0.93 (0.15)	1.01 (0.14)	0.88 (0.13)	0.000
FN BMD T5, gm/cm ²	0.89 (0.13)	0.94 (0.13)	0.85 (0.12)	0.000
FN BMD T6, gm/cm ²	0.85 (0.13)	0.92 (0.14)	0.81 (0.12)	0.000
Absolute change TH, gm/cm ²	-0.03 (0.04)	-0.02 (0.04)	-0.37 (0.05)	0.000
Absolute change FN, gm/cm ²	-0.34 (0.05)	-0.02 (0.05)	-0.04 (0.05)	0.000
Percentage change TH, %/ cm ²	-3.08 (4.67)	-1.62 (3.85)	-3.95 (4.89)	0.000
Percentage change FN, %/ cm ²	-3.81 (5.36)	-2.58 (4.93)	-4.54 (5.47)	0.000

Absolute Annual change TH, gm/yr	-0.004 (0.007)	-0.002 (0.006)	-0.006 (0.007)	0.000
Absolute Annual change FN, gm/yr	-0.005 (0.007)	-0.004 (0.007)	-0.006 (0.007)	0.000
Annual % change TH, %/yr	-0.47 (0.71)	-0.25 (0.58)	-0.60 (0.75)	0.000
Annual % change FN, %/yr	-0.58 (0.82)	-0.39 (0.75)	-0.69 (0.84)	0.000

BMD: Bone Mineral Density, BMI: Body Mass Index, DM: Diabetes Mellitus, FN: Femoral neck, TH: Total hip*Measurements from Tromsø V 2001-2002 (T5) and Tromsø VI (T6) included. Mean (SD) is reported for continuous variable and number (%) is reported for categorical variable. Sample sizes vary by characteristics due to missing values.

Table 2: Baseline characteristics of participants with and without DM

Variables	Men			Women		
	DM	Non-DM	P	DM	Non-DM	P
Baseline Characteristics						
Age, Years	64.93 (4.46)	64.97 (4.89)	0.967	64.31 (4.83)	63.36 (5.02)	0.287
BMI	29.46 (4.11)	27.08 (3.12)	0.000	28.63 (5.03)	26.96 (4.41)	0.035
Education, years						
<13 years	23 (82.1%)	654 (82.0%)	0.980	31 (100%)	1117 (83.7%)	0.010
≥13 years	5 (17.9%)	144 (18.0%)		0 (0.00%)	218 (16.3%)	
Personal history						
Health Status						
Good	7 (24.1%)	567 (69.1%)	0.000	10 (32.3%)	812 (60.3%)	0.002
Poor	22 (75.9%)	253 (30.9%)		21 (67.7%)	535 (39.7%)	
Alcohol						
Yes	0 (0.0%)	69 (8.9%)	0.158	7 (22.6%)	207 (16.3%)	0.349
No	27 (100%)	706 (91.1%)		24 (77.4%)	1065 (83.7%)	
Smoking						
Yes	2 (7.1%)	192 (23.4%)	0.044	9 (28.1%)	335 (24.6%)	0.647
No	26 (92.9%)	627 (76.6%)		23 (71.9%)	1027 (75.4%)	
Physical Activity						
Sedentary	6 (26.1%)	125 (19.1%)	0.195	9 (37.5%)	288 (28.9%)	0.598
Moderate	17 (73.9%)	458 (69.9)		14 (58.3%)	662 (66.5%)	
High	0 (0.0%)	72 (11.0%)		1 (4.2%)	45 (4.5%)	
Systolic BP, mmHg	143.00(23.41)	140.92(19.22)	0.571	144.47(19.41)	140.66(20.66)	0.303
Diastolic BP, mmHg	80.07 (10.84)	82.46 (11.05)	0.253	77.69 (10.34)	80.36 (12.23)	0.220
Cholesterol	5.37 (1.19)	6.13 (1.13)	0.000	5.95 (1.16)	6.54 (1.13)	0.003
Triglycerides	2.60 (2.17)	1.57 (0.90)	0.000	1.84 (0.86)	1.42 (0.71)	0.001
Glucose	8.85 (3.81)	5.52 (1.14)	0.000	8.65 (3.08)	5.31 (1.04)	0.000
BMD						
TH BMD T5, gm/cm ²	1.09 (0.13)	1.03 (0.13)	0.017	0.96 (0.14)	0.92 (0.13)	0.087
TH BMD T6, gm/cm ²	1.07 (0.14)	1.01 (0.14)	0.041	0.91 (0.13)	0.88 (0.13)	0.240
FN BMD T5, gm/cm ²	0.97 (0.11)	0.94 (0.13)	0.164	0.89 (0.13)	0.85 (0.12)	0.092
FN BMD T6, gm/cm ²	0.95 (0.13)	0.91 (0.14)	0.225	0.84 (0.11)	0.81 (0.12)	0.232
Absolute change TH, gm/cm ²	-0.02 (0.04)	-0.16 (0.04)	0.535	-0.05 (0.05)	-0.04 (0.04)	0.115
Absolute change FN, gm/cm ²	-0.03 (0.05)	-0.02 (0.05)	0.792	-0.05 (0.05)	-0.04 (0.05)	0.191
Percentage change TH, %/cm ²	-1.90 (3.85)	-1.61 (3.85)	0.688	-4.94 (4.95)	-3.92 (4.88)	0.246
Percentage change FN, %/cm ²	-2.74 (5.74)	-2.56 (4.90)	0.841	-5.35 (5.22)	-4.50 (5.49)	0.385
Absolute Annual change TH, gm/yr	-0.003(0.006)	-0.002(0.006)	0.485	-0.01 (0.01)	-0.01 (0.01)	0.114
Absolute Annual change FN, gm/yr	-0.004(0.008)	-0.004(0.007)	0.827	-0.01 (0.01)	-0.01 (0.01)	0.202
Annual % change TH, %/yr	-0.30 (0.60)	-0.25 (0.58)	0.636	-0.75 (0.76)	-0.01 (0.01)	0.241
Annual % change FN, %/yr	-0.41 (0.89)	-0.39 (0.74)	0.861	-0.81 (0.79)	-0.68 (0.84)	0.398

BMD: Bone Mineral Density, BMI: Body Mass Index, DM: Diabetes Mellitus, FN: Femoral neck, TH: Total hip. Mean (SD) is reported for continuous variable and number (%) is reported for categorical variable. Sample sizes vary by characteristics due to missing values. Fishers exact test is used when any expected frequency is less than 1 or 20% of expected frequencies are less than or equal to 5.

Table 3: Baseline characteristics of participants with and without CVD

Variables	Men			Women		
	CVD	Non-CVD	P	CVD	Non-CVD	P
Baseline Characteristics						
Age, Years	66.47(4.60)	64.64 (4.87)	0.000	66.38 (4.99)	63.17 (4.96)	0.000
BMI	27.96 (3.18)	26.98 (3.16)	0.000	27.94 (4.42)	26.93 (4.42)	0.033
Education, years						
<13 years	133 (89.3%)	548 (80.5%)	0.011	83 (93.3%)	1072 (83.4%)	0.014
≥13 years	16 (10.7%)	133 (19.5%)		6 (6.7%)	214 (16.6%)	
Personal history						
Health Status						
Good	75 (48.1)	500 (71.7%)	0.000	40 (44.4%)	785 (60.6%)	0.003
Poor	81 (51.9%)	197 (28.3%)		50 (55.6%)	510 (39.4%)	
Alcohol						
Yes	15 (10.3%)	54 (8.2%)	0.400	15 (16.7%)	200 (16.4%)	0.949
No	130 (89.7%)	606 (91.8%)		75 (83.3%)	1019(83.6%)	
Smoking						
Yes	23 (14.9%)	172 (24.7%)	0.009	18 (19.4%)	327 (25.0%)	0.221
No	131 (85.1%)	525 (75.3%)		75 (80.6%)	980 (75.0%)	
Physical Activity						
Sedentary	25 (20.5%)	106 (19.0%)	0.905	19 (31.0%)	278 (28.9%)	0.908
Moderate	85 (69.7%)	392 (70.3%)		39 (63.9%)	642 (66.7%)	
High	12 (9.8%)	60 (10.8%)		3 (4.9%)	43 (4.5%)	
Systolic BP,mmHg	139.85 (19.69)	141.20 (19.25)	0.431	143.02 (22.60)	140.61 (20.60)	0.277
DiastolicBP,mmHg	79.65 (10.55)	82.96 (11.05)	0.001	80.40 (14.08)	80.27 (12.12)	0.921
Cholesterol	5.39 (1.14)	6.25 (1.08)	0.000	5.77 (1.40)	6.58 (1.09)	0.000
Triglycerides	1.67 (0.90)	1.59 (1.00)	0.341	1.58 (0.91)	1.42 (0.70)	0.033
Glucose	5.77 (1.62)	5.61 (1.42)	0.218	5.52 (1.29)	5.39 (1.24)	0.302
BMD						
TH BMD T5, gm/cm ²	1.03 (0.13)	1.03 (0.13)	0.735	0.91 (0.13)	0.92 (0.13)	0.799
TH BMD T6, gm/cm ²	1.01 (0.14)	1.01 (0.14)	0.769	0.88 (0.14)	0.88 (0.13)	0.645
FN BMD T5, gm/cm ²	0.93 (0.12)	0.94 (0.13)	0.456	0.83 (0.11)	0.86 (0.12)	0.109
FN BMD T6, gm/cm ²	0.91 (0.13)	0.92 (0.14)	0.333	0.80 (0.12)	0.81 (0.12)	0.181
Absolute change TH, gm/cm ²	-0.02 (0.05)	-0.02 (0.04)	0.944	-0.04 (0.05)	-0.04 (0.05)	0.550
Absolute change FN, gm/ cm ²	-0.03 (0.05)	0.02 (0.04)	0.421	-0.04 (0.04)	0.04 (0.05)	0.442
Percentage change TH, %/ cm ²	-1.61 (4.78)	-1.62 (3.61)	0.965	-4.40 (4.95)	-3.93 (4.88)	0.368
Percentage change FN, %/ cm ²	-2.87 (5.43)	-2.49 (4.80)	0.385	-4.38 (5.21)	-4.56 (5.49)	0.757
Absolute Annual change TH, gm/yr	-0.002 (0.007)	-0.002 (0.005)	0.835	-0.006 (0.007)	-0.006 (0.007)	0.760
Absolute Annual change FN, gm/yr	-0.004 (0.008)	-0.004 (0.007)	0.463	-0.005 (0.006)	-0.006 (0.007)	0.317
Annual % change TH, %/yr	-0.24 (0.73)	-0.25 (0.55)	0.866	-0.65 (0.72)	-0.60 (0.75)	0.542
Annual % change FN, %/yr	-0.43 (0.82)	-0.38 (0.73)	0.418	-0.65 (0.77)	-0.70 (0.85)	0.586

BMD: Bone Mineral Density, BMI: Body Mass Index, DM: Diabetes Mellitus, FN: Femoral neck, TH: Total hip. Mean (SD) is reported for continuous variable and number (%) is reported for categorical variable. Sample sizes vary by characteristics due to missing values. Fishers exact test is used when any expected frequency is less than 1 or 20% of expected frequencies are less than or equal to 5.

Table 4: Baseline characteristics of participants with and without Cerebral Stroke

Variables	Men			Women		
	Stroke	No Stroke	P	Stroke	No Stroke	P
Baseline Characteristics						
Age, Years	65.50 (4.89)	64.95 (4.87)	0.573	63.96 (4.96)	63.35 (5.02)	0.555
BMI	27.80 (2.86)	27.13 (3.20)	0.291	28.10 (5.79)	26.98 (4.41)	0.223
Education, years						
<13 years	21 (84.0%)	655 (82.0%)	1.000	18 (81.8%)	1126(83.9%)	0.770
≥13 years	4 (16.0%)	144 (18.0%)		4 (18.2%)	216 (16.1%)	
Personal history						
Health Status						
Good	11 (44.0%)	561 (68.3%)	0.016	6 (25.0%)	814 (60.4%)	0.001
Poor	14 (56.0%)	260 (31.7%)		18 (75.0%)	534 (39.6%)	
Alcohol						
Yes	2 (8.0%)	66 (8.5%)	1.000	4 (17.4%)	209 (16.4%)	0.782
No	23 (92.0%)	708 (91.5%)		19 (82.6%)	1066(83.6%)	
Smoking						
Yes	6 (23.1%)	187 (22.9%)	0.979	4 (16.7%)	336 (24.7%)	0.367
No	20 (76.9%)	631 (77.1%)		20 (83.3%)	1027(75.3%)	
Physical Activity						
Sedentary	5 (26.3%)	125 (19.1%)	0.276	5 (27.8%)	289 (28.9%)	1.000
Moderate	14 (73.7%)	459 (70.0%)		13 (72.2%)	664 (66.5%)	
High	0 (0.0%)	72 (11.0%)		0 (0.0%)	46 (4.6%)	
Systolic BP,mmHg	145.81(17.25)	140.83(19.39)	0.197	140.04(20.43)	140.70(20.69)	0.878
DiastolicBP,mmHg	85.65 (9.19)	82.24 (11.07)	0.120	80.50 (13.22)	80.23 (12.20)	0.915
Cholesterol	5.62 (1.20)	6.12 (1.13)	0.029	6.18 (1.15)	6.53 (1.13)	0.126
Triglycerides	1.71 (1.08)	1.61 (0.98)	0.600	1.51 (0.70)	1.42 (0.70)	0.563
Glucose	5.64 (1.03)	5.64 (1.48)	1.00	5.67 (1.31)	5.40 (1.24)	0.291
BMD						
TH BMD T5, gm/cm ²	1.02 (0.12)	1.03 (0.13)	0.807	0.91(0.13)	0.92 (0.13)	0.881
TH BMD T6, gm/cm ²	1.00 (0.11)	1.01 (0.14)	0.555	0.88 (0.15)	0.88 (0.13)	0.899
FN BMD T5, gm/cm ²	0.93 (0.12)	0.94 (0.13)	0.715	0.85 (0.13)	0.85 (0.12)	0.767
FN BMD T6, gm/cm ²	0.90 (0.11)	0.92 (0.14)	0.413	0.81 (0.13)	0.81 (0.12)	0.729
Absolute change TH, gm/cm ²	-0.03 (0.04)	-0.02 (0.04)	0.175	-0.04 (0.06)	-0.04 (0.04)	0.944
Absolute change FN, gm/cm ²	-0.04 (0.05)	-0.02 (0.05)	0.158	-0.04 (0.04)	-0.04 (0.05)	0.925
Percentage change TH, %/ cm ²	-2.42 (3.45)	-1.60 (3.86)	0.286	-3.97 (6.95)	-3.92 (4.83)	0.962
Percentage change FN, %/ cm ²	-3.74 (5.18)	-2.53 (4.92)	0.217	-4.77 (5.12)	-4.51 (5.48)	0.824
Absolute Annual change TH, gm/yr	-0.004 (0.005)	-0.002 (0.006)	0.197	-0.006 (0.01)	-0.006 (0.007)	0.994
Absolute Annual change FN, gm/yr	-0.005 (0.007)	-0.003 (0.007)	0.177	-0.006 (0.007)	-0.006 (0.007)	0.877
Annual % change TH, %/yr	-0.36 (0.51)	-0.24 (0.59)	0.312	-0.62 (1.14)	-0.60 (0.73)	0.904
Annual % change FN, %/yr	-0.56 (0.77)	-0.38 (0.75)	0.239	-0.73 (0.82)	-0.69 (0.84)	0.779

BMD: Bone Mineral Density, BMI: Body Mass Index, DM: Diabetes Mellitus, FN: Femoral neck, TH: Total hip. Mean (SD) is reported for continuous variable and number (%) is reported for categorical variable. Sample sizes vary by characteristics due to missing values. Fishers exact test is used when any expected frequency is less than 1 or 20% of expected frequencies are less than or equal to 5.

