Ischemic stroke in a general population:
Time trends in incidence, case fatality
and the impact of risk factors.

The Tromsø Study

Anne Merete Vangen-Lønne
A dissertation for the degree of Philosophiae Doctor – October 2017
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and the impact of changing risk factors.
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"When we try to pick out anything by itself, we find it hitched to everything else in the universe".

John Muir (1838–1914)
Scottish-American glaciologist and environmental philosopher, and an early advocate for the preservation of wilderness in the United States.
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Summary

Cerebral stroke is a clinical syndrome caused by lack of blood supply to the brain. About 80-85% of the strokes are ischemic, due to a reduction or complete blockage of blood flow to the brain, while approximately 15% are a result of hemorrhage. The impact of stroke as a global health problem will most likely increase in coming years due to ongoing demographic changes, including aging population and health transitions in developing countries.

Lack of national data regarding time trends in incidence and case fatality of ischemic stroke (IS) in Norway represented a main motivation for this study. Data from the population-based Tromsø Study, following >40,000 attendees from six surveys through 2012, provided an excellent opportunity to reveal time trends of IS and assess the potential mechanisms behind these trends.

We found that the overall age- and sex adjusted incidence of IS in persons aged ≥30 years declined with 27% from 1995–2012. The time trends differed by age, with increasing IS incidence in women aged 30–49 years, a non-significant rising trend among the youngest men, and declining incidence in women aged 50–74 years and men aged 65–74 years. In men aged 50–64 years, the IS incidence in 2012 did not differ from the incidence two decades earlier. The IS incidence also remained stable in persons aged 75 years and older. The age-adjusted 30-days case fatality decreased in men aged 30–84 years while no significant decline was found in women aged 30-84 years or in attendees ≥85 years.

Overall, the combined changes in seven cardiovascular risk factors, the systolic blood pressure (SBP), total cholesterol, HDL-cholesterol, daily smoking, physical activity, diabetes and body mass index accounted for 57% (95% CI 28–100) of the decrease in IS incidence from 1995 through 2012, with decreasing blood pressure and decline in smoking prevalence as the most important contributors. The increasing diabetes prevalence contributed negatively, as did the change in body mass index, although not significant.

We found that a feasible joint hypothetical intervention on six metabolic and lifestyle risk factors (SBP, total cholesterol, weight, physical activity, smoking and alcohol intake) would reduce the 18-year stroke risk in our population by 19% (1995–2012). A combination of more intensive interventions would reduce the estimated 18-years stroke risk by 55%. Blood pressure reduction and quitting smoking significantly reduced the risk when applied separately.
Sammendrag

Hjerneslag er et klinisk syndrom forårsaket av manglende blodtilførsel til hjernen. Omlag 80-85% av hjerneslagene er ischemiske, dvs. forårsaket av en redusert eller blokkert blodtilførsel til hjernen, mens ca. 15% er forårsaket av blødning. På grunn av demografiske endringer, som en aldrende befolkning og endringer i helsetilstand i utviklingsland, vil konsekvensene av hjerneslag som et globalt helseproblem sannsynligvis øke i årene som kommer.

Mangelen på nasjonale data vedrørende tidstrender i insidens og letalitet av ischemiske slag (IS) i Norge var en hovedmotivasjon for denne studien. Data fra den populasjonsbaserte Tromsøundersøkelsen, der >40,000 deltakere fra seks tverrsnitts-undersøkelser ble fulgt opp med registering av førstegangs IS til og med 2012, ga oss en unik mulighet til å avdekke tidstrender i insidens av IS, og mulige mekanismer som kunne forklare disse tidstrendene.


Endinger i syv kardiovaskulære risikofaktorer, systolisk blodtrykk, total kolesterol, HDL kolesterol, daglig røyking, fysisk aktivitet, diabetes og kroppsmasseindeks, forklarte samlet sett 57% (95% CI 28–100) av reduksjonen i IS insidens fra 1995 til og med 2012, med fallende blodtrykk og redusert prevalens av daglig røyking som de viktigste bidragsyterne. Den økende prevalensen av diabetes bidro negativt, dvs. motvirket fallet i insidens av IS. Det samme gjorde økningen i kroppsmasseindeks, men ikke signifikant.

Vi fant at en hypotetisk, men gjennomførbar kombinert endring av seks kardiovaskulære risikofaktorer (systolisk blodtrykk, total kolesterol, vekt, fysisk aktivitet, daglig røyking og alkoholinntak) kunne ha redusert risikoen for hjerneslag i vår populasjon med 19% i perioden 1995–2012. En mer intensiv kombinert endring av de samme risikofaktorene kunne ha endret den estimerte 18-årige risikoen for hjerneslag med 55%. Reduksjon av blodtrykk og røykestopp ville hver for seg ha ført til signifikant reduksjon i forekomsten av IS.
List of papers

This thesis is based on the following papers:


III. Vangen-Lønne AM, Ueda P, Gulayin P, Wilsgaard T, Mathiesen EB, Danaei G. Hypothetical interventions to prevent stroke: An application of the parametric $g$-formula to a healthy middle-aged population. (Submitted)
Abbreviations

AF: Atrial fibrillation

BMI: Body mass index

BP: Blood pressure

CVD: Cardiovascular disease

DBP: Diastolic blood pressure

GBD study: Global Burden of Disease Study

HDL: High density lipoprotein

HT: Hypertension

ICH: Intracerebral hemorrhage

IRR: Incidence rate ratio

IS: Ischemic stroke

LDL: Low density lipoprotein

PA: Physical activity

PAR: Population attributable risk

RCT: Randomized clinical trial

SAH: Subarachnoid hemorrhage

SBP: Systolic blood pressure
1. Introduction

1.1 What is stroke?

More than 2400 years ago, the physician Hippocrates of Cos (460–370 BC) presented the Greek term “apoplexy” (from “apoplessein”: “to strike down and incapacitate”) to describe an acute, non-traumatic brain injury associated with a sudden paralysis or impaired speech. The Swiss pathologist Johan Jacob Wepfer (1620–1695) discovered in the mid-1600s that patients who died with apoplexy could have a bleeding in the brain as well as an obstruction in one of the brain’s blood vessels (1). However, the term “stroke” was probably first introduced into medicine in 1689 by William Cole (1635–1716) in his book “A Physio-Medical Essay concerning the Late Frequencies of Apoplexies”.

Cerebral stroke is a clinical syndrome, defined by the World Health Organization (WHO) as “rapidly developing clinical signs of focal or global disturbance of cerebral function, with symptoms lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin” (2). Generally, a stroke is caused by lack of blood supply to the brain. This depletion of sufficient blood supply can, as discovered in the mid-1600s, be caused by different mechanisms, which all lead to an injured brain tissue and where the neurological deficits reflect the cerebral area involved. Ischemic strokes are caused by a reduction or complete blockage of blood flow to the brain, and account for about 80–85% of all stroke cases globally. Approximately 15% of the strokes are hemorrhagic, either as intracerebral hemorrhage (ICH, approximately 10–12%) or subarachnoid hemorrhage (SAH, approximately 3%). Although ischemic stroke (IS) is the dominating pathological type of stroke worldwide, the proportional frequency of ICH vs. IS tend to be noticeably greater in low-and middle income countries than in high-income countries (3).
1.2 Ischemic stroke

The arterial occlusion preceding an IS can be caused by several mechanisms: by atherothrombosis (extra or intracranial); by embolism (cardiogenic or artery to artery embolism); by small vessel disease; by non-atherosclerotic abnormalities (dissection, artery diseases, vasculitis, coagulopathy, metabolic diseases with arteriopathy) or by decreased perfusion due to systemic hypotension (Figure 1).

**Figure 1 Patophysiological mechanisms for ischemic stroke**

*From Hart RG, Benavante O. Am Fam Physician 1999; 2475–82. Reproduced with permission from the publisher*
Several classification systems for subtyping of IS exist, based on etiology, clinical manifestations, localization or combinations of these. Which one to use depends on the purpose of subclassification (e.g. clinical decision-making or description of patient characteristics in an epidemiological study). The frequently used TOAST classification (Trial of ORG 10172 in Acute Stroke Treatment) denotes five subtypes of ischemic stroke: large-artery atherosclerosis, cardioembolism, small-vessel occlusion, stroke of other determined etiology, and stroke of undetermined etiology (4). Other classification systems are the Causative Classifications System (5) and the Oxfordshire Community Stroke Project (OCSP) Subtype Classification (6).

1.3 Epidemiology

1.3.1 The burden of stroke in numbers

Stroke is the second leading cause of death worldwide and a frequent cause of adult disability in most regions. Worldwide, during the last decades, the age-standardized stroke mortality rates have declined, as a result of declining stroke incidence as well as reduced case fatality (7). Despite this global decrease in age-standardized stroke mortality, the absolute numbers of people who experience a stroke every year, live with the consequences of stroke or die from their stroke, is increasing. In 2013, there were globally 10.3 million new strokes (67% were IS), 6.5 million deaths from stroke (51% from IS) and nearly 25.7 million who had survived a stroke (71% with IS) (8). The incidence rate of stroke increases markedly with age (9). Worryingly, the impact of stroke as a global health problem is likely to further increase in coming years due to ongoing demographic changes, including aging of the population and health transitions observed in developing countries (8). In the absence of effective clinical or public health interventions, it is estimated that in 2030, 23 million people will have a first ever stroke, including 7.8 million fatal strokes (10).
1.3.2 Geographical variation in stroke burden

The largest stroke burden is carried by countries with low and middle income (developing countries). In 2010, more than 71% of the global stroke deaths and 69% of all incident strokes took place in developing countries (11). There are considerable geographical variations with regard to stroke incidence, prevalence and mortality rates due to differences in prevalence of risk factors and access to appropriate health care (including primary prevention, acute treatment of strokes and secondary prevention given). Moreover, comparison of estimates from different studies are often complicated by heterogeneity in study designs and types of population. A major challenge in stroke epidemiology is also the lack of good-quality epidemiological studies from low-income countries (12).

Changes in stroke burden over the last decades differ substantially by country income level. A 42% reduction in age-adjusted stroke incidence rate (1.1% annual reduction) was found in high-income countries (1970-2008) while there was a 100% increase in countries with low and middle income (3). The percentage decline in age-standardized mortality rate was nearly twice as large in developed compared to developing countries from 1990 to 2010 (11), (Figure 2 shows mortality decline from 1990 to 2013).

Figure 2. Percent change in age-standardized ischemic stroke mortality rate (1990-2013)

From Feigin V, Mensah GA, Norrving B et al. Neuroepidemiology. 2015;45:230–236. Reproduced with permission from the publisher
1.3.3 Incidence

Incidence is defined as the number of new cases of a disease that occur over a specified period of time. In 2010, the worldwide incidence rate for stroke (age-adjusted) was 258 per 100,000 person-years; 217 per 100,000 person–years in high–income countries (11). In a population-based European register study, the risk of stroke (age standardized) varied more than 2-fold between the European populations, with higher incidence rates observed in eastern, and lower rates in southern European countries (13).

With the exception of estimations from the Innherred study, covering the years 1994-96 (14), complete national data on stroke incidence in Norway or estimates based on data from well-defined Norwegian cohorts were lacking until 2012-2013. At this time, the Norwegian Patient registry became person-specific, and the Norwegian Cardiovascular Disease Registry was established as a national register. Furthermore, there are no studies of how the stroke incidence and case fatality have changed over time in Norway. The lack of national data regarding time trends in incidence and case fatality of ischemic stroke represents a main motivation for this study.

1.3.4 Time trends in incidence

The Global Burden of Disease (GBD) Study revealed a 13% significant reduction of IS incidence (age-standardized) in high-income countries from 1990–2010, driven by a significant IS incidence decline among those <75 years (15). No significant change in the overall incidence if IS was found in persons aged ≥75 years. Time trends of stroke incidence differ in direction and steepness also among high-income populations, as well as across the different age groups. However, possible diverging trends across age may not be acknowledged in age-unstratified analyses.

While a downward trend in age-adjusted stroke incidence is shown for middle aged and slightly older in several high-income populations (16–18), other studies found no decline in incidence
with time (19). From studies which include younger age groups, worrying reports have risen about an increasing incidence of stroke at younger age (17, 20, 21), while stable incidence rates among the youngest ones are reported in other studies (19). Many studies of stroke incidence have not included the eldest ones; but among the limited number of studies, both a stable time trend (22) and a decreasing trend (17, 20, 23) is reported.

A decrease in stroke incidence in both sexes has been demonstrated in many high-income populations the last decades (16, 18). Some studies have revealed relatively stable male/female ratios of incidence decline over time, suggesting that primary preventive measures have been equally effective in men and women (24). Other studies from developed countries reported an overall significant IS incidence decline in men only (25), or a steeper incidence decline in men for IS (26). Contrary, the worldwide data from the GBD study revealed a significant decrease of IS in women from 1990 to 2013, while no significant change in IS incidence was detected in men (27).

1.3.5 Case fatality

Early case fatality is defined as the proportion of cases with an event (here: IS) followed by death within 30 days (28 days to 1 month), irrespective of the reason of death. A systematic review based on population-based studies (published 1970–2008) from high-, middle- and low-income countries found that early (21 days to 1 month) stroke case fatality differed substantially among countries and study periods (3), as was previously reported in the MONICA study (28). In 2000–2008, case fatality for IS ranged from 13–23% in high income countries (3). A Norwegian population-based study reported 11% case fatality (30 days) for IS in 1994–96 (14).

The case fatality increases steeply with advancing age (29), and comparison of populations with different age profiles may be challenging. A systematic review of studies on stroke in the very old reported a three time odds for death within 30 days after stroke in persons aged ≥80 years
compared to those < 80 years (29). Moreover, the case fatality depends on the severity of the events, comorbidity and treatment given (19). In terms of sex differences in case fatality, conflicting results are reported; of increased risk in women (24, 30) as well as no difference between men and women (31, 32).

1.3.6 Time trends in case fatality

In a Swedish cohort in the MONICA study, 28-days case fatality after stroke declined significantly from 20% in 1985 to 12% in 1998 (both for men and women, first-ever and recurrent stroke), without concurrent change in the distribution of stroke subtypes during this period (for IS; 18%–12%) (33). In Oxford Vascular study, the 30-day incident stroke case fatality was not significantly different in 2002–2004 compared to 1981–1984 (17% vs. 18%) (34), while a national-wide Finnish register study found a significant 28-days case fatality reduction of incident stroke from 1999 to 2007 (for IS: 13% to 10%) (35). A nationwide registry-based study from Scotland, looking at all first hospitalizations for stroke, showed decreasing case fatality for all age groups (men and women separately) from 1986 to 2005 (<55, 55–64, 65–74, 75–84, 85+, adjusted for comorbidity and admission year), but a steeper decline in men than in women, resulting in an increasing difference in case fatality across sex with time (24). This is in contrast to studies reporting similar decline in case fatality across sex (i.e. no interaction between sex and year) during comparable study periods (26).
1.4 Risk factors for ischemic stroke

The risk factors for stroke are traditionally classified as non-modifiable and modifiable risk factors, and overlap with the risk factors for cardiovascular disease (CVD). Several studies have estimated population-attributable risks (PARs) for the associations of IS with cardiovascular risk factors (36-38). With approximately 75% of strokes being first-ever events (39), primary prevention directed towards modifiable risk factors is particularly important to reduce the burden of stroke. Although most risk factors perform an independent effect, significant interactions between individual risk factors exist, which must be considered when predicting the overall risk. While a risk factor traditionally is defined as a factor associated with a pathological medical condition (40), the levels of evidence supporting a causal relationship between these risk factors and subsequent stroke risk vary substantially between the risk factors. IS and ICH share several of their most important risk factors, despite diverse underlying pathogenesis, but the relative impact of a common risk factor on risk of IS vs. ICH differ (41). Correspondingly, the associations between well known risk factors for IS and the different subtypes of IS vary, and are still debated (42).

Table 1. Non-modifiable and modifiable risk factors for ischemic stroke

<table>
<thead>
<tr>
<th>Non-modifiable risk factors</th>
<th>Modifiable risk factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>High blood pressure</td>
</tr>
<tr>
<td>Male gender</td>
<td>Diabetes</td>
</tr>
<tr>
<td>Race</td>
<td>Smoking</td>
</tr>
<tr>
<td>Genetics (mono- or polygenic)</td>
<td>Atrial fibrillation</td>
</tr>
<tr>
<td>Low birth weight</td>
<td>Dyslipidemia</td>
</tr>
<tr>
<td>Previous TIA or stroke</td>
<td>Obesity</td>
</tr>
<tr>
<td>Heart disease</td>
<td>Physical inactivity</td>
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<td></td>
<td>Alcohol</td>
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<td></td>
<td>Unhealthy diet</td>
</tr>
<tr>
<td></td>
<td>Illicit drug use</td>
</tr>
</tbody>
</table>
1.4.1 Non-modifiable risk factors

The risk of stroke more than doubles for each successive 10 years after age 55 (9), and the effect of *ageing* seems to carry the same risk in women as in men (43).

**Male sex** generally carries about 1.3 times the stroke risk compared to females at the same age, but this risk difference tends to decrease with age (44). However, slightly higher stroke risk in women aged 35–44 compared to equally aged men has been reported, with oral contraceptive use and pregnancy as possible contributors (9). Among the eldest (≥85 years), some studies found higher stroke incidence in women compared to men (45), but male and female rates in the eldest age category are not directly comparable when the age band is open ended (44). Women are on average 4 years older than men when they get their first stroke, but longer life expectancy in women results in a higher lifetime risk for stroke (31,44).

Stroke incidences differ by *ethnicity*; e.g. African American show a nearly twice times higher risk for stroke than European Americans (46). However, some of this difference may be related to disparities in management of modifiable risk factors.

Twin studies have revealed nearly a five times higher stroke prevalence in monozygotic as compared to dizygotic twins, which strongly support *genetic factors* related to stroke risk (47). Several established stroke risk factors (as hypertension and diabetes) provide both genetic and behavioral components (48). Moreover, various genetic diseases show association with stroke (49).

**Low birth weight** is found to be associated with increased risk of stroke in adult life, and higher risk of vascular disease in adulthood seems to remain even after adjustment for socioeconomical factors in childhood (50).

Although being non-modifiable, these factors identify those at highest risk of stroke who may benefit most from rigorous prevention or treatment of the modifiable risk factors.
1.4.2 Modifiable risk factors

Hypertension (HT) is regarded as the single most important treatable risk factor for IS (42,51) and stroke in general (36, 38). The relationship between blood pressure (BP) and cardiovascular risk is “continuous, consistent, and independent of other risk factors” (51). Hence, there is no “threshold” for BP; a significant proportion of all strokes happen in persons with normal BP or “mild” hypertension. Both systolic (SBP) (52) and diastolic blood pressure (DBP) (53) is of importance for stroke risk; but prospective studies have shown SBP to be a better predictor for CVD risk, especially in middle-aged and older adults in whom most cardio-vascular disease occur (52). In INTERSTROKE, being hypertensive (defined as self-reported HT or BP \( \geq 140/90 \) mmHg) gave an odds ratio (OR) of 2.21 for IS (age- and sex matched) in sub-analyses on data from Western Europe, USA and Australia (41). From BP level of 115/75 mmHg, the risk of death from stroke doubles for each increment of 20/10 mmHg (52).

Having diabetes more than doubles the risk for stroke; the estimated risk for IS in diabetic persons is 1.8 to 5-fold compared to non-diabetics (48). Individuals without diabetes, but with an elevated fasting blood glucose, do also carry an excess risk for stroke (54). Diabetes is found to increase the risk for IS for all age groups, but age-specific risk for IS in diabetics vs. non-diabetics is most prominent in those aged <65 years compared to elder ones (55). While some studies have suggested a higher proportion of lacunar strokes in diabetic IS patients (56), this in not confirmed by others (57). The effect of diabetes may in part be mediated through other risk factors such as HT and lipid alterations (55, 58). Potentiating effects of diabetes with other risk factors on stroke risk is also suggested (55, 58).

Cigarette smoking is an independent risk factor for stroke, especially IS; and is associated with approximately a doubling of risk (59,60). Smoking likely contributes to higher stroke risk through both acute effects (aggregation of blood platelets / thrombus generation) and long-term effects (increased burden of atherosclerosis) (61). Moreover, a strong dose-response relationship has been shown between number of cigarettes and risk of IS (59, 61). Cigarette
smoking may also potentiate the effect of other risk factors for stroke (61, 62). In a pooled analysis of prospective data (3.9 million individuals; >42,000 strokes from 81 cohorts worldwide), the excess stroke risk by smoking was similar by sex, while in Western cohorts, smoking was a stronger risk factor for stroke in women than in men (60). Smoking cessation have been shown to reduce the stroke risk by 50% by the first year after cessation, reaching the stroke risk of never-smokers within 2–5 years (63, 64).

**Atrial fibrillation** (AF) alone is associated with an overall 4 to 5-times excess risk of IS (65), by embolism of thrombi developed in the left atrial appendage. However, among persons with AF, the absolute stroke risk differs 20-fold, depending on age and associated cardiovascular risk factors (66). IS associated with AF tend to be larger and more disabling than other IS, with a higher case fatality (67). The incidence of AF increases with age, and is higher in men than in women in all age groups (68). Diabetes, hypertension, smoking and obesity are modifiable risk factors that contribute to the development of AF (68). A recent review reported the prevalence of AF in adult population (>20 years) to be between 2.5% and 3.5%; ranging from 0.1% in adults <55 years to 10% or more in persons aged 80 years and older (68). In The Tromsø population, the point prevalence of AF at the end of 2007 was 2.2% in women and 3.3% in men (mean age 57 years) (69). About 25% of IS among those ≥80 years are due to AF (65) (66). In the Framingham Heart Study, both prevalence and incidence of AF (age-adjusted and sex stratified) showed a roughly four times increase from 1958–2007. However, the incidence of AF in the Framingham Heart Study electrocardiograms (ECGs) did not change significantly across time, leading to the conclusion that enhanced detection may be part of the explanation behind increasing trends in AF prevalence and incidence (70).

The associations between **dyslipidemia** and stroke incidence are complex. Several large, observational studies have found high **total cholesterol** to be a significant risk factor for IS (71,72) while other studies have shown only a weak (73), or no association (74). This relationship also seems to differ by subtype of IS, with strongest associations for
atherosclerotic subtypes (especially large artery atherosclerosis) (75). Conversely, an inverse relationship between cholesterol level and ICH risk is found (76). Some studies have shown associations between increased low-density lipoprotein cholesterol (LDL), and higher risk of IS (71), while no significant association was found in others (73). Despite relatively sparse epidemiological findings regarding novel levels of LDL and risk of IS, primary stroke prevention trials have demonstrated risk reduction of incident stroke ranging from 11%–40% in high-risk populations when receiving statin treatment (75). In a meta-analysis, an estimated 21% risk reduction of stroke was found with each 1 mmol/L reduction in LDL (77). Regarding high-density lipoprotein cholesterol (HDL), a systematic review reported a reduced risk of IS ranging from 11–15% for each 10mg/dL (=0.26 mmol/L) increase in HDL (78). Studies evaluating triglycerides vs. IS risk have shown mixed results (73, 75).

High body-mass index (BMI) is an important risk factor for stroke, and increased BP, cholesterol and glucose partly mediates its effects. In a meta-analysis of 97 prospective cohorts (1.8 million individuals; >31,000 strokes), about three quarters of the effect BMI exerted on stroke risk was mediated by these three metabolic risk factors, with BP as the most important mediator, accounting for two thirds of excess risk (79). In this study, each 5 kg/m2 increase of BMI was associated with a 4% higher risk of stroke, while persons with obesity (BMI ≥30 kg/m2) showed a 14% excess risk of stroke compared to normal-weighted (BMI ≥20 to <25 kg/m2) (79).

Several studies have reported a beneficial effect of regular physical activity (PA) on stroke risk, but studies comparing the effects of vigorous and lower levels of PA are limited (48). Even if the types and frequency of exercise necessary to prevent stroke are not fully established, meta-analyses conclude that regular PA reduces stroke risk by 25–30% when compared to least active persons (48,80). In INTERSTROKE, PA (defined as regularly moderate or strenuous leisure-time PA ≥4 hours per week) was associated with 27% reduced risk for stroke in Western populations (41). The protective effect of PA on stroke risk is partly mediated through declining BP, and by controlling other cardiovascular risk factors as diabetes and high BMI (81).
The impact of diet patterns on the risk of stroke have been assessed in recent years, as opposed to earlier research which focused on the impact of individual nutrients or food groups. High adhesion to a Mediterranean diet (high intake of olive oil, fruit, nuts, vegetables and cereals; moderate intake of fish and poultry; low intake of dairy products, red meat, processed meats and sweets; and wine in moderation) was related to a 39% reduction of incident strokes in the PREDIMED trial (Prevencion con Dieta Mediterranea) (82). The Dietary Approach to Stop Hypertension (DASH) diet (a diet rich in fruits, vegetables and low-fat dairy products; low in saturated and total fat) significantly reduced blood pressure among persons with hypertension (SBP ≥140 mmHg and/ or DBP ≥90 mmHg) as well as among non-hypertensive (83). The beneficial effects of these dietary patterns on stroke risk have later been confirmed in meta-analyses for a Mediterranean (84) as well as for a DASH type of diet (85).