Table 5: Baseline characteristics of participants with and without Hypothyroidism

Variables	Men			Women		
	Hypothyroid +	Hypothyroid -	P	Hypothyroid +	Hypothyroid -	P
Age, Years	66.13 (4.24)	64.88 (4.90)	0.325	63.76 (5.06)	63.20 (4.95)	0.192
BMI	27.85 (4.20)	27.14 (3.12)	0.386	27.44 (4.29)	26.90 (4.39)	0.151
Education, years						
<13 years	15 (100%)	628 (81.7%)	0.087	128 (85.3%)	919 (83.2%)	0.518
≥13 years	0 (0.0%)	141 (18.3%)		22 (14.7%)	185 (16.8%)	
Personal history						
Health Status						
Good	71 (47.7%)	686 (61.5%)	0.531	9 (60.0%)	533 (67.6%)	0.001
Poor	78 (52.3%)	429 (38.5%)		6 (40.0%)	255 (32.4%)	
Alcohol						
Yes	1 (6.7%)	64 (8.3%)	0.821	27 (18.9%)	169 (15.3%)	0.269
No	14 (93.3%)	708 (91.7%)		116 (81.1%)	935 (84.7%)	
Smoking						
Yes	3 (20.0%)	179 (22.7%)	1.000	27 (17.8%)	282 (25.2%)	0.045
No	12 (80.0%)	608 (77.3%)		125 (82.2%)	838 (74.8%)	
Physical Activity						
Sedentary	3 (30.0%)	124 (19.5%)	0.678	29 (26.6%)	239 (28.3%)	0.914
Moderate	6 (60.0%)	443 (69.8%)		75 (68.8%)	568 (67.3%)	
High	1 (10.0%)	68 (10.7%)		5 (4.6%)	37 (4.4%)	
Systolic BP,mmHg	143.93 (18.98)	140.86(18.96)	0.534	138.16 (19.80)	140.85(20.75)	0.129
Diastolic BP,mmHg	88.07 (11.87)	82.31 (10.95)	0.045	79.61 (11.31)	80.18 (12.36)	0.588
Cholesterol	5.74 (1.04)	6.10 (1.13)	0.214	6.56 (1.29)	6.52 (1.10)	0.692
Triglycerides	1.39 (0.60)	1.61 (0.95)	0.368	1.52 (0.68)	1.42 (0.74)	0.129
Glucose	5.69 (1.21)	5.65 (1.49)	0.915	5.30 (1.04)	5.42 (1.31)	0.270
BMD						
TH BMD T5, gm/cm ²	1.03 (0.95)	1.03 (0.13)	0.999	0.92 (0.13)	0.92 (0.13)	0.948
TH BMD T6, gm/cm ²	1.01 (0.12)	1.02 (0.14)	0.860	0.88 (0.13)	0.88 (0.13)	0.629
FN BMD T5, gm/cm ²	0.93 (0.80)	0.94 (0.13)	0.790	0.86 (0.12)	0.86 (0.12)	0.949
FN BMD T6, gm/cm ²	0.90 (0.11)	0.92 (0.14)	0.670	0.81 (0.12)	0.82 (0.12)	0.772
Absolute change TH, gm/cm ²	-0.02 (0.04)	-0.02 (0.04)	0.502	-0.04 (0.05)	-0.04 (0.04)	0.216
Absolute change FN, gm/cm ²	-0.03 (0.05)	-0.02 (0.05)	0.595	-0.04 (0.05)	-0.04 (0.05)	0.379
Percentage change TH, %/ cm ²	-2.24 (3.84)	-1.55 (3.78)	0.479	-4.46 (5.86)	-3.91 (4.68)	0.181
Percentage change FN, %/ cm ²	-3.33 (5.02)	-2.49 (4.88)	0.512	-5.00 (5.29)	-4.50 (5.39)	0.286
Absolute Annual change TH, gm/yr	-0.003 (0.006)	-0.002 (0.006)	0.467	-0.006 (0.008)	-0.006 (0.007)	0.184
Absolute Annual change FN, gm/yr	-0.004 (0.007)	-0.003 (0.007)	0.604	-0.007 (0.007)	-0.006 (0.007)	0.353
Annual % change TH, %/yr	-0.35 (0.57)	-0.23 (0.57)	0.449	-0.69 (0.89)	-0.59 (0.72)	0.156
Annual % change FN, %/yr	-0.50 (0.72)	-0.37 (0.74)	0.522	-0.76 (0.81)	-0.69 (0.83)	0.269

BMD: Bone Mineral Density, BMI: Body Mass Index, DM: Diabetes Mellitus, FN: Femoral neck, TH: Total hip. Mean (SD) is reported for continuous variable and number (%) is reported for categorical variable. Sample sizes vary by characteristics due to missing values. Fishers exact test is used when any expected frequency is less than 1 or 20% of expected frequencies are less than or equal to 5.

Table 6: Adjusted and unadjusted Absolute annual change and Annualised percentage change in Total hip BMD with chronic diseases among women.

Total Hip	DM Change (CI)	P	CVD Change (CI)	P	Stroke Change (CI)	P	Hypothyroidism Change (CI)	P
Absolute Annual Change								
Unadjusted model	-0.002 (-0.004-0.000)	0.114	0.000 (-0.002-0.001)	0.760	-0.000011 (-0.003-0.003)	0.994	-0.001 (-0.002-0.000)	0.184
Multivariate model ^a	-0.002 (-0.004-0.000)	0.102	0.000 (-0.002-0.001)	0.535	-0.000054 (-0.003-0.003)	0.969	-0.001 (-0.002-0.000)	0.164
Multivariate model ^b	-0.002 (-0.004-0.001)	0.193	0.000 (-0.002-0.001)	0.686	-0.000057 (-0.003-0.003)	0.967	-0.001 (-0.002-0.000)	0.171
Multivariate model ^c	-0.002 (-0.004-0.001)	0.124	-0.001 (-0.002-0.001)	0.428	0.000 (-0.003-0.002)	0.790	-0.001 (-0.002-0.000)	0.097
Multivariate model ^d	-0.000093 (-0.003-0.003)	0.949	-0.002 (-0.004-0.000)	0.034*	0.002 (-0.002-0.005)	0.321	-0.001 (-0.003-0.000)	0.049*
Multivariate model ^e	0.000 (-0.003-0.003)	0.918	-0.002 (-0.003-0.000)	0.083	0.002 (-0.001-0.005)	0.230	-0.001 (-0.003-0.000)	0.034*
Annual % change								
Unadjusted model	-0.16 (-0.417-0.105)	0.241	-0.05 (-0.204-0.107)	0.542	-0.02 (-0.318-0.281)	0.904	-0.09 (-0.215-0.034)	0.156
Multivariate model ^a	-0.16 (-0.419-0.104)	0.237	-0.06 (-0.213-0.102)	0.489	-0.02 (-0.320-0.280)	0.897	-0.09 (-0.216-0.034)	0.153
Multivariate model ^b	-0.14 (-0.402-0.120)	0.289	-0.05 (-0.207-0.108)	0.540	-0.02 (-0.319-0.280)	0.896	-0.09 (-0.214-0.035)	0.157
Multivariate model ^c	-0.17 (-0.429-0.088)	0.196	-0.08 (-0.236-0.077)	0.319	-0.05 (-0.350-0.242)	0.720	-0.11 (-0.229-0.016)	0.088
Multivariate model ^d	0.001 (-0.308-0.310)	0.995	-0.23 (-0.426- -0.038)	0.019*	0.17 (-0.195-0.525)	0.367	-0.15 (-0.298- -0.006)	0.041*
Multivariate model ^e	0.001 (-0.336-0.337)	0.997	-0.20 (-0.398-0.000)	0.050*	0.20 (-0.160-0.560)	0.276	-0.16 (-0.308- -0.014)	0.032*

BMD: Bone Mineral Density, BMI: Body Mass Index, DM: Diabetes Mellitus, FN: Femoral neck, TH: Total hip. ^a Adjusted for age. ^b Adjusted for age and baseline BMD. ^c Adjusted for age, baseline BMD and BMI. ^d Adjusted for age, baseline BMD, BMI, smoking, physical activity, education and health status. ^e Adjusted for age, baseline BMD, BMI, smoking, physical activity, education, health status, cholesterol, BP, triglycerides and glucose. In multivariate model^e 'Glucose' is included only for DM. * P<0.05.

Table 7: Adjusted and unadjusted Absolute annual change and Annualised percentage change in Total hip BMD with chronic diseases among men.

Total Hip	DM Change (CI)	P	CVD Change (CI)	P	Stroke Change (CI)	P	Hypothyroidism Change (CI)	P
Absolute Annual Change								
Unadjusted model	-0.001 (-0.003-0.001)	0.485	0.000 (-0.001-0.001)	0.835	-0.001 (-0.004-0.001)	0.197	-0.001 (-0.004-0.002)	0.467
Multivariate model ^a	-0.001 (0.003-0.001)	0.494	0.000 (-0.001-0.001)	0.510	-0.001 (-0.004-0.001)	0.216	-0.001 (-0.004-0.002)	0.520
Multivariate model ^b	-0.001 (-0.003-0.001)	0.327	0.000 (-0.001-0.001)	0.513	-0.001 (-0.004-0.001)	0.222	-0.001 (-0.004-0.002)	0.510
Multivariate model ^c	-0.001 (-0.004-0.001)	0.209	0.000 (-0.001-0.001)	0.735	-0.001 (-0.004-0.001)	0.188	-0.001 (-0.004-0.002)	0.468
Multivariate model ^d	-0.001 (-0.003-0.002)	0.579	0.000 (-0.001-0.001)	0.655	-0.002 (-0.005-0.001)	0.116	-0.001 (-0.005-0.002)	0.514
Multivariate model ^e	-0.002 (-0.005-0.001)	0.220	-0.000040 (-0.001-0.001)	0.952	-0.002 (-0.005-0.001)	0.112	-0.001 (-0.005-0.002)	0.529
Annual % change								
Unadjusted model	-0.05 (-0.274-0.167)	0.636	0.01 (-0.093-0.111)	0.866	-0.12 (-0.346-0.111)	0.312	-0.11 (-0.407-0.180)	0.449
Multivariate model ^a	-0.05 (-0.270-0.168)	0.649	0.04 (-0.068-0.138)	0.504	-0.11 (-0.337-0.117)	0.343	-0.10 (-0.392-0.194)	0.507
Multivariate model ^b	-0.10 (-0.312-0.120)	0.384	0.03 (-0.067-0.135)	0.507	-0.12 (-0.330-0.118)	0.353	-0.10 (-0.390-0.188)	0.491
Multivariate model ^c	-0.13 (-0.343-0.092)	0.258	0.02 (-0.083-0.121)	0.719	-0.12 (-0.340-0.107)	0.308	-0.11 (-0.400-0.178)	0.451
Multivariate model ^d	-0.06 (-0.324-0.205)	0.657	0.04 (-0.088-0.158)	0.574	-0.18 (-0.450-0.100)	0.211	-0.10 (-0.466-0.262)	0.582
Multivariate model ^e	-0.16 (-0.453-0.125)	0.258	0.001 (-0.129-0.131)	0.986	-0.18 (-0.454-0.099)	0.207	-0.10 (-0.466-0.266)	0.592

BMD: Bone Mineral Density, BMI: Body Mass Index, DM: Diabetes Mellitus, FN: Femoral neck, TH: Total hip. ^a Adjusted for age. ^b Adjusted for age and baseline BMD. ^c Adjusted for age, baseline BMD and BMI. ^d Adjusted for age, baseline BMD, BMI, smoking, physical activity, education and health status. ^e Adjusted for age, baseline BMD, BMI, smoking, physical activity, education, health status, cholesterol, BP, triglycerides and glucose. In multivariate model^e 'Glucose' is included only for DM.

Table 8: Adjusted and unadjusted Absolute annual change and Annualised percentage change in Femoral neck BMD with chronic diseases among women.

Femoral neck	DM Change (CI)	P	CVD Change (CI)	P	Stroke Change (CI)	P	Hypothyroidism Change (CI)	P
Absolute Annual Change								
Unadjusted model	-0.002 (-0.004-0.001)	0.202	0.001 (-0.001-0.002)	0.317	0.000 (-0.003-0.003)	0.877	-0.001(-0.002-0.001)	0.353
Multivariate model ^a	-0.002 (-0.004-0.001)	0.155	0.000 (-0.001-0.002)	0.804	0.000 (-0.003-0.003)	0.816	-0.001 (-0.002-0.001)	0.267
Multivariate model ^b	-0.001 (-0.004-0.001)	0.367	0.000 (-0.001-0.002)	0.755	0.000 (-0.003-0.002)	0.781	-0.001 (-0.002-0.001)	0.307
Multivariate model ^c	-0.001 (-0.004-0.001)	0.332	0.000095 (-0.001-0.002)	0.902	0.000 (-0.003-0.002)	0.735	-0.001 (-0.002-0.000)	0.257
Multivariate model ^d	0.000 (-0.003-0.003)	0.903	-0.001 (-0.003-0.001)	0.311	0.000 (-0.003-0.004)	0.815	-0.001 (-0.002-0.001)	0.271
Multivariate model ^e	-0.001 (-0.004-0.003)	0.751	-0.001 (-0.003-0.001)	0.383	0.001 (-0.003-0.004)	0.716	-0.001 (-0.002-0.000)	0.201
Annual % change								
Unadjusted model	-0.13 (-0.422-0.168)	0.398	0.05 (-0.127-0.225)	0.586	-0.05 (-0.388-0.291)	0.779	-0.08 (-0.218-0.061)	0.269
Multivariate model ^a	-0.14 (-0.436-0.153)	0.346	0.002 (-0.175-0.180)	0.980	-0.06 (-0.396-0.280)	0.737	-0.09 (-0.226-0.052)	0.218
Multivariate model ^b	-0.10 (-0.385-0.198)	0.529	0.01 (-0.171-0.181)	0.955	-0.06 (-0.396-0.273)	0.719	-0.08 (-0.220-0.055)	0.240
Multivariate model ^c	-0.11 (-0.398-0.186)	0.477	-0.01 (-0.190-0.163)	0.882	-0.07 (-0.409-0.261)	0.664	-0.09 (-0.228-0.047)	0.197
Multivariate model ^d	-0.002 (-0.346-0.341)	0.989	-0.14 (-0.355-0.077)	0.207	0.03 (-0.368-0.432)	0.875	-0.11 (-0.271-0.050)	0.176
Multivariate model ^e	-0.03 (-0.400-0.348)	0.891	-0.13 (-0.353-0.091)	0.248	0.05 (-0.346-0.455)	0.790	-0.12 (-0.286-0.037)	0.131

BMD: Bone Mineral Density, BMI: Body Mass Index, DM: Diabetes Mellitus, FN: Femoral neck, TH: Total hip. ^a Adjusted for age. ^b Adjusted for age and baseline BMD. ^c Adjusted for age, baseline BMD and BMI. ^d Adjusted for age, baseline BMD, BMI, smoking, physical activity, education and health status. ^e Adjusted for age, baseline BMD, BMI, smoking, physical activity, education, health status, cholesterol, BP, triglycerides and glucose. In multivariate model^e 'Glucose' is included only for DM.