Several studies report a protective effect of light to moderate alcohol consumption on the risk of IS (86, 87), while others (88) claim that this finding could be due to e.g. residual confounding or contamination of the teetotaler group by ex-drinkers. A high consumption of alcohol (87) as well as binge drinking (89) have been associated with higher risk of stroke. The Scandinavian pattern of drinking is commonly characterized by low rates of abstinence and fairly high rates of binge drinking (90); 23% of male drinkers and 12% of female drinkers reported binge drinking (≥6 units of alcohol in one occasion) at least once a month in a national survey in 2012 (91).

Drug abuse (cocaine, amphetamines, heroin) may cause stroke through several pathogenetic mechanisms, e.g. by embolization after i.v. drug injection (infectious, air, talkum); by hypersensitivity reactions; by vasculitic-like changes ; by induced vasospasm (especially cocaine), or by altered cerebral autoregulation / hypertensive crisis (66).
1.4.3 Modifiable risk factors include both metabolic and lifestyle risk factors

Metabolic risk factors as hypertension, diabetes and dyslipidemia, being traditional major foci for practice guidelines and clinical research, are strongly influenced by lifestyle factors, and act as intermediate factors between lifestyle factors (e.g. diet, physical inactivity, adiposity, smoking) and ischemic stroke. Generally, risk factors can be characterized as proximal or more distal causal factors in relation to an outcome (here: IS). As illustrated in figure 3, lifestyle factors also influence IS risk through other novel risk factors, as altered endothelial function, inflammation/oxidative stress, thrombosis/coagulation, arrhythmia and other pathways (92).

Figure 3. The relations of lifestyle, established metabolic risk factors and novel risk factors on cardiovascular disease. Lifestyle factors influence disease risk through established cardiovascular risk factors (e.g. hypertension, diabetes) as well as through their effect on other novel risk factors (e.g. endothelial dysfunction, inflammatory pathways).

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1.4.4 Observed time trends in risk factors vs. time trends in stroke incidence

Changes in stroke incidence mirror the changes in risk factors over time, and the implementation of primary prevention (7, 93). The American Heart Association/American Stroke Association proposed that 20–40% of the decrease in first-ever stroke incidence is attributed to the improvement of risk factor control (7). Nevertheless, at population level, a combined risk score of trends in systolic BP, daily cigarette smoking, serum cholesterol and body mass index explained only a small proportion of stroke incidence decrease between 1982 and 1995 (94). Most studies on the relationship between changes in risk factors over time and alterations of stroke incidence have based their estimates on ecological data or mathematical modeling of aggregated data (19, 94, 95) Fewer studies used individual person data from repeated surveys to assess how the changing trends in IS incidence are associated with changes in modifiable cardiovascular risk factors (16, 18, 34); some of these studies were limited to subgroups of age (16) or did not study out-of-hospital strokes (18).

1.4.5 "What if...?" Estimating the effect of risk factor change on future stroke risk

In a public health perspective, an important question is: What would be the impact of a change in risk factor exposition in a population, on the subsequent population risk of first-ever stroke?

Randomized clinical trials (RCTs) have shown that treatment of hypertension reduces the risk of first-ever stroke by 35–40% (51, 96), and that usage of statin in low-risk, healthy individuals reduces stroke incidence by 24% (97). In contrast, only a few RCTs have evaluated the effect of lifestyle improvement on first-ever stroke risk (82, 98). However, clinical trials often have short follow-up time and limited generalizability. Therefore, evidence for long-term effect of interventions on stroke prevention may best be derived from prospective observational studies.

Several prospective observational studies have assessed the long-term associations between lifestyle risk factors and stroke risk in healthy populations (37, 99, 100) and found that 35–55%
of events were attributable to unhealthy lifestyle (i.e. smoking, heavy or irregular drinking, unhealthy diet and physical inactivity). Similarly, meta-analyses of observational studies have reported lower risk of stroke with lower levels of BP and serum cholesterol (52, 101, 102).

However, these observational studies cited above either used only baseline values of risk factors or used updated values of risk factors during follow-up (37) without appropriately adjusting for time-varying confounding. Furthermore, these observational studies estimated the lifelong impact of risk factors, (i.e. what would the stroke risk be if these risk factors were erased); whereas of more interest (and closer to real-life scenario) is the potential impact of a change in risk factor in midlife or later as an intervention.

Therefore, there is a need for reliable estimates of the potential impact of interventions on risk factors initiated in midlife or later (as in the clinical trials) over a long period of time in healthy populations (as in the observational studies).

A particular methodological challenge is to estimate the unbiased effect of a time-varying exposure in the presence of time-varying confounders if those confounders are affected by prior exposure (103). For example, if the effect of long-term weight loss is of interest, prior physical activity should be adjusted as a time-varying confounder but future physical activity can be affected by weight loss. In such cases, conventional regression models fail to adjust for confounding and may indeed introduce bias. G-methods, including the parametric g-formula, have been developed to handle such situations.
2. Aims of the thesis

The aims of the thesis were:

• To investigate age- and sex-specific trends in incidence and case fatality of first-ever ischemic stroke in a general Norwegian population

• To estimate the impact of changing risk factor levels across time on the concurrent change in ischemic stroke incidence

• To assess the effects of risk factor interventions (separate and combined) on the subsequent population risk of stroke and ischemic stroke
3. Study population and methods

3.1 The Tromsø Study cohort

The Tromsø Study is a single-center population-based health study, conducted in the municipality of Tromsø, Norway. Tromsø is located at 69° N and is a center of education, research, administration and fishing related activities. The Tromsø population is dominated by Caucasians of mainly Norwegian origin (including a Sami minority), and may be considered representative of a Northern European, white, urban population (104). From 1974 to 2012 the number of inhabitants increased from 42,200 to 68,000. Seven cross-sectional screening surveys (Tromsø 1–7) have been carried out so far; the first one in 1974, followed by repeated surveys with 6–7 years interval (1979–80, 1986–87, 1994–95, 2001, 2007–08 and 2015–16). Total birth cohorts and additional random samples of inhabitants in Tromsø were invited to surveys by written invitations sent by mail, and the attendance rate ranged from 65% to 77% (Table 2). The initial main focus in 1974 was cardiovascular diseases, but the study has expanded throughout the years to include other research areas and health aspects. In this study, data from Tromsø 1 (1974) to Tromsø 6 (2007–08) is used.

<table>
<thead>
<tr>
<th>Year of screening</th>
<th>Age group</th>
<th>Participants men, n</th>
<th>Attendance rate, %</th>
<th>Participants women, n</th>
<th>Attendance rate, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974</td>
<td>20–49</td>
<td>6 595</td>
<td>74.4</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1979–80</td>
<td>20–54*</td>
<td>8 477</td>
<td>73.8</td>
<td>8 144</td>
<td>81.8</td>
</tr>
<tr>
<td>1986–87</td>
<td>20–61†</td>
<td>10 413</td>
<td>71.7</td>
<td>10 189</td>
<td>79.1</td>
</tr>
<tr>
<td>1994–95</td>
<td>25–97</td>
<td>12 865</td>
<td>69.6</td>
<td>14 293</td>
<td>74.9</td>
</tr>
<tr>
<td>2001</td>
<td>30–89</td>
<td>3 511</td>
<td>75.7</td>
<td>4 619</td>
<td>80.8</td>
</tr>
<tr>
<td>2007–08</td>
<td>30–87</td>
<td>6 054</td>
<td>62.9</td>
<td>6 930</td>
<td>68.4</td>
</tr>
</tbody>
</table>

*20–49 years in women  
†20–56 years in women
Figure 4. Flowchart of the study population
3.1.1 Paper I study population

In Paper I we investigated the age- and sex-specific time trends in incidence and case fatality of IS. Of the 38,880 men and women who attended at least one of the studies Tromsø 1–6 and were aged ≥20 years, registered as inhabitants in Tromsø at the date of enrollment and had valid informed consent to medical research; we excluded 1,822 participants who remained <30 years during the entire follow-up period. (Participants who were enrolled at an age younger then 30, but became 30 years during follow-up, were followed from age 30 and onwards). Moreover, we excluded 146 with previous IS and 44 with previous unclassified stroke at time of inclusion; and 8 who after enrollment got an unclassified stroke followed by an IS. The analyses were stratified by gender and age (30–49, 50–64, 65–74 75–84 and 85 years and older). Because the oldest birth cohorts were included in the study at a later point of time than the younger ones, the time periods for the trend analyses and incidence rates were different for each age group (see Table 1 and detailed description in Paper I). Thus for men, age-specific trends for the age groups 30–49, 50–64, 65–74, 75–84 and ≥85 years could be estimated for the time periods 1974–2010, 1989–2010, 1995–2010, 1995–2010 and 1995–2010, respectively. As lack of access to computed tomography (CT) before 1977 made it more difficult to rule out hemorrhage, onset of follow-up for men aged 30–49 years was set to January 1st, 1977. For women, analyses for the corresponding age groups were done for the time periods 1980–2010, 1994–2010, 1995–2010, 1995–2010 and 1995–2010. Due to age limitations, we had to exclude another 285 subjects from the trend analyses. Hence the total number of persons included in the analyses on incident ischemic stroke was 36,575; 18,367 women and 18,208 men.

3.1.2 Paper II Study population

In Paper II we estimated the impact of changing risk factor levels across time on the concurrent change in ischemic stroke incidence. In the time between writing Paper I and Paper II, one participant withdraw the consent to research, leaving 38,879 participants aged ≥20 years who
had attended at least one of the studies Tromsø 1–6 with valid consent and valid address in Tromsø at enrolment. Of these, we excluded 10,663 who did not attend any of the surveys Tromsø 4, Tromsø 5 or Tromsø 6 or who remained <30 years during the entire follow-up period, leaving 28,216 persons who attended at least one of the surveys Tromsø 4–6 and were aged ≥30 years at survey date or during follow-up. (Participants who were enrolled at an age younger then 30, but became 30 years during follow-up, were followed from age 30 and onwards). Further, we excluded 217 with previous IS at baseline (the first survey the person participated in out of Tromsø 4-6); 57 with previous unclassified stroke at time of inclusion; and 6 who after enrollment got an unclassified stroke followed by an IS, leaving 27,936 persons (14,697 women and 13,239 men) eligible for the background analyses in Paper II (see Figure 4 and detailed description in Paper II). Included in the main analysis in Paper II, however, were those out of the 27,936 who had attended Tromsø without missing risk factors; who were 30 years or older at Tromsø 4 or became 30 years during follow-up Hence, we excluded 1,607 who did not attend Tromsø 4, and 296 with missing risk factors for at least one of the variables at Tromsø 4, leaving 26,033 persons who were included in the main analysis in Paper II.

3.1.3 Paper III Study population

In paper III we assessed the effect of risk factor intervention on the subsequent population risk of stroke and IS. We chose Tromsø 4 (1994–95) as baseline in order to have complete pre-baseline data on the selected covariates. From the 38,879 participants aged ≥20 years who had attended at least one of the studies Tromsø 1–6 with valid consent and valid address in Tromsø at enrolment, we excluded 17,039 who did not attend baseline and at least one of the prior surveys Tromsø 2 or Tromsø 3; 1,997 without valid address at baseline and 349 who were <20 years in Tromsø 3. Participants who were 25 years or older at Tromsø 4 and had attended at least one prior cycle were eligible for our study (n=19,494). We excluded 4,698 participants who at baseline had experienced cancer, heart attack or stroke or had incomplete pre-baseline or baseline covariate data after carrying data one cycle forward (see Figure 4 and detailed
description in Paper III). After exclusions, our cohort included 14,796 persons (7,547 women and 7,249 men.)

3.1.4 Ethics

The Tromsø Study was approved by the Norwegian Data Inspectorate and recommended by the Regional Committee of Research Ethics. In Tromsø 4, 5, and 6, each participant signed a written informed consent.

3.2 Physical measurements, blood samples and questionnaires

Each Tromsø survey applied a standardized protocol with physical measurements, blood samples and self-administered questionnaires. Blood pressure (BP) was measured by trained personnel with an automatic device ("Dinamap") from 1986 and onwards (Tromsø 3), and by stethoscope and mercury sphygmomanometer ("ERKAmeter") in the two earliest surveys. Validation studies have shown systematic slightly lower blood pressure values when measured with Dinamap as compared to ERKA-meter (Details in supplement, Paper III). Hence, in paper III, because some participants contributed with pre-baseline data from Tromsø 2; Dinamap measurements were transformed to ERKA-meter values in accordance with previously validated methods (105). Hypertension was defined as systolic BP (SBP) ≥140 mmHg and/or diastolic BP (DBP) ≥90 mmHg and/or use of BP-lowering medication. Body Mass Index (BMI) was calculated as weight divided by the square of height (kg/m²). Overweight was defined as BMI ≥25 to <30 kg/m² and obesity as BMI ≥30 kg/m².

Non-fasting blood samples were analyzed for serum total cholesterol and high-density lipoprotein cholesterol by standard methods at the University Hospital of Northern Norway. Hyperlipidemia was defined as total cholesterol/HDL ratio >5.

In all Tromsø Surveys, a questionnaire was enclosed in the invitation. In Tromsø 2–6, the participants were given a second questionnaire and asked to return it by mail in a pre-
addressed stamped envelope; approximately 90% did so. The questionnaires include questions regarding a wide range of diseases and symptoms, socio-economic status, lifestyle aspects and use of medication. In our study, we used this self-reported information regarding prevalent cancer and CVD, cardiovascular symptoms, family history of coronary heart disease, race, education and employment. Moreover, diabetes was self-reported by questionnaire, as were smoking, alcohol consumption and leisure-time physical activity (PA). In paper II attendees were defined as physically active if they reported performance of strenuous physical activity (i.e. became breathless and sweaty) at least one hour/week. In paper III, where we wanted to assess one feasible and one intensive PA intervention, participants were categorized according to PA as: ‘sedentary’; ‘intermediate physically active’ (some light PA and/or vigorous PA less than 3–4 hours per week) and ‘highly physically active’ (vigorous PA several times or ≥3–4 hours per week) (Details in supplement, Paper III).

3.3 Ascertainment of endpoints

First-ever ischemic stroke was the primary endpoint in Paper I and II. In Paper III, first-ever stroke was the primary endpoint, but separate analyses were performed for first-ever ischemic stroke. Stroke was defined according to the WHO definition ("rapidly developing clinical signs of focal or global disturbance of cerebral function, with symptoms lasting ≥24 hours or leading to death, with no apparent cause other than vascular origin") (2). Hence, silent infarcts discovered only by radiological imaging were not included. A stroke was classified as an ischemic stroke when computed tomography (CT), magnetic resonance imaging (MRI) and/or autopsy had ruled out intracerebral and subarachnoid hemorrhage. If imaging or autopsy had not been conducted in the acute stage, the stroke was categorized as unclassified. The unique national identification number was used to link each participant to the discharge diagnosis registry at University Hospital of North Norway (the only hospital serving Tromsø) and to the National Causes of Death Registry and the Population Registry of Norway. An independent endpoint committee adjudicated all possible hospitalized and out of hospital events using medical
records, autopsy reports and death certificates. Information from additional sources (records from nursing homes, general practitioners, and ambulance services) was used for validation. Participants were followed until the first-ever IS event (Paper I, II, III) or first-ever stroke (Paper III), emigration from Tromsø, death, or administrative end of follow-up, whichever happened first. End of follow-up was 31.12.2010 in Paper I, and 31.12.2012 in Paper II and III. The endpoint registry was updated through 2012 after the publication of Paper I. Hence, we repeated the main analyses in paper I with end of follow-up 31.12.2012, these additional analyses are referred separately.

### 3.4 Statistical analyses

The analyses in paper I were performed using STATA, version 12 and 13 (Stata Corp LP Texas, USA), while STATA 13 and SAS 9.4 (SAS Institute, Cary, NC) were used for the analyses in paper II and III. Additionally, in paper III we applied the parametric g-formula ([http://www.hsph.harvard.edu/causal/software](http://www.hsph.harvard.edu/causal/software)) to estimate the 18-years cumulative risk of stroke under different hypothetical interventions.

#### 3.4.1 Paper I

Sex-specific crude incidence rates (per 1,000 person-years) were calculated for the age groups 30–49, 50–64, 65–74, 75–84 and 85 years and older by dividing the number of all events in the period of time by the corresponding person-years at risk. Time trends in incidence rates were estimated by taking into account the possibility of non-linearity. In each sex and age strata, calendar year was fitted by second-degree fractional polynomials and regressed on the incidence of stroke in Poisson regression models. The stratified analyses were age-adjusted by including age as a continuous variable in the models. Of the forty-four models fitted and compared for each stratum, the best fractional polynomial model of degree 2 was compared with the best model of degree 1, and the model with the best likelihood ratio test statistic for the fractional polynomial term was selected. The p-value of the selected model represents the
p-value for the time trend.

Incidence rate ratio (IRR) was defined as the incidence rate in the last year of follow-up divided by the incidence rate in the first year. For all age groups, except women aged 30–49 years, IRR was calculated from start of follow-up (see 3.1.1) through Dec.31 2010. In women aged 30–49 years, IRR was calculated from 1989, when the first stroke occurred in this stratum. Additional analyses were done with a combined endpoint of ischemic and unclassified stroke.

Crude case fatality rates were calculated for the time periods 1995–2000, 2001–2005 and 2006–2010. Logistic regression was used to estimate age-adjusted odds ratios (OR) for case fatality in the period 2001–2005 and 2006–2010, using 1995–2000 as the reference. Possible non-linear time trends of case fatality from 1995 to 2010 were assessed in separate sex-specific logistic regression models by including fractional polynomials of calendar year, with age included as a covariate. Age-adjusted ORs for case fatality were estimated for the years 2003 and 2010, using 1995 as the reference. Trends across age and sex were compared by including two-way interaction terms between time and age and time and sex. A probability value of <0.2 was considered statistically significant for tests of interaction, while a two-sided level of significance of $P <0.05$ was used for all other analyses.

3.4.2 Paper II

Descriptive baseline characteristics were presented as means (95% CI) or frequencies (%) for the study participants with or without incident IS during follow-up; $P$-values for baseline differences were estimated by linear and logistic regression for continuous and categorical variables, respectively. Age- and sex-adjusted means or prevalences of risk factors over time were estimated by generalized estimating equations (GEE), accounting for dependencies between repeated observations.

Hazard ratios (HR) of IS were estimated for the different cardiovascular risk factors with Cox proportional hazards regression. For attendees who participated in more than one survey and
who were still free of IS, cardiovascular risk factors were updated at the date of subsequent examinations (106). HRs were adjusted for age and sex in model 1 and additionally adjusted for systolic BP, cholesterol, HDL, daily smoking, BMI, diabetes and physical activity in model 2. The proportional hazard assumption was verified by visual inspection of Schoenfeld residuals and log minus log survival plots.

Incidence analyses were based on the participants of Tromsø 4 in 1994–95 (n=26,329). Time trends in incidence were standardized by age and sex using the Tromsø population in 2007 as the standard population. Linear time trends were estimated by Poisson regression.

The proportion of the IS incidence decline explained by the change in each risk factor over time (SBP, daily smoking, diabetes, BMI, total cholesterol, HDL cholesterol, physical activity) could be estimated among those who attended Tromsø 4 in 1994–95 without missing values of risk factors (n=26,033), by the expression (β0 – β1)/β0. The βs are time trend coefficients from Poisson regression models, where β0 is adjusted for age and sex and the β1 additionally adjusted for risk factors added to the model as time-dependent covariates. End of follow-up was defined to 2001 for those who did not attend the 2001 survey and to 2007 for those who did not attend the 2007–08 survey. Individuals who had an IS event were censored from the analyses at the time of their event. One thousand bootstrapped samples were selected to estimate 95% confidence interval for the explained decline. We performed supplemental Poisson regression analyses stratified by sex and by age group (baseline age <60 years and ≥60 years, this cut-off was chosen to get sufficient power in both groups). A two-sided level of $P$ <0.05 was considered statistically significant.
3.4.3 Paper III

We applied the parametric g-formula to estimate the 18-years cumulative risk of stroke under different hypothetical interventions (107). The parametric g-formula represents a generalization of standardization for time-varying exposures and confounders, and the analytical steps of this method are described in paper III.

This method can be described as constructing a hypothetical RCT based on data from a prospective cohort study, where the control group and the treatment group consists of the same individuals. Our cohort under the "natural scenario" represents the "control group" (with the risk factor distribution and concurrent stroke incidence we observed in "real life", i.e. no intervention), and each hypothetical intervention (separate or combined) applied on this cohort defines a new "treatment group".

The models included the following potential baseline confounders: age (continuous and quadratic), sex, marital status, education, work-time physical activity, night- or shiftwork, former smoking and family history of coronary heart disease in parents or siblings, as well as pre-baseline HDL cholesterol and diabetes mellitus, and the pre-baseline values of six selected intervention variables: smoking, physical activity, alcohol use, BMI, systolic BP and total cholesterol.

We evaluated six feasible and six intensive hypothetical interventions, and their combination. The feasible interventions were: 13% of smokers quit smoking (108); all participants were somewhat physically active (some light PA and/or vigorous PA <3–4 hours per week); 20% of alcohol drinkers quit drinking (109); all overweight or obese participants lost weight by 10% every 6 years; all participants maintained systolic blood pressure (SBP) <140 mmHg (51); and all maintained total cholesterol <6.22 mmol/L (110). The intensive interventions were: all smokers quit smoking; all participants performed vigorous PA ≥3–4 hours per week; all drinkers quitted alcohol; all participants had normal body mass index (i.e.<25 kg/m²); all maintained SBP <120
mmHg (111) and total serum cholesterol <5.18 mmol/L (110).

We compared the estimated stroke risks under different hypothetical interventions with the 18-years stroke risk under no intervention to calculate the population risk ratios and the population risk differences. Subgroup analyses were done for men and women, for participants aged <55 vs. ≥55 years at baseline, and for participants with highest attained baseline education level ≤10 and >10 years. We conducted sensitivity analyses in which we varied the ordering of the time-varying covariates in our model, and excluded attendees with diabetes at baseline. Separate analyses were done with ischemic stroke as endpoint. We used nonparametric bootstrapping with 500 samples to estimate the 95% confidence intervals. The proportion of participants who were hypothetically intervened on in any period were also computed, as well as the average proportion of attendees intervened on, in each 6-years period.
4. Main results

4.1 Time trends in incidence and case fatality of first-ever ischemic stroke.

The Tromsø Study 1977–2010 (paper I)

Among 36,575 attendees aged ≥30 years there were 1,214 first-ever ischemic strokes within a total follow-up time of 611,176 person-years. The overall age- and sex-adjusted incidence declined by 24% from 1995 through 2010 (IRR 0.76, 95% CI 0.62–0.92; p for trend <0.001).

In women aged 30 to 49 years, the incidence increased significantly from 1980 to 2010 (IRR: 2.69, 95% CI 1.04–6.99; p for trend 0.003). In men aged 30–49 years, there was a non-significant, rising trend from 1977 to 2010. Men aged 50–64 years had similar incidence in 2010 compared to 1989. From the mid-1990s to 2010, the incidence declined significantly in women aged 50–74 years and in men aged 65–74 years, but remained stable in those aged ≥75 years. Despite this indication of interaction of age by different shapes of the curves, we did not reveal any statistical significant interaction by age (P=0.87). This may be due to that our test for interaction lack power. There was no significant interaction by sex. Mean age at IS onset was approximately 4 years higher in women aged 30–84 years compared to men. In the combined endpoint analyses where 77 unclassifiable strokes were included, time trends remained fundamentally unchanged, but the IRRs were no longer significant in women aged 30–49 and men aged 50–64 years.

Between 1995 and 2010, the mean crude case fatality for IS in persons aged 30–84 years was 7%, and 20% in participants ≥85 years. The age-adjusted case fatality decreased significantly in men aged 30 to 84 years from 1995 to 2010, whereas there was no significant change in women (p for interaction =0.007). Age-adjusted case fatality of IS was higher for women than men through the whole period.
4.2 Declining incidence of ischemic stroke: What is the impact of changing risk factors? The Tromsø Study 1995–2012 (paper II)

There were 1,226 first-ever IS (45% in women) during 367,636 person-years of follow-up among 27,936 attendees ≥30 years followed through 2012. Mean observation time was 12.8 years (SD 6.0). Several cardiovascular risk factors changed favorably across the three surveys Tromsø 4–6. Systolic and diastolic BP, total cholesterol, proportions of hypertension, hyperlipidemia, and daily smoking declined, and the proportion of participants who reported ≥1 hour strenuous physical activity per week enlarged. However, the prevalence of obesity and diabetes mellitus increased substantially from Tromsø 4 (1994–95) to Tromsø 6 (2007–08). While the diabetes prevalence increased with 100% among attendees aged ≥30 in this period, the prevalence of overweight and obesity combined increased from 51% to 61%.

In Cox proportional hazard regression, hypertension was the strongest risk factor for IS, with 92% increased hazard (multi-adjusted) in hypertensive participants. Diabetes was associated with 80%, and daily smoking with 71% higher IS risk. Obese attendees had 28% higher hazard for IS compared to those normal weighted. The risk of IS was 28% increased in attendees with hyperlipidemia, while HDL was protective for IS, with 22% reduced HR per 1 mmol/l increase in mean HDL. Associations that were significant in the age- and sex-adjusted model remained significant in the multivariate model, except for overweight and physical activity.

Overall, the combined change in seven cardiovascular risk factors (systolic blood pressure, daily smoking, diabetes, BMI, total cholesterol, HDL, physical activity) accounted for 57% (95% CI 28–100%) of the decrease in IS incidence from 1995 through 2012 in those who attended Tromsø 4 without missing risk factors (n=26,033). The most important contributors were decreasing mean systolic blood pressure and smoking prevalence, accounting for 26% (95% CI 15–56) and 17% (95% CI 8–41) of the observed decline, respectively. Changing levels of HDL contributed with 2% (95% CI 0.3–7), while reduction of total cholesterol and increase in physical activity were associated with 12% and 5% of the declining IS incidence (not significant). In contrast, the
increasing diabetes prevalence contributed negatively with 4% increase in risk, (95% CI –10 to –1), as did the change in BMI over time, which was associated with 5% increasing risk, though not significant. The sex-stratified analyses revealed that the reduction in SBP and decreasing prevalence of daily smoking contributed most to the declining IS incidence in both women and men. Age-stratified analyses (baseline age <60 years and ≥60 years) showed no differences in risk factor contribution to the IS incidence reduction (p=0.58), and hence no significant interaction by age in the fully adjusted model.

4.3 Hypothetical interventions to prevent stroke: An application of the parametric g-formula to a healthy middle-aged population (paper III)

Among the 14,796 eligible participants (mean age at baseline 46.1 years, 51% women) there were 871 deaths and 524 cases of stroke during 18-years follow-up (399 IS, 61 ICH, 33 SAH and 31 unspecified strokes). Of the 6,917 participants who were not eligible through all 18 years of follow-up, 68% (n=4,718) were not invited to a later survey due to logistics; 21% (n=1,425) moved out of Tromsø, and 11% (n=774) had missing data on two subsequent surveys. The simulated 18-years risk of stroke under no intervention was 5.50% (95% CI 5.03–5.99) and similar to the observed risk at 5.89%.

Even feasible reductions substantially reduced the stroke risk. Specifically, reducing SBP to <140 mmHg was estimated to lower the 18-years population risk of stroke by 15% (95% CI 10–20), compared to "no intervention". Smoking cessation in 13% of smokers would reduce the risk by 2% (95% CI 0–4), and quitting drinking in 20% of drinkers would reduce risk by 8% (95% CI –1 to 14); whereas increasing physical activity, reducing body-mass index or lowering total cholesterol to <6.22 mmol/l did not substantially alter the population stroke risk. The 18-years risk of stroke would be reduced by 19% (95% CI 8–30) when all six feasible interventions were applied. Maintaining adherence to the strategy of feasible reduction of SBP in this particular population would require changing the SBP of an average of 31% of participants in each period,
while adherence to a strategy with joint feasible interventions would require risk factor changes of an average of 80% of the attendees in each period.

Under more intensive interventions, lowering SBP to <120 mmHg would reduce this populations 18-year stroke risk by 32% (95% CI 22–40), quitting drinking by 25% (95% CI –2 to 45) and quitting smoking by 9% (95% CI 1–17). The other intensive interventions did not change the stroke risk substantially when applied separately. Combining all the intensive interventions would reduce the estimated 18-years risk of stroke by 55% (95% CI 32–72).

In sub-group analyses, the estimated impact of an intensive combined intervention on all six risk factors did not differ significantly by the selected subgroups in multiplicative or additive scale. The estimates of relative risks and risk differences did not change materially in any of the sensitivity analyses conducted.

For IS, the observed 18-years risk was 4.55% and the simulated risk under no intervention was 4.23% (95% CI 3.80–4.67). Separate intensive interventions on SBP and alcohol drinking reduced the risk of ischemic stroke. If all drinkers had quit alcohol, the 18-years IS risk would be reduced by 32% (95% CI 3–54), nearly as much as lowering SBP to <120 mmHg (35% (95% CI 25–44). The 18-year risk of ischemic stroke would be reduced by 64% (95% CI 39–79) under the intensive joint intervention on all risk factors, while a more feasible combined intervention would give an estimated 24% (95% CI 9–35) IS incidence decline. Separate feasible interventions on SBP reduced the risk of IS with 18% (95% CI 12–23). The risk reduction by quitting alcohol in 20% of drinkers was 10% (95% CI 1–17), while smoking cessation in 13% of smokers would reduce the IS risk by 2% (95% CI 0–4).
5. Discussion

5.1 Methodological considerations

The renown epidemiologist Kenneth Rothman has written that “The objective of an epidemiological study is to obtain a valid and precise estimate of the frequency of a disease or of the effect of an exposure on the occurrence of a disease in the source population of the study” (112). Essential to epidemiological studies is accuracy in measurements. Accuracy is defined as the degree to which a measurement, or estimate based on measurements represent the true value of the attribute being measured (113). Threats against accuracy in estimations are random errors (lack of precision) and systematic errors (bias). If not recognized, errors will generate false knowledge. Precision, as a measure of random error, refers to the magnitude of differences between repeated measurements (reliability, reproducibility). Precision is expressed through the confidence interval and depends of the study size and the study efficiency. Systematic errors in estimates (systematic deviations from the truth) are commonly referred to as bias. Bias can occur at every step of the research process, with weakening of a true association or production of a false association as consequence. The opposite of bias is validity, so that an estimate with little systematic error may be described as valid (112). Moreover, validity refers to how the study results apply to the target population. Validity can be separated into two components: Internal and external validity, where the former is a prerequisite for the latter.

5.1.1 Internal validity

Internal validity (or lack of systematic error) refers to the inference drawn from the sample to the source population, i.e. whether the results of a study are representative, true or valid for the population under study (112). Three types of errors may threaten the internal validity of an epidemiological study: selection bias, information bias (= measurement bias) and confounding. Any observed association might also occur by chance alone.
**Selection bias**

Selection bias is defined as “a systematic error that results from procedures used to select study subjects, and from factors that influence study participation” (112). Hence, this type of bias can also occur if many attendees are lost to follow-up. The common consequence of selection bias is that the association between exposure and outcome is different for those who participate and for all those who should have been theoretically eligible for study, including those who did not participate (112). In a population survey, selection bias can be a problem especially if the participation rate is low.

The design of the Tromsø Study, with invitation of total birth cohorts and random samples ensures a representative study population. Despite a lower attendance rate in the sixth survey, the participation rates to the Tromsø Study surveys have generally been high (Table 1). In the Tromsø Study, a higher proportion of non-attendees belonged to the youngest age group or was ≥80 years; a higher proportion was single and the proportion of men was higher compared with attendees. Legal restrictions have precluded analyses of mortality and morbidity among non-attendees. However, healthy persons may generally be more prone to attend population studies than the less healthy ones (known as healthy participant bias or non-response bias)(114). We cannot exclude that a healthy participant bias may have affected our estimates in paper I, II and III, diluting the true associations between risk factors and outcome, even if a high participation rate minimize its impact on the risk estimates.

The loss to follow-up in the Tromsø Study is negligible due to usage of the unique personal identity number to search official health registries. Selective survival, especially among the eldest ones, may also be a source of selection bias, with higher representation during follow-up of attendees with a more favorable risk factor profile compared to deceased persons from the same birth cohort. Lower mortality was previously demonstrated among subjects who were consistent attendees in the three surveys Tromsø 2, 3 and 4, compared to those who were invited to all three surveys, but only attended Tromsø 4 (104). In the main analysis in paper II,
the associations between trends in IS incidence and trends in risk factors were based on participants with updated risk factors. In paper III, the eligible participants were those with complete baseline and pre-baseline data. The criteria of subsequent attendance in paper III and the use of data only from the years with updated risk factors (in the main analysis paper II, and in paper III) could also introduce healthy participant bias as well as survival bias (due to higher contribution from consistent attendees).

**Information bias and misclassification**

An important source of error in cohort studies is information bias (measurement bias); defined as “an error that arises from systematic differences in the way that information on exposure or disease is obtained from the study groups” (115). Information bias may distort an effect estimate when exposure status or disease status is incorrectly measured or classified (113).

Thorough validation of measurement methods and questionnaires are crucial to minimize measurement error in the exposure variables. For discrete variables, measurement error is usually named misclassification (112). Classification error (of exposure or outcome variables) that depends on the actual value of other variables is called differential misclassification, while non-differential misclassification is classification error not dependent on the values of other variables. Non-differential misclassification will most often weaken a true association, (although with more than two levels in the exposure or the disease variable, the direction of the bias may be more difficult to interpret) (112). Differential misclassification is more serious, and can alter the estimates in any direction.

In a prospective cohort study, the level of exposure is registered prior to the registration of outcome status, and the classification errors of exposure tend to be non-differential.

The physical measurements (blood pressure, height, weight) were performed by standard protocol in the Tromsø surveys to minimize measurement error (see 3.2). Non-fasting blood lipids were registered. The effect of non-fasting condition on total and HDL cholesterol is
negligible, while triglyceride levels vary substantially throughout the day (116). The
questionnaire instrument is subjective and imprecise and some misclassification may exist. This
will probably be most pronounced in the self-reported lifestyle variables. HbA1C was
introduced as an additional diagnostic test for diabetes during the study period, and the
proportion with unrecognized diabetes may have been higher in the earliest phase of our study
(117). Nevertheless, self report on well defined medical conditions often have a high positive
predictive value (118). The validity of the physical activity questions is discussed in paper II and
III (supplements). A meta-analysis revealed that the validity of self-reported smoking were
generally high (119). However, for smoking (120) and alcohol consumption (121), an under-
report must be expected, while over-reporting is more liable with regard to physical activity
(122). As a result of some non-differential misclassification of these exposure variables, the
effect estimates in paper II and III could be diluted or underestimated.

Several steps were taken to ensure an accurate classification of the outcome variables IS and
stroke (Details in 3.3). However, despite a thorough case ascertainment, we cannot exclude
that some IS (or in paper III: strokes) remained unidentified, due to sparse symptomatology
leading to non-detection, non-referral (or both).

The amount of misclassification of IS over time, due to non-detection, is difficult to assume.
The definition of IS in our study is based on the clinical stroke definition by WHO (2) and
exclusion of hemorrhage. The considerable improvements in radiological imaging the last
decades include gradual implementation of CT and MRI modalities with increasing sensitivity
for small ischemic lesions (123). Despite that the IS endpoint classification in our study is based
on a clinical stroke definition (i.e. silent cerebral infarcts are not included in the IS endpoint),
the enhanced options to verify a small ischemic lesion by imaging could still lead to information
bias by changing the proportions of misclassified IS with time. Under the assumption that
radiological confirmation of ischemia (in the clinical setting) may lead to a higher awareness of
clinical signs/ more thorough clinical examination), fewer of the IS cases with only minimal
clinical signs would (wrongly) be classified as “not IS” in the latest period, compared to the earliest years of our study. This represents a source for potential differential misclassification of those IS with only sparse clinical signs. Furthermore, improved treatment options for stroke may have lowered the threshold for referral of stroke patients to hospital, leading to increased detection rate in the latter part of the follow-up period.

Confounding

When an association between an exposure and an outcome is distorted due to the effect of a covariate related to both the exposure and the outcome, this is called confounding (114). Most simply, confounding can be defined as a “mixing” of effects. Hence, a confounder is a factor which is associated both with the exposure (causally or non-causally) and the outcome variable (causally), and which accounts for some of the relationship observed between the exposure and the outcome. To be a confounder, this factor must not be an intermediate factor between these two.

Confounding can also be considered in terms of the counterfactual ideal (114). Counterfactual means “contrary to the fact”, a logic expressing of what has not happened but could, would or might have happened under differing conditions (124). In a cohort study, the ideal comparison group should consist of exactly the same persons as in the exposure group, had they not been exposed to the risk factor of interest. Because it is not possible in real life for the same individual to be exposed and unexposed simultaneously, the obvious comparison group (reference group) in a cohort study will consist of other persons, namely those not exposed to the risk factor of interest. Confounding can be viewed as a failure of the comparison group to reflect the counterfactual experience of the exposed group (115).

Confounding may under- or overestimate the association under study, it may change the direction of an effect, or it may obscure a true causal relationship (114). If sufficient information about possible confounders is available, confounding can (partly) be accounted for.
in the statistical analyses. Strategies that can be used to minimize bias due to confounding are stratification and multivariate adjusted models with inclusion of potential confounders.

In paper I, we performed age-and sex stratified analyses of time trends in incidence and case fatality of IS. Moreover, the stratified analyses were age-adjusted by including age as a continuous variable in the regression models.

In paper II (main analysis), the association between changes over time in levels or prevalence of each risk factor (updated values) vs. time trends in incidence of the outcome (IS) (“explained decline of IS incidence”) was assessed in an age-and sex adjusted Poisson regression model for each risk factor separately. Moreover, a multi-adjusted Poisson model estimated the joint effect of the observed risk factor change on the concurrent 18-years risk of IS. Separate sex stratified analyses were done, as well as analyses stratified on baseline age <60 and >60 years. Due to relatively few number of IS in the youngest age group (30–49 years), and additionally the prerequisite of using updated risk factor values in the main analysis, we did not have sufficient power to run separate analyses for explained decline for the youngest age group.

In the background analysis in paper II, the associations between the different risk factors (updated values) and the outcome (IS) were assessed in a multivariate adjusted Cox regression model, but also shown in an age-and sex adjusted model.

In paper III, in a framework of counterfactual consideration of confounding, we applied (by parametric g-formula) hypothetical interventions on the sample of eligible attendees, using the identical sample under no intervention (i.e. the “natural scenario”) as the comparison group. Thus, the analyses in paper III are performed in a (hypothetical) setting where the exposure group and the comparison (reference) group consist of the same individuals (see 3.4.3). In addition to reduce the possibilities for confounding by ensuring an identical exposure and comparison group, the parametric g-formula is found to appropriately adjust for time dependent confounding. For example, if the effect of long-term weight loss is of interest, prior
physical activity should be adjusted as a time-varying confounder, but future physical activity can be affected by weight loss. Hence, a particular methodological challenge is to estimate the unbiased effect of a time-varying exposure in the presence of time-varying confounders if those confounders are affected by prior exposure (103). In such cases, conventional regression models fail to adjust for confounding and may indeed introduce bias. G-methods, including the parametric g-formula, have been developed to handle such situations (107).

5.1.2 External validity

The external validity of a study refers to whether the study findings are valid for people outside the study population, i.e. the generalizability of the results. The age and sex distribution of the Tromsø Study mirror the Tromsø population in general. The Tromsø population is not substantially different from other Western populations with regard to risk factor levels and incidence of cardiovascular diseases. Our results are therefore likely applicable to other Western populations, however, generalizability may be restricted to ethnicity, as the Tromsø population consists of mainly Caucasians (104, 125).
5.2 Discussion of main results

5.2.1 Time trends in incidence and case fatality of first-ever ischemic stroke

The overall age-and sex adjusted incidence of IS declined with 24% from 1995–2010; this decline was driven by the changing incidences across time among the middle-aged and elderly, in whom the vast majority of ischemic strokes occur. The age-stratified analyses, however, revealed different time trends across the predefined age groups.

The increasing incidence of IS among women aged 30–49 years in our cohort is worrying. Although these findings must be interpreted with caution due to the low number of endpoints in this age group, they are in line with other studies reporting an increase in incidence for the youngest age groups (17,20,21). In a prospective, population-based study from Dijon the incidence of first-time IS among men and women <55 years increased significantly from 1994–2002 to 2003–2011 (21). A significant increasing IS incidence in persons aged 20–44 years was also reported in the retrospective, population-based Greater Cincinnati/Northern Kentucky Stroke Study between 1993 and 2005 (20), while a continuous rising incidence of IS in people aged 18–44 years was found in a nationwide Swedish study from 1987 to 2010 (17).

Similarly, increasing incidence was revealed in a register based study among Dutch men and women aged 35–64 years from 1997 to 2005 (22). A rise in hospitalization rate for acute IS in people <45 years of age from 1995 to 2008 was also discovered in a study based on administrative data from USA (126). Even if some of these referred trends were rather weak and even if stable IS time trends in younger age groups are reported in other studies (19), a recent editorial in Journal of the American Heart Association proclaimed the large amount of evidence regarding increasing incidence of IS in young adults, but stated that the reasons for this trend are probably multiple (127) (see 5.2.2).
The declining IS incidence from the mid-1990s among women aged 50 to 74 and men aged 65–74 years are in line with findings from other high-income populations (16–18). The decrease is explained by the combined effect of reduction in risk factor levels and improved primary prevention (16, 34, 93).

The rising trend among men aged 50–64 years from 1989 to early 2000, followed by a decline until 2010, is difficult to interpret. Rosengren et al. found an increase in the IS incidence in people aged 45 to 64 years, from the late 1980s, to the late 1990s, followed by a decline to 2010 (17). In the ARIC cohort, no decline in stroke incidence was found from 1987 to 2011 in the age group 45–64 years in contrast to decreasing incidence in those >65 years (18).

We found no significant change in incidence over time among participants aged 75–84 and ≥85 years, which was also reported in the Global Burden of Disease Study (1990–2010) (15), and in the Netherlands from 1997 to 2005 (22). In contrast, studies from Sweden showed a significant declining trend of IS in subjects aged 75–84 from the mid-1990s to 2010, and a reduced stroke incidence in women ≥85 years old (17, 23).

Paper I was written when the endpoint registry was updated through 2010. When updated through 2012, 164 IS were added, and the main analyses in paper I were repeated with end of follow-up set to 31.12.2012 (Table 3). The overall age- and sex-adjusted incidence decline from 1995 through 2012 was 27% (95% CI 13%–39%) and similar in men and women. The increasing trend in IS incidence among the youngest women (30–49 years) persisted through 2012 and the corresponding P-value for this rising time trend was strengthened (IRR 2012 vs. 1980: 3.29, 95% CI 1.19–9.09; p for trend 0.0007), as compared to the original analyses with end of follow-up 31.12.2010 (IRR 2.69, 95% CI 1.04–6.99; p for trend 0.0033). In men aged 30–49 years, a non-significant, rising trend was found from 1977 to 2012; in men aged 50–64 years, the IS incidence in 2012 was not significantly different from that in 1989. The incidence decline was significant through 2012 also in women aged 50–64 and men aged 65–74 years. Women 65–74
years showed a significant declining time trend (non-linear). Among attendees aged 75–84 and ≥85 years, the incidence remained stable also after the end-point registry was updated through 2012.

Table 3. Age-adjusted incidence rate ratio (IRR) of ischemic stroke by age group and sex.

<table>
<thead>
<tr>
<th>Age group (y)</th>
<th>Period</th>
<th>No. of ischemic strokes</th>
<th>IRR* (95% CI)</th>
<th>p value time trend†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30–49</td>
<td>1977–2012</td>
<td>63</td>
<td>4.18 (0.43–40.31)</td>
<td>0.152</td>
</tr>
<tr>
<td>50–64</td>
<td>1989–2012</td>
<td>225</td>
<td>1.55 (0.90–2.68)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>65–74</td>
<td>1995–2012</td>
<td>219</td>
<td>0.56 (0.37–0.85)</td>
<td>0.0082</td>
</tr>
<tr>
<td>75–84</td>
<td>1995–2012</td>
<td>211</td>
<td>0.86 (0.54–1.38)</td>
<td>0.173</td>
</tr>
<tr>
<td>≥85</td>
<td>1995–2012</td>
<td>72</td>
<td>0.92 (0.44–1.95)</td>
<td>0.832</td>
</tr>
<tr>
<td>≥30†</td>
<td>1995–2012</td>
<td>744</td>
<td>0.73 (0.58–0.93)</td>
<td>0.0089</td>
</tr>
<tr>
<td>Women</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30–49</td>
<td>1980–2012</td>
<td>31</td>
<td>3.29 (1.19–9.09)</td>
<td>0.0007</td>
</tr>
<tr>
<td>50–64</td>
<td>1994–2012</td>
<td>86</td>
<td>0.42 (0.21–0.85)</td>
<td>0.019</td>
</tr>
<tr>
<td>65–74</td>
<td>1995–2012</td>
<td>116</td>
<td>0.55 (0.31–1.01)</td>
<td>0.049</td>
</tr>
<tr>
<td>75–84</td>
<td>1995–2012</td>
<td>228</td>
<td>0.83 (0.54–1.28)</td>
<td>0.397</td>
</tr>
<tr>
<td>≥85</td>
<td>1995–2012</td>
<td>127</td>
<td>1.34 (0.64–2.81)</td>
<td>0.432</td>
</tr>
<tr>
<td>≥30‡</td>
<td>1995–2012</td>
<td>575</td>
<td>0.72 (0.55–0.95)</td>
<td>0.018</td>
</tr>
<tr>
<td>All ≥30‡</td>
<td>1995–2012</td>
<td>1319</td>
<td>0.73 (0.61–0.87)</td>
<td>0.0004</td>
</tr>
</tbody>
</table>

CI: Confidence Interval; IRR: Incidence Rate ratio

* Incidence rate ratio (IRR) is calculated from start of follow up (year) until 2012 except for women aged 30–49 years, where IRR is calculated from 1989 to 2012.
† P-values are for time trends using fractional polynomials.
‡ Estimated from 1995 to ensure that the whole age span was represented.
**Table 4. Odds ratios for 30-days case fatality (CF) of ischemic stroke according to calendar year by sex and age group*. The Tromsø Study 1995–2012**

<table>
<thead>
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<tbody>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>30-84 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ischemic strokes, n</td>
<td>201</td>
<td>248</td>
<td>223</td>
<td>672</td>
<td></td>
</tr>
<tr>
<td>30-days CF, n (%)</td>
<td>18 (8.9)</td>
<td>10 (4.0)</td>
<td>10 (4.5)</td>
<td>38 (5.7)</td>
<td></td>
</tr>
<tr>
<td>Odds Ratio (95%CI)‡</td>
<td>1.00</td>
<td>0.40 (0.18-0.89)</td>
<td>0.44 (0.20-0.99)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odds Ratio (95%CI)§</td>
<td>1.00</td>
<td>0.45 (0.22-0.93)</td>
<td>0.31 (0.11-0.90)</td>
<td>0.035</td>
<td></td>
</tr>
</tbody>
</table>

| ≥ 85 years     |           |           |           |           |                     |
| Ischemic strokes, n | 14        | 28        | 30        | 72        |                     |
| 30-days CF, n (%) | 3 (21.4)  | 7 (25.0)  | 2 (6.6)   | 12 (16.7) |                     |
| Odds Ratio (95%CI)‡ | 1.00      | 1.24 (0.26-5.82) | 0.28 (0.04-1.96) |           |                     |
| Odds Ratio (95%CI)§ | 1.00      | n.a. || n.a. || 0.027 |

| **Women**      |           |           |           |           |                     |
| 30-84 years    |           |           |           |           |                     |
| Ischemic strokes, n | 144       | 155       | 149       | 448       |                     |
| 30-days CF, n (%) | 13 (9.0)  | 9 (5.8)   | 18 (12.1) | 40 (8.9)  |                     |
| Odds Ratio (95%CI)‡ | 1.00      | 0.59 (0.24-1.43) | 1.32 (0.62-2.82) |           |                     |
| Odds Ratio (95%CI)§ | 1.00      | 1.17 (0.88-1.66) | 1.60 (0.56-4.56) | 0.384     |                     |

| ≥ 85 years     |           |           |           |           |                     |
| Ischemic strokes, n | 16        | 57        | 54        | 127       |                     |
| 30-days CF, n (%) | 2 (12.5)  | 12 (21.0) | 16 (29.6) | 30 (23.6) |                     |
| Odds Ratio (95%CI)‡ | 1.00      | 1.69 (0.33-8.56) | 2.31 (0.46-11.74) |           |                     |
| Odds Ratio (95%CI)§ | 1.00      | 1.46 (0.87-2.47) | 3.11 (0.66-14.66) | 0.149     |                     |

CI: Confidence Interval

* Adjusted for age using logistic regression models.
† P-values for time trends using fractional polynomials.
§ Age-adjusted odds ratios comparing 2003 (middle year in period 2001-2006) and 2012 with 1995.
|| n.a.: Not applicable due to low number of ischemic strokes.
Between 1995 and 2010, the age-adjusted case fatality declined in men aged 30–84 years while no significant time trend was found in women aged 30–84 or in attendees aged ≥85 years. Due to relatively few endpoints, we did not have the power to stratify in smaller age groups. When the endpoint registry was updated through 2012, the results were essentially unchanged (Table 4). In high-income countries, trends in IS case fatality have either declined (3, 22) or remained stable (128) during the last decades. Declining case fatality has been viewed as a measure of treatment effect for hospitalized strokes (19, 23). It may also reflect a real decrease in stroke severity with time, as well as increased detection of less severe strokes due to improved imaging of ischemic lesions by CT or MRI (19, 129). Some studies showed an equal decline in case fatality for men and women with time (26, 130), while different time trends with a steeper decrease in men than women were revealed by others (24). Compared to men, the lack of reduction in case fatality among women in our study is noteworthy. Whether the reasons are due to sex-differences in stroke severity, comorbidity or treatment effects over time still remains an open question.
5.2.2 The impact of risk factor change on ischemic stroke incidence

In paper II, we sought to answer the following question: "To which degree could changes in risk factors across time explain the changing incidence of ischemic stroke?"