Table 9: Adjusted and unadjusted Absolute annual change and Annualised percentage change in Femoral neck BMD with chronic diseases among men.

Femoral neck	DM Change (CI)	P-value	CVD Change (CI)	P-value	Stroke Change (CI)	P-value	Hypothyroidism Change (CI)	P-value
Absolute Annual Change								
Unadjusted model	0.000 (-0.003-0.002)	0.827	0.000 (-0.002-0.001)	0.463	-0.002 (-0.005-0.001)	0.177	-0.001 (-0.004-0.003)	0.604
Multivariate model ^a	0.000 (-0.003-0.002)	0.830	0.000 (-0.002-0.001)	0.516	-0.002 (-0.005-0.001)	0.182	-0.001 (-0.004-0.003)	0.610
Multivariate model ^b	0.000 (-0.003-0.002)	0.823	0.000 (-0.002-0.001)	0.516	-0.002 (-0.005-0.001)	0.183	-0.001 (-0.004-0.003)	0.612
Multivariate model ^c	0.000 (-0.003-0.002)	0.802	0.000 (-0.002-0.001)	0.493	-0.002 (-0.005-0.001)	0.181	-0.001 (-0.004-0.003)	0.625
Multivariate model ^d	0.000 (-0.003-0.003)	0.884	0.000 (-0.002-0.001)	0.577	-0.005 (-0.008- -0.001)	0.008*	-0.001 (-0.005-0.004)	0.684
Multivariate model ^e	-0.001 (-0.004-0.003)	0.624	-0.001 (-0.002-0.001)	0.361	-0.005 (-0.008- -0.001)	0.006*	-0.001 (-0.005-0.004)	0.685
Annual % change								
Unadjusted model	-0.03 (-0.308-0.258)	0.861	-0.05 (-0.185-0.077)	0.418	-0.18 (-0.470-0.117)	0.239	-0.12 (-0.503-0.256)	0.522
Multivariate model ^a	-0.02 (-0.307-0.259)	0.866	-0.05 (-0.177-0.088)	0.508	-0.17 (-0.46-0.121)	0.248	-0.12 (-0.499-0.261)	0.538
Multivariate model ^b	-0.04 (-0.321-0.244)	0.790	-0.05 (-0.177-0.087)	0.507	-0.17 (-0.462-0.123)	0.256	-0.12 (-0.497-0.261)	0.542
Multivariate model ^c	-0.04 (-0.328-0.243)	0.770	-0.05 (-0.181-0.086)	0.486	-0.17 (-0.464-0.122)	0.253	-0.12 (-0.495-0.264)	0.551
Multivariate model ^d	0.03 (-0.319-0.375)	0.875	-0.04 (-0.198-0.125)	0.658	-0.46 (-0.821- -0.102)	0.012*	-0.11 (-0.589-0.370)	0.653
Multivariate model ^e	-0.09 (-0.468-0.292)	0.651	-0.07 (-0.242-0.098)	0.406	-0.48 (-0.841- -0.117)	0.010*	-0.11 (-0.592-0.375)	0.659

BMD: Bone Mineral Density, BMI: Body Mass Index, DM: Diabetes Mellitus, FN: Femoral neck, TH: Total hip. ^a Adjusted for age. ^b Adjusted for age and baseline BMD. ^c Adjusted for age, baseline BMD and BMI. ^d Adjusted for age, baseline BMD, BMI, smoking, physical activity, education and health status. ^e Adjusted for age, baseline BMD, BMI, smoking, physical activity, education, health status, cholesterol, BP, triglycerides and glucose. In multivariate model^e 'Glucose' is included only for DM. * P<0.05.

Table 10: Comparison of the mean difference in BMD among females with no disease, one disease and two diseases

Variables	0	1	2	P
TH BMD T5, gm/cm ²	0.92 (0.13)	0.92 (0.14)	0.92 (0.10)	0.935
TH BMD T6, gm/cm ²	0.88 (0.13)	0.88 (0.14)	0.87 (0.11)	0.942
FN BMD T5, gm/cm ²	0.85 (0.12)	0.85 (0.13)	0.85 (0.81)	0.951
FN BMD T6, gm/cm ²	0.82 (0.11)	0.81 (0.12)	0.81 (0.08)	0.827
Absolute Annual change TH, gm/yr	-0.006 (0.007)	-0.006 (0.008)	-0.007 (0.006)	0.269
Absolute Annual change FN, gm/yr	-0.006 (0.008)	-0.006 (0.008)	-0.006 (0.006)	0.781
Annual % change TH, %/yr	-0.59 (0.72)	-0.65 (0.88)	-0.79 (0.69)	0.206
Annual % change FN, %/yr	-0.68 (0.85)	-0.74 (0.81)	-0.70 (0.74)	0.650

BMD: Bone Mineral Density, BMI: Body Mass Index, DM: Diabetes Mellitus, FN: Femoral neck, TH: Total HipMean (SD) is reported for continuous variable. Sample sizes vary by characteristics due to missing values.

Table 11: Comparison of the mean difference in BMD among males with no disease, one disease and two diseases

Variables	0	1	2	P
TH BMD T5, gm/cm ²	1.03 (0.13)	1.02 (0.13)	1.07 (0.12)	0.331
TH BMD T6, gm/cm ²	1.01 (0.14)	1.01 (0.14)	1.04 (0.14)	0.638
FN BMD T5, gm/cm ²	0.94 (0.13)	0.93 (0.12)	0.95 (0.10)	0.812
FN BMD T6, gm/cm ²	0.92 (0.14)	0.91 (0.13)	0.91 (0.13)	0.732
Absolute Annual change TH, gm/yr	-0.002 (0.005)	-0.002 (0.007)	-0.004 (0.007)	0.236
Absolute Annual change FN, gm/yr	-0.004 (0.007)	-0.004 (0.007)	-0.005 (0.008)	0.420
Annual % change TH, %/yr	-0.25 (0.55)	-0.23 (0.68)	-0.44 (0.68)	0.260
Annual % change FN, %/yr	-0.38 (0.73)	-0.41 (0.80)	-0.60 (0.89)	0.365

BMD: Bone Mineral Density, BMI: Body Mass Index, DM: Diabetes Mellitus, FN: Femoral neck, TH: Total hipMean (SD) is reported for continuous variable. Sample sizes vary by characteristics due to missing values.

Table 12: Adjusted and unadjusted Absolute annual change and Annualised percentage change in Total hip with single or multiple chronic diseases among women.

Total Hip	1 Change (CI)	P-value	2 Change (CI)	P-value
Absolute Annual Change				
Unadjusted model	-0.001 (-0.001-0.000)	0.253	-0.002 (-0.004-0.001)	0.223
Multivariate model ^a	-0.002(-0.000)	0.178	-0.002 (-0.005-0.001)	0.155
Multivariate model ^b	-0.001 (-0.001-0.000)	0.248	-0.002(-0.004-0.001)	0.207
Multivariate model ^c	-0.001 (-0.002-0.000)	0.092	-0.002 (-0.005-0.001)	0.152
Multivariate model ^d	-0.001 (-0.002-0.001)	0.275	-0.004 (-0.007- -0.001)	0.023*
Multivariate model ^e	-0.001 (-0.002-0.001)	0.363	-0.004 (-0.007- -0.001)	0.023*
Annual % change				
Unadjusted model	-0.06 (-0.164-0.039)	0.228	-0.20 (-0.494-0.086)	0.168
Multivariate model ^a	-0.07 (-0.169-0.036)	0.201	-0.22 (-0.507-0.076)	0.147
Multivariate model ^b	-0.06 (-0.165- 0.039)	0.229	-0.21 (-0.497-0.085)	0.166
Multivariate model ^c	-0.09 (-0.191-0.012)	0.083	-0.23 (-0.516-0.059)	0.119
Multivariate model ^d	-0.08 (-0.199-0.047)	0.227	-0.43 (-0.772- -0.088)	0.014*
Multivariate model ^e	-0.07 (-0.190-0.061)	0.314	-0.44 (-0.788- -0.088)	0.014*

BMD: Bone Mineral Density, BMI: Body Mass Index, DM: Diabetes Mellitus, FN: Femoral neck, TH: Total hip. ^a Adjusted for age. ^b Adjusted for age and baseline BMD. ^c Adjusted for age, baseline BMD and BMI. ^d Adjusted for age, baseline BMD, BMI, smoking, physical activity, education and health status. ^e Adjusted for age, baseline BMD, BMI, smoking, physical activity, education, health status, cholesterol, BP, triglycerides and glucose. In multivariate model^e ‘Glucose’ is included only for DM. * P<0.05.

Table 13: Adjusted and unadjusted Absolute annual change and Annualised percentage change in Total hip with single or multiple chronic diseases among men.

Total Hip	1 Change (CI)	P-value	2 Change (CI)	P-value
Absolute Annual Change				
Unadjusted model	0.000 (-0.001-0.001)	-0.776	-0.002 (-0.004-0.000)	1.000
Multivariate model ^a	0.000 (-0.001-0.001)	0.529	-0.002 (-0.004-0.001)	0.153
Multivariate model ^b	0.000 (-0.001-0.001)	0.517	-0.002 (-0.004-0.000)	0.098
Multivariate model ^c	0.000 (-0.001-0.001)	0.799	-0.002 (-0.005-0.000)	0.067
Multivariate model ^d	0.000 (-0.001-0.001)	0.823	-0.002 (-0.005-0.001)	0.174
Multivariate model ^e	0.000 (-0.001-0.001)	0.702	-0.003 (-0.006-0.000)	0.080
Annual % change				
Unadjusted model	-0.05 (-0.169-0.060)	0.354	-0.02 (-0.342-0.312)	0.929
Multivariate model ^a	-0.07 (-0.169-0.036)	0.201	-0.22 (-0.507-0.076)	0.147
Multivariate model ^b	0.04 (-0.055-0.135)	0.413	-0.20 (-0.447-0.041)	0.102
Multivariate model ^c	0.02 (-0.075-0.118)	0.659	-0.23 (-0.469-0.020)	0.072
Multivariate model ^d	0.03 (-0.087-0.147)	0.612	-0.19 (-0.500-0.112)	0.213
Multivariate model ^e	-0.01 (-0.130-0.115)	0.905	-0.26 (-0.574-0.052)	0.102

BMD: Bone Mineral Density, BMI: Body Mass Index, DM: Diabetes Mellitus, FN: Femoral neck, TH: Total hip. ^a Adjusted for age. ^b Adjusted for age and baseline BMD. ^c Adjusted for age, baseline BMD and BMI. ^d Adjusted for age, baseline BMD, BMI, smoking, physical activity, education and health status. ^e Adjusted for age, baseline BMD, BMI, smoking, physical activity, education, health status, cholesterol, BP, triglycerides and glucose. In multivariate model^e 'Glucose' is included only for DM.

Table 14: Adjusted and unadjusted Absolute annual change and Annualised percentage change in Femoral neck with single or multiple chronic diseases among women.

Femoral neck	1 Change (CI)	P-value	2 Change (CI)	P-value
Absolute Annual Change				
Unadjusted model	0.000 (-0.001-0.001)	0.487	0.000078 (-0.003-0.003)	0.958
Multivariate model ^a	-0.001 (-0.002-0.000)	0.248	-0.001 (-0.003-0.002)	0.684
Multivariate model ^b	0.000 (-0.001-0.000)	0.314	0.000 (-0.003-0.003)	0.875
Multivariate model ^c	-0.001 (-0.002-0.000)	0.224	0.000 (-0.003-0.002)	0.834
Multivariate model ^d	0.000 (-0.002-0.001)	0.431	-0.002 (-0.005-0.002)	0.341
Multivariate model ^e	-0.001 (-0.002-0.001)	0.403	-0.002 (-0.005-0.002)	0.319
Annual % change				
Unadjusted model	-0.05 (-0.169-0.060)	0.354	-0.02 (-0.342-0.312)	0.929
Multivariate model ^a	-0.07 (-0.188-0.041)	0.211	-0.07 (-0.396-0.258)	0.678
Multivariate model ^b	-0.07 (-0.181-0.046)	0.246	-0.05 (-0.369-0.279)	0.785
Multivariate model ^c	-0.08 (-0.195-0.033)	0.164	-0.06 (-0.379-0.268)	0.737
Multivariate model ^d	-0.07 (-0.209-0.064)	0.297	-0.23 (-0.608-0.149)	0.235
Multivariate model ^e	-0.08 (-0.216-0.062)	0.275	-0.24 (-0.628-0.146)	0.222

BMD: Bone Mineral Density, BMI: Body Mass Index, DM: Diabetes Mellitus, FN: Femoral neck, TH: Total hip. ^a Adjusted for age. ^b Adjusted for age and baseline BMD. ^c Adjusted for age, baseline BMD and BMI. ^d Adjusted for age, baseline BMD, BMI, smoking, physical activity, education and health status. ^e Adjusted for age, baseline BMD, BMI, smoking, physical activity, education, health status, cholesterol, BP, triglycerides and glucose. In multivariate model^e 'Glucose' is included only for DM.

Table 15: Adjusted and unadjusted Absolute annual change and Annualised percentage change in Femoral neck with single or multiple chronic diseases among men.