We found that changes in cardiovascular risk factors accounted for 57% of the decrease in incidence of IS from 1995 to 2012. The concept of explained decline used in our analysis reflects both the proportion of the decline in risk for IS that can be attributed to specific risk factors (the population-attributable risk: PAR) and the change of each particular risk factor in this cohort during the time-period of interest. We were not able to find other studies estimating the impact of risk factor contribution to changing stroke incidence by similar methodology as in our study. Several studies have estimated population-attributable risks for the association of IS with established as well as potential risk factors (36-38). However, with PAR as effect estimate, the dimension of time is not included. A large case-control study from 22 countries found that hypertension, current smoking, abdominal obesity, diet and physical activity accounted for 82% of the global risk of IS (PAR 82%; 95% CI 73–87) (36). In contrast to these high values of combined PAR, the population-based Rotterdam Study reported a total PAR of 55% (95% CI 41–68) for the combined risk factors hypertension, smoking, diabetes, atrial fibrillation, coronary disease, overweight/obesity and total cholesterol/HDL (38). The differences in the combined PAR estimates may partly be explained by differences in selection of risk factors, in the populations under study and in study design.

We did not have the statistical power to run separate Poisson analyses for those aged 30 to 49 years. Hence, we cannot causally assess to which degree changing risk factors in the youngest age group can explain the increasing IS incidence in the youngest women, and the lack of decline among the youngest men. However, the background analyses revealed some risk factor patterns, by which hypotheses regarding possible causes for increasing IS in the youngest age group can be generated. This will be briefly discussed in the latest paragraph in this chapter.
Decline in systolic blood pressure contributed most to the decreasing stroke incidence in our study. Hypertension is the single most important treatable risk factor for IS, with estimated PAR between 26% and 33% (36,38,131). However, there is no “threshold” for BP and a significant proportion of all strokes happen in persons with normal BP or “mild” hypertension. Globally, BP levels have decreased the last decades, with the most pronounced decline in Western countries and in high-income groups (132). A recent study from the Tromsø Study cohort demonstrated a secular decrease in the entire range of BP distribution, indicating a mass-population effect rather than a treatment effect of individuals with hypertension (133).

We found that decreasing prevalence of daily smoking contributed second most to the observed IS risk reduction. The estimated multi-adjusted PARs of daily smoking for IS vary from 12% to 21% (36, 131), and the prevalence of daily smoking in attendees ≥30 years decreased by 34% in our study from Tromsø 4 (1994–1995) to Tromsø 6 (2007–2008).

The concurrent 100% increase in diabetes prevalence contributed negatively to the decline in IS incidence. The prevalence of diabetes has increased steadily the last decades, both in developed countries and globally (134). However, (as discussed in 5.1.1) this increase might have been influenced by changing criteria for diabetes in the time period (117).

The estimated contribution of the change in BMI on the declining incidence of IS was negative, reflecting the increasing BMI in our cohort, however statistically non-significant. While both elevated blood pressure, cholesterol and glucose mediate the effects of elevated BMI, the effect of the BMI increase on IS incidence during the study period mirrors the divergent time trends in these mediators in our cohort. Additionally, an elevated BMI seem to mediate its effect on atherosclerosis through an inflammatory pathway (135).

Although baseline cholesterol levels were associated with increased risk of IS in our cohort, changes in total cholesterol level did not contribute significantly to the decline in incidence of
IS, despite decreasing total cholesterol during the observation period. In most, but not all observational studies, there is an association between higher total cholesterol levels (and higher LDL cholesterol) and IS, but the associations seem to differ with the subtype of IS, and different cohorts may have different IS subtype distribution (75). In our study, we had regretfully no information regarding the distribution of IS subtypes.

Our results are in line with other studies from high-income countries. In a cohort of 9,152 persons aged ≥55 years from the Framingham study, the age-adjusted incidence of first-ever stroke declined significantly between 1950 and 2004, concurrent with an overall reduction in prevalence of risk factors (16). Similar diverging trends as in our study were observed, with a decline in systolic BP, total cholesterol, prevalence of hypertension and daily smoking, while mean BMI and diabetes prevalence (in women) increased significantly over time.

In the OXVASC study the age-standardized incidence of first-ever IS fell by 27% (p=0.0002) from 1981 to 2004, simultaneously with significant reductions in the premorbid levels of systolic BP, cholesterol and the proportions of smokers (34).

The Atherosclerosis Risk in Communities Study found a significant decrease in stroke incidence from 1987–2011 with an age-adjusted decrease in stroke risk by 24% (95%CI 13–34%) per 10 years. However, the results were not consistent for participants aged <65 years. Concomitantly the age-adjusted rates of diabetes increased, as did the rate of hypertension, while the prevalence of current smoking declined, resulting in a relatively small effect on the IS risk estimates when adjusting for time-varying risk factors and demographic variables (18).

The main analysis in paper II was performed on the entire age-span, i.e. on eligible attendees aged 30 years and older. However, eligible were those who had attended Tromsø 4 without missing risk factors (n=26,033) (see 3.1.2); moreover, only updated risk factors contributed in the analysis (see 3.4.2). As a consequence, data from consistent attendees with complete risk
factor registration contributed to a larger degree in the main analysis in paper II than was the case in a background analysis (Poisson analysis applied on the sample of 26,329 attendees in paper II), in which there was no additional criteria with regard to risk factors (5.1.1, Figure 2).

Table 5 shows the percentage decline in IS incidence across different subsamples. The non-significant difference in IS risk decline from 1995 through 2012 (37% (95% CI 19–52) vs. 26% (95% CI 11–39) is probably a result of healthy participant bias as well as survival bias, affecting our analysis when only updated risk factor values contributed as in the main analysis in paper II.

Table 5. Percentage decline in incidence * of ischemic stroke from 1995–2012, by sample and Poisson regression model characteristics

<table>
<thead>
<tr>
<th></th>
<th>Poisson regression model (power)</th>
<th>Number of eligible attendees</th>
<th>Incidence rate ratio (95% CI)</th>
<th>% decline IS incidence (95% CI)</th>
<th>P-value time trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper I updated analyses †</td>
<td>fractional polynomial (3)</td>
<td>32,327</td>
<td>0.727 (0.608-0.869)</td>
<td>27% (13–39%)</td>
<td>0.0004</td>
</tr>
<tr>
<td>Paper II (cohort in Figure 1)</td>
<td>fractional polynomial (3)</td>
<td>26,329</td>
<td>0.737 (0.611-0.889)</td>
<td>26% (11–39%)</td>
<td>0.0014</td>
</tr>
<tr>
<td>Paper II (cohort in Figure 1)</td>
<td>linear</td>
<td>26,329</td>
<td>0.747 (0.619-0.903)</td>
<td>25% (10–38%)</td>
<td>0.0025</td>
</tr>
<tr>
<td>Paper II (cohort in Table 4)</td>
<td>linear</td>
<td>26,033</td>
<td>0.628 (0.484-0.813)</td>
<td>37% (19–52%)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

CI: Confidence Interval. *Age- and sex-adjusted †Total number of eligible attendees in the updated analyses was 36,574 (after one person withdrew consent) whereas 32,327 attendees could be followed from 1995 (all age groups included).
Generally, the search for possible explanations behind the increasing incidence of IS in young adults is complicated by the fact that the underlying cause of "young stroke" despite thorough investigations remains undetermined in about one third of the cases (127). A higher proportion of IS in young adults is thought to be caused by more "rare" etiologies compared to those associated with the traditional cardiovascular risk factors seen in older stroke patients, which may explain why IS incidence in this age group is less influenced by changes in CVD risk factor levels. However, results from other previous studies indicate that the role of traditional vascular risk factors in the young may have been underestimated (136).

A study from Greater Cincinnati/Northern Kentucky Stroke Study suggested that diabetes may particularly increase the risk of IS in the young (55). The 15 Cities Young Stroke Study, which included 3944 European patients with first ever IS aged 15–45 years, revealed high frequencies of well documented vascular risk factors; as 49% were current smokers, 46% had dyslipidemia and 36% were hypertensive (136).

Among 4,467 prospectively recruited European TIA or IS patients (Stroke in Young Fabry Patients Study, median age 47 years), the most frequent well-documented modifiable risk factor was smoking (56%), followed by physical inactivity (48%), hypertension (47%), dyslipidemia (35%) and obesity (22%) (137).

In our study, systolic and diastolic blood pressure changed favorably across time both in the youngest age group and among those aged ≥50 years, as did the prevalence of smoking. The use of BP lowering drugs increased similarly in both groups (with 150% and 131% from Tromsø 4 to Tromsø 6, respectively). However, while the prevalence of overweight and obesity increased generally, there was an augmented ascent in obesity prevalence among those aged 30–49 compared to those aged ≥50 years (118% increase vs. 42% increase of obesity prevalence, respectively). Concomitantly, the diabetes prevalence rose with 171% in the age group 30–49 years, and with 76% in those aged ≥50 years.
5.2.3 Hypothetical interventions to prevent stroke

In paper III, we wanted to assess the effects of particular interventions on the subsequent risk of stroke and IS. Hence, we sought to answer research questions as: "What would be the 18-years population risk of stroke (compared to what happened in "real life") if everyone with a systolic blood pressure of ≥140 mm Hg were "placed" at a systolic blood pressure <140?" Or: "What would be the effect on the 18-years population risk of stroke, compared to the 18-years stroke risk observed in our cohort, if everyone who smoke daily, quitted smoking?" Or "What if all feasible interventions were applied jointly?" This approach contrasts the main analysis in paper II, where we estimated the impact of concurrent risk factor trends on the already observed decline in ischemic stroke risk.

We found that a combination of feasible modification of lifestyle and metabolic risk factors (smoking, alcohol use, physical activity, BMI, SBP and total cholesterol) could prevent 19% of all strokes observed during 18 years of follow-up. Solely reducing SBP to <140 mmHg in all attendees with SBP ≥140 mmHg would reduce the 18-year population risk of stroke by 15%. A more intensive combined intervention resulted in a 55% reduction in stroke risk, whereas reducing SBP to <120 mmHg alone would reduce the risk by almost a third.

The results from our hypothetical interventions on SBP are in line with the strong, graded and independent relationship between SBP and stroke risk. A recent meta-analysis of randomized trials found that 10 mmHg reduction in SBP reduced the risk of stroke by 27% (138). There was no evidence that the proportional effects were weaker in trials that included persons with lower SBP (<130 mmHg) at baseline, or in trials including high-risk populations. In comparison, the estimated 32% reduced stroke risk in our study, under the intensive intervention on SBP was due to a 21 mmHg average reduction in SBP by the end of follow-up. The smaller effect size in our study may be due to residual confounding, model misspecification or to differences between the study populations.
We did not observe a significant effect of reducing serum total cholesterol on the 18-years population risk of stroke. While some studies found total cholesterol to be a risk factor for IS (71), this was not supported by others (73, 74) (see 1.4.2). Moreover, the relationship between cholesterol level and risk of hemorrhagic stroke seem to be inverse (76).

The significant risk reduction for stroke by smoking cessation in our study is consistent with the prior evidence linking smoking to stroke (60, 61). Smoking cessation was also associated with a considerable decline in stroke risk among 117,000 participants in the Nurse Health Study, with the excess risk among former smokers disappearing 2–4 years after quitting (63).

We did not find a significant effect for physical activity or weight loss. The questionnaires on physical activity were not consistent across surveys in our study and therefore we had to define rather broad categories, which limited our ability to define appropriate interventions (e.g. separating moderate from vigorous activity). Previous analyses of prospective studies using parametric g-formula that investigated effect of weight loss did not find an impact on CHD (139) and death (140), which may be due to either residual confounding by undiagnosed diseases at baseline or irreversibly increased risk due to weight gain.

The estimated benefits of abstinence in our study combines both the accepted positive effect of alcohol cessation in those with heavy or binge drinking and the presumed negative effects of quitting drinking among light to moderate drinkers. Information on amount of alcohol and drinking pattern were not consistently reported across the surveys, limiting the analyses to use vs. no use. Hence, we were not able to estimate the effect of regular low to moderate drinking, which is a limitation. Neither did we have access to consistent data on diet, and detailed data on use of BP-lowering drugs, statins and aspirin were insufficient in the earliest rounds of the study.

In this study, we applied the parametric g-formula to adjust for time-varying confounding by major risk factors for stroke and to simulate long-term interventions on lifestyle and metabolic
risk factors. Importantly, as for other observational studies, the validity of our results relies on the assumptions of no residual confounding, no measurement error and no model misspecification. We included all presumed important fixed and time-varying confounders that were available to us, but despite adjustment for a large number of potential confounders, the possibility of residual confounding cannot be logically excluded. Some measurement error is expected, especially for self-reported lifestyle variables, and may have contributed to bias. We were able to reproduce the observed risk factor patterns and stroke risk with the parametric g-formula, which indicates that under no intervention, the models were not grossly misspecified.
6. Conclusions and implications for further research

We found that the overall age- and sex adjusted incidence of ischemic stroke declined with 27% from 1995–2012 in this large, general Norwegian cohort of men and women aged ≥30 years. This decline was driven by the changing incidences across time among the middle-aged and elderly, which is line with that reported from several other high-income countries the last decades. The age-stratified analyses revealed different time trends across the predefined strata, with increasing incidence in women aged 30–49 years, a non-significant rising trend among the youngest men (30–49 years), and declining incidence in women aged 50–74 and men aged 65–74. In men aged 50 to 64 years, the ischemic stroke incidence in 2012 was not significantly different from the incidence two decades earlier. The incidence also remained stable in persons aged 75 years and older. The increasing trend in ischemic stroke incidence among the youngest women adds to the worrying reports about an increasing incidence of stroke at younger age.

Mean crude case fatality for ischemic stroke in persons aged 30–84 years (1995–2012) was 7%, and 21% in participants ≥85 years. Age-adjusted case fatality was higher for women than men through the whole period. Between 1995 and 2012, the age-adjusted case fatality decreased in men aged 30–84 years while no significant decline was found in women aged 30–84 or in attendees ≥85 years.

Our results showed that changes in seven cardiovascular risk factors (systolic blood pressure, total cholesterol, HDL, daily smoking, physical activity, diabetes and BMI) accounted for 57% (95% CI 28–100) of the decrease in ischemic stroke incidence from 1995 through 2012, with decreasing mean systolic blood pressure and decline in smoking prevalence as the most important contributors. The increasing diabetes prevalence contributed negatively, as did the change in BMI, although not significant.
We found that a feasible joint hypothetical intervention on six metabolic and lifestyle risk factors (systolic blood pressure, total cholesterol, weight, physical activity, smoking and alcohol intake) would reduce the 18-year stroke risk in our population by 19%. A combination of more intensive interventions would reduce the estimated 18-years stroke risk by 55%. Blood pressure reduction and quitting smoking significantly reduced the risk when applied separately.

While an ischemic stroke could be caused by several pathological mechanisms, there is a need for future studies that include subclassification of ischemic strokes. Ideally, separate time trends should be presented for each subtype of ischemic stroke across age, to assess potential differences in time trends for the different pathological subtypes by age groups. This calls for studies with a high number of endpoints. Moreover, there is an urgent need for further research to explore the impact of risk factor change on the disquieting change in incidence of ischemic stroke among the youngest ones. To explore the possible reasons behind the divergent time trends of case fatality in men and women, future studies should, in addition to sub-classification of ischemic strokes, include information regarding severity of the stroke events, the patients comorbidity and the treatment given.

The Tromsø Study represents a valuable source for exploring the impact of lifestyle and more distal variables (ecological variables) on the long-term risk of stroke. The newly completed Tromsø 7 survey includes extended data on diet, physical activity and socioeconomic status, with possibilities for an even more comprehensive approach in future projects.
References


Appendix 1a

Questionnaire 1, the 2nd Tromsø Study 1979–80

English version
### A

**Do you have, or have you had:**
- A heart attack?  
- Angina pectoris (heart cramp)?  
- Any other heart disease?  
- Hardened arteries in the legs?  
- A cerebral stroke?  
- Diabetes?  

**Are you being treated for:**
- High blood pressure?  

**Do you use:**
- Nitroglycerine?  

---

### B

**Do you have get or discomfort in the chest when:**
- Walking up hills or stairs, or walking fast on level ground?  
- Walking at normal pace at level ground?  

**If you get pain or discomfort in the chest when walking, do you usually:**
1. **Stop?**  
2. **Slow down?**  
3. **Carry on at the same pace?**  

**If you stop or slow down, does the pain disappear:**
1. Within 10 minutes?  
2. After more than 10 minutes?  

**Do you get pain in the calf while:**
- Walking?  
- Resting?  

**If you get pain in the calf, then:**
- Does the pain increase when you walk faster or uphill?  
- Does the pain disappear when you stop?  

**Do you usually have:**
- Cough in the morning?  
- Phlegm chest in the morning?  

---

### C

**Exercise and physical exertion in leisure time.**
If your activity varies much, for example between summer and winter, then give an average. The question refers only to the last twelve months:

Tick "Yes" beside the description that fits best:
1. Reading, watching TV, or other sedentary Activity?  
2. Walking, cycling, or other forms of exercise at least 4 hours a week?  (include walking or cycling to place of work, Sunday walk/stroll, etc.)  
3. Participation in recreational sports, heavy gardening, etc.?  
   (note: duration of activity at least 4 hours a week)  
4. Participation in hard training or sports competitions, regularly several times a week?  

---

### D

**Do you smoke daily at present?**  
**If the answer was "Yes" in the previous question, then:**

**Do you smoke cigarettes daily?**
- (hand-rolled or factory made)  

**If you do not smoke cigarettes at present, then:**
- Have you previously smoked cigarettes daily?  

**If "Yes", how long is it since you stopped:**
1. Less than 3 months?  
2. 3 months to 1 year?  
3. 1 to 5 years?  
4. More than 5 years?  

For those who smoke or have smoked previously:
- How many years altogether have you smoked daily?  
- How many cigarettes do you smoke, or did you, smoke daily? Give number of cigarettes per day:  
   (hand-rolled or factory made)  

**Do you smoke tobacco products other than cigarettes daily:**
- Cigars or cigarillos?  
- A pipe?  

**If you smoke a pipe, how many packs of tobacco (50 grams) do you smoke per week?**  
**Give the average number of packs per week:**  

---

### E

**Do you usually work shifts or at nights?**  

**Can you usually come home from work:**
- Every day?  
- Every weekend?  

**Are there periods during which your working days are longer than usual?**  
- (e.g. fishing season, harvest)  

**During the last year, have you had:**
- Tick "Yes" beside description that fits best:  
   1. Mostly sedentary work?  
   - (e.g. office work, watchmaker, light manual work)  
   2. Work that requires a lot of walking  
   - (e.g. shop assistant, light industrial work, teaching)  
   3. Work that requires a lot of walking and lifting?  
   - (e.g. postman, heavy industrial work, construction)  
   4. Heavy manual labour?  
   - (e.g. forestry, heavy farm-work, heavy construction)  

**During the last 12 months, have you had:**
- To move for work reasons?  

**Is housekeeping your main occupation?**  

**Have you within the last 12 months received unemployment benefit?**  

**Are you at present on sick leave, or receiving rehabilitation allowance?**  

**Do you receive a complete or partial disability pension?**  

---

### F

**Have one or more of your parents or sisters or brothers had a heart attack (heart wound) or angina pectoris (heart cramp)?**  

**Are two or more of your grandparents of Finnish origin?**  

**Are two or more of your grandparents of Sami origin?**
Appendix 1b

Questionnaire 2, the 2nd Tromsø Study 1979–80

English version
Together with the invitation to attend you received a questionnaire from the National Mass Radiography Service. You delivered this questionnaire at the examination.

Cardiovascular diseases are, however, a complex group of diseases. The causes are still partly unknown. In Tromsø we are therefore trying to obtain a more complete description of factors which may be of importance for the course of these diseases, such as diet, psychological pressure ("stress"), social conditions, and occurrence of disease in relatives. We hope you will take the trouble to complete this questionnaire as well, an return it to the Tromsø Board of Health in the enclosed envelope.

All information in connection with the mass x-ray examination will be treated as strictly confidential.

<table>
<thead>
<tr>
<th><strong>1. YOUR OWN DIET</strong></th>
<th><strong>3. How many slices of bread do you usually eat daily?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>What type of bread do you usually eat?</td>
<td>Tick the most appropriate box.</td>
</tr>
<tr>
<td>White bread (e.g. French bread)</td>
<td>1</td>
</tr>
<tr>
<td>Ordinary bread (light texture)</td>
<td>2</td>
</tr>
<tr>
<td>Whole meal (brown) bread</td>
<td>3</td>
</tr>
<tr>
<td>Home-made (brown) bread</td>
<td>4</td>
</tr>
<tr>
<td>How many slices of bread do you usually eat daily?</td>
<td>Tick the most appropriate box.</td>
</tr>
<tr>
<td>Less than two slices</td>
<td>1</td>
</tr>
<tr>
<td>2-6 slices</td>
<td>2</td>
</tr>
<tr>
<td>7-12 slices</td>
<td>3</td>
</tr>
<tr>
<td>13 or more slices</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>2. What type of butter of margarine do you usually eat?</strong></th>
<th><strong>4. What type of milk do you usually drink?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tick the most appropriate box.</td>
<td>Tick the most appropriate box.</td>
</tr>
<tr>
<td>Butter</td>
<td>1</td>
</tr>
<tr>
<td>Ordinary margarine</td>
<td>2</td>
</tr>
<tr>
<td>Plant margarine</td>
<td>3</td>
</tr>
<tr>
<td>Soft margarine spread</td>
<td>4</td>
</tr>
<tr>
<td>What type of milk do you usually drink?</td>
<td>Do not drink milk.</td>
</tr>
<tr>
<td>Full cream milk: ordinary type or curdled</td>
<td>1</td>
</tr>
<tr>
<td>Skimmed milk: ordinary type or curdled</td>
<td>2</td>
</tr>
<tr>
<td>Mixture of full cream and skimmed milk</td>
<td>3</td>
</tr>
</tbody>
</table>

5. The drawings below show cubes of butter of margarine (actual size). Tick the box above the cube which best resembles the amount you spread on a slice of bread.

If in doubt, try buttering a slice.

- Do not use butter or margarine

1. 2. 3. 4.
6. How many glasses/cups of milk do you usually drink daily?
   Tick the most appropriate box.
   - Do not drink milk, or drink less than 1 glass/cup ..................
   - 1-2 glasses/cups ........................................
   - 3-4 glasses/cups ........................................
   - 5 or more glasses/cups ....................................

7. How many cups of coffee do you usually drink daily?
   Tick the most appropriate box.
   - Do not drink coffee, or drink less than 1 cup ......................
   - 1-4 cups .................................................
   - 5-8 cups ................................................
   - 9 or more cups ...........................................

8. Are you a teetotaller?
   If "No",
   — How often do you usually drink beer?
   Tick the most appropriate box.
   - Never or just a few times a year ................................
   - Once or twice a month ....................................
   - About once a week ......................................
   - 2-3 times a week ........................................
   - More or less daily .......................................  
   — How often do you usually drink wine?
   Tick the most appropriate box.
   - Never or just a few times a year ..........................
   - Once or twice a month ..................................
   - About once a week ......................................
   - 2-3 times a week ........................................
   - More or less daily .......................................  
   — How often do you usually drink spirits?
   Tick the most appropriate box.
   - Never or just a few times a year ..........................
   - Once or twice a month ..................................
   - About once a week ......................................
   - 2-3 times a week ........................................
   - More or less daily ....................................... 

9. Approximately how often during the last 12 months have you drunk so much wine, beer or spirits that you got drunk?
   Tick the most appropriate box.
   - Have never been drunk, or have not been drunk during the last year ..........  
   - A few times during the last year ................................
   - Once or twice a month ..................................
   - Once or twice a week .....................................
   - 3 or more times a week ....................................

10. How often does your main meal consist of fish or fish dishes?
    Tick the most appropriate box.
    - Less than once a week ..................................
    - Once or twice a week ..................................
    - 3-4 times a week ........................................
    - 5-6 times a week ........................................
    - 7 times a week ..........................................  

11. How often do you eat fruit or vegetables?
    Tick the most appropriate box.
    - Never eat fruit or vegetables ................................
    - A few times a year ......................................
    - Once or twice a month ..................................
    - About once a week ......................................
    - 2-3 times a week ........................................
    - More or less daily .......................................  

12. How many times a month do you eat boiled or fried sausages, meat balls, other processed meat, etc.?
    Tick the most appropriate box.
    - Never or less than once a month ........................
    - Once or twice a month ..................................
    - 3-4 times a month (up to once a week) .....................
    - 5-8 times a month (up to twice a week) ..................
    - More than 8 times a month (more than twice a week) .........
13. Have you made any changes in your diet during the last 5 years as regards the following food items? 
   Tick each item in the appropriate box.
   | Ordinary margarine or butter | Skimmed milk | Lean meat | Full cream milk | Soya margarine (soft) | Fatty margarine |
   | As before | More now | Less now | As before | As before | As before |

14. Have you ever had?
   - Sudden paralysis or numbness on one side of your face or body, in your hand or foot
   - Sudden loss of ability to speak
   - Sudden loss of eye sight, complete or partial, or sudden onset of double vision

15. Have you had a peptic ulcer? 
   - Do you often have a gnawing pain in the upper part of your stomach? 
   - Do you suffer much from heartburn or regurgitation of gastric juices? 
   - Do you suffer much from wind and rumbling in your stomach? 
   - Do you often get cramps in your stomach? 
   - Have you ever had your large intestine x-rayed? 
   - Have you ever had gallstones?

16. Have you had kidney stones or stones in the urinary tract? 
   - If yes, how many times? 
   - and, when did you have the last attack?

17. Have you ever had cancer? 
   - If yes, in what year was the disease discovered?

18. Have you, or have had you the skin disease psoriasis?

19. Have you had allergy-induced eczema on your hands during the last 12 months?

20. Have you been on sick leave, or been unable to work due to allergic eczema on your hands at any time during the past 3 years?

21. Have you ever had arthritis? (chronic rheumatoid arthritis)

22. Have you suffered from back pain during the past 12 months lasting for more than 4 weeks? 
   - If yes, did the back pain improve if you exercised?

23. Have you suffered from morning stiffness in your back lasting more than 30 minutes?

24. Have you suffered from pains lasting more than 3 months, in the joints listed below during the last 3 years?
   - Knees
   - Elbows
   - Innermost finger joints
   - Other joints
   - If yes, did you suffer from stiff joints in the mornings lasting more than 30 minutes?

25. Have you had any infectious disease during the past 14 days? (influenza, common cold, vomiting, diarrhoea, etc.)

26. Have you taken iron tablets during the past 14 days?
27. How often do you take painkillers such as Globoid, Noid, Dispril, Albyl, etc.? Tick the most appropriate box.
   - 1-3 times a week
   - 1-3 times a month
   - Seldom or never

28. Have you changed the amount of physical exercise you take in leisure time during the last five years? Tick the most appropriate box.
   - As before
   - More than before
   - Less than before

29. ILLNESS IN PARENTS AND SIBLINGS
   - Have any of these relatives had:
     - Cerebral stroke or brain haemorrhage
     - Diabetes
     - Arthritis (chronic rheumatoid arthritis)
     - Cancer
     - Kidney stones or stone in urinary tract
     - Psoriasis
     - Peptic ulcer
     - None of the above mentioned illnesses

30. SOCIAL CONDITIONS AND PSYCHOLOGICAL PRESSURE (“STRESS”)
   - How many years of education have you had? (including primary and secondary schools)

31. How was your family’s financial situation when you were growing up? Tick the most appropriate box.
   - Very good
   - Good
   - Poor
   - Very poor

32. Do you suffer from sleeplessness? If yes, at what time of the year do you suffer from sleeplessness? Tick the most appropriate box.
   - No particular time
   - Especially during the polar night
   - Especially during the midnight sun season
   - Especially in spring and autumn

33. Have you had difficulty sleeping in the past couple of weeks? Tick the most appropriate box.
   - Not at all
   - No more than usual
   - Rather more than usual
   - Much more than usual

34. Have you felt unhappy and depressed during the last couple of weeks? Tick the most appropriate box.
   - Not at all
   - No more than usual
   - Rather more than usual
   - Much more than usual

35. Have you felt unable to cope with your difficulties during the last couple of weeks? Tick the most appropriate box.
   - Not at all
   - No more than usual
   - Rather more than usual
   - Much more than usual

36. What form does your sleeplessness take?
Appendix 2a

Questionnaire 1, the 3rd Tromsø Study 1986–87

English version
The health survey is coming now to your district.

You find the time and place for attendance below.

You will find an orientation on the survey in the enclosed brochure.

We would like you to fill in the form on the back and take it with you to the survey.

We ask those possibly not attending to report their absence in the attached absence report.

Yours sincerely

MUNICIPAL HEALTH AUTHORITY OF TROMSØ
COUNTY DOCTOR OF TROMS UNIVERSITY OF TROMSØ
NATIONAL HEALTH SCREENING SERVICE
### A

**FAMILY**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have one or more of your parents or siblings had a heart attack (heart wound) or angina pectoris?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### B

**OWN ILLNESSES**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you have, or have you had:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A heart attack?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angina pectoris (heart cramp)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A cerebral stroke?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Are you being treated for:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>High blood pressure?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you use:

<table>
<thead>
<tr>
<th>Drug</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitroglycerine?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### C

**SYMPTOMS**

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you get pain or discomfort in the chest when walking up stairs or on level ground?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking at normal pace at level ground?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you get pain or discomfort in the chest when walking, do you usually:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow down?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carry on at the same pace?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you stop or slow down, does the pain disappear:

<table>
<thead>
<tr>
<th>Time</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>After less than 10 minutes?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After more than 10 minutes?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you usually have:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cough in the morning?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phlegm chest in the morning?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### D

**EXERCISE**

Exercise and physical exertion in leisure time. If your activity varies much, for example between summer and winter, then give an average. The question refers only to the last year:

<table>
<thead>
<tr>
<th>Activity</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading, watching TV, or other sedentary activity?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking, cycling or other forms of exercise at least 4 hours a week?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participation in recreational sports, heavy gardening, etc.?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participation in hard training or sports competitions, regularly several times a week?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### E

**SALT/ FAT**

How often do you use salted meat or salted fish for dinner?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never or less than once a month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Once a week or less</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than once a week</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How often do you add extra salt to your dinner?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rarely or never</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sometimes or often</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always or nearly always</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What type of margarine or butter do you usually use on your bread?

<table>
<thead>
<tr>
<th>Type</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not use margarine or butter on bread</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hard Margarine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft (soya) margarine spread</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butter/ margarine mixtures</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What type of cooking fat do you normally use in your household?

<table>
<thead>
<tr>
<th>Type</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butter or hard margarine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft (soya) margarine or oil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butter/ margarine mixtures</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### F

**SMOKING**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you smoke daily?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If the answer is &quot;YES&quot;, then:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you smoke cigarettes daily?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(hand-rolled or factory made)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If you do not smoke cigarettes at present, then:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you previously smoked cigarettes daily?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If you answered &quot;Yes&quot;, how long is it since you stopped:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 3 months?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 months to 1 year?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - 5 years?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 5 years?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To be answered by those who smoke or who have smoked previously:

<table>
<thead>
<tr>
<th>How many years altogether have you smoked?</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many cigarettes do you smoke or did you smoke daily?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Give number of cigarettes per day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(hand-rolled + factory made)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you smoke anything else other than cigarettes daily?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cigs or cigarillos/cheroots?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A pipe?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you smoke a pipe, how many packs of tobacco (50 grams) do you smoke per week?

Give the average number of packs per week...

### G

**COFFEE**

How many cups of coffee do you usually drink daily?

Tick the most appropriate box.

<table>
<thead>
<tr>
<th>Type</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not drink coffee, or less than one cup</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - 4 cups</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 - 8 cups</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 or more cups</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What type of coffee do you usually drink daily?

<table>
<thead>
<tr>
<th>Type</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not drink coffee</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caffeine free coffee</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finely ground filter coffee</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coarsely ground coffee for brewing (boiled)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### H

**EMPLOYMENT**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you within the last 12 months received unemployment benefit?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are you at present on sick leave, or receiving rehabilitation benefit?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you receive a complete or partial disability pension?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you usually work shifts or at night?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### I

**FOLLOW-UP EXAMINATION**

Has any one in your household (other than yourself) been called in to a doctor for further medical examination after the previous cardiovascular disease survey?

If this survey suggests that you need a further medical examination, which general practitioner do you wish to be referred to?

Write the doctor's name here...

<table>
<thead>
<tr>
<th>Doctor</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don't write here</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 2b

Questionnaire 2, the 3rd Tromsø Study 1986–87

English version
ADDITIONAL QUESTIONS TO THE TROMSØ HEALTH SURVEY 1986-87.

Cardiovascular heart and circulatory diseases, on which the surveys of the 1974 and 1979-80 focused, are a very varied category of diseases whose causes are still partly unknown. In Tromsø we are therefore trying to obtain a more complete description of factors which may be important for the course of these diseases, such as diet, psychological pressure, "stress", social conditions and the occurrence of disease in relatives. Such a description is also important in the search of factors that contribute to cancer, a group of diseases which also we try to combat in the coming years.

When you were called in, you received a questionnaire which you handed in at the survey. The present questionnaire asks for further information about your health and includes questions on various diseases and physical and psychological complaints. We have included questions on pregnancy, birth and menstruation.

In addition, we are interested in obtaining information on the public use of medical health services in order to find out how to improve the health service.

We hope that you will take the trouble to fill in yet another questionnaire and return it to "Tromsø Board of Health" in the enclosed envelope. All information will be treated with strict confidentiality. If you have any comments regarding the survey, you may write them down in the space provided on the last page of the questionnaire.

Yours sincerely

Tromsø Board of Health       Department of medicine
University of Tromsø
**CONTACT DUE TO OWN HEALTH OR ILLNESS**

<table>
<thead>
<tr>
<th>Question</th>
<th>Number of visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many visits have you made during the past year due to your own health or illness?</td>
<td></td>
</tr>
<tr>
<td>To a GP (general practitioner) ........................................... 71</td>
<td></td>
</tr>
<tr>
<td>To a specialist (not hospital) ........................................... 72</td>
<td></td>
</tr>
<tr>
<td>Emergency GP ........................................................................ 85</td>
<td></td>
</tr>
<tr>
<td>Medical officer at work ................................................................ 87</td>
<td></td>
</tr>
<tr>
<td>Physiotherapist ..................................................................... 89</td>
<td></td>
</tr>
<tr>
<td>Chiropractor ......................................................................... 81</td>
<td></td>
</tr>
<tr>
<td>Alternative practitioner (homoeopath, foot zone therapist, etc.) ........ 83</td>
<td></td>
</tr>
<tr>
<td>Hospital outpatient department .............................................. 85</td>
<td></td>
</tr>
<tr>
<td>Number of hospital admissions in the past year .................................. 87</td>
<td></td>
</tr>
</tbody>
</table>

**DIET**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many slices of bread do you usually eat daily?</td>
<td>88</td>
</tr>
<tr>
<td>Tick the box where “Yes” is appropriate.</td>
<td></td>
</tr>
<tr>
<td>Less than 2 slices ........................................................................ 1</td>
<td></td>
</tr>
<tr>
<td>2 – 4 slices ............................................................................... 2</td>
<td></td>
</tr>
<tr>
<td>5 – 6 slices ............................................................................... 3</td>
<td></td>
</tr>
<tr>
<td>7 – 12 slices ............................................................................... 4</td>
<td></td>
</tr>
<tr>
<td>13 or more slices ......................................................................... 5</td>
<td></td>
</tr>
<tr>
<td>What type of milk do you usually drink?</td>
<td>89</td>
</tr>
<tr>
<td>Tick the box where “Yes” is appropriate.</td>
<td></td>
</tr>
<tr>
<td>Do not drink milk ......................................................................... Yes</td>
<td></td>
</tr>
<tr>
<td>Full cream milk (ordinary or curdled) ......................................... 1</td>
<td></td>
</tr>
<tr>
<td>Semi-skimmed milk ......................................................................... 2</td>
<td></td>
</tr>
<tr>
<td>Skimmed milk (ordinary or curdled) ........................................... 3</td>
<td></td>
</tr>
<tr>
<td>How many glasses/cups of milk do you usually drink daily?</td>
<td>90</td>
</tr>
<tr>
<td>Tick the box where “Yes” is appropriate.</td>
<td></td>
</tr>
<tr>
<td>Less than 1 glass/cup ................................................................... 1</td>
<td></td>
</tr>
<tr>
<td>1 – 2 glasses/cups ....................................................................... 2</td>
<td></td>
</tr>
<tr>
<td>3 – 4 glasses/cups ....................................................................... 3</td>
<td></td>
</tr>
<tr>
<td>5 or more glasses/cups ................................................................... 4</td>
<td></td>
</tr>
</tbody>
</table>

**FISH**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often do you eat cod/pollock or other lean fish for dinner or in a sandwich?</td>
<td></td>
</tr>
<tr>
<td>Tick the box where “Yes” is appropriate.</td>
<td></td>
</tr>
<tr>
<td>Less than once a week ...................................................................... 91</td>
<td></td>
</tr>
<tr>
<td>Once a week ................................................................................ 2</td>
<td></td>
</tr>
<tr>
<td>Twice a week .............................................................................. 3</td>
<td></td>
</tr>
<tr>
<td>3 or more times a week .................................................................. 4</td>
<td></td>
</tr>
<tr>
<td>How often do you eat fatty fish such as herring, halibut, red fish, mackerel, salmon or trout for dinner or in a sandwich?</td>
<td></td>
</tr>
<tr>
<td>Tick the box where “Yes” is appropriate.</td>
<td></td>
</tr>
<tr>
<td>Less than once a week ...................................................................... 92</td>
<td></td>
</tr>
<tr>
<td>Once a week ................................................................................ 1</td>
<td></td>
</tr>
<tr>
<td>Twice a week .............................................................................. 2</td>
<td></td>
</tr>
<tr>
<td>3 or more times a week .................................................................. 3</td>
<td></td>
</tr>
<tr>
<td>Do you take cod liver oil regularly?</td>
<td>93</td>
</tr>
<tr>
<td>Tick the box where “Yes” is appropriate.</td>
<td></td>
</tr>
<tr>
<td>No ............................................................................................. Yes</td>
<td></td>
</tr>
<tr>
<td>During polar night ........................................................................ No</td>
<td></td>
</tr>
<tr>
<td>All year ..................................................................................... No</td>
<td></td>
</tr>
</tbody>
</table>

**BREAKFAST**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you usually eat breakfast daily? ............................................... 94</td>
<td></td>
</tr>
</tbody>
</table>

**DINNER**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often do you eat meat for dinner?</td>
<td></td>
</tr>
<tr>
<td>Tick the box where “Yes” is appropriate.</td>
<td></td>
</tr>
<tr>
<td>Less than once a week ...................................................................... 95</td>
<td></td>
</tr>
<tr>
<td>1 – 2 times a month ...................................................................... 1</td>
<td></td>
</tr>
<tr>
<td>About once a week .......................................................................... 2</td>
<td></td>
</tr>
<tr>
<td>2 – 3 times a week ........................................................................ 3</td>
<td></td>
</tr>
<tr>
<td>4 – 5 times a week ........................................................................ 4</td>
<td></td>
</tr>
<tr>
<td>5 or more times a week .................................................................... 5</td>
<td></td>
</tr>
<tr>
<td>How often do you eat cod/pollock or other lean fish for dinner?</td>
<td></td>
</tr>
<tr>
<td>Tick the box where “Yes” is appropriate.</td>
<td></td>
</tr>
<tr>
<td>Less than once a week ...................................................................... 96</td>
<td></td>
</tr>
<tr>
<td>1 – 2 times a month ...................................................................... 1</td>
<td></td>
</tr>
<tr>
<td>About once a week .......................................................................... 2</td>
<td></td>
</tr>
<tr>
<td>2 – 3 times a week ........................................................................ 3</td>
<td></td>
</tr>
<tr>
<td>4 – 5 times a week ........................................................................ 4</td>
<td></td>
</tr>
<tr>
<td>5 or more times a week .................................................................... 5</td>
<td></td>
</tr>
<tr>
<td>How often do you eat vegetables with your dinner?</td>
<td>97</td>
</tr>
<tr>
<td>Tick the box where “Yes” is appropriate.</td>
<td></td>
</tr>
<tr>
<td>Yes .......................................................................................... Yes</td>
<td></td>
</tr>
<tr>
<td>No ........................................................................................... No</td>
<td></td>
</tr>
</tbody>
</table>

**FRUIT**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often do you usually eat fruit?</td>
<td></td>
</tr>
<tr>
<td>Tick the box where “Yes” is appropriate.</td>
<td></td>
</tr>
<tr>
<td>Less than once a week ...................................................................... 98</td>
<td></td>
</tr>
<tr>
<td>1 – 2 times a month ...................................................................... 1</td>
<td></td>
</tr>
<tr>
<td>About once a week .......................................................................... 2</td>
<td></td>
</tr>
<tr>
<td>2 – 3 times a week ........................................................................ 3</td>
<td></td>
</tr>
<tr>
<td>4 – 5 times a week ........................................................................ 4</td>
<td></td>
</tr>
<tr>
<td>More or less daily ......................................................................... 5</td>
<td></td>
</tr>
</tbody>
</table>

**ALCOHOL**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you a teetotaller?</td>
<td></td>
</tr>
<tr>
<td>If not,</td>
<td></td>
</tr>
<tr>
<td>How often do you usually drink beer?</td>
<td></td>
</tr>
<tr>
<td>Tick the box where “Yes” is appropriate.</td>
<td></td>
</tr>
<tr>
<td>Never or just a few times a year .................................................. 100</td>
<td></td>
</tr>
<tr>
<td>1 – 2 times a month ........................................................................ 1</td>
<td></td>
</tr>
<tr>
<td>About once a week ............................................................................ 2</td>
<td></td>
</tr>
<tr>
<td>2 – 3 times a week ........................................................................... 3</td>
<td></td>
</tr>
<tr>
<td>More or less daily ............................................................................ 4</td>
<td></td>
</tr>
<tr>
<td>How often do you usually drink wine?</td>
<td></td>
</tr>
<tr>
<td>Tick the box where “Yes” is appropriate.</td>
<td></td>
</tr>
<tr>
<td>Never or just a few times a year .................................................. 101</td>
<td></td>
</tr>
<tr>
<td>1 – 2 times a month ........................................................................ 1</td>
<td></td>
</tr>
<tr>
<td>About once a week ............................................................................ 2</td>
<td></td>
</tr>
<tr>
<td>2 – 3 times a week ........................................................................... 3</td>
<td></td>
</tr>
<tr>
<td>More or less daily ............................................................................ 4</td>
<td></td>
</tr>
<tr>
<td>How often do you usually drink spirits?</td>
<td></td>
</tr>
<tr>
<td>Tick the box where “Yes” is appropriate.</td>
<td></td>
</tr>
<tr>
<td>Never or just a few times a year .................................................. 102</td>
<td></td>
</tr>
<tr>
<td>1 – 2 times a month ........................................................................ 1</td>
<td></td>
</tr>
<tr>
<td>About once a week ............................................................................ 2</td>
<td></td>
</tr>
<tr>
<td>2 – 3 times a week ........................................................................... 3</td>
<td></td>
</tr>
<tr>
<td>More or less daily ............................................................................ 4</td>
<td></td>
</tr>
<tr>
<td>How often do you usually drink alcohol corresponding to at least 5 small bottles of beer, a bottle of wine, or 1/4 bottle of spirits?</td>
<td></td>
</tr>
<tr>
<td>Tick the box where “Yes” is appropriate.</td>
<td></td>
</tr>
<tr>
<td>Not at all the past year ................................................................... 103</td>
<td></td>
</tr>
<tr>
<td>A few times .................................................................................... 1</td>
<td></td>
</tr>
<tr>
<td>Once or twice a month ...................................................................... 2</td>
<td></td>
</tr>
<tr>
<td>3 or more times a week .................................................................... 3</td>
<td></td>
</tr>
</tbody>
</table>
### PHYSICAL ACTIVITY

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often do you take part in physical activity lasting at least 20 minutes, which makes you perspire or become breathless?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If you usually take part in this type of activity at least weekly, how much time do you spend exercising?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does anyone in your household need special care/assistance – other than the children?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### CHANGE IN DIETARY HABITS AND OTHER HABITS

<table>
<thead>
<tr>
<th>Habits</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietary fat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soya margarine or oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skimmed or low fat milk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coffee intake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol intake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical activity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MARRIAGE / PARTNER

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you married or partner?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How old were you when you first married or moved in with a partner?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### HOUSEHOLD

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many people live in your household?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is anyone in your household 10 years or younger?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does anyone in your household need special care/assistance – other than the children?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SCHOOLING

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many years education have you had? (including primary and secondary schools)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### EMPLOYMENT

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you had paid work the entire past year?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How much house work do you normally do yourself?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### BACK AND JOINTS CONDITIONS

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>During this last year have you suffered from back pain that has lasted longer than 4 weeks?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you suffered from morning stiffness in your back lasting more than 30 minutes?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>During the past 3 years have you suffered from pain in any of the following joints lasting more than 30 minutes?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does anyone in your household suffer from stiff joints in the morning lasting more than 30 minutes?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### NECK, HEAD AND SHOULDER COMPLAINTS

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often do you suffer from headache?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often do you suffer pain in the neck or shoulder?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do the pains in your head, neck or shoulder reduce your ability to work?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have your back, shoulder, and/or neck ever been x-rayed?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SLEEPLESSNESS/ LOSS OF CONSCIOUSNESS

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you ever suffered from sleeplessness?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes, what time of the year does it affect you most?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you suffered from sudden loss of consciousness in the past year?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you noticed sudden changes in your pulse rate of heartbeat in the past year?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## REACTION TO PROBLEMS

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If you have major personal problems, do you expect to get help and support from your spouse or family?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>In the last year, have you for a long time felt a need to seek help with personal problems, without doing so?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>During the past 2 weeks have you felt unable to cope with your problems?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Do you ever feel lonely?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>During the past 2 weeks have you felt unhappy or depressed?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

## THE REMAINING SECTION OF THE QUESTIONNAIRE APPLIES TO WOMEN ONLY

### MENSTRUATION

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>How old were you when you started menstruating?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>When did your last period start?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>How many days usually pass from the first day of one period to the first day of your next period (the time lapsed between the start of two periods)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Do/ did you menstruate regularly?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Do you usually take painkillers during menstruation?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### PRE-MENSTRUAL TENSION

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you have any of the following complaints before your period:</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>- Are you depressed or irritable?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>- Are your breasts painful?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>- Do you have swollen hands/feet, put on weight, or feel bloated?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### PREGNANCY

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many children have given birth to?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>How old were you when you got pregnant for the first time?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### CONTRACEPTION

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you use or have you ever used oral contraceptive pills or an intrauterine device?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>If yes, for how many years altogether have you used:</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>The pill?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>An intrauterine device?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>How old were you when you started using:</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>The pill?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>An intrauterine device?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>If you have stopped taking the pill, did 6 months or more pass without menstruating without you being pregnant?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Did you have to stop taking the pill due to high blood pressure?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### CERVICAL SMEAR TEST

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many times have you had a cervical smear test in the last 3 years?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>How many years is it since you had your last cervical smear test?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Your comments:  

---

Thank you for the help! Remember to post the questionnaire today!  
The Tromsø survey 1986-1987
Appendix 3a

Questionnaire 1, the 4rd Tromsø Study 1994–95

English version
Welcome to the Tromsø Health Survey!

The Health Survey is coming to Tromsø. This leaflet will tell you when and where. You will also find information about the survey in the enclosed brochure.

We would like you to fill in the form overleaf and take it with you to the examination.

The more people take part in the survey, the more valuable its results will be. We hope, therefore, that you will be able to come. Attend even if you feel healthy, if you are currently receiving medical treatment, or if you have had your cholesterol and blood pressure measured recently.

Yours sincerely,
Municipal Health Authorities
Faculty of Medicine - University of Tromsø
National Health Screening Service
Appendix 3b

Questionnaire 2 (<70 years), the 4th Tromsø Study 1994–95

English version
The Tromsø Health Survey

The main aim of the Tromsø Study is to improve our knowledge about cardiovascular diseases in order to aid prevention. The survey 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 a 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 in strict confidence. The information you give us may later be stored along 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 in doubt about what to answer, tick the box that you feel fits best.

The completed form should be sent to us in the enclosed pre-paid envelope.

Thank you in advance for helping us.

Yours sincerely,

Faculty of Medicine
University of Tromsø

National Health Screening Service

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 for filling in this form: ..........................................

Day Month Year

HOME

Who do you live with?
Tick once for each item and give the number.

Yes  No  Number

Spouse/partner ................................................. 36
Other people over 18 years .................................. 37
People under 18 years ........................................ 40

How many of the children attend day care/kindergarten? .... 43

What type of house do you live in?

Villa/detached house ........................................... 45
Farm ................................................................ 46
Flat/apartment ................................................... 47
Terraced/semi-detached house ............................ 48
Other ................................................................ 49

How big is your house? ........................................... 46

Yes  No

Approximately what year was your house built? .......... 49

Has your house been insulated after 1970? ............... 53

Do you live on the lower ground floor/basement? ....... 54

If "Yes", is the floor laid on concrete? ...................... 55

What is the main source of heat in your home?

Electric heating ................................................. 50
Wood-burning stove .......................................... 51
Central heating system using:
Paraffin ........................................................... 52
Electricity .......................................................... 53

Yes  No

Do you have fitted carpets in the living room? ............ 54

Is there a cat in your home? ................................ 55

Is there a dog in your home? ................................ 56

WORK

If you have paid or unpaid work, how would you describe your work?