Femoral neck	1 Change (CI)	P-value	2 Change (CI)	P-value
Absolute Annual Change				
Unadjusted model	0.000 (-0.002-0.001)	0.536	-0.002 (-0.005-0.001)	0.226
Multivariate model ^a	0.000 (-0.001-0.001)	0.582	-0.002 (-0.005-0.001)	0.244
Multivariate model ^b	0.000 (-0.001-0.001)	0.583	-0.002 (-0.005-0.001)	0.242
Multivariate model ^c	0.000 (-0.002-0.001)	0.567	-0.002 (-0.005-0.001)	0.238
Multivariate model ^d	-0.001 (-0.002-0.001)	0.369	-0.002 (-0.006-0.001)	0.235
Multivariate model ^e	-0.001 (-0.003-0.000)	0.164	-0.003 (-0.007-0.001)	0.125
Annual % change				
Unadjusted model	-0.03 (-0.158-0.090)	0.590	-0.22 (-0.539-0.099)	0.176
Multivariate model ^a	-0.03 (-0.152-0.098)	0.675	-0.21 (-0.528-0.112)	0.202
Multivariate model ^b	-0.03 (-0.151-0.098)	0.677	-0.22 (-0.536-0.102)	0.183
Multivariate model ^c	-0.03 (-0.155-0.098)	0.661	-0.22 (-0.540-0.102)	0.180
Multivariate model ^d	-0.06 (-0.209-0.097)	0.473	-0.24 (-0.646-0.157)	0.232
Multivariate model ^e	-0.10 (-0.262-0.061)	0.222	-0.32 (-0.734-0.088)	0.124

BMD: Bone Mineral Density, BMI: Body Mass Index, DM: Diabetes Mellitus, FN: Femoral neck, TH: Total hip. ^a Adjusted for age. ^b Adjusted for age and baseline BMD. ^c Adjusted for age, baseline BMD and BMI. ^d Adjusted for age, baseline BMD, BMI, smoking, physical activity, education and health status. ^e Adjusted for age, baseline BMD, BMI, smoking, physical activity, education, health status, cholesterol, BP, triglycerides and glucose. In multivariate model^e 'Glucose' is included only for DM

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APPENDICES

E

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Health
survey

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Personal invitation

Do not write here:

E13 (Municipality)

(County)

(Country)

E15 (Mark)

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E1. YOUR OWN HEALTH

What is your current state of health? (Tick only once)

Poor	Not so good	Good	Very good
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Do you have, or have you had?:

			Age first time
	Yes	No	
Asthma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chronic bronchitis/emphysema		<input type="checkbox"/>	<input type="checkbox"/>
.....Diabetes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Osteoporosis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fibromyalgia/chronic pain syndrome	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Psychological problems for which you have sought help	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A heart attack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Angina pectoris (heart cramp)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cerebral stroke/brain haemorrhage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you get pain or discomfort in the chest when: Yes No

Walking up hills, stairs, or walking fast on level ground?

If you get such pain, do you usually:

Stop?	Slow down?	Carry on at the same pace?
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3

If you stop, does the pain disappear within 10 minutes?

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>
Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

Can such pain occur even if you are at rest?....

E2. ILLNESS IN THE FAMILY

Have one or more of your parents or siblings had:

	Yes	No	Don't know
A heart attack (heart wounds) or angina pectoris (heart cramp)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Tick for the relatives who have or have had any of the illnesses: (Tick for each line)

	Mother	Father	Brother	Sister	Child of these	None
Cerebral stroke or brain haemorrhage ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heart attack before age of 60 years	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Asthma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cancer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diabetes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

E3. COMPLAINTS

Below is a list of various problems.

Have you experienced any of this during the last week (including today)?

	No complaint	Little complaint	Pretty much	Very much
(Tick once for each line)				
Sudden fear without reason	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Felt afraid or anxious	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faintness or dizziness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Felt tense or upset	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tend to blame yourself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sleeping problems.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Depressed, sad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling of being useless, worthless ..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling that everything is a struggle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling of hopelessness with regard to the future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4

E4. TEETH, MUSCLE AND SKELETON

How many teeth have you lost/extracted? Number of teeth (disregard milk-teeth and wisdom teeth)

Have you been bothered by pain and/or stiffness in muscles and joints during the last 4 weeks?

	No complaint	Little complaint	Severe complaint
Neck / shoulders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Arms, hands.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Upper part of the back	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lumbar regions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hips, legs, feet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other places.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Have you ever had:

Fracture in wrist/forearm?

	Yes	No	Age last time
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If any relatives have diabetes, at what age did they get diabetes (if for e.g. many siblings, consider the one who got it earliest in life)

Don't know, not applicable	Mother's age	Father's age	Brother's age	Sister's age	Child's age
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Hip fracture?.....

Have you fallen down during the last year? (Tick once only)

No Yes, 1-2 times Yes, more than 2 times
 1 2 3

E5. EXERCISE AND PHYSICAL ACTIVITY

How has your physical activity been during this last year?

Think of a weekly average for the year. Answer both questions.

	Hours per week			
	None	Less than 1	1-2	3 or more
Light activity (not sweating/out of breath).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hard physical activity (sweating/out of breath).....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

E6. BODY WEIGHT

Estimate your body weight when you were 25 years old:

kg.

E7. EDUCATION

How many years of education have you completed?

(include all the years you have attended school or studied)

E8. FOOD AND BEVERAGES

How often do you usually eat these foods?

(Tick once for each line)

	Rarely /never	1-3 times /month	1-3 times /week	4-6 times /week	1-2 times /day	3 times or more /day
Fruit, berries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cheese (all types) ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Potatoes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boiled vegetables ..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fresh vegetables/salad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fat fish (e.g. salmon, trout, mackerel, herring) 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you use dietary supplements:

	Yes, daily	Sometimes	No
Cod liver oil, fish oil capsules	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vitamins and/or mineral supplements ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How much of the following do you usually drink?

(Tick once for each line)

	Rarely /never	1-6 glasses /week	1 glass /day	2-3 glasses /day	4 glasses or more /day
Full milk, full-fat curdled milk, yoghurt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Semi-skimmed milk, semi-skimmed curdled milk, low-fat yoghurt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Skimmed milk, skimmed curdled milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Extra semi-skimmed milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Juice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soft drink, mineral water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How many cups of coffee and tea do you drink daily?

(Put 0 for the types you do not drink daily)

	Number of cups
Filtered coffee	<input type="text"/>
Boiled coffee/coarsely ground coffee for brewing	<input type="text"/>
Other type of coffee	<input type="text"/>
Tea	<input type="text"/>

Approximately, how often have you during the last year consumed alcohol?

(Do not count low-alcohol and alcohol-free beer)

Never consumed alcohol	Have not consumed alcohol last year	A few times last year	About 1 time a month
1	2	3	4
2-3 times per month	About 1 time a week	2-3 times a week	4-7 times a week

E9. SMOKING

How many hours a day do you normally spend in smoke-filled rooms?

Number of total hours

Yes No

Did any of the adults smoke at home while you were growing up?

Do you currently, or did you previously live together with a daily smoker after your 20th birthday?

Yes No

Do you/did you smoke daily?

Yes, now
Never
Yes, previously

If you have NEVER smoked daily;

Go to question E11 (BODILY FUNCTIONS AND SAFETY)

If you smoke daily now, do you smoke:

	Yes	No
Cigarettes?	<input type="checkbox"/>	<input type="checkbox"/>
Cigars/cigarillos?	<input type="checkbox"/>	<input type="checkbox"/>
A pipe?	<input type="checkbox"/>	<input type="checkbox"/>

If you previously smoked daily, how long is it since you quit?

Number of years

If you currently smoke, or have smoked previously:

How many cigarettes do you or did you normally smoke per day? Number of cigarettes

How old were you when you began daily smoking? Age in years

How many years in all have you smoked daily? Number of years

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	6	7	8

To those who have consumed the last year:

When you drink alcohol, how many glasses or drinks do you normally drink?

Number

Approximately how many times during the last year have you consumed alcohol equivalent to 5 glasses or drinks within 24 hours? Number of times

Would you feel safe by walking alone in the evening in the area where you live?

Yes	A little unsafe	Very unsafe
<input type="checkbox"/> 123	<input type="checkbox"/>	<input type="checkbox"/>

When it comes to mobility, sight and hearing, can you:

(Tick once for each line)

	Without problems	With some problems	With great problems	No
Take a 5 minute walk in fairly high pace?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Read ordinary text in newspaper, if necessary with glasses?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hear what is said in a normal conversation?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Do you because of chronic health problems have

difficulties with: *(Tick once for each line)*

	No difficulties	Some difficulties	Great difficulties
Move around in your home?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Get out of your home by yourself?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Participate in organization or other leisure time activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use public transport?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Perform necessary daily shopping?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Tranquillizers
- Antidepressants
- Other prescription medicines
- 1 2 3 4

State the name of the medicines you are using now and the reason you are taking the medicines (disease or symptom):

(Tick for each duration you have used the medicine)

Name of the medicine: (one name per line):	Reason for use of the medicine:	Up to 1 year	One year or more
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

How long altogether have you lived in the county? | years

How long altogether have you lived in the municipality? | years

Where did you live most of the time before the age of 16?
(Tick one option and specify)

- Same municipality..... 1
- Another municipality
- in the county..... 2 Which one: _____
- Another county in Norway 3 Which one: _____
- Outside Norway 4 Country: _____

Have you moved during the last five years?

No Yes, once Yes, more than once

If there is not enough space here, you may continue on a separate sheet that you attach.

E15. THE REST OF THE FORM IS TO BE ANSWERED BY WOMEN ONLY

How old were you when you started menstruating? Age in years

How old were you when you stopped menstruating? Age in years

How many children have you given birth to? Age in years

Number of children

Do you use, or have you ever used estrogen? Total number of years

Tablets or patches Never Previously Now

Cream or suppositories

If you use estrogen, which brand you use now?

Yes No

Beyer-Hecos 02.01

050000 3 1 - 9,000

T

□¹ □² □³

Have you ever used contraceptives pills? □

— □

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survey

Health

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Personal Invitation

Don't write here

5.3 (Municipality)

(County)

(Country)

9.3 (Business)

9.4 (Occupation)

14.7 (Mark)

└

- Physiotherapist
- Chiropractor
- Dentist
- Alternative practitioner

5. CHILDHOOD/YOUTH AND AFFILIATION

5.1 How long altogether have you lived in the county? year
(Put 0 if less than half a year)

5.2 How long altogether have you lived in the municipality?
 year
(Put 0 if less than half a year)

Hip fracture?

5.3 Where did you live most of the time before the age of 16?
(Tick one option and specify)

- Same municipality 1
- Another municipality
 in the county 2 Which one: _____
- Another county in Norway 3 Which one: _____
- Outside Norway 4 Country:: _____

5.4 Have you moved within the last five years?

- No 1
- Yes, one time 2
- Yes, more than once 3

6. BODY WEIGHT

6.1 Estimate your body weight when you were 25 years old: kg

7. FOOD AND BEVERAGES

7.1 How often do you usually eat these foods?

(Tick once per line)

	Rarely /never	1-3 times /month	1-3 times /week	4-6 times /week	1-2 /day	3 times or more /day
Fruit, berries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cheese (all types)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Potatoes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boiled vegetables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fresh vegetables/salad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fatty fish (e.g. salmon, trout, mackerel, herring)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7.2 What type of fat do you usually use? (Tick once per line)

	Don't use	Soft/light Butter	Hard margarine	Soft/light margarine	Oils	Other
On bread	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For cooking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Yes, daily
Sometimes
No

7.3 Do you use the following dietary supplements:

Cod liver oil, fish oil capsules	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vitamins and/or mineral supplements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7.4 How much of the following do you usually drink?

(Tick once per line)

	Rarely /never	1-6 glasses /week	1 glass /day	2-3 glasses /day	4 glasses or more /day
Full milk, full-fat curdled milk, yoghurt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Semi-skimmed milk, semi-skimmed curdled milk, low-fat yoghurt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Skimmed milk, skimmed curdled milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Extra semi-skimmed milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Juice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mineral water (e.g. Farris, Ramløsa etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cola-containing soft drink	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other soda/soft drink	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7.5 Do you usually drink soft drink: with sugar 1 without sugar 2

7.6 How many cups of coffee and tea do you drink daily? Number of cups

(Put 0 for the types you don't drink daily)

Filtered coffee

Boiled coffee/coarsely ground coffee for brewing

Other type of coffee

Tea

7.7 Approximately how often have you during the last year consumed alcohol? (Do not count low-alcohol and alcohol-free beer)

Never consumed alcohol	Have not consumed alcohol last year	A few times last year	About 1 time a month
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

2-3 times per month	About 1 time a week	2-3 times a week	4-7 times a week
<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8

To those who have consumed the last year:

7.8 When you drink alcohol, how many glasses or drinks do you normally drink? number

7.9 Approximately how many times during the last year have you consumed alcohol equivalent to 5 glasses or drinks within 24 hours? Number of times

7.10 When you drink, do you normally drink: (Tick one or more)

Beer	Wine	Spirits
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. EXERCISE AND PHYSICAL ACTIVITY

10.1 How has your physical activity in leisure time been during this last year?
 Think of a weekly average for the year.
 Time spent going to work is count as leisure time. Answer both questions.

	Hours per week			
	None	Less than 1	1-2	3 or more
Light activity (not sweating/out of breath)...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hard physical activity (sweating/out of breath).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4

10.2 Describe exercise and physical exertion in your leisure time. If your activity varies much e.g. between summer and winter, then give an average. The question refers only to the last year.
 (Tick the most appropriate box)

Reading, watching TV or other sedentary activity?..... 1

Walking, cycling or other forms of exercise at least 4 hours a week? 2
 (Include walking or cycling to work, Sunday walk/stroll, etc.)

Participation in recreational sports, heavy gardening, etc.? 3

Participation in hard training or sports competitions, regularly several times a week?..... 4

11. FAMILY AND FRIENDS

11.1 Do you live with:
 Spouse/partner? Yes No

11.2 How many good friends do you have? Number of friends
 Count the ones you can talk confidentially with and who can give you help when you need it. Do not count people you live with, but do include other relatives.

11.3 How much interest do people show for what you do?
 (Tick only once)

Great interest	Some interest	Little interest	No interest	Uncertain
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

11.4 How many associations, sport clubs, groups, religious communities or similar do you take part in? Number
 (Write 0 if none)

11.5 Do you feel that you can influence what happening in your local community where you live? (Tick only once)

Yes, a lot	Yes, some	Yes, a little	No	Never
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

12. ILLNESS IN THE FAMILY

12.1 Have one or more of your parents or siblings had a heart attack (heart wound) or angina pectoris (heart cramp)? Yes

12.2 Tick for the relatives who have or have had any of the illnesses: (Tick for each line)

	Mother	Father	Brother	Sister
Cerebral stroke or brain haemorrhage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heart attack before age of 60 years	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. USE OF MEDICINES

With medicines, we mean drugs purchased at pharmacies.
 Supplements and vitamins are not considered here.

13.1 Do you use:

	Now	Previously, but not now	Never used
Blood pressure lowering drugs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cholesterol-lowering drugs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13.2 How often have you during the last 4 weeks used the following medicines?

	Not used in the last 4 weeks	Less than every week	Every week but not daily	Daily
(Tick once for each line)				
Painkillers non-prescription	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Painkillers on prescription	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sleeping pills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tranquillizers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Antidepressants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other prescription medicines ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4

13.3 For those medicines you have checked in points 13.1 and 13.2, and that you've used during the last 4 weeks:

State the name and the reason that you are taking/have taken these (disease or symptom):
 (Tick for each duration you have used the medicine)

Name of the medicine: (one name per line)	Reason for use of the medicine	How long have you used the medicine	
		Up to 1 year	1 year or more
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

If there is not enough space here, you may continue on a separate sheet that you attach

14. THE REST OF THE FORM IS TO BE ANSWERED BY WOMEN ONLY

14.1 How old were you when you started menstruating? Age in years

14.2 If you no longer menstruating, how old were you when you stopped menstruating? Age in years

14.3 Are you pregnant at the moment?

Don't know No

Asthma.....

Cancer.....

Diabetes.....

None Child of these

	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>

Yes No Uncertain Above fertile
 1 2 3 4

14.4 How many children have you given birth to?

Number of children

age \perp

0	1
---	---

Heccos

14.5 Do you use, or have you ever used?

(Tick once for each line)

	Now	Before, but not now	Never	Byer
Oral contraceptive pills/mini pill/				
contraceptive injection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	24.00
Hormonal intrauterine device (IUD) (not ordinary IUD)..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Estrogen (tablets or patches)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
Estrogen (cream or suppositories)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0

14.6 If you use/have used prescription estrogen:

0	0
---	---

12.3 If any relatives have diabetes, at what age did they get diabetes (if for e.g. many siblings, consider the one who got it earliest in life):

Don't know, Mother's age, Father's age, Brother's age, Sister's age, Child's age

not applicable

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

How long have you used it?

Number of years

14.7 If you use contraceptive pills, mini pill, contraceptive injection, hormonal IUD or estrogen, what brand do you use?

Label

Additional questions to the health survey in Troms and Finnmark 2001-2002

The main aim of the Tromsø Study is to improve our knowledge about cardiovascular diseases in order to aid prevention. The study is also intended to improve our knowledge of cancer and other general conditions, such as allergies, muscle pains and mental conditions. We would therefore like you to answer some questions about factors that may be relevant for your risk of getting these and other illnesses. This form is part of the Health Survey, which has been approved by the Norwegian Data Inspectorate and the Regional Board of Research Ethics. The answers will only be used for research purposes and will be treated strictly confidential.

T1. NEIGHBORHOOD AND HOME

The information you give us may later be linked with information from other public health registers in accordance with the rules laid down by the Data Inspectorate and the Regional Board of Research Ethics.

If you are unsure about what to answer, tick the box that you feel fits best.

The completed form should be sent to us in the enclosed prepaid envelope. Thank you in advance for helping us.

Yours sincerely

Department of Community Medicine
University of Tromsø

National Health
Screening Service

2. In which municipality did you live at the age of 1 year?
(If you have not lived in Norway, state country of residence instead of the municipality)

3. What type of house do you live in? (Tick only once)

- Detached house/villa 1
- Farm 2
- Flat/apartment 3
- Terraced/semi-detached house 4
- Institution/care home 5
- Other 6

1.3 How big is your house?

m² (gross)

1.4 Are you bothered by: (Tick once for each line)

	No complaint	Little complaint	Severe complaint
Moisture, drought or coldness in your home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other forms of bad indoor climate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traffic noise (cars or aircraft)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other noise (industrial, construction, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Neighbour noise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drinking water quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air pollution from traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air pollution from wood/oil heating, factory etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1.5 What home language did your grandparents have?
(Tick for one or more alternatives)

	Norwegian	Sami	Kven/ Finnish	Other language
Mother's mother ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mother's father	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Father's mother ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Father's father	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you do not wish to answer the questionnaire, tick the box below and return the form. Then you will not receive reminders.

I do not wish to answer the questionnaire

Date of completion:

Day Month Year

T1. NEIGHBORHOOD AND HOME (cont.)

1.6 What do you consider yourself as?
(Tick for one or more alternatives)

- Norwegian
- Sami
- Kven/
Finnish
- Other

1.7 Do you feel that you have enough good friends?

Yes No

1.8 How often do you normally take part in organised gatherings, e.g. sewing circles, sports clubs, political meetings or other associations?
(Tick only once)

- Never, or just a few times a year 1
- 1-3 times a month 2
- Approximately once a week 3
- More than once a week 4

T2. PAID AND UNPAID WORK

5.4 If you have paid or unpaid work, how would you describe your work? (Tick only once)

- Mostly sedentary work?
(e.g. office work, mounting) 1
- Work that requires a lot of walking?
(e.g. shop assistant, light industrial work, teaching) 2
- Work that requires a lot of walking and lifting?
(e.g. Postman, nursing, construction) 3
- Heavy manual labour?
(e.g. forestry, heavy farm-work, heavy construction) 4

8. Can you decide yourself how your work (paid or unpaid) should be organised? (Tick only once)

- No, not at all 1
- To a small extent 2
- Yes, to a large extent 3
- Yes, I decide myself 4

2.3 Are you on call, do you work shifts or nights?

Yes No

T3. TOBACCO

3.1 Do you smoke?

Yes, daily Yes, sometimes No, never

1 2 3

T

If "Yes, sometimes",

What do you smoke?

Cigarettes Pipe Cigar/cigarillos

3.2 Have you used or do you use snuff daily?

Yes, now Yes, previously Never

If YES:

How many years altogether have you used snuff?

years

T4. ALCOHOL

4.1 Are you a teetotaler?.....

Yes No

4.2 How many times a month do you

normally drink alcohol?..... *Number of times*
(Do not count low-alcohol beer.
Put 0 if less than once a month)

4.3 How many glasses of beer, wine or spirits do you normally drink in a fortnight?

(Do not count low-alcohol beer.
Put 0 if you do not drink alcohol)

Beer Wine Spirits

4.4 For approximately how many years has your alcohol consumption been at the same level you described above?

years

4.5 Have you, in one or more periods in the last 5 years consumed so much alcohol that it has inhibited your work or social life?

Yes, at work Yes, socially Yes, both at work and social life No, never

1 2 3 4

T5. FOOD AND DIETARY SUPPLEMENTS

5.1 Do you usually eat breakfast every day?...

Yes No

5.2 How many times a week do you eat a warm dinner?.....

times

5.3 How important is it for you to have a healthy diet?

Very Somewhat Little Not

1 2 3 4

5.4 Do you use the following dietary supplements?

Yes, daily sometimes No

Iron tablets

Calcium tablets or bonemeal

Vitamin D supplements

Cod liver oil

T6. BODY WEIGHT

6.1 Do you currently try to change your

T7. ILLNESSES AND INJURIES

7.1 Have you ever had:

Tick once for each question. Also give the age at the time. If you have had the condition several times, how old were you the last time

	Yes	No	Age last time
Severe injury requiring hospital admission	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/> years
Ankle fracture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/> years
Peptic ulcer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/> years
Peptic ulcer surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/> years
Neck surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/> years
Prostate surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/> years

body weight?

No Yes, I try to gain weight Yes, I try to lose weight

1 2 3

6.2 What weight would you be satisfied with (your "ideal weight")?

kg

7.2 Do you have, or have you ever had:

(Tick once for each question)

	Yes	No
Cancer	<input type="checkbox"/>	<input type="checkbox"/>
Psoriasis.....	<input type="checkbox"/>	<input type="checkbox"/>
Thyroid disease	<input type="checkbox"/>	<input type="checkbox"/>
Glaucoma	<input type="checkbox"/>	<input type="checkbox"/>
Cataract	<input type="checkbox"/>	<input type="checkbox"/>
Osteoarthritis (arthrosis).....	<input type="checkbox"/>	<input type="checkbox"/>
Bent fingers	<input type="checkbox"/>	<input type="checkbox"/>
Skin contractions in your palms	<input type="checkbox"/>	<input type="checkbox"/>
Kidney stone	<input type="checkbox"/>	<input type="checkbox"/>
Appendectomy.....	<input type="checkbox"/>	<input type="checkbox"/>
Hernia surgery	<input type="checkbox"/>	<input type="checkbox"/>
Surgery/treatment for urine incontinence	<input type="checkbox"/>	<input type="checkbox"/>
Epilepsy.....	<input type="checkbox"/>	<input type="checkbox"/>
Poliomyelitis (polio)	<input type="checkbox"/>	<input type="checkbox"/>
Parkinson's disease.....	<input type="checkbox"/>	<input type="checkbox"/>
Migraine.....	<input type="checkbox"/>	<input type="checkbox"/>
Leg ulcer	<input type="checkbox"/>	<input type="checkbox"/>

Allergy and hypersensitivity:

	Yes	No
Atopic eczema (e.g. childhood eczema)	<input type="checkbox"/>	<input type="checkbox"/>
Hand eczema.....	<input type="checkbox"/>	<input type="checkbox"/>
Food allergy	<input type="checkbox"/>	<input type="checkbox"/>
Other hypersensitivity (not allergy)	<input type="checkbox"/>	<input type="checkbox"/>

7.3 Have you had common cold, influenza, gastroenteritis, etc. during the last 14 days? Yes No

7.4 Have you during the last 3 weeks had common cold, influenza, bronchitis, pneumonia, sinusitis, or other respiratory infection? Yes No

7.5 Have you ever had bronchitis or pneumonia? Yes No

7.6 Have you during the last 2 years had bronchitis or pneumonia? *(Tick only once)*

No	1-2 times	More than 2 times
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3

T8. SYMPTOMS

8.1 Have you in the last two weeks felt:
(Tick once for each question)

	No	A Little	A lot	Very much
Nervous or worried	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bothered by anxiety.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confident and calm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irritable.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Happy and optimistic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Down/depressed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lonely.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4

8.2 Do you cough about daily for periods of the year?

Yes No

If YES:

Is your cough productive?

Have you had this kind of cough for as long as 3 months in each of the last two years?

8.3 Have you had episodes with wheezing in the chest?

If YES:

Has this occurred: (Tick once for each question) Yes No

At night

In connection with respiratory infections

In connection with physical exertion

In connection with very cold weather

Yes No

8.4 Do you get pain in the calf while walking

If YES:

How long can you go before you notice the pain?..... meter

9.6 Do you get short-winded in the following situations?
(Tick once for each question)

Yes No

While walking fast on level ground or slight up hills

While walking calmly on level ground

While washing or dressing yourself

While resting

8.6 Do you have to stop because of short-windedness while walking in your own pace on level ground?...

Yes No

10.3 Have you during the last year suffered from pain and/or stiffness in muscles and joints that have lasted continuously for at least 3 months?.....

Yes No

If YES:

Has the complaint reduced your leisure time activity?

For how long has the complaint endured in total?

approx. years and months

Has the complaint reduced your ability to work during the last year? (Also applies to domestic workers and pensioners) (Tick once)

No/insignificant To some extent Significantly reduced Do not know

y 1 2 3 4
Have you been on sick leave due to these complaints during the last year?.....
 Yes No work

1
2
3
4

Yes No

Yes No

T8. SYMPTOMS (continue)

(one name per line)

11.4 How often do you suffer from sleeplessness?

(Tick only once)

- Never, or just a few times a year 1
- 1-3 times a month 2
- Approximately once a week 3
- More than once a week 4

13.4 If you suffer from sleeplessness monthly or more frequently, what time of the year does it affect you most?

- No particular time of the year 1
- Especially during the polar night 2
- Especially during the midnight sun season 3
- Especially in spring and autumn 4

8.10 Have you in the last year suffered from sleeplessness to the extent that it has affected your ability to work ?

Yes No

8.11 Do you usually sleep during the day?

8.12 How often do you suffer from urinary incontinence?

- Never
- Not more than once a month
- Two or more times a month
- Once a week or more

8.13 Are you able to walk down 10 steps without holding on to something (e.g. a handrail) ...

8.14 Do you use glasses?

8.15 Do you use a hearing aid?

8.16 How is your memory?

(Tick once for each question)

- Do you forget what you just have heard or read?
- Do you forget where you have placed things?
- Is it more difficult to remember now than earlier?
- Do you more often write memos now than earlier?

If "YES" on one of these questions; Yes No
Is this a problem in your daily life?

T9. MEDICINES

9.1 Do you use, or have you used any of the following medicines:

Previously, used 1st time Never
 Now but not now used

- Drugs for osteoporosis years
- Tablets for diabetes years
- Drugs for hypothyroidism (thyroxine) years

Yes No

9.2 Do you use any medicines which you take as injections?

If YES:

Give the name of the medicines (for injection):

T

T10. ILLNESS IN THE FAMILY

10.1 Tick for the relatives who have or have ever had any of the diseases: (Tick for each line)

	Mother	Father	Brother	Sister	Child	None of these
Heart attack (heart wound)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Angina pectoris (heart cramp)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High blood pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aneurysm.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gastric/duodenal ulcer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hip fracture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Psychological problems ..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Allergy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Osteoarthritis (arthrosis) ..						
Dementia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10.2 How many siblings and children do you have?

	Brothers	Sisters	Children
Number	<input type="text"/>	<input type="text"/>	<input type="text"/>

10.3 Do you usually do extra caring work because of illness etc. in your close family?

Yes, daily/almost daily	Yes, sometimes	No
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3

10.4 Do you/your family receive home aid or home nursing care?.....

Yes No

Age at death

Yes No

10.5 Is your mother alive?

years

10.6 Is your father alive?

years

T11. MOBILE TELEPHONE

11.1 Do you have (own, rent, etc.) a mobile telephone?

Yes, always	Yes, sometimes	No
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3

If Yes:

What do you use your mobile telephone for, and how often do you use it? (Tick once for each line)

	Number of times per day				
	30 or more	10-29	2-9	1 or less	Never
Conversations..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Text messaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12345

T12. THE REST IS TO BE ANSWERED BY WOMEN ONLY

12.1 If you have given birth, fill in each child's birth year and how many months you breastfed after delivery.

(If you did not breastfeed, write 0)

Child:	Birth year:	Number of months breastfed:
1 st child	<input type="text"/>	<input type="text"/>
2 nd child	<input type="text"/>	<input type="text"/>
3 rd child	<input type="text"/>	<input type="text"/>

T12. THE REST IS TO BE ANSWERED BY WOMEN ONLY

12.2 If you still have menstruate or are pregnant:

What date did your last menstruation start?