Mostly sedentary work? ..................................... 63
(e.g. office work, mounting)

Work that requires a lot of walking? ...................... 64
(e.g. shop assistant, light industrial work, teaching)

Work that requires a lot of walking and lifting? ....... 65
(e.g. postman, nursing, construction)

Heavy manual work? ........................................ 66
(e.g. forestry, heavy farm-work, heavy construction)

Can you decide yourself how your work should be organised?

No, not at all ..................................................... 67
To a small extent .............................................. 68
Yes, to a large extent ....................................... 69
Yes, I decide myself ......................................... 70

Are you on call, do you work shifts or nights? .......... 60

Do you do any of the following jobs (full- or part-time)?

Tick one box only for each item.

Yes  No

Driver .......................................................... 86
Farmer .......................................................... 87
Fisherman ...................................................... 88

CHILDHOOD/YOUTH

In which Norwegian municipality did you live at the age of 1 year?

If you did not live in Norway, give country of residence instead of municipality.

How was your family’s financial situation during your childhood?

Very good ...................................................... 29
Good ............................................................ 30
Difficult ......................................................... 31
Very difficult .................................................. 32

How many of the first three years of your life

- did you live in a town/city? ......................... 36
- did your family have a cat or dog in the home? 37

How many of the first 15 years of your life

- did you live in a town/city? ......................... 38
- did your family have a cat or dog in the home? 39
**YOUR OWN ILLNESSES**

Tick one box only for each item. Give your age at the time. If you have had the condition several times, how old were you last time?

<table>
<thead>
<tr>
<th>Condition</th>
<th>Yes</th>
<th>No</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hip fracture</td>
<td>69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrist/forearm fracture</td>
<td>72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whiplash</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injury requiring hospital admission</td>
<td>78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastric ulcer</td>
<td>81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duodenal ulcer</td>
<td>84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastric/duodenal ulcer surgery</td>
<td>87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neck surgery</td>
<td>92</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Have you ever had, or do you still have: Tick one box only for each item.

- **Asthma**
- **Heart attack before age 60**
- **Allergy**
- **Peptic ulcer**
- **Diabetes**
- **Injury requiring hospital admission**
- **Cancer**
- **Neck surgery**
- **Gastric/duodenal ulcer surgery**
- **Tick for the relatives who have or have ever had any of the following diseases:**
  - **Cerebral stroke or brain haemorrhage**
  - **Heart attack before age 60**
  - **Cancer**
  - **Asthma**
  - **Gastric/duodenal ulcer**
  - **Osteoporosis**
  - **Psychological problems**
  - **Allergy**
  - **Diabetes**
  - **Hand eczema**
  - **Hay fever**
  - **Food allergy**
  - **Other hypersensitivity (not allergy)**

**ILLNESS IN THE FAMILY**

Tick for the relatives who have or have ever had any of the following diseases: Tick "None" if none of your relatives have had the disease.

**SYMPTOMS**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you cough about daily for some periods of the year?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 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? |     |    |
| Have you had episodes of wheezing in your chest?                         |     |    |
| If "Yes", has this occurred:
  - Tick one box only for each item.                                      |     |    |
  - At night                                                                |     |    |
  - In connection with respiratory infections                               |     |    |
  - In connection with physical exertion                                   |     |    |
  - In connection with very cold weather                                   |     |    |
| Have you noticed sudden changes in your pulse or heart rhythm in the last year? |     |    |
| How often do you suffer from sleeplessness?                              |     |    |
  - Never, or just a few times a year                                      |     |    |
  - 1-2 times a month                                                       |     |    |
  - Approximately once a week                                               |     |    |
  - More than once a week                                                   |     |    |
| If you suffer from sleeplessness, what time of the year does it affect you most? |     |    |
  - No particular time of year                                             |     |    |
  - Especially during the polar night                                      |     |    |
  - Especially during the midnight sun season                              |     |    |
  - Especially in spring and autumn                                        |     |    |
| Have you in the last year suffered from sleeplessness to the extent that it has affected your ability to work? |     |    |
| How often do you suffer from headaches?                                 |     |    |
  - Rarely or never                                                         |     |    |
  - Once or more a month                                                   |     |    |
  - Once or more a week                                                    |     |    |
  - Daily                                                                   |     |    |
| Does the thought of getting a serious illness ever worry you?           |     |    |
  - Not at all                                                              |     |    |
  - Only a little                                                           |     |    |
  - Some                                                                   |     |    |
  - Very much                                                               |     |    |
| Have you had this in the last 14 days?                                  |     |    |
| How many times have you had a cold, influenza (flu), vomiting/diarrhoea, or similar in the last six months? times |     |    |
| How many visits have you made during the past year due to your own health or illness:     | |    |
| Tick 0 if you have not had such contact                                  |     |    |

**USE OF HEALTH SERVICES**

- To a general practitioner (GP)/Emergency GP
- To a psychologist or psychiatrist
- To an other medical specialist (not at a hospital)
- To a hospital out-patient clinic
- Admitted to a hospital
- To a medical officer at work
- To a physiotherapist
- To a chiropractor
- To an acupuncturist
- To a dentist
- To an alternative practitioner (homoeopath, foot zone therapist, etc.)
- To a healer, faith healer, clairvoyant
MEDICATION AND DIETARY SUPPLEMENTS

Have you for any length of time in the past year used any of the following medicines or dietary supplements daily or almost daily? Indicate how many months you have used them.

**Put 0 for items you have not used.**

**Medicines**

<table>
<thead>
<tr>
<th>Category</th>
<th>Item</th>
<th>Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Painkillers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleeping pills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tranquilizers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antidepressants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allergy drugs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asthma drugs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dietary supplements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron tablets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium tablets or bonemeal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin D supplements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other vitamin supplements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cod liver oil or fish oil capsules</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Have you in the last 14 days used the following medicines or dietary supplements? **Tick one box only for each item.**

**Medicines**

<table>
<thead>
<tr>
<th>Category</th>
<th>Item</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Painkillers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antipyrética (to reduce fever)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Migraine drugs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eczema cream/ointment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart medicines (not blood pressure)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cholesterol lowering drugs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleeping pills</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tranquilizers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antidepressants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other drugs for nervous conditions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antacids</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastric ulcer drugs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes tablets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drugs for hypothyroidism (Thyroxine)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cortisone tablets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other medicine(s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dietary supplements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron tablets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium tablets or bonemeal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin D supplements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other vitamin supplements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cod liver oil or fish oil capsules</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FOOD HABITS

If you use butter or margarine on your bread, how many slices does a small catering portion normally cover? By this, we mean the portion packs served on planes, in cafés, etc. (10-12g)

A catering portion is enough for about ___________ slices

What kind of fat is normally used in cooking (not on the bread) in your home?

- Butter ___________
- Hard margarine ___________
- Soft margarine ___________
- Butter/margarine blend ___________
- Oils ___________

What kind of bread (bought or home-made) do you usually eat? **Tick one or two boxes!**

The bread I eat is most similar to:

- White bread ___________
- Light textured bread ___________
- Ordinary brown bread ___________
- Coarse brown bread ___________
- Crisp bread ___________

How much (in number of glasses, cups, potatoes or slices) do you usually eat or drink daily of the following foodstuffs? **Tick one box for each foodstuff.**

<table>
<thead>
<tr>
<th>Foodstuff</th>
<th>Never</th>
<th>Less than 1</th>
<th>1-2</th>
<th>3-4</th>
<th>5-6</th>
<th>More than 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full milk (ordinary or curdled) (glasses)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semi-skimmed milk (ordinary or curdled) (glasses)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skimmed milk (ordinary or curdled) (glasses)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tea (cups)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orange juice (glasses)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potatoes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slices of bread in total (incl. crisp-bread)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slices of bread with fish (e.g. mackerel in tomato sauce)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- lean meat (e.g. ham)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- fat meat (e.g. salami)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- cheese (e.g. Gouda/ Norvegia)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- brown cheese</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- smoked cod caviare</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- jam and other sweet spreads</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How many times per week do you normally eat the following foodstuffs? **Tick a box for all foodstuffs listed.**

**White bread**

- Yoghurt ___________
- Boiled or fried egg ___________
- Breakfast cereal/ oat meal, etc. ___________
- Dinner with
  - unprocessed meat ___________
  - sausage/meatloaf/ meatballs ___________
  - fatty fish (e.g. salmon/redfish) ___________
  - lean fish (e.g. cod) ___________
  - fishballs/fishpuding/fishcakes ___________
  - vegetables ___________
  - Mayonnaise, remoulade ___________
  - Carrots ___________
  - Cauliflower/cabbage/ broccoli ___________
  - Apples/ pears ___________
  - Oranges, mandarins ___________
  - Sweetened soft drinks ___________
  - Sugar-free ("Light") soft drinks ___________
  - Chocolate ___________
  - Waffles, cakes, etc. ___________

**Light textured bread**

**Ordinary brown bread**

**Coarse brown bread**

**Crisp bread**

**FRIENDS**

How many good friends do you have whom you can talk confidentially with and who give you help when you need it? ___________ friends

**Do not count people you live with, but do include other relatives!**

How many of these good friends do you have contact with at least once a month? ___________ friends

Do you feel you have enough good friends? ___________ friends

How often do you normally take part in organised gatherings, e.g. sewing circles, sports clubs, political meetings, religious or other associations?

- Never, or just a few times a year ___________ times per week
- 1-2 times a month ___________ times per week
- Approximately once a week ___________ times per week
- More than once a week ___________ times per week
**ALCOHOL**

How often do you usually drink beer?  
- Never, or just a few times a year  
- 1-2 times a month  
- About once a week  
- 2-3 times a week  
- More or less daily

How often do you usually drink wine?  
- Never, or just a few times a year  
- 1-2 times a month  
- About once a week  
- 2-3 times a week  
- More or less daily

How often do you usually drink spirits?  
- Never, or just a few times a year  
- 1-2 times a month  
- About once a week  
- 2-3 times a week  
- More or less daily

Approximately how often during the last year have you consumed alcohol corresponding to at least 5 small bottles of beer, a bottle of wine, or 1/4 bottle of spirits?  
- Not at all the last year  
- A few times  
- 1-2 times a month  
- 1-2 times a week  
- 3 or more times a week

For approximately how many years has your alcohol consumption been as you described above?  

**WEIGHT REDUCTION**

About how many times have you deliberately tried to lose weight? Write 0 if you never have.  
- before age 20  
- later

If you have lost weight deliberately, about how many kilos have you ever lost at the most?  
- before age 20  
- later

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

**URINARY INCONTINENCE**

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

**TO BE ANSWERED BY WOMEN ONLY**

**MENSTRUATION**

How old were you when you started menstruating?  

If you no longer menstruate, how old were you when you stopped menstruating?  

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?  

If you still menstruate or are pregnant:  
- What date did your last menstruation period begin?  
- Do you usually use painkillers to relieve period pains?  
- Yes  
- No

**PREGNANCY**

How many children have you given birth to?  

Are you pregnant at the moment?  
- Yes  
- No  
- Don't know

Have you during pregnancy had high blood pressure and/or proteinuria?  
- Yes  
- No

If "Yes", during which pregnancy?  
- High blood pressure  
- Proteinuria

If you have given birth, fill in for each child the year of birth and approximately how many months you breastfed the child.

**CONTRACEPTION AND ESTROGEN**

Do you use, or have you ever used:  
- Oral contraceptive pills (incl. minipill)  
- Hormonal intrauterine device  
- Estrogen (tablets or patches)  
- Estrogen (cream or suppositories)

If you use oral contraceptive pills, hormonal intrauterine device, or estrogen, what brand do you currently use?  

If you use or have ever used oral contraceptive pills:  
- Age when you started to take the pill?  
- How many years in total have you taken the pill?  
- If you have given birth, how many years did you take the pill before your first delivery?  
- If you have stopped taking the pill:  
- Age when you stopped?

**Thank you for the help! Remember to mail the form today!**

*The Tromsø Health Survey*
Appendix 3c

Questionnaire 2 (≥70 years), the 4th Tromsø Study 1994–95

English version
Tromsø Health Survey
for the over 70s

The main aim of the Tromsø Study is to improve our knowledge about cardiovascular diseases in order to aid prevention. The survey is also intended to improve our knowledge of cancer and other general conditions, such as allergies, muscle pains and mental conditions. Finally, the survey should give knowledge about the older part of the population. We would therefore like you to answer the questions below.

This form is a 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 in strict confidence. The information you give us may later be stored along 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 in doubt about what to answer, tick the box that you feel fits best.

The completed form should be sent to us in the enclosed pre-paid envelope.

Thank you in advance for helping us.

Yours sincerely,

Faculty of Medicine
University of Tromsø

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 ........................................17

Screening Service
National Health

PREVIOUS WORK AND FINANCIAL SITUATION

How will you describe the type of work you had for the last 5-10 years before you retired?

<table>
<thead>
<tr>
<th>Most work requires a lot of walking?</th>
<th>Yes</th>
<th>No</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most work requires a lot of lifting?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mostly sedentary work?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e.g. forestry, heavy farm-work, heavy construction)</td>
<td>53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy manual work</td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e.g. postman, nurse, construction)</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy manual work</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e.g. forestry, heavy farm-work, heavy construction)</td>
<td>57</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Did you do any of the following jobs (full-time or part-time)?

Tick one box only for each item.

<table>
<thead>
<tr>
<th>Job</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farmer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisherman</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How old were you when you retired?

How is your current financial situation?

<table>
<thead>
<tr>
<th>Type of financial situation</th>
<th>Very good</th>
<th>Good</th>
<th>Difficult</th>
<th>Very difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>58</td>
<td>59</td>
<td>60</td>
<td>61</td>
</tr>
</tbody>
</table>

HOME

Who do you live with?

Tick once for each item and give the number.

<table>
<thead>
<tr>
<th>Who do you live with?</th>
<th>Yes</th>
<th>No</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spouse/partner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other people over 18 years</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>People under 18 years</td>
<td>35</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What type of house do you live in?

<table>
<thead>
<tr>
<th>Type of house</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Villa/ detached house</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flat/apartment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terraced /semi-detached house</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How long have you lived in your present home?

Is your home adapted to your needs?

If "No", do you have problems with:

Living space
Variable temperature,
too cold/too warm
Stairs
Toilet
Bath/shower
Maintenance
Other (please specify)

Would you like to move into a retirement home?

CHILDFORD/YOUTH

In which Norwegian municipality did you live at the age of 1 year?

If you did not live in Norway, give country instead of municipality.

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

<table>
<thead>
<tr>
<th>Type of financial situation</th>
<th>Very good</th>
<th>Good</th>
<th>Difficult</th>
<th>Very difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>30</td>
<td>31</td>
<td>32</td>
<td>33</td>
</tr>
</tbody>
</table>

How old were your parents when they died?

Mother
Father

Day Month Year

Date for filling in this form: ................. 18 / /
### HEALTH AND ILLNESS

Has your state of health changed in the last year?
- Yes, it has got worse .................................................. Yes No Age
- No, unchanged .......................................................... 2
- Yes, it has got better ..................................................... 3

How do you feel your health is now compared to others of your age?
- Much worse ........................................................................ Yes No
- A little worse ........................................................................ Yes No
- About the same .................................................................... Yes No
- A little better ........................................................................ Yes No
- Much better ........................................................................ Yes No

### YOUR OWN ILLNESSES

Have you ever had:
**Tick one box only for each item. Give your age at the time. If you have had the condition several times, how old were you last time?**

<table>
<thead>
<tr>
<th>Illness</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hip fracture</td>
<td>64</td>
</tr>
<tr>
<td>Wrist/forearm fracture</td>
<td>67</td>
</tr>
<tr>
<td>Whiplash</td>
<td>70</td>
</tr>
<tr>
<td>Injury requiring hospital admission</td>
<td>72</td>
</tr>
<tr>
<td>Gastric ulcer</td>
<td>76</td>
</tr>
<tr>
<td>Duodenal ulcer</td>
<td>79</td>
</tr>
<tr>
<td>Gastric/duodenal ulcer surgery</td>
<td>82</td>
</tr>
<tr>
<td>Neck surgery</td>
<td>86</td>
</tr>
</tbody>
</table>

Have you ever had, or do you have:
**Tick one box only for each item.**

<table>
<thead>
<tr>
<th>Illness</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer</td>
<td>88</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>89</td>
</tr>
<tr>
<td>Migraine</td>
<td>89</td>
</tr>
<tr>
<td>Parkinson’s disease</td>
<td>89</td>
</tr>
<tr>
<td>Chronic bronchitis</td>
<td>89</td>
</tr>
<tr>
<td>Psoriasis</td>
<td>89</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>89</td>
</tr>
<tr>
<td>Fibromyalgia/fibrositis/chronic pain syndrome</td>
<td>89</td>
</tr>
<tr>
<td>Psychological problems for which you have sought help</td>
<td>89</td>
</tr>
<tr>
<td>Thyroid disease</td>
<td>98</td>
</tr>
<tr>
<td>Liver disease</td>
<td>98</td>
</tr>
<tr>
<td>Recurrent urinary incontinence</td>
<td>98</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>98</td>
</tr>
<tr>
<td>Cataract</td>
<td>98</td>
</tr>
<tr>
<td>Arthrosis (osteoarthritis)</td>
<td>98</td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
<td>102</td>
</tr>
<tr>
<td>Kidney stones</td>
<td>102</td>
</tr>
<tr>
<td>Appendectomy</td>
<td>102</td>
</tr>
<tr>
<td>Allergy and hypersensitivity</td>
<td>102</td>
</tr>
<tr>
<td>Atopic eczema (e.g. childhood eczema)</td>
<td>102</td>
</tr>
<tr>
<td>Hand eczema</td>
<td>102</td>
</tr>
<tr>
<td>Hay fever</td>
<td>102</td>
</tr>
<tr>
<td>Food allergy</td>
<td>102</td>
</tr>
<tr>
<td>Other hypersensitivity (not allergy)</td>
<td>102</td>
</tr>
</tbody>
</table>

How many times have you had a common cold, influenza (flu), diarrhoea/vomiting or similar in the last 6 months? **111 times**

Have you had this in the last 14 days? **113**

### ILLNESS IN THE FAMILY

Tick for the relatives who have or have ever had any of the following diseases:
**Tick “None” if none of your relatives have had the disease.**

<table>
<thead>
<tr>
<th>Illness</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerebral stroke or brain haemorrhage</td>
<td>114</td>
</tr>
<tr>
<td>Heart attack before age 60</td>
<td>120</td>
</tr>
<tr>
<td>Cancer</td>
<td>126</td>
</tr>
<tr>
<td>Hypertension</td>
<td>132</td>
</tr>
<tr>
<td>Asthma</td>
<td>138</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>144</td>
</tr>
<tr>
<td>Arthrosis (osteoarthritis)</td>
<td>150</td>
</tr>
<tr>
<td>Psychological problems</td>
<td>156</td>
</tr>
<tr>
<td>Dementia</td>
<td>162</td>
</tr>
<tr>
<td>Diabetes</td>
<td>168</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>202</td>
</tr>
<tr>
<td>Colon cancer</td>
<td>202</td>
</tr>
<tr>
<td>Kidney stones</td>
<td>202</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td>202</td>
</tr>
<tr>
<td>Leukaemia</td>
<td>202</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>202</td>
</tr>
</tbody>
</table>

- age when they got diabetes: 174

### SYMPTOMS

Do you cough about daily for some periods of the year? **184 Yes No**

If “Yes”:
- Is your cough productive? **185 Yes No**

Have you had this kind of cough for as long as 3 months in each of the last two years? **186 Yes No**

Have you had episodes with wheezing in your chest? **187 Yes No**

If “Yes”, has this occurred:
**Tick one box only for each item.**

- At night **188 Yes No**
- In connection with respiratory infections **188 Yes No**
- In connection with physical exertion **188 Yes No**
- In connection with very cold weather **188 Yes No**

Have you noticed sudden changes in your pulse or heart rhythm in the last year? **192 Yes No**

Have you lost weight in the last year? **193 Yes No**

If “Yes”:
- How many kilograms? **194 kg**

How often do you suffer from sleeplessness?
- Never, or just a few times a year **196 Yes No**
- 1-2 times a month **196 Yes No**
- Approximately once a week **196 Yes No**
- More than once a week **196 Yes No**

If you suffer from sleeplessness, what time of the year does it affect you most?
- No particular time of year **197 Yes No**
- Especially during the polar night **197 Yes No**
- Especially during the midnight sun season **197 Yes No**
- Especially in spring and autumn **197 Yes No**

Do you usually take a nap during the day? **198 Yes No**

Do you feel that you usually get enough sleep? **199 Yes No**

Do you suffer from:
- Dizziness **200 Yes No**
- Poor memory **200 Yes No**
- Lack of energy **200 Yes No**
- Constipation **200 Yes No**
**BODILY FUNCTIONS**

Can you manage the following everyday activities on your own without help from others?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Yes</th>
<th>With some help</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking indoors on one level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking up/down stairs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking outdoors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking approx. 500 metres</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Going to the toilet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washing yourself</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking a bath/shower</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dressing and undressing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Getting in and out of bed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doing light housework (e.g. washing up)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doing heavier housework (e.g. cleaning floor)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Go shopping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take the bus</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Can you hear normal speech (if necessary with hearing aid)?

<table>
<thead>
<tr>
<th>Ability</th>
<th>Yes</th>
<th>With difficulty</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Can you read (if necessary with glasses)?

<table>
<thead>
<tr>
<th>Ability</th>
<th>Yes</th>
<th>With difficulty</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**USE OF HEALTH SERVICES**

How many visits have you made during the past year due to your own health or illness:

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of times the past year</th>
</tr>
</thead>
<tbody>
<tr>
<td>To a general practitioner (GP)/emergency GP</td>
<td>238</td>
</tr>
<tr>
<td>To a psychologist or psychiatrist</td>
<td></td>
</tr>
<tr>
<td>To an alternative practitioner (homeopath, foot zone therapist, etc.)</td>
<td></td>
</tr>
<tr>
<td>To a hospital-out-patient clinic</td>
<td>234</td>
</tr>
<tr>
<td>Admitted to a hospital</td>
<td></td>
</tr>
<tr>
<td>To a physiotherapist</td>
<td></td>
</tr>
<tr>
<td>To a chiropractor</td>
<td>240</td>
</tr>
<tr>
<td>To a acupuncturist</td>
<td></td>
</tr>
<tr>
<td>To a dentist</td>
<td></td>
</tr>
<tr>
<td>To an alternative practitioner (homeopath, foot zone therapist, etc.)</td>
<td></td>
</tr>
<tr>
<td>To a healer, faith healer, clairvoyant</td>
<td></td>
</tr>
</tbody>
</table>

Do you have home aid?

<table>
<thead>
<tr>
<th>Type</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>262</td>
<td></td>
</tr>
<tr>
<td>Municipal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you receive home nursing care?

<table>
<thead>
<tr>
<th>Type</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MEDICATION AND DIETARY SUPPLEMENTS**

Are you pleased with the health care and home assistance services in the municipality?

<table>
<thead>
<tr>
<th>Service</th>
<th>Yes</th>
<th>No</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assigned family GP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home nursing care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home assistance services</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you feel confident that you will receive health care and home assistance services if you need it?

<table>
<thead>
<tr>
<th>Confidence</th>
<th>Yes</th>
<th>No</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confident</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not confident</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very unsure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don't know</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FAMILY AND FRIENDS**

Do you have close relatives who can give you help and support when you need it?

<table>
<thead>
<tr>
<th>Relative Type</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spouse/partner</td>
<td>294</td>
<td></td>
</tr>
<tr>
<td>Children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How many good friends do you have whom you can talk confidentially with and who give you good help when you need it?

<table>
<thead>
<tr>
<th>Number of good friends</th>
<th>Yes</th>
<th>No</th>
<th>Don't count</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you feel you have enough good friends?

<table>
<thead>
<tr>
<th>Feelings</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you feel that you belong to a community (group of people) who can depend on each other and who feel committed to each other (e.g. a political party, religious group, relatives, neighbours, work place, or organisation)?