Day	Month	Year
<input type="text"/>	<input type="text"/>	<input type="text"/>

12.3 If you no longer menstruate; why did your periods stop? (Tick once)

It stopped by itself	<input type="checkbox"/>
1	
Uterus surgery	<input type="checkbox"/>
2	
Surgically removed both ovaries	<input type="checkbox"/>
3	
Other reason (e.g. radiation, chemotherapy)	<input type="checkbox"/>
4	

12.4 Do you use or have you used prescribed estrogen (tablets or patches)?.....

Yes No

If YES:

How old were you when you started taking estrogen?

years

If you stopped using estrogen,

How old were you when you stopped taking estrogen?.....

years

15. Do you use or have you used oral contraceptive pills?.....

Yes No

If YES:

How old were you when you started taking the pill?.....

years

How many years in total have you taken the pills?.... Number of years

If you have given birth:

How many years did you take the pill before your first delivery?... Number of years

If you stopped taking the pill:

How old were you when you stopped?....

years

12.6 Apart from pregnancy and after giving birth, have you ever stopped having menstruation for 6 months or more?

Yes No

If YES:

How many times?.....

12.7 How is your current menstruation status?

times

4th child

5th child

6th child

- I have not had menstruation in the last year 1
- I have regular menstruation 2
- I have irregular menstruation 3

12.8 When you were 25-29 years old, how many days usually passed between the start of two periods?

Minimum	Maximum	Do not know	
<input type="text"/> <input type="text"/> days	<input type="text"/> <input type="text"/> days	<input type="checkbox"/>	02.01

The periods were of approximately equal length every time?

Yes	No	
<input type="checkbox"/>	<input type="checkbox"/>	

How many days did a typical menstrual bleeding period last? ...

<input type="text"/> <input type="text"/> days	0
--	---

Thank you for the help! 05 00 00

Remember to mail the form today!

(If more children, use additional sheet)



The Tromsø Study

The form will be read electronically. Please use a blue or black pen You can not use comas, use upper-case letters.

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c 1-3 times a month
c Approximately once a week c More that once a week

HEALTH AND DISEASES

4. How do you in general consider your own health to be?

c Very good

c Good

c Neither good nor bad

c Bad



c Very bad

2 How is your health compared to others in your age?

c Much better

c A little better

c About the same

c A little worse

c Much worse

3 Do you have, or have you had?

Age first
Yes No time

A heart attack

c c

Angina pectoris (*heart cramp*)

c c

Cerebral stroke/brain hemorrhage

c c

Atrial fibrillation

c c

High blood pressure

c c

Osteoporosis

c c

Asthma

c c

Chronic bronchitis/Emphysema/COPD

c c

Diabetes

c c

Psychological problems (*for which you*

c c

have sought help)

Hypothyroidism

c c

Kidney disease, *not including urinary*

c c

tract infection (UTI)

Migraine

c c

1.7 Do you have persistent or constantly recurring pain that has lasted for 3 months or more?

c Yes

c No

1.8 How often have you suffered from sleeplessness during the last 12 months?

c Never, or just a few times



1.6 Below you find a list of various problems.

Have you experienced any of this during the last week (including today)? (Tick once for each complaint)

complaint	No	Little	Pretty	Very
	complaint	complaint	much	much
Sudden fear without reason		c	c	c
Felt afraid or anxious	c	c	c	c
Faintness or dizziness	c	c	c	c
Felt tense or upset	c	c	c	c
Tend to blame yourself	c	c	c	c
Sleeping problems	c	c	c	c
Depressed, sad	c	c	c	c
Feeling of being useless, worthless	c	c	c	c
Feeling that everything is a struggle	c	c	c	c
Feeling of hopelessness with regard to the future	c	c	c	c

1.9 Have you during the last 12 months visited:

If YES; how many times?

	Yes	No	No. of times
General practitioner (GP)	c	c	
Psychiatrist/psychologist	c	c	
Medical specialist outside hospital (other than general practitioner/psychiatrist) c c			
Physiotherapist	c c		<input type="text"/>
Chiropractor	c c		<input type="text"/>
Alternative practitioner (homeopath, acupuncturist, foot zone therapist, herbal medicine practitioner, laying on hands practitioner, healer, clairvoyant, etc.) c c			<input type="text"/>
Dentist/dental service	c c		<input type="text"/>

8 Have you during the last 12 months been to a hospital?

	Yes	No	No. of times
Admitted to a hospital	c c		<input type="text"/>
Had consultation in a hospital without admission;			
At psychiatric out-patient clinic ^c		c	
At another out-patient clinic	c	c	

5.5 Have you undergone any surgery during the last 3 years? c Yes c No

USE OF MEDICINES

or painkillers the last 24 hours. If you have, you will be asked to provide the name of the drug, strength, dose and time of use.

9. **Do you currently use, or have you used some of the following medicines?** (Tick once for each line)

	Never			Age
	used	Now	Earlier	first time
Blood pressure lowering drugs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>
Cholesterol lowering drugs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="text"/>
Drugs for heart disease	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="text"/>
Diuretics	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="text"/>
Drugs for osteoporosis	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="text"/>
Insulin	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="text"/>
Tablets for diabetes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="text"/>
The drugs for hypothyroidism				
Thyroxine/levaxin	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="text"/>

7.2 **How often have you during the last 4 weeks used the following medicines?** (Tick once for each line)

	Not used in the last 4 weeks	Less than every week	Every week, but not daily	Daily
Painkillers on prescription	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Painkillers non-prescription	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sleeping pills	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tranquillizers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Antidepressants	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.5 **State the name of all medicines -both those on prescription and non-prescription drugs- you have used regularly during the last 4 weeks.**

Do not include vitamins, minerals, herbs, natural remedies, other nutritional supplements, etc.

If there is not enough space for all medicines, continue on a separate sheet.

When attending you will be asked whether you have used antibiotics

FAMILY AND FRIENDS

4.6 **Who do you live with?** (Tick for each question and give the number)

	+	Yes	No	Number	
Spouse/partner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	
Other people older than 18 years	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<table border="1" style="width: 20px; height: 20px; margin: 0 auto;"><tr><td style="text-align: center;"> </td></tr></table>	
People younger than 18 years	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<table border="1" style="width: 20px; height: 20px; margin: 0 auto;"><tr><td style="text-align: center;"> </td></tr></table>	

14 **Tick for the relatives who have or have had**

		Parents	Children	Siblings
A heart attack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A heart attack before age of 60	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Angina pectoris (<i>heart cramp</i>)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cerebral stroke/brain haemorrhage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Osteoporosis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gastric/duodenal ulcers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Asthma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diabetes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dementia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Psychological problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Substance abuse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7.5 **Do you have enough friends who can give you help when you need it?**

Yes No

Do you have enough friends whom you can talk confidentially with? ¹⁶

Yes No

17 **How often do you normally take part in organised gatherings, e.g. sport clubs, political meetings, religious or other associations?**

7.7 Never, or just a few times a year

7.8 1-2 times a month

7.9 Approximately once a week

7.10 More than once a week

WORK, SOCIAL SECURITY AND INCOME

9.7 **What is the highest level of education you have completed?** (Tick once)

- Primary/secondary school, modern secondary school Technical school, vocational school, 1-2 years
 senior high school
 High school diploma
 College/university less than 4 years
 College/university 4 years or more



9.8 **What is your main activity?** (Tick once)

- Full time work Housekeeping
 Part time work Retired/benefit recipient
 Unemployed Student/military service

- 10.4 **Do you receive any of the following benefits?** Old-age, early retirement or survivor pension Sickness benefit (on sick leave)
 Rehabilitation benefit Full disability pension Partial disability pension Unemployment benefits
 Transition benefit for single parents Social welfare benefits

- 10.5 **What was the household's total taxable income last year?** Include income from work, pensions, benefits and similar

- | | |
|--|--|
| <input type="checkbox"/> Less than 125 000 NOK | <input type="checkbox"/> 401 000-550 000 NOK |
| <input type="checkbox"/> 125 000-200 000 NOK | <input type="checkbox"/> 551 000-700 000 NOK |
| <input type="checkbox"/> 201 000-300 000 NOK | <input type="checkbox"/> 701 000 -850 000 NOK |
| <input type="checkbox"/> 301 000-400 000 NOK | <input type="checkbox"/> More than 850 000 NOK |

- 11.5 **Do you work outdoor at least 25% of the time, or in cold buildings (e.g. storehouse/industry buildings)?**

Yes No

PHYSICAL ACTIVITY

- 13.5 **If you have paid or unpaid work, which statement describes your work best?**

- Mostly sedentary work
(e.g. office work, mounting)
 Work that requires a lot of walking
(e.g. shop assistant, light industrial work, teaching)
 Work that requires a lot of walking and lifting
(e.g. postman, nursing, construction)
 Heavy manual labour

- 24 **Describe your exercise and physical exertion in leisure time. If your activity varies much, e.g. between summer and winter, then give an average. The question refers only to the last year.** (Tick the most appropriate box)

- Reading, watching TV, or other sedentary activity.
 Walking, cycling, or other forms of exercise at least 4 hours a week *(include walking or cycling to work, Sunday-walk/stroll, etc.)*
 Participation in recreational sports, heavy gardening, etc. *(note: duration of activity at least 4 hours a week)*
 Participation in hard training or sports competitions, regularly several times a week.

- 25 **How often do you exercise?** (With exercise we mean for example walking, skiing, swimming or training/sports)

- Never
 Less than once a week Once a week
 2-3 times a week
 Approximately every day

16. **How hard do you exercise on average?**

- Easy- do not become short-winded or sweaty You become short-winded and sweaty
 Hard- you become exhausted

17. **For how long time do you exercise every time on average?**

- Less than 15 minutes 30-60 minutes
 15-29 minutes More than 1 hour

ALCOHOL AND TOBACCO

- 12.8 **How often do you drink alcohol?**

- Never
 Monthly or less frequently 2-4 times a month
 2-3 times a week
 4 or more times a week

- 12.9 **How many units of alcohol (a beer, a glass of wine or a drink) do you usually drink when you drink alcohol?**

- 1-2 5-6 10 or more
 3-4 7-9

- 30 **How often do you drink 6 units of alcohol or more in one occasion?**

- Never
 Less frequently than monthly Monthly
 Weekly
 Daily or almost daily

- 31 **Do you smoke sometimes, but not daily?** Yes No

- 32 **Do you/did you smoke daily?**

- Yes, now Yes, previously Never

- 33 **If you previously smoked daily, how long is it since you quit?**

Number of years

- 34 **If you currently smoke, or have smoked previously: How many cigarettes do you or did you usually smoke per day?**

Number of cigarettes

- 35 **How old were you when you began daily smoking?**

Age in years

- 36 **How many years in all have you smoked daily?**

Number of years

- 37 **Do you use or have you used snuff or chewing tobacco?**

- No, never Yes, sometimes
 Yes, previously Yes, daily

DIET

38 Do you usually eat breakfast every day? c Yes c No

39 How many units of fruit or vegetables do you eat on average per day? (units means for example a fruit, a cup of juice, potatoes, vegetables)

Number of units +

40 How many times a week do you eat warm dinner?

Number

41 How often do you usually eat these foods? (Tick once for each line)

	0-1 times/ mth	2-3 times/ mth	1-3-4-6 times/ week	1-2 times/ day
Potatoes	c	c	c	c
Pasta/rice	c	c	c	c
Meat (not processed)	c	c	c	c
Processed meat (sausages, hamburger, etc.)	c	c	c	c
Fruits, vegetables, berriese		c	c	c
Lean fish	c	c	c	c
Fatty fish (e.g. salmon, trout, mackerel, herring, halibut, redfish)	c	c	c	c

42 How much do you usually drink the following? (Tick once for each line)

	Rarely/ never	1-6 glasses /week	1 glass /day	2-3 glasses /day	4 or more glasses /day
Milk, curdled milk, yoghurt	c	c	c	c	c
Juice	c	c	c	c	c
Soft drinks with sugar	c	c	c	c	c

43 How many cups of coffee and tea do you drink daily? (Put 0 for the types you do not drink daily)

	Number of cups
Filtered coffee	<input type="text"/>
Boiled coffee (coarsely ground coffee for brewing)	<input type="text"/>
Other types of coffee	<input type="text"/>
.....Tea	<input type="text"/>

44 How often do you usually eat cod liver and roe?

(i.e. "mølje")

c Rarely/never c 1-3 times/yearc 4-6 times/year

QUESTIONS FOR WOMEN

46 Are you pregnant at the moment?

c Yes c No c Uncertain

47 How many children have you given birth to?

Number +

48 If you have given birth, fill in for each child: birth year, birth weight and months of breastfeeding (Fill in the best you can)

	Child Birth year	Birth weight in grams	Months of breastfeeding
1	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>	<input type="text"/>
5	<input type="text"/>	<input type="text"/>	<input type="text"/>
6	<input type="text"/>	<input type="text"/>	<input type="text"/>

49 Have you during pregnancy had high blood pressure?

c Yes c No

50 If yes, during which pregnancy?

c The first c Second or later

51 Have you during pregnancy had proteinuria? c Yes c No

52 If yes, during which pregnancy?

c The first c Second or later

53 Were any of your children delivered prematurely (a month or more before the due date) because of preeclampsia?

c Yes c No

54 If yes, which child?

1st child	2nd child	3rd child	4th child	5th child	6th child
c	c	c	c	c	c

55 How old were you when you started menstruating?

Age T

56 Do you currently use any prescribed drug influencing the menstruation?

Oral contraceptives, hormonal intraurtine or similar c Yes c No

c 7-12 times/year e More than 12 times/year

45 **Do you use the following nutritional supplements?**

Daily Sometimes No



Cod liver oil or fish oil capsules

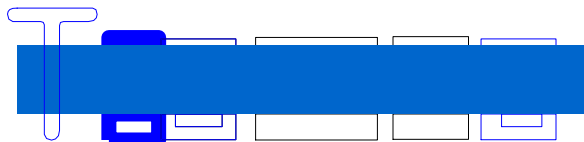
c c c

Omega 3 capsules (*fish oil, seal oil*)

c c c

Calcium tablets

c c c



- part of The Tromsø Study



- part of The Tromsø Survey



FILL OUT THE FORM IN THIS WAY:

The form would be read by machine, it is therefore important that you tick appropriately:

Correct ✓

Wrong

Wrong

If you tick the wrong box, correct by filling the box like this



Write the numbers clearly

1 2 3 ~~4~~ 5 6 7 8 9 0 Correct

Wrong



Use only black or blue pen, do not use pencil or felt tip pen

1. DESCRIPTION OF YOUR HEALTH STATUS

By placing a tick in one box in each group below, please indicate which statements best describe your own health state today:

1.6 To allow you to show us how good or bad your state of health is we have made a scale (almost like a thermometer) where the best state of health you can imagine is marked 100 and the worst 0. We ask you to show your state of health by drawing a line from the box below to the point on the scale that best fits your state of health.

1.01 Mobility

- I have no problems in walking about
- I have some problems in walking about
- I am confined to bed

1.02 Self-care

- I have no problems with self-care
- I have some problems washing or dressing myself
- I am unable to wash or dress myself
-

1.03 Usual activities (e.g. work, study, housework, family or leisure activities)

- I have no problems with performing my usual activities
- I have some problems with performing my usual activities
- I am unable to perform my usual activities
-

1.04 Pain and discomfort

- I have no pain or discomfort
- I have moderate pain or discomfort I have extreme pain or discomfort
-

1.05 Anxiety and depression

- I am not anxious or depressed
- I am moderately anxious or depressed
- I am extremely anxious or depressed
-
-
-

Best imaginable health state

100

90

80

70

60

50

40

30

20

10

0

Worst imaginable health state

Your own health state today

2. CHILDHOOD/YOUTH AND AFFILIATION

2.01 **Where did you live at the age of 1 year?** In Tromsø (with present municipal borders)

- In Troms, but not Tromsø In Finnmark
- In Nordland
- Another place in Norway
- Abroad

2.02 **How was your family's financial situation during your childhood?**

- Very good
- Good
- Difficult
- Very difficult

2.03 **What is the importance of religion in your life?**

- Very important
- Somewhat important
- Not important
-

2.07 **What was/is the highest completed education for your parents and your spouse/partner?**
(Tick once for each column)

	Mother	Father	Spouse/partner
<input type="checkbox"/> 7-10 years primary/secondary school, modern secondary school, Technical school, vocational school, 1-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 2 years senior high school, High school diploma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> College or university (less than 4 years)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> College or university (4 years or more)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.04 **What do you consider yourself as?** (Tick for one or more alternatives)

- Norwegian Sami
- Kven/Finnish
- Another

2.05 **How many siblings and children do you have/have you had?**

Number of siblings

Number of children

2.06

If NO: her age when she died

Is your mother
Is your father alive? Yes No

Yes No
If NO: his age when he died

3. WELL BEING AND LIVING CONDITIONS

3.01 Below are three statements about satisfaction with life as a whole. Then there are two statements about views on your own health. Show how you agree or disagree with each of the statements by ticking in the box for the number you think fits best for you. (tick once for each statement)

Completely disagree 1 2 3 4 5 6 7 agree Completely

In most ways my life is close to my ideal My life conditions are excellent I am satisfied with my life I have a positive view of my future health By living healthy, I can prevent serious diseases

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.02 Below are four statements concerning your current job conditions, or if you are not working now, the last job you had. (Tick once for each statement)

Completely disagree 1 2 3 4 5 6 7 Completely agree

My work is tiring, physically or mentally
 I have sufficient influence on when and how my work should be done
 I am being bullied or harassed at work
 I am being treated fairly at work

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.03 I consider my occupation to have the following social status in the society (if you are not currently employed, think about your latest occupation)

Very high status Fairly high status Medium status Fairly low status Very low status

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.04 Have you over a long period experienced any of the following? (Tick one or more for each line)

Yes, as a child Yes, as adult Yes, last year Yes, No

Been tormented, or threatened with violence
 Been beaten, kicked at or victim of other types of violence
 Someone in your close family have used alcohol or drugs in such a way that it has caused you worry

If you have experienced anything of the above, how much are you affected by that now?
 Not affected Affected to some extent Affected to a large extent

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. ILLNESS AND WORRIES

4.01 Have you during the last month experienced any illness or injury?

Yes No

If YES: have you during the same period? (Tick once for each line)
Yes No

Been to a general practitioner Been to a medical specialist
 Been to emergency department Been admitted to a hospital
 Been to an alternative practitioner (chiropractor, homeopath or similar)

4.02 Have you noticed sudden changes in your pulse or heart rhythm in the last year?

Yes No

4.03 Do you become breathless in the following situations? (tick once for each question)

When you walk rapidly on level ground or up a moderate slope Yes No

When you walk calmly on level ground While you are washing or dressing

At rest

4.04 Do you cough about daily for some periods of the year?

Yes No

If YES: Is the cough usually productive?

Yes No

Have you had this kind of cough for as long as 3 months in each of the last two years?

Yes No

4.05 How often do you suffer from sleeplessness? (tick once)

Never, or just a few times a year 1-3 times a month
Approximately once a week

More than once a week

If you suffer from sleeplessness monthly or more often, what time of the year does it affect you most? (Put one or more ticks)

No particular time Polar night
time Midnight sun time

Spring and autumn

4.06 Have you had difficulty sleeping during the past couple of weeks?

Not at all

No more than usual

Rather more than usual

Much more than usual

4.07 Have you during the last two weeks felt unhappy and depressed?

Not at all

No more than usual Rather more than usual

Much more than usual

4.08 Have you during the last two weeks felt unable to cope with your difficulties?

Not at all

No more than usual Rather more than usual Much more than usual

4.09 Below, please answer a few questions about your memory: (tick once for each question)

Do you think that your memory has declined?

Do you often forget where you have placed your things? Do you have difficulties finding common words in a conversation?

Have you problems performing daily tasks you used to master?

Have you been examined for memory problems?

If YES to at least one of the first four questions above: Is this a problem in your daily life?

Yes No

Yes

No

Yes No

Yes No

4.10 Have you during the last last year suffered

in muscles or complaints during the last 12 months? at least 3 consecutive months?

(tick once for each line)

	No complaint	Little complaint	Severe complaint
Neck, shoulders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Arms, hands	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Upper part of the back	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
lumbar region	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
feet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other places	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

suffered from pain and/or stiffness in muscles or joints during the last 4 weeks? (tick once for each line)

	No	Little complaint	Severe
Neck, shoulders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Arms, hands	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Upper part of the back	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The lumbar region	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hips, leg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
feet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other places	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.12 Have you ever had:

	Yes	No	Age last time
Fracture in the wrist/forearm?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hip fracture?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.13 Have you been diagnosed with arthritis by a physician?

Yes No

4.14 Do you have or have you ever had some of the following:

	Never	Some	Much	Nickel
allergy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pollen allergy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other allergies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.15 Have you ever experienced infertility for more than 1 year?

Yes No

If Yes: was it due to:

	Yes	No	A
condition concerning you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A condition concerning your partner?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.16 To which degree have you had the following from pain and/or stiffness

	Never	Some
Nausea	<input type="checkbox"/>	<input type="checkbox"/>
Heartburn/regurgitation	<input type="checkbox"/>	<input type="checkbox"/>
Diarrhoea	<input type="checkbox"/>	<input type="checkbox"/>
Constipation	<input type="checkbox"/>	<input type="checkbox"/>
Alternating diarrhoea and constipation	<input type="checkbox"/>	<input type="checkbox"/>
Bloated stomach	<input type="checkbox"/>	<input type="checkbox"/>
Abdominal pain	<input type="checkbox"/>	<input type="checkbox"/>

4.17 If you have had abdominal pain or discomfort during the last year:

	Yes	No
Was it located in your upper stomach?	<input type="checkbox"/>	<input type="checkbox"/>
Were you bothered as often as once a week or more during the last 3 months?	<input type="checkbox"/>	<input type="checkbox"/>
Do you feel symptoms relief after bowel movement?	<input type="checkbox"/>	<input type="checkbox"/>
Are the symptoms related to more frequent or rare bowel movements than normally?	<input type="checkbox"/>	<input type="checkbox"/>
Are the symptoms related to more loose or hard stool than normally?	<input type="checkbox"/>	<input type="checkbox"/>
Do the symptoms appear after a meal?	<input type="checkbox"/>	<input type="checkbox"/>

4.18 Have you ever had:

	Yes	No	Age last time
Gastric ulcer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Duodenal ulcer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ulcer surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.19 For women: Have you ever had a miscarriage?

	Yes	No	Do not know
If Yes: number of times	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.20 For men: Have your partner ever had a miscarriage?

	Yes	No	Do not know
If Yes: number of times	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.21 Is your diet gluten-free?

	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>

4.22 Have you been diagnosed with Dermatitis Herpetiformis (DH)?

	Yes	No	Do not know
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do not know

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do not know

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.23 Have you been diagnosed with coeliac disease, based on a biopsy from your intestine taken in a gastroscopy examination?

Yes No Do not know

4.24 Do you have your natural teeth? Yes No

4.25 How many amalgam-tooth fillings do you have/have you had?
0 1-5 6-10 10+

4.26 Have you been suffering from headache the last year?
Yes No

If No: go to section 5, food habits

4.27 What kind of headache are you suffering from?
 Migraine Other headache

4.28 How many days per month do you suffer from headache?
Less than one day 1-6 days
 7-14 days More than 14 days

4.29 Is the headache attacks usually:
(tick once for each line)
 Yes No
 Pounding/pulsatory pain
 Pressing/tightening pain
 Unilateral pain (right or left)

4.30 What is the normal intensity of headache attacks?

Mild (do not hinder normal activity)
 Moderate (decrease normal activity)
 Strong (block normal activity)

4.31 What is the normal duration of the headache attacks?

Less than 4 hours 4 hours –

1 day
 1-3 days
 More than 3 days

4.32 If you suffer from headache, when during the year does it affect you most? (tick one or more)

No particular time
 Polar night time
 Midnight sun time
 Spring and/or Autumn

4.33 Before or during the headache, do you have a temporary: Yes

No
 Visual disturbances? (flickering, blurred vision, flashes of light).....
 Unilateral numbness in your face or hand?
 Aggravated pain by moderate physical activity?
 Nausea and/or vomiting?

4.34 Describe how many days you have been away from work or school during the last month due to headache?

Number of days.....

5. FOOD HABITS

5.01 How often do you usually eat the following? (tick once for each line)

	0-1 times per month	2-3 times per month	1-3 times times per week	More than 3 per week
Fresh water fish (not farmed)				
Salt water fish (not farmed)				
Farmed fish (salmon, trout, char)				
Tuna fish (fresh or canned)				
Fish bread spread				
Mussels, shells				
The brown content in crabs				
Whale or seal meat				
Pluck (liver/kidney/heart) from reindeer or elk/moose..				
Pluck (liver/kidney/heart) from ptarmigan/grouse				

5.02 How many times during the year do/did you usually eat the following? (number of times) In adulthood In childhood

	In adulthood	In childhood
Mølje (cod or pollack meat, liver, and roe)(Number of times per year)		
Sea gull's egg (Number of eggs per year)		
Reindeer meat (Number of times per year)		
Local mushroom and wild berries (blueberries/lingonberries/cloudberries) (Number of times per year)		

5.03

Number

5.04 Do you take vitamins and/or mineral supplements?

Yes, daily Sometimes Never

5.05 How often do you eat?

	Never	1-3 times per month	1-3 times per week	4-6 times per week	1-2 times per day	3 times per day or more
Dark chocolate						
Light chocolate/milk chocolate						
Chocolate cake						
Other sweets						

How many times per month do you eat canned (tinned) foods (from metal)

5.06 If you eat chocolate, how much do you usually eat each time?

Compared with the size of a Kvikk-Lunsj sjokolade (a chocolate brand in the market) and describe how much do you eat in relation to it.

1/4 1/2 1 1 1/2 2 More than 2

5.07 How often do you drink cocoa/hot chocolate?

	Never	1-3 times per month	1-3 times per week	4-6 times per week	1-2 times per day	3 times per day or more

6. ALCOHOL

6.01 How often have you in the last year:	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
Not been able to stop drinking alcohol when you have started?					
Failed to do what was normally expected of you because of drinking? Needed a drink in the morning to get yourself going after a heavy drinking session? Had feeling of guilt or remorse after drinking?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not been unable to remember what happened the night before because of your drinking?.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	Never	Yes, but not in the last year	Yes, during the last year
6.02 Have you or someone else been injured because of your drinking?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has a relative, friend, physician, or other health care workers been concerned about your drinking or suggested you to cut down?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7.01 Have you involuntary lost weight during the last 6 months? Yes No If Yes: how many kilograms?	7.03 Are you satisfied with your present body weight? Yes No
7.02 Estimate your body weight when you were 25 years old: Number of kilograms	7.04 What weight would you be satisfied with (your "ideal" weight)?

7.02 Estimate your body weight when you were 25 years old: Number of kilograms

8.01 How many hours per week, do you do the following leisure- or professional activities: Automobile repair/paint, ceramic work, painting/varnishing/solvents, hair dressing, glazier, electrician. (Put 0 if you do not engage in such leisure or professional activities) Number of hours per week on average`	8.02 Do you use hair color preparations Yes No If Yes: How many times per year? ..
--	---

8.02 Do you use hair color preparations Yes No If Yes: How many times per year? ..

.....	<input type="checkbox"/>	<input type="checkbox"/>
-------	--------------------------	--------------------------	-------

.....

9.10 During the last 12 months, have you been examined or treated by the specialist health care?

Yes No

If Yes, did you have a difficult time to understand what the doctor(s) told you? Answer on a scale from 0 to 10, where 0 = they were difficult to understand and 10 = they were always easy to understand

0 1 2 3 4 5 6 7 8 9 10

9.11 How would you rate the treatment or

counselling you got at your last visit to a specialist? Answer on a scale from 0 to 10, where 0 = worst treatment or counselling, and 10 = best treatment or counselling

0 1 2 3 4 5 6 7 8 9 10

9.12 Have you ever, previous to the year 2002, had an operation at a hospital or a specialist clinic?

Yes No

9.13 Have you, during the last 12 months, used herbal or natural medicine?

Yes No

9.14 Have you, during the last 12 months, used meditation, yoga, qi gong or thai chi as self-treatment?

Yes No

10. USE OF ANTIBIOTICS

10.01: Have you used antibiotics during the last 12 months? (all penicillin-like medicine in the form of tablets, syrups or injections)

Yes No Do not remember

If YES: What did you get the treatment for? Have you taken many antibiotic treatments, tick for each treatment.

Treatment Treatment Treatment Treatment Treatment Treatment 1 2
3 4 5 6

• Urinary tract infection (bladder infection, cystitis) • Respiratory tract infection (ear, sinus, throat or lung infection, bronchitis)

• Other

Treatment duration: number of days

How did you acquire the antibiotics for treatment? Have you acquired many treatments, tick for each one.

With prescription from a physician/dentist Without contacting a physician/without prescription:

• Purchase from a pharmacy abroad • Purchase over the internet • Remnants from earlier treatment at home • From family/friends • Other ways

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10.02 Do you presently have antibiotics at home?

Yes No

If YES: is this after an agreement with your physician for treatment of chronic or frequently recurring disease?

Yes No

If No: how did you acquire this antibiotic?