<table>
<thead>
<tr>
<th>Experience</th>
<th>Strong sense of belonging</th>
<th>Some sense of belonging</th>
<th>Little or no sense of belonging</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>300</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

**Dietary supplements:**

<table>
<thead>
<tr>
<th>Supplement</th>
<th>Number of months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Painkillers</td>
<td></td>
</tr>
<tr>
<td>Sleeping pills</td>
<td></td>
</tr>
<tr>
<td>Tranquillizers</td>
<td></td>
</tr>
<tr>
<td>Antidepressants</td>
<td></td>
</tr>
<tr>
<td>Allergy drugs</td>
<td></td>
</tr>
<tr>
<td>Asthma drugs</td>
<td></td>
</tr>
<tr>
<td>Heart medicines (not blood pressure)</td>
<td></td>
</tr>
<tr>
<td>Insulin</td>
<td></td>
</tr>
<tr>
<td>Diabetes tablets</td>
<td></td>
</tr>
<tr>
<td>Drugs for hypothyroidism (Thyroine)</td>
<td></td>
</tr>
<tr>
<td>Cortisone tablets</td>
<td></td>
</tr>
<tr>
<td>Remedies for constipation</td>
<td></td>
</tr>
<tr>
<td>Iron tablets</td>
<td>283</td>
</tr>
<tr>
<td>Vitamin D supplements</td>
<td></td>
</tr>
<tr>
<td>Other vitamin supplements</td>
<td></td>
</tr>
<tr>
<td>Calcium tablets or bone meal</td>
<td>289</td>
</tr>
<tr>
<td>Cod liver oil or fish oil capsules</td>
<td></td>
</tr>
</tbody>
</table>

**Activities**

- Taking a bath/shower
- Walking outdoors
- Walking indoors on one level
- Walking up/down stairs
- Walking approx. 500 metres
- Going to the toilet
- Eating
- Cooking
- Doing light housework (e.g., washing up)
- Doing heavier housework (e.g., cleaning floor)
- Go shopping
- Take the bus
- Wheelchair
- Hearing aid
- Safety alarm device

**Healing Options**

- Admitted to a hospital
- To an acupuncturist
- To a therapist
- To an alternative practitioner
- To a healer, faith healer, clairvoyant

**Sense of Belonging**

- Very much
- Some
- Little or no

**Medicines**

- Painkillers
- Sleeping pills
- Tranquillizers
- Antidepressants
- Allergy drugs
- Asthma drugs
- Heart medicines (not blood pressure)
- Insulin
- Diabetes tablets
- Drugs for hypothyroidism (Thyroine)
- Cortisone tablets
- Remedies for constipation
- Iron tablets
- Vitamin D supplements
- Other vitamin supplements
- Calcium tablets or bone meal
- Cod liver oil or fish oil capsules
How often do you normally take part in organised gatherings, e.g. sewing circles, sports clubs, political meetings, religious or other associations?

- Never, or just a few times a year ........................................ 301
- 1-2 times a month ................................................................. 2
- Approximately once a week .................................................. 3
- More than once a week ........................................................... 4

How many meals a day do you normally eat (dinner and bread meals)? ................................................................. 302

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

What kind of bread (bought or home-made) do you usually eat?

Tick one or two boxes.

<table>
<thead>
<tr>
<th>White Bread</th>
<th>Light textured</th>
<th>Ordinary brown</th>
<th>Coarse brown</th>
<th>Crisp bread</th>
</tr>
</thead>
<tbody>
<tr>
<td>306</td>
<td></td>
<td></td>
<td></td>
<td>319</td>
</tr>
</tbody>
</table>

What kind of fat is normally used in cooking (not on the bread) in your home?

- Butter ........................................................................... 311
- Hard margarine ............................................................... 3
- Soft margarine ................................................................. 3
- Butter/margarine blend ...................................................... 3
- Oils .............................................................................. 315

How much (in number of glasses, cups, potatoes or slices) do you usually eat/drink daily the following foodstuffs?

Tick one box for each foodstuff.

<table>
<thead>
<tr>
<th>Milk of all types (glasses)</th>
<th>Orange juice (glasses)</th>
<th>Potatoes</th>
<th>Slices of bread in total (incl. crispbread)</th>
<th>Slices of bread with – fish (e.g. mackerel in tomato sauce)</th>
<th>– cheese (e.g. Gouda/ Norvegia)</th>
<th>– smoked cod caviare</th>
</tr>
</thead>
<tbody>
<tr>
<td>316</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>322</td>
</tr>
</tbody>
</table>

How many times per week do you normally eat the following foodstuffs?

Tick for all foodstuffs listed.

<table>
<thead>
<tr>
<th>Yoghurt</th>
<th>Boiled or fried egg</th>
<th>Breakfast cereal/oatmeal, etc.</th>
<th>Dinner with – unprocessed meat</th>
<th>– fatty fish (e.g. salmon/red-fish)</th>
<th>– lean fish (e.g. cod)</th>
<th>– vegetables (fresh or cooked)</th>
<th>Carrots (fresh or cooked)</th>
<th>Cauliflower/cabbage/ broccoli</th>
<th>Apples/ pears</th>
<th>Oranges, mandarins, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>333</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 2 3 4</td>
</tr>
</tbody>
</table>

How content do you generally feel with growing old?

- Good .............................................................................. 334
- Quite good ....................................................................... 2
- Up and down ...................................................................... 3
- Bad ................................................................................... 4

What is your view of the future?

- Bright .............................................................................. 335
- Not too bad ........................................................................ 1
- Quite worried ...................................................................... 2
- Dark .................................................................................... 5

How old were you when you started menstruating? ................................................................. 336

How old were you when you stopped menstruating? ................................................................. 338

How many times per week do you normally
take part in organised gatherings, e.g. sewing circles, sports clubs, political meetings, religious or other associations?

- Never, or just a few times a year ........................................ 301
- 1-2 times a month ................................................................. 2
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What kind of bread (bought or home-made) do you usually eat?

Tick one or two boxes.

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<th>Coarse brown</th>
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</thead>
<tbody>
<tr>
<td>306</td>
<td></td>
<td></td>
<td></td>
<td>319</td>
</tr>
</tbody>
</table>

What kind of fat is normally used in cooking (not on the bread) in your home?

- Butter ........................................................................... 311
- Hard margarine ............................................................... 3
- Soft margarine ................................................................. 3
- Butter/margarine blend ...................................................... 3
- Oils .............................................................................. 315

How much (in number of glasses, cups, potatoes or slices) do you usually eat/drink daily the following foodstuffs?

Tick one box for each foodstuff.

<table>
<thead>
<tr>
<th>Milk of all types (glasses)</th>
<th>Orange juice (glasses)</th>
<th>Potatoes</th>
<th>Slices of bread in total (incl. crispbread)</th>
<th>Slices of bread with – fish (e.g. mackerel in tomato sauce)</th>
<th>– cheese (e.g. Gouda/ Norvegia)</th>
<th>– smoked cod caviare</th>
</tr>
</thead>
<tbody>
<tr>
<td>316</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>322</td>
</tr>
</tbody>
</table>

How many times per week do you normally eat the following foodstuffs?

Tick for all foodstuffs listed.

<table>
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<tr>
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<th>– fatty fish (e.g. salmon/red-fish)</th>
<th>– lean fish (e.g. cod)</th>
<th>– vegetables (fresh or cooked)</th>
<th>Carrots (fresh or cooked)</th>
<th>Cauliflower/cabbage/ broccoli</th>
<th>Apples/ pears</th>
<th>Oranges, mandarins, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>333</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 2 3 4</td>
</tr>
</tbody>
</table>

Have you during pregnancy had high blood pressure and/or proteinuria? ................................................................. 366

If "Yes", during which pregnancy?

- Yes .................................................................................... 367
- No ..................................................................................... 366

What is your view of the future?

- Bright .............................................................................. 335
- Not too bad ........................................................................ 1
- Quite worried ...................................................................... 2
- Dark .................................................................................... 5

How old were you when you started menstruating? ................................................................. 336

How old were you when you stopped menstruating? ................................................................. 338

Has the bread type is most similar to:

- White Bread ....................................................................... 306
- Light textured ................................................................... 310
- Ordinary brown .................................................................. 3
- Coarse brown ..................................................................... 3
- Crisp bread ...................................................................... 319

How much (in number of glasses, cups, potatoes or slices) do you usually eat/drink daily the following foodstuffs?

Tick one box for each foodstuff.

<table>
<thead>
<tr>
<th>Milk of all types (glasses)</th>
<th>Orange juice (glasses)</th>
<th>Potatoes</th>
<th>Slices of bread in total (incl. crispbread)</th>
<th>Slices of bread with – fish (e.g. mackerel in tomato sauce)</th>
<th>– cheese (e.g. Gouda/ Norvegia)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>316</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>322</td>
</tr>
</tbody>
</table>

Have you during pregnancy had high blood pressure and/or proteinuria? ................................................................. 366

If "Yes", during which pregnancy?

- High blood pressure ................................................................ 367
- Proteinuria ........................................................................... 369

Your comments:

Thank you for the help! Remember to mail the form today!

Tromsø Health Survey
Appendix 4a

Questionnaire 1 (<70 years), the 5th Tromsø Study 2001–02

English version
Personal Invitation
1. YOUR OWN HEALTH

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

<table>
<thead>
<tr>
<th>Poor</th>
<th>Not so good</th>
<th>Good</th>
<th>Very good</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

1.2 Do you have, or have you had?:

Asthma ................................................
Hay fever ................................................
Chronic bronchitis/emphysema ...............
Diabetes ..................................................
Osteoporosis ..........................................
Fibromyalgia/chronic pain syndrome ......
Psychological problems for which you have sought help ............................................
A heart attack ........................................
Angina pectoris (heart cramp) ............
Cerebral stroke/brain haemorrhage ........

5.1 How long altogether have you lived in the county? (Put 0 if less than half a year)
5.2 How long altogether have you lived in the municipality? (Put 0 if less than half a year)
5.3 Where did you live most of the time before the age of 16? (Tick one option and specify)

Same municipality .................................
Another municipality in the county ........
Another county in Norway ....................
Outside Norway ...................................
Country:

5.4 Have you moved within the last five years?

No
Yes, one time
Yes, more than once

6. BODY WEIGHT

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

kg
### 7. FOOD AND BEVERAGES

<table>
<thead>
<tr>
<th>7.1 How often do you usually eat these foods? (Tick once per line)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit, berries ........................................................................</td>
</tr>
<tr>
<td>Cheese (all types) ...................................................................</td>
</tr>
<tr>
<td>Potatoes ..................................................................................</td>
</tr>
<tr>
<td>Boiled vegetables .....................................................................</td>
</tr>
<tr>
<td>Fresh vegetables/salad ................................................................</td>
</tr>
<tr>
<td>Fatty fish (e.g. salmon, trout, mackerel, herring) ..................</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7.2 What type of fat do you usually use? (Tick once per line)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don't use ...............................................................................</td>
</tr>
<tr>
<td>Butter ....................................................................................</td>
</tr>
<tr>
<td>Margarine ...............................................................................</td>
</tr>
<tr>
<td>Margarine ...............................................................................</td>
</tr>
<tr>
<td>Oils ......................................................................................</td>
</tr>
<tr>
<td>Other .....................................................................................</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7.3 Do you use the following dietary supplements?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cod liver oil, fish oil capsules .......................</td>
</tr>
<tr>
<td>Vitamins and/or mineral supplements? ...................</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7.4 How much of the following do you usually drink? (Tick once per line)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rarely/rever 1 glass /day 2-3 glasses /week 4-6 glasses /week 1-2 glasses /week</td>
</tr>
<tr>
<td>2-3 glasses /week 4 glasses /day 5 glasses or more /day</td>
</tr>
<tr>
<td>Full milk, full-fat curdled milk, yoghurt ...........................................</td>
</tr>
<tr>
<td>Semi-skinned milk, semi-skinned curdled milk, low-fat yoghurt ..............</td>
</tr>
<tr>
<td>Skimmed milk, skimmed curdled milk ..................................................</td>
</tr>
<tr>
<td>Extra semi-skinned milk .................................................................</td>
</tr>
<tr>
<td>Juice ..............................................................................................</td>
</tr>
<tr>
<td>Water .............................................................................................</td>
</tr>
<tr>
<td>Mineral water (e.g. Farris, Ramlesa etc) ...........................................</td>
</tr>
<tr>
<td>Cola-containing soft drink ..................................................................</td>
</tr>
<tr>
<td>Other soda/soft drink .......................................................................</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7.5 Do you usually drink soft drink: with sugar 1 without sugar 2</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>7.6 How many cups of coffee and tea do you drink daily? (Put 0 for the types you don't drink daily)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filtered coffee .........................................................................................................................</td>
</tr>
<tr>
<td>Boiled coffee/coarsely ground coffee for brewing .....................................................................</td>
</tr>
<tr>
<td>Other type of coffee ..................................................................................................................</td>
</tr>
<tr>
<td>Tea ...........................................................................................................................................</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7.7 Approximately how often have you during the last year consumed alcohol? (Do not count low-alcohol and alcohol-free beer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never consumed alcohol ..................................................................................................................................</td>
</tr>
<tr>
<td>Have not consumed alcohol last year 2-3 times / month 4-6 times / month 1-2 times / week 3 times or more / day</td>
</tr>
<tr>
<td>2-3 times / month 4 times / week 1-2 times / week 3 times or more / week 1-2 times / day 3 times or more / day</td>
</tr>
<tr>
<td>To those who have consumed the last year: 2-3 times / month 4 times / week 1-2 times / week 3 times or more / week 1-2 times / day 3 times or more / day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7.8 When you drink alcohol, how many glasses or drinks do you normally drink?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>7.9 Approximately how many times during the last year have you consumed alcohol equivalent to 5 glasses or drinks within 24 hours?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>7.10 When you drink, do you normally drink: (Tick one or more)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beer ....................................................................................</td>
</tr>
<tr>
<td>Wine ....................................................................................</td>
</tr>
<tr>
<td>Spirits ...............................................................................</td>
</tr>
</tbody>
</table>

### 8. SMOKING

<table>
<thead>
<tr>
<th>8.1 How many hours a day do you normally spend in smoke-filled rooms? Number of total hours</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>8.2 Did any of the adults smoke at home while you were growing up? .........................................</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>8.3 Do you currently, or did you previously live together with a daily smoker after your 20th birthday?</th>
</tr>
</thead>
</table>

| 8.4 Do you/did you smoke daily? .................................................................................................. |

<table>
<thead>
<tr>
<th>8.5 If you smoke daily now, do you smoke:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cigarettes ...........................................</td>
</tr>
<tr>
<td>Cigars/cigarillos ....................................</td>
</tr>
<tr>
<td>A pipe .......................................................</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8.6 If you previously smoked daily, how long is it since you quit? Number of years</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>8.7 If you currently smoke, or have smoked previously:</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many cigarettes do you or did you normally smoke per day? Number of cigarettes</td>
</tr>
<tr>
<td>How old were you when you began daily smoking? Age in years</td>
</tr>
<tr>
<td>How many years in all have you smoked daily? Number of years</td>
</tr>
</tbody>
</table>

### 9. EDUCATION AND WORK

<table>
<thead>
<tr>
<th>9.1 How many years of education have you completed? (Include all the years you have attended school or studied) Number of years</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>9.2 Do you currently have paid work?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, full-time 1 Yes, part-time 2 No 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9.3 Describe the activity at the workplace where you had paid work for the longest period in the last 12 months. (e.g. Accountancy firm, school, paediatric department, carpentry workshop, garage, bank, grocery store, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business: If retired, enter the former business and occupation. Also applies to 9.4</td>
</tr>
<tr>
<td>Occupation: ........................................................................................................</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9.4 Which occupation/title have or had you at this workplace? (e.g. Secretary, teacher, industrial worker, nurse, carpenter, manager, salesman, driver, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupation: ........................................................................................................</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9.5 In your main occupation, do you work as self-employed, as an employee or family member without regular salary?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-employed 1 Employee 2 Family member 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9.6 Do you believe that you are in danger of losing your current work or income within the next two years? ........................................................</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>9.7 Do you receive any of the following benefits?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sickness benefit (are on sick leave) ....................</td>
</tr>
<tr>
<td>Old age pension, early retirement (AFP) or survivor pension ..........................................................</td>
</tr>
<tr>
<td>Rehabilitation/reintegration benefit ........................</td>
</tr>
<tr>
<td>Disability pension (full or partial) ..........................</td>
</tr>
<tr>
<td>Unemployment benefits during unemployment ...........</td>
</tr>
<tr>
<td>Social welfare benefits ........................................</td>
</tr>
<tr>
<td>Transition benefit for single parents ........................</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9.8 Do you believe that you are in danger of losing your current work or income within the next two years? Yes No</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>9.9 In your main occupation, do you work as self-employed, as an employee or family member without regular salary?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-employed 1 Employee 2 Family member 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9.10 Do you believe that you are in danger of losing your current work or income within the next two years? Yes No</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>9.11 In your main occupation, do you work as self-employed, as an employee or family member without regular salary?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-employed 1 Employee 2 Family member 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9.12 Do you believe that you are in danger of losing your current work or income within the next two years? Yes No</th>
</tr>
</thead>
</table>
10. EXERCISE AND PHYSICAL ACTIVITY

10.1 How has your physical activity in leisure time been during this last year? (Tick the most appropriate box)

- Light activity (not sweating/out of breath)...
- Hard physical activity (sweating/out of breath)...

Think of a weekly average for the year.

Time spent going to work is count as leisure time. Answer both questions.

- None
- Hours per week
  - Less than 1
  - 1-2
  - 3 or more

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
- Participation in recreational sports, heavy gardening, etc.? (Note: duration of activity at least 4 hours a week) 3
- Participation in hard training or sports competitions, regularly several times a week? ........................................... 4

11. FAMILY AND FRIENDS

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

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 1
Some interest 2
Little interest 3
No interest 4
Uncertain 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 tried

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)? .........................

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

- Cerebral stroke or brain haemorrhage ...........
- Heart attack before age of 60 years
- Asthma
- Cancer
- Diabetes

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):

- Mother's age
- Father's age
- Brother's age
- Sister's age
- Child's age

- Don't know

13. USE OF MEDICINES

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

13.1 Do you use:
- Blood pressure lowering drugs ..............
- Cholesterol-lowering drugs ..................

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

- Painkillers non-prescription ................
- Painkillers on prescription ..............
- Sleeping pills ................................
- Tranquilizers ................................
- Antidepressants ............................
- Other prescription medicines ... 1

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
- Up to 1 year
- 1 year or more

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

14.1 How old were you when you started menstruating?

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

14.3 Are you pregnant at the moment?

14.4 How many children have you given birth to?

14.5 Do you use, or have you ever used?
(Tick once for each line)

- Oral contraceptive pills/mini pill/contraceptive injection
- Hormonal intrauterine device (IUD) (not ordinary IUD).
- Estrogen (tablets or patches) .......
- Estrogen (cream or suppositories) ....

14.6 If you use/have used prescription estrogen:
How long have you used it?

14.7 If you use contraceptive pills, mini pill, contraceptive injection, hormonal IUD or estrogen, what brand do you use?
Appendix 4b

Questionnaire 1 (≥70 years), the 5th Tromsø Study 2001–02

English version
Personal invitation
**E1. YOUR OWN HEALTH**

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

<table>
<thead>
<tr>
<th>Poor</th>
<th>Not so good</th>
<th>Good</th>
<th>Very good</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Do you have, or have you had?:

- Asthma: [ ] Yes, Age first time [ ] No
- Chronic bronchitis/emphysema: [ ] Yes, [ ] No
- Diabetes: [ ] Yes, [ ] No
- Osteoporosis: [ ] Yes, [ ] No
- Fibromyalgia/chronic pain syndrome: [ ] Yes, [ ] No
- Psychological problems for which you have sought help: [ ] Yes, [ ] No

A heart attack: [ ] Yes, [ ] No

Angina pectoris (heart cramp): [ ] Yes, [ ] No

Cerebral stroke/brain haemorrhage: [ ] Yes, [ ] No

Do you get pain or discomfort in the chest when:

- Walking up hills, stairs, or walking fast on level ground? [ ] Yes, [ ] No

If you get such pain, do you usually:

<table>
<thead>
<tr>
<th>Stop?</th>
<th>Slow down?</th>
<th>Carry on at the same pace?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

If you stop, does the pain disappear within 10 minutes? [ ] Yes, [ ] No

Can such pain occur even if you are at rest? .... [ ] Yes, [ ] No

**E3. COMPLAINTS**

Below is a list of various problems. Have you experienced any of this during the last week (including today)? (Tick once for each line)

<table>
<thead>
<tr>
<th>No complaint</th>
<th>Little complaint</th>
<th>Pretty much</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudden fear without reason</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
</tr>
<tr>
<td>Felt afraid or anxious</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
</tr>
<tr>
<td>Faintness or dizziness</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
</tr>
<tr>
<td>Felt tense or upset</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
</tr>
<tr>
<td>Tend to blame yourself</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
</tr>
<tr>
<td>Sleeping problems</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
</tr>
<tr>
<td>Depressed, sad</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
</tr>
<tr>
<td>Feeling of being useless, worthless</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
</tr>
<tr>
<td>Feeling that everything is a struggle</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
</tr>
<tr>
<td>Feeling of hopelessness with regard to the future</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
<td>[ ] Yes, [ ] No</td>
</tr>
</tbody>
</table>

**E4. TEETH, MUSCLE AND SKELETON**

How many teeth have you lost/extracted? (Tick once only)

<table>
<thead>
<tr>
<th>Number of teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] No complaint</td>
</tr>
<tr>
<td>[ ] Little complaint</td>
</tr>
<tr>
<td>[ ] Severe complaint</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Neck / shoulders</th>
<th>Shoulders</th>
<th>Upper part of the back</th>
<th>Lumbar regions</th>
<th>Hips, legs, feet</th>
<th>Other places</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] No complaint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ ] Little complaint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ ] Severe complaint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**E2. ILLNESS IN THE FAMILY**

Have one or more of your parents or siblings had:

- A heart attack (heart wounds) or angina pectoris (heart cramp): [ ] Yes, [ ] No

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

- Cerebral stroke or brain haemorrhage: [ ] Mother, [ ] Father, [ ] Brother, [ ] Sister, [ ] None of these
- Heart attack before age of 60 years: [ ] Mother, [ ] Father, [ ] Brother, [ ] Sister, [ ] None of these
- Asthma: [ ] Mother, [ ] Father, [ ] Brother, [ ] Sister, [ ] None of these
- Cancer: [ ] Mother, [ ] Father, [ ] Brother, [ ] Sister, [ ] None of these
- Diabetes: [ ] Mother, [ ] Father, [ ] Brother, [ ] Sister, [ ] None of these

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)

<table>
<thead>
<tr>
<th>Don't know</th>
<th>Mother's age</th>
<th>Father's age</th>
<th>Brother's age</th>
<th>Sister's age</th>
<th>Child's age</th>
</tr>
</thead>
</table>

**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.

<table>
<thead>
<tr>
<th>Hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
</tbody>
</table>

Light activity (not sweating/out of breath): [ ] Yes, [ ] No

Hard physical activity (sweating/out of breath): [ ] Yes, [ ] No

**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)
Number of years

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
Cheese (all types)
Potatoes
Boiled vegetables
Fresh vegetables/salad
Fat fish (e.g. salmon, trout, mackerel, herring)

Do you use dietary supplements: Yes, daily Sometimes No
Cod liver oil, fish oil capsules
Vitamins and/or mineral supplements

How much of the following do you usually drink? (Tick once for each line)
Full milk, full-fat curdled milk, yoghurt
Semi-skimmed milk, semi-skimmed curdled milk, low-fat yoghurt
Skimmed milk, skimmed curdled milk
Extra semi-skimmed milk
Juice
Water
Soft drink, mineral water

How many cups of coffee and tea do you drink daily? (Put 0 for the types you do not drink daily)
Filtering coffee
Boiled coffee/coarsely ground coffee for brewing
Other type of coffee
Tea

Approximately, how often have you during the last year consumed alcohol? (Do not count low-alcohol and alcohol-free beer)
Never consumed alcohol
2-3 times per month
Have not consumed alcohol last year
About 1 time a week
A few times last year
2-3 times a week
About 1 time a month
4-7 times a week

To those who have consumed the last year:
When you drink alcohol, how many glasses or drinks do you normally drink?

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

E9. SMOKING
How many hours a day do you normally spend in smoke-filled rooms? Number of total hours

Did any of the adults smoke at home while you were growing up? Yes No

Do you currently, or did you previously live together with a daily smoker after your 20th birthday?
Yes, now Yes, previously Never

If you have NEVER smoked daily;
Go to question E11 (BODILY FUNCTIONS AND SAFETY)

If you smoke daily now, do you smoke:
Cigarettes
Cigars/cigarillos
A pipe

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

E10. BODILY FUNCTIONS AND SAFETY
Would you feel safe by walking alone in the evening in the area where you live? Yes No

A little unsafe Very unsafe

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?
Read ordinary text in newspaper, if necessary with glasses?
Hear what is said in a normal conversation?

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?
Get out of your home by yourself?
Participate in organization or other leisure time activities?
Use public transport?
Perform necessary daily shopping?
### E11. USE OF HEALTH SERVICES

<table>
<thead>
<tr>
<th>How many times in the last 12 months have you been used?</th>
<th>None</th>
<th>1-3 times</th>
<th>4 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>General practitioner (GP) ..................................</td>
<td>☐</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td>Specialist (private or out-patient clinic) ..................</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Emergency GP (private or public) ..................................</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Home care admission .............................................</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Physiotherapist ..................................................</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Chiropractor .....................................................</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Municipal home care .............................................</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Dentist ...........................................................</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Alternative practitioner .......................................</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### E12. FAMILY AND FRIENDS

**Do you live:**  
At home? ☐  In an institution/shared apartment? ☐

**Do you live with:**  
Spouse/partner? ☐  Other people? ☐

**How many good friends do you have?**  
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 your children and other relatives.