(Multiple ticks are possible)

Purchased from a pharmacy abroad internet

From family/friends

Other ways

10.03 Would you consider using antibiotics without consulting your physician?

Yes No

If YES: which conditions would you treat in such situation? (multiple ticks are possible)

Common cold

Cough

Bronchitis

Sore throat Purchased over the

Sinusitis Remnants from earlier treatment

Fever

Influenza

Ear infection

Diarrhoea Urinary

tract infection

Other infections

13

11. YOUR CIRCADIAN RHYTHM

We will ask you some questions about your sleeping habits

11.01 **Have you worked in a shift work schedule during the last 3 months?**

Yes No

11.02 **Number of days per week which you cannot freely choose when you sleep (e.g. work days)?**

0 1 2 3 4 5 6 7

Then I go to bed at

I get ready to fall asleep at

Number of minutes I need to fall asleep

I wake up at

With help of: Alarm clock External stimulus (*noise, family members etc.*)

Number of minutes I need to get up

11.03 **Number of days per week which you can freely choose when you sleep (e.g. free days or holidays)**

0 1 2 3 4 5 6 7

Then I go to bed at

I get ready to fall asleep at

Number of minutes I need to fall asleep

I wake up at

With help of: Alarm clock External stimulus (*noise, family members etc.*)

Number of minutes I need to get up

--	--	--	--

--	--	--	--

--	--

By myself

--	--	--	--

--	--

--	--	--	--

--	--	--	--

By myself

--	--

--	--	--	--

--	--

12. SKIN AND DERMATOLOGY

12.01 How often do you usually take a shower or a bath? (tick once)

2 or more times daily 1 time daily

4-6 times per week 2-3 times

per week Once a week

Less than once a week

12.02 How often do you usually wash your hands with soap daily? (tick once)

0 times

1-5 times 6-10

times

11-20 times

More than 20 times

12.03 Have you ever taken any antibiotics (penicillin and penicillin-like medicines) because of a skin disease, for example infected eczema, acne, non-healing leg ulcers, recurrent abscess?

Yes No

If Yes: How many times in average per year did you take antibiotics during the period you were most affected (tick once)

1-2

3-4

More than 4 times

12.04 Have you or have you ever had the following skin disorders? (tick once for each line)

Yes No

Psoriasis Atopic

eczema (children's eczema).... Recurrent hand

eczema

Recurrent pimples/spots for

several months

Leg or foot ulcer that did not heal for 3-4 weeks

If YES on the question concerning leg and/or foot ulcer, do you have any leg ulcer today?

Yes No

15

12.05 Have you often or always any of the following complaints? (tick once for each line)

Swelling in the ankles or legs, particularly in the evenings Yes No

Varicose veins

Eczema (red, itchy rash) on your legs

Leg pain that is getting worse when you are walking and is relieved when you are standing still

12.06 Have you ever had the following diagnoses by a physician? (tick once for each line)

Yes No

Psoriasis

Atopic eczema

Rosacea

12.07 Have you recurring large acne/abscesses that are tender/painful and often form scars in the following places? (tick once for each line)

Yes No

Armpits

Under the breasts

Stomach groove/the navel Around the genitalia

Around the anus

The groin

If Yes: Have you ever visited a physician because of abscesses?

Yes No

If Yes, did you get any of the following treatments? (tick once for each line)

Yes No

Antibiotic ointment Antibiotic tablets

Surgical drainage

A larger surgical intervention including skin removal

Surgical laser treatment

Follow-up questions



INFORMATION TO FOLLOW-UP QUESTIONS

The following pages with questions should not be answered by everybody. If you have answered yes to one or more of questions below, we ask you to move on to the follow-up questions on the topic or topics you have answered yes to. The first four topics are from the first questionnaire and the last question is from this form.

We have for the sake of simplicity highlighted topics with different colours so that you will find the questions that applies to you.

If you answered YES to that you have: long-term or recurrent pain that has lasted for 3 months or more, please answer the questions on page 19 and 20. The margin is marked with green.

If you answered YES to that you have undergone any surgery during the last 3 years, please answer the questions on page 21 and 22. The margin is marked with purple.

If you answered YES to that you're working outdoors at least 25% of the time, or in facilities with low temperature, such as warehouse/industrial halls, please answer the questions on page 23. The margin is marked with red.

If you answered YES to that you have used non-prescription pain relievers, please answer questions on page 24. The margin is marked with orange.

If you answered YES to that you have or have ever had skin problems (such as psoriasis, atopic eczema, non-healing leg or foot ulcers, recurrent hand eczema, acne or abscesses), please answer the questions on page 25. The margin is marked with yellow.

If you have answered **NO** to these five questions, you are finished with your answers. The questionnaire is to be returned in the reply envelope you were given at the survey site. The postage is already paid.

Should you wish to give us written feedback on either the questionnaire or The Tromsø Study in general, you are welcome to that on page 26.

Do you have any questions, please contact us by phone or by e-mail. You can find the contact information on the back of the form. **THANK YOU** for taking the time to the survey and to answer our questions.

13. FOLLOW-UP QUESTIONS ON PAIN

You answered in the first questionnaire that you have protracted or constantly recurrent pain that has lasted for 3 months or more. Here, we ask you to describe the pain a little closer.

13.01 **How long have you had this pain?** Number of years _____
months

13.02 **How often do you have this pain?** Every day
Once a week or more

Once a month or more
Less than once a month

13.03 **Where does it hurt?** (Tick for all locations where you have protracted or constantly recurrent pain)

- | | |
|---|---|
| <input type="checkbox"/> Head/face | <input type="checkbox"/> Thigh/knee/leg |
| <input type="checkbox"/> Jaw/temporo-mandibular joint | <input type="checkbox"/> Ankle/foot Chest/breast |
| <input type="checkbox"/> Neck | <input type="checkbox"/> Stomach |
| <input type="checkbox"/> Back | <input type="checkbox"/> Genitalia /reproductive organs |
| <input type="checkbox"/> Shoulder | <input type="checkbox"/> Skin |
| <input type="checkbox"/> Arm/elbow | <input type="checkbox"/> Hand |
| <input type="checkbox"/> Hip | <input type="checkbox"/> Other location |

13.04 **What do you believe is the cause of the pain?** (Tick for all known causes)

- | | | | |
|--|--|--|---|
| <input type="checkbox"/> Accident /acute injury | <input type="checkbox"/> Long-term stress | <input type="checkbox"/> Fibromyalgia | <input type="checkbox"/> Angina pectoris |
| <input type="checkbox"/> Surgical intervention/operation | <input type="checkbox"/> Herniated disk (<i>prolapse</i>) /lumbago | <input type="checkbox"/> Whiplash | <input type="checkbox"/> Poor blood circulation |
| <input type="checkbox"/> Migraine/headache | <input type="checkbox"/> Osteoarthritis | <input type="checkbox"/> Rheumatoid arthritis | <input type="checkbox"/> Bechterews syndrome |
| | | <input type="checkbox"/> Infection | <input type="checkbox"/> Herpes zoster |
| | | <input type="checkbox"/> Another cause (<i>describe below</i>) | <input type="checkbox"/> Don't know |

Describe the other cause:

13.05 **Which kind of treatment have you received for the pain?** (Tick for all types of pain treatments you have received)

- | | |
|--|---|
| <input type="checkbox"/> No treatment | <input type="checkbox"/> |
| <input type="checkbox"/> Analgesic medications/painkillers | <input type="checkbox"/> |
| <input type="checkbox"/> Physiotherapy/chiropractic treatment | <input type="checkbox"/> |
| <input type="checkbox"/> clinic (<i>homeopathy, healing, aromatherapy, etc.</i>) | <input type="checkbox"/> Complimentary and alternative medicine |
| <input type="checkbox"/> Surgery | <input type="checkbox"/> Treatment at a pain clinic |
| <input type="checkbox"/> | <input type="checkbox"/> Other treatment 19 |
| <input type="checkbox"/> | <input type="checkbox"/> |

- | | |
|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> Psycho-educative/relaxation psychotherap |
| <input type="checkbox"/> | <input type="checkbox"/> Acupunctur |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

13.06 On a scale of 0 to 10, where 0 corresponds to no pain and 10 corresponds to the worst possible pain you can imagine:

How strong would you say that the pain usually is?

 No pain 0 1 2 3 4 5 6 7 8 9 10 Worst imaginable pain

How strong is the pain when it is in its strongest Intense?
 No pain Worst imaginable pain

what degree does the pain interfere with your sleep?
 No To effect 0 1 2 3 4 5 6 7 8 9 10 to sleep

To what degree does the pain interfere with performing common activities at home and work?
 No effect 0 1 2 3 4 5 6 7 8 9 10 anything Can not do 7 8

14. FOLLOW-UP QUESTIONS ON SURGERY

In the first questionnaire you answered that you have undergone an operation during the last 3 years.

14.01 **How many times have you undergone surgery during the last 3 years?**

Number

Below, please describe the operation. If you have undergone several operations during the last 3 years, these questions concern the last surgery you underwent.

14.02

Where in your body did you have surgery?

(If you were operated simultaneously in several areas, please indicate this in the boxes below.)

Head/face
 Neck/throat
 Back

Surgery in the chest
 · Heart
 Lungs
 · Breasts
 Another surgery in the chest region

Surgery in the stomach/pelvis
 · Stomach/intestines Inguinal hernia
 Urinary tract/reproductive organs
 · Gall bladder/biliary tract Another surgery in the stomach/pelvis

Surgery in the hip/legs
 · Hip/thigh
 Knee/leg
 Ankle/foot
 Amputation

Surgery in the shoulder and arm
 Shoulder/overarm
 Elbow/underarm
 Hand
 · Amputation

14.03 **Reason for the surgery:**

Acute illness/trauma Planned non-cosmetic operation Planned cosmetic operation

14.04 **Where did you have the surgery?** The hospital in Tromsø
 The hospital in Harstad
 Other public hospital Private clinic

14.05 **How long time is it since you had surgery?** Number of years
 Months

14.06 **Do you have reduced sensitivity in an area near the surgical scar?** Yes No

14.07

14.08

Are you hypersensitive to touch, heat or cold in an area near the surgical scar?

14.09 **If you had pain at the site of surgery before you had surgery, do you have the same type of pain now?** Yes No

Does slight touch from clothes, showering or similar cause pain?

Yes No

The pain at the site of surgery: Answer on a scale from 0 to 10, where 0=no pain and 10=worst pain you can imagine

How strong pain did you have at the site of surgery before you had surgery

No How pain 0 1 2 3 4 5 6 7 8 9 10 Worst imaginable pain

How strong pain do you normally have at the site of surgery now

No How pain 0 1 2 3 4 5 6 7 8 9 10 Worst imaginable pain

How strong pain do you normally have at the site of surgery when it is most intense

No pain 0 1 2 3 4 5 6 7 8 9 10 pain Worst imaginable

16. USE OF NON-PRESCRIPTION PAINKILLERS

In the first questionnaire you answered that you had used non-prescription painkillers (analgesics) in the last 4 weeks. Here are some follow-up questions we hope you will answer.

16.01 What types of non-prescription painkillers have you used?

Paracetamol: (*Pamol, Panodil, Paracet, Paracetamol, Pinex*)

Not used
 Less than every week
 Every week, but not daily
 Daily
 How much do you usually take daily when you use these medicines? (number of tablets, suppositories)

Acetylsalicylates: (*Aspirin, Dispril, Globoid*)

Not used
 Less than every week
 Every week, but not daily
 Daily
 How much do you usually take daily when you use these medicines? (number of tablets)

Ibuprofen: (*Ibumetin, Ibuprofen, Ibuprox, Ibux*)

Not used
 Less than every week
 Every week, but not daily
 Daily
 How much do you usually take daily when you use these medicines? (number of tablets, suppositories)

Naproxen: (*Ledox, Naproxen*)

Not used
 Less than every week
 Every week, but not daily
 Daily
 How much do you usually take daily when you use these medicines? (number of tablets)

Phenazone with caffeine: (*Antineuralgica, Fanalgin, Fenazon-koffein, Fenazon-koffein sterke*)

Not used
 Less than every week
 Every week, but not daily
 Daily
 How much do you usually take daily when you use these medicines? (number of tablets)

16.02 For which complaints do you use non-prescription painkillers? (multiple ticks are possible)

Headache
 Menstrual discomfort
 Migraine
 Back pain
 Muscle/joint pain
 Tooth pain
 Other

16.03 Do you think you have experienced side effects of some of the medicines? (tick once for each line)

	Yes	No
<input type="checkbox"/> Paracetamol		
<input type="checkbox"/> Acetylsalicylates		
<input type="checkbox"/> Ibuprofen		
<input type="checkbox"/> Naproxen		
<input type="checkbox"/> Phenazone with caffeine		

16.04 Where do you usually purchase painkillers?

Pharmacy
 Grocery stations
 Petrol stations
 Abroad
 Internet

16.05 Do you combine the treatment with the use of painkillers on prescription?

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

17. FOLLOW-UP QUESTIONS ABOUT SKIN DISEASES

On page 15 in this questionnaire you answered that you have or have had a skin disease. Here are some follow-up questions we hope you will answer.

Answer on a scale from 0 to 10, where 0 corresponds to no symptoms and 10 correspond to worst imaginable complaints. If you answered YES to that you have or have had:

17.01 **Psoriasis** No complaint Worst imaginable complaints

· How much are you affected by your psoriasis today? · How much are you affected by your psoriasis when it is most severe?

1 2 3 4 5 6 7 8 9 10

0

17.02 **Atopic eczema**

· How much are you affected by your atopic eczema today?

· How much are you affected by your atopic eczema when it is most severe?

17.03 **Hand eczema**

· How much are you affected by your hand eczema today?

· How much are you affected by your hand eczema when it is most severe?

17.04 **Acne**

· How much are you affected by your acne today?

· How much are you affected by your acne when it is most severe?

17.05 **Abscesses**

· How much are you affected by your abscesses today?

· How much are you affected by your abscesses when it is most severe?

17.06 **Here is a list of factors that might trigger or exacerbate abscesses, tick for what you think apply to you:**

Stress/psychological strain Narrow/tight clothing Menstrual periods Pregnancy Other

17.08 **How old were you when you got abscesses for the first time?**

0-12 years 13-19 years 20-25 years 26-35 years 36-50 years Older than 50 years

17.09 **If you no longer have abscesses, how old were you when it disappeared?**

0-12 years 13-19 years 20-25 years 26-35 years 36-50 years Older than 50 years

17.07 **How many episodes of abscesses do you usually have per year? (tick once)** 0-1 2-3 4-6 More than 6

Yes 25

Thank you for your help





Tromsø-undersøkelsen

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Hormone treatment for

menopausal problems ° Yes ° No

<p>When attending you will get supplementary questions about menstruation and any use of hormones. Write down on a sheet of paper the names of all the hormones you have used and bring it with you. You will also be asked whether your menstruation have ceased and possibly when and why.</p>