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

- Great interest  
- Some interest  
- Little interest  
- No interest  
- Uncertain

**How many associations, sport clubs, groups, religious communities, or similar do you take part in?**  
(Number of friends)

### E13. CHILDHOOD/YOUTH AND AFFILIATION

**How long altogether have you lived in the county?**  
Number of years

**How long altogether have you lived in the municipality?**  
Number of years

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

- Same municipality
- Another municipality in the county
- Another county in Norway
- Outside Norway

**Have you moved during the last five years?**  
No ☐  Yes, once ☐  Yes, more than once ☑

### E14. USE OF MEDICINES

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

**Do you use?**  
(Tick once for each line)

- Blood pressure lowering drugs
- Cholesterol-lowering drugs
- Drugs for osteoporosis
- Insulin
- Tablets for diabetes

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

- Painkillers non-prescription
- Painkillers on prescription
- Sleeping pills
- Tranquilizers
- Antidepressants
- Other prescription medicines

**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)

### 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?**  
Number of children

**Do you use, or have you ever used estrogen?**  
Never ☐  Previously, but not now ☐  Now ☐

**Have you used contraceptives pills?**  
Yes ☐  No ☐
Appendix 4c

Questionnaire 2, the 5th Tromsø Study 2001–02

English version
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

1.1 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)

1.2 What type of house do you live in? (Tick only once)
- Detached house/villa
- Farm
- Flat/apartment
- Terraced/semi-detached house
- Institution/care home
- Other

1.3 How big is your house? m² (gross)

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

- Moisture, drought or coldness in your home
- Other forms of bad indoor climate
- Traffic noise (cars or aircraft)
- Other noise (industrial, construction, etc.)
- Neighbour noise
- Drinking water quality
- Air pollution from traffic
- Air pollution from wood/oil heating, factory etc.

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

- Norwegian
- Sami
- Kven/Finnish
- Other

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

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

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
- 1-3 times a month
- Approximately once a week
- More than once a week

T2. PAID AND UNPAID WORK

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

- 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 (e.g. forestry, heavy farm-work, heavy construction)

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

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

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  

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?

### T4. ALCOHOL

4.1 Are you a teetotaller?  
- 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?  
- Beer  
- Wine  
- Spirits

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

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

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 socially  
- No, never

### 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

5.4 Do you use the following dietary supplements?  
- Iron tablets  
- Calcium tablets or bonemeal  
- Vitamin D supplements  
- Cod liver oil

### T6. BODY WEIGHT

6.1 Do you currently try to change your body weight?  
- No  
- Yes, I try to gain weight  
- Yes, I try to lose weight

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

### 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

<table>
<thead>
<tr>
<th>Illness or Injury</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe injury requiring hospital admission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ankle fracture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peptic ulcer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peptic ulcer surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neck surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prostate surgery</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.2 Do you have, or have you ever had:  
- (Tick once for each question)

<table>
<thead>
<tr>
<th>Illness or Injury</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psoriasis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thyroid disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glaucoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cataract</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Osteoarthritis (arthrosis)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bent fingers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin contractions in your palms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kidney stone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appendectomy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hernia surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgery/treatment for urine incontinence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epilepsy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poliomyelitis (polio)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parkinson's disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Migraine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leg ulcer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Allergy and hypersensitivity:  
- Atopic eczema (e.g. childhood eczema)  
- Hand eczema  
- Food allergy  
- Other hypersensitivity (not allergy)

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?  
- Yes  
- No

<table>
<thead>
<tr>
<th>Frequency</th>
<th>No</th>
<th>1-2 times</th>
<th>More than 2 times</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
### T8. SYMPTOMS

#### 8.1 Have you in the last two weeks felt:

*(Tick once for each question)*

<table>
<thead>
<tr>
<th>Symptom</th>
<th>No</th>
<th>A Little</th>
<th>A Lot</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nervous or worried</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Bothered by anxiety</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Confident and calm</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Irritable</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Happy and optimistic</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Down/depressed</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Lonely</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

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

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)
  - At night
  - In connection with respiratory infections
  - In connection with physical exertion
  - In connection with very cold weather

#### 8.4 Do you get pain in the calf while walking?

If YES:

- How long can you go before you notice the pain? [ ] meter

#### 8.5 Do you get short-winded in the following situations?

*(Tick once for each question)*

<table>
<thead>
<tr>
<th>Situation</th>
<th>No</th>
<th>A Little</th>
<th>A Lot</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>While walking on level ground</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>While walking calmly on level ground</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>While washing or dressing yourself</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>While resting</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

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

If YES:

- Has the complaint reduced your leisure time activity?

#### 8.7 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?

If YES:

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

#### 8.8 How often do you suffer from sleeplessness?

*(Tick only once)*

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

#### 8.9 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
- Especially during the polar night
- Especially during the midnight sun season
- Especially in spring and autumn

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

#### 8.11 Do you usually sleep during the day?

#### 8.12 How often do you suffer from urinary incontinence?

- Never
- Less than once a month
- 1-2 times a month
- 3 or more times a month

#### 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?
- Is it more difficult to remember now than earlier?
- Do you more often write memos now than earlier?

#### T9. MEDICINES

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

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Previously Used</th>
<th>Age when Used 1st time</th>
<th>Never Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drugs for osteoporosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tablets for diabetes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drugs for hypothyroidism (thyroxine)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

If YES:

- Give the name of the medicines (for injection):
  - (one name per line)
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)

- Heart attack (heart wound)
- Angina pectoris (heart cramp)
- High blood pressure
- Aneurysm
- Gastric/duodenal ulcer
- Hip fracture
- Psychological problems
- Allergy
- Osteoarthritis (arthritis)
- Dementia

10.2 How many siblings and children do you have?

<table>
<thead>
<tr>
<th>Number</th>
<th>Brothers</th>
<th>Sisters</th>
<th>Children</th>
</tr>
</thead>
</table>

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

- Yes, daily/almost daily
- Yes, sometimes
- No

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

- Yes
- No

10.5 Is your mother alive? 

- Yes
- No

10.6 Is your father alive? 

- Yes
- No

T11. MOBILE TELEPHONE

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

- Yes, always
- Yes, sometimes
- No

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

- Conversations
- Text messaging

12.2 If you still have menstruate or are pregnant: What date did your last menstruation start?

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

- It stopped by itself
- Uterus surgery
- Surgically removed both ovaries
- Other reason (e.g. radiation, chemotherapy)

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?

12.5 Do you use or have you used oral contraceptive pills?

- Yes
- No

If YES: How old were you when you started taking the pill?

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?

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

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

<table>
<thead>
<tr>
<th>Number of times per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 or more</td>
</tr>
<tr>
<td>10-29</td>
</tr>
<tr>
<td>2-9</td>
</tr>
<tr>
<td>1 or less</td>
</tr>
<tr>
<td>Never</td>
</tr>
</tbody>
</table>

Conversations

Text messaging

13.2 The periods were of approximately equal length every time? 

- Yes
- No

How many days did a typical menstrual bleeding period last?
Appendix 5a

Questionnaire 1, the 6th Tromsø Study 2007–08

English version
HEALTH AND DISEASES

1. How do you in general consider your own health to be?
   - Very good
   - Good
   - Neither good nor bad
   - Bad
   - Very bad

2. How is your health compared to others in your age?
   - Much better
   - A little better
   - About the same
   - A little worse
   - Much worse

3. Do you have, or have you had?
   - Heart attack
   - Angina pectoris
   - Stroke/brain hemorrhage
   - Atrial fibrillation
   - High blood pressure
   - Osteoporosis
   - Asthma
   - Chronic bronchitis/Emphysma/COPD
   - Diabetes mellitus
   - Psychological problems (for which you have sought help)
   - Low metabolism
   - Kidney disease, not including urinary tract infection (UTI)
   - Migraine

4. Do you have persistent or constantly recurring pain that has lasted for 3 months or more?
   - Yes
   - No

5. How often have you suffered from sleeplessness during the last 12 months?
   - Never, or just a few times
   - 1-3 times a month
   - Approximately once a week
   - More than once a week

6. Below you find a list of different situations. Have you experienced some of them in the last week (including today)? (Tick once for each complaint)
   - Sudden fear without reason
   - You felt afraid or worried
   - Faintness or dizziness
   - You felt tense or upset
   - Easily blamed yourself
   - Sleeping problems
   - Depressed, sad
   - You felt useless, worthless
   - Feeling that life is a struggle
   - Feeling of hopelessness with regard to the future

USE OF HEALTH SERVICES

7. Have you during the past year visited: If YES; how many times?
   - General practitioner (GP)
   - Psychiatrist/psychologist
   - Medical specialist outside hospital (other than general practitioner)
   - Physiotherapist
   - Chiropractor
   - Alternative medical practitioner
   - Dentist/dental service

8. Have you during the last 12 months been to a hospital?
   - Admitted to a hospital
   - Had consultation in a hospital without admission;
     - At psychiatric out-patient clinic
     - At another out-patient clinic

9. Have you undergone any surgery during the last 3 years?
   - Yes
   - No
### USE OF MEDICINE

Do you take, or have you taken some of the following medications? (Tick once for each line)

<table>
<thead>
<tr>
<th>Medication</th>
<th>Never used</th>
<th>Now</th>
<th>Earlier</th>
<th>Age first time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drugs for high blood pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lipid lowering drugs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drugs for heart disease</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diuretics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medications for osteoporosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tablets for diabetes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drugs for metabolism</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thyroxine/levaxin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Medication</th>
<th>Not used the last 4 weeks</th>
<th>Less than every week</th>
<th>Every week, but not daily</th>
<th>Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>Painkillers on prescription</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Painkillers non-prescription</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleeping pills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tranquillizers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antidepressants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

State the names of all medications - 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.

When attending the survey centre you will be asked whether you have used antibiotics 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.

### FAMILY AND FRIENDS

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

<table>
<thead>
<tr>
<th>Relationship</th>
<th>Yes</th>
<th>No</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spouse/cohabitant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other persons older than 18 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persons younger than 18 years</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tick for relatives who have or have had

- Myocardial infarction
- Myocardial infarction before 60 years
- Angina pectoris
- Stroke/brain haemorrhage
- Osteoporosis
- Stomach/duodenal ulcer
- Asthma
- Diabetes mellitus
- Dementia
- Psychological problems
- Drugs/substance abuse

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?

- Yes
- No

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

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

### WORK, SOCIAL SECURITY AND INCOME

What is the highest level of education you have completed? (Tick one)

- Primary, 1-2 years secondary school
- Vocational school
- High secondary school (A-level)
- College/university less than 4 years
- College/university 4 years or more

What is your main occupation/activity? (Tick one)

- Full time work
- Part time work
- Unemployed
- Housekeeping
- Retired/benefit recipient
- Student/military service
Do you receive any of the following benefits?

- Old-age, early retirement or survivor pension
- Sickness benefit (are in a sick leave)
- Rehabilitation benefit
- Full disability pension
- Partial disability pension
- Unemployment benefits
- Transition benefit for single parents
- Social welfare benefits

What was the households total taxable income last year? Include income from work, social benefits and similar

- Less than 125 000 NOK
- 125 000-200 000 NOK
- 201 000-300 000 NOK
- 301 000-400 000 NOK
- More than 850 000 NOK

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

- Yes
- No

**PHYSICAL ACTIVITY**

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

Describe your exercise and physical exertion in leisure time. If your activity varies much, for example between summer and winter, then give an average. The question refers only to the last year. (Tick the one that fits best)

- Reading, watching TV, or other sedentary activity.
- Walking, cycling, or other forms of exercise at least 4 hours a week (here including walking or cycling to place of work, Sunday-walking, 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.

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

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

For how long time do you exercise every time on average?

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

**ALCOHOL AND TOBACCO**

How often do you drink alcohol?

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

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

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

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

Do you smoke sometimes, but not daily?

- Yes
- No

Do you/did you smoke daily?

- Yes
- Yes, now
- Yes, previously
- Never

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

Number of years

If you currently smoke, or have smoked before: How many cigarettes do you or did you usually smoke per day?

Number of cigarettes

How old were you when you began smoking daily?

Number of years

How many years in all have you smoked daily?

Number of years

Do you use or have you used snuff or chewing tobacco?

- No, never
- Yes, previously
- Yes, daily
**DIET**

38. Do you usually eat breakfast every day? 
   - Yes
   - No

39. How many units of fruits 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 per week do you eat hot dinner?
   - Number

41. How often do you usually eat these products? (Tick once for each line)
   - 0-1 times/month
   - 2-3 times/month
   - 1-3 times/week
   - 4-6 times/week
   - 1-2 times/day
   - Potatoes
   - Pasta/rice
   - Meat (not processed)
   - Processed meat (sausages/meatloaf/meatballs)
   - Fruits, vegetables, berries
   - Lean fish
   - Fat fish (e.g. salmon, trout, mackerel, herring, halibut, redfish)

42. How much do you normally 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
   - Juice
   - Soft drinks with sugar

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
   - Boiled coffee (coarsely ground coffee for brewing)
   - Other types of coffee
   - Tea

44. How often do you usually eat cod liver and roe? (i.e. "mølje")
   - Rarely/never
   - 1-3 times/year
   - 4-6 times/year
   - 7-12 times/year
   - More than 12 times/year

45. Do you use the following supplements? (Daily Sometimes No)
   - Cod liver oil or fish oil capsules
   - Omega 3 capsules (fish oil, seed oil)
   - Vitamins and/or mineral supplements

**QUESTIONS FOR WOMEN**

46. Are you currently pregnant?
   - Yes
   - No
   - 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

49. During pregnancy, have you had high blood pressure?
   - Yes
   - No

50. If yes, which pregnancy?
   - The first
   - Second or later

51. During pregnancy, have you had proteinuria?
   - Yes
   - No

52. If yes, which pregnancy?
   - The first
   - Second or later

53. Were any of your children delivered prematurely (a month or more before the due date) because of preeclampsia?
   - Yes
   - No

54. If yes, which child?
   - 1st child
   - 2nd child
   - 3rd child
   - 4th child
   - 5th child
   - 6th child

55. How old were you when you started menstruating?
   - Age

56. Do you currently use any prescribed drug influencing the menstruation?
   - Oral contraceptives, hormonal IUD or similar
   - Yes
   - No
   - Hormone treatment for menopausal problems
   - Yes
   - No

---

When attending the survey centre you will get a questionnaire about menstruation and possible use of hormones. Write down on a paper the names of all the hormones you have used and bring the paper with you. You will also be asked whether your menstruation have ceased and possibly when and why.
Appendix 5b

Questionnaire 2, the 6th Tromsø Study 2007–08

English version
1. DESCRIPTION OF YOUR HEALTH STATUS

Mark the statement that best fits your state of health today by ticking once in one of the boxes under each of the five groups below:

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 little 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

Your own health state today

Best imaginable health state

100
90
80
70
60
50
40
30
20
10
0
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

2.04 What do you consider yourself as? (Tick for one or more alternatives)
- Norwegian
- Sami ethnicity
- Kven/Finnish
- Another ethnicity

2.05 How many siblings and children do you have/have you had?
- Number of siblings
- Number of children

2.06 Is your mother alive?
- Yes
- No

If NO: her age when she died

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

<table>
<thead>
<tr>
<th>Mother</th>
<th>Father</th>
<th>Spouse/cohabitant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary 7-10 years, 1-2 years secondary school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocational school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High secondary school (A level)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College or university (less than 4 years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College or university (4 years or more)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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)

<table>
<thead>
<tr>
<th>Completely disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Completely agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>In most ways my life is close to my ideal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My life conditions are excellent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am satisfied with my life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have a positive view of my future health</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By living healthy, I can prevent serious diseases</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Completely disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Completely agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>My work is tiring, physically or mentally</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have sufficient influence on when and how my work should be done</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am being bullied or harassed at work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am being treated fairly at work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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
- [ ] Middle status
- [ ] Fairly low status
- [ ] Very low status

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

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Yes, as a child</th>
<th>Yes, as adult</th>
<th>Yes, last year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Been tormented, or threatened with violence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Been beaten, kicked at or victim of other types of violence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Someone in your close family have used alcohol or drugs in such a way that it has caused you worry</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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
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 rythm in the last year?  
☐ Yes  ☐ No

4.03 Do you become breathless in the following situations? (tick once for each question)  
☐ Yes  ☐ No

- When you walk rapidly on level ground or up a moderate slope ..........  
- 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 special 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)  
☐ Yes  ☐ No

Do you think that your memory has declined? ............................................  
☐ Yes  ☐ No

Do you often forget where you have placed your things? .............................  
☐ Yes  ☐ No

Do you have difficulties finding common words in a conversation? ............  
☐ Yes  ☐ No

Have you problems performing daily tasks you used to master? ............  
☐ Yes  ☐ No

Have you been examined for memory problems? .....................................  
☐ Yes  ☐ No

If YES to at least one of the first four questions above: Is this a problem in your daily life?  
☐ Yes  ☐ No
Have you during the last last year suffered from pain and/or stiffness in muscles or joints in your neck/shoulders lasting for at least 3 consecutive months? (tick once for each line)

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>A little</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neck, shoulder</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Arms, hands</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Upper part of the back</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>The lumbar region</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Hips, leg, feet</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Other places</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

Have you suffered from pain and/or stiffness in muscles or joints during the last 4 weeks

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>A little</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neck, shoulder</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Arms, hands</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Upper part of the back</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>The lumbar region</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Hips, leg, feet</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Other places</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

Have you ever had:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fracture in the wrist/underarm?</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Hip fracture?</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

Have you been diagnosed with arthrosis by a doctor?  □ Yes  □ No

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

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Little</th>
<th>Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel allergy</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Pollen allergy</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Other allergies</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

Have you ever experienced infertility for more than 1 year?  □ Yes  □ No

If Yes: was it due to:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td>A condition concerning you?</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>A condition concerning your partner?</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

To which degree have you had the following complaints during the last 12 months?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Little</th>
<th>Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Heartburn/regurgitation</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Constipation</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Alternating diarrhoea and constipation</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Bloated stomach</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was it located in your upper stomach?</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Were you bothered as often as once a week or more during the last 3 months?</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Became better after bowel movement?</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Are the symptoms related to more frequent or rare bowel movements than normally?</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Are the symptoms related to more loose or hard stool than normally?</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Do the symptoms appear after a meal?</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

Have you ever had:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Age last time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stomach ulcer</td>
<td>□</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Duodenal ulcer</td>
<td>□</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Ulcer surgery</td>
<td>□</td>
<td>□</td>
<td></td>
</tr>
</tbody>
</table>

For women: Have you ever had a miscarriage?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Yes: number of times</td>
<td>□</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For men: Have your partner ever had a miscarriage?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Yes: number of times</td>
<td>□</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Is your diet gluten-free?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Do not know</th>
</tr>
</thead>
</table>

Have you been diagnosed with Dermatitis Herpetiformis (DH)?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Do not know</th>
</tr>
</thead>
</table>
Have you been diagnosed with coeliac disease, based on a biopsy from your intestine taken in an endoscopy examination?
☐ Yes  ☐ No  ☐ Do not know

Do you have your natural teeth?
☐ Yes  ☐ No

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

Have you been suffering from headache the last year?
☐ Yes  ☐ No
If No: go to section 5, food habits

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

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

Is the headache usually:
☐ Yes  ☐ No
(tick one for each line)
- Pounding/pulsatory pain
- Pressing/tightening pain
- Unilateral pain (right or left)

What is the intensity of your headache?
☐ Mild (do not hinder normal activity)
☐ Moderate (decrease normal activity)
☐ Strong (block normal activity)

What is the duration of the headache usually?
☐ Less than 4 hours
☐ 4 hours - 1 day
☐ 1-3 days
☐ More than 3 days

If you suffer from headache, when during the year does it affect you most? (tick one or more)
☐ No special time
☐ Polar night time
☐ Midnight sun time
☐ Spring and/or Autumn

Before or during the headache, do you have a transient:
☐ Yes  ☐ No
- Visual disturbances? (flickering, blurred vision, flashes of light)
- Unilateral numbness in your face or hand?
- Deterioration by moderate physical Activity?
- Nausea and/or vomiting?

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)

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

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

<table>
<thead>
<tr>
<th>Item</th>
<th>In adulthood</th>
<th>In childhood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mølje (cod or pollack meat, liver, and roe)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gulls egg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reindeer meat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local mushroom and wild berries (blueberries/lingonberries/cloudberries)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Number</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

5.04 Do you take vitamins and/or mineral supplements?

<table>
<thead>
<tr>
<th>Choice</th>
<th>Yes, daily</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.05 How often do you eat?

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>1-3 times per month</th>
<th>1-3 times per week</th>
<th>4-6 times per week</th>
<th>1-2 times per day</th>
<th>3 times per day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dark chocolate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light chocolate/milk chocolate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chocolate cake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other sweets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Size</th>
<th>1/4</th>
<th>1/2</th>
<th>1</th>
<th>1 1/2</th>
<th>2</th>
<th>More than 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.07 How often do you drink cocoa/hot chocolate?

<table>
<thead>
<tr>
<th>Item</th>
<th>Never</th>
<th>1-3 times per month</th>
<th>1-3 times per week</th>
<th>4-6 times per week</th>
<th>1-2 times per day</th>
<th>3 times per day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6. ALCOHOL

6.01 How often have you in the last year:

- 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? ☐
- Not been unable to remember what happened the night before because of your drinking? ☐

6.02 Have you or someone else been injured because of your drinking? ☐

- Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down? ☐

7. WEIGHT

7.01 Have you involuntary lost weight during the last 6 months?

- Yes ☐
- No ☐

If Yes: how many kilograms? ..........

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

Number of kilograms ..................

7.03 Are you satisfied with your present body weight?

- Yes ☐
- No ☐

7.04 What weight would you be satisfied with (your “ideal” weight)?

Number of kilograms ..................

8. SOLVENTS

8.01 How many hours per week, do you do the following leisure- or professional activities:

Automobile repair/paint, ceramic work, painting/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? ......

9. USE OF HEALTH SERVICES

Have you ever experienced that disease has been inadequately examined or treated, and that this had serious consequences?
- [ ] Yes, this has happened to me
- [ ] Yes, this has happened to a close relative (child, parents, spouse)
- [ ] No

If Yes, where do you think the reason of the problem is? (tick once or more):
- [ ] With a general practitioner
- [ ] With an emergency medical doctor
- [ ] With a private practising specialist
- [ ] With a hospital doctor
- [ ] With another health personnel
- [ ] With an alternative practitioner
- [ ] with more than one person due to the failure of procedures and collaboration

Have you ever felt persuaded to accept an examination or treatment that you do not want?
- [ ] Yes
- [ ] No

If Yes, do you think this has had unfortunate health-related consequences?
- [ ] Yes
- [ ] No

Have you ever complained about a treatment you have got?
- [ ] Have never a reason for complaining
- [ ] Have considered complaining, but did not do that
- [ ] Have complained verbally
- [ ] Have complained in writing

How long have you had your current general practitioner/other physician?
- [ ] Less than 6 months
- [ ] 6 to 12 months
- [ ] 12 to 24 months
- [ ] More than 2 years

At the last visit to the general practitioner, did the doctor(s) speak to you in a way so you understand them? Answers to a scale from 0 to 10, where 0 = they were difficult to understand and 10 = they were always easy to understand

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>

How would you characterize the treatment or counselling, you got the last time you were with a doctor? Answer on a scale from 0 to 10, where 0 = very bad treatment, and 10 = very good treatment

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>

Do you have during the last 12 months experienced that it has been difficult to be referred to special investigations (like X-ray or similar) or to specialized health service (private practising specialist or at hospital)?
- [ ] Not applicable
- [ ] No problem
- [ ] Some problems
- [ ] Great problems

Have you during the last 12 months experienced that it is difficult to be referred to physiotherapist, chiropractor or similar?
- [ ] Not applicable
- [ ] No problem
- [ ] Some problems
- [ ] Great problems

All in all, have you experienced that it is difficult or simply to be referred to specialized health services?
- [ ] Not applicable
- [ ] Very difficult
- [ ] Somehow difficult
- [ ] Reasonably easy
- [ ] Very easy
### 10. USE OF ANTIBIOTICS

**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.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary tract infection <em>(bladder infection, cystitis)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory tract infection <em>(ear, sinus, throat or lung infection, bronchitis)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 doctor/dentist
- [ ] Without contacting a doctor/without prescription:
  - Purchase from a pharmacy abroad
  - Purchase over the internet
  - Remnants from earlier treatment at home
  - From family/friends
  - Other ways

**Do you have antibiotics at home?**

- [ ] Yes
- [ ] No

If YES: is this after an agreement with your doctor 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
- [ ] Purchased over the internet
- [ ] Remnants from earlier treatment
- [ ] From family/friends
- [ ] Other ways

**Would you consider using antibiotics without consulting your doctor?**

- [ ] Yes
- [ ] No

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

- Common cold
- Cough
- Bronchitis
- Sore throat
- Sinusitis
- Fever
- Influenza
- Ear infection
- Diarrhoea
- Urinary tract infection
- Other infections
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.)* ☐ By myself
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.)* ☐ By myself
Number of minutes I need to get up .....................................................................................................................
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 during a day usually wash your hands with soap? (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 similar 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)
- 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 for the question on leg and/or foot ulcer, do you have the ulcer today?
- Yes
- No

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
- Varicose veins
- Eczema (red, itchy rash) on your legs
- Leg pain when you walk, but is relieved when you stand still

12.06 Have you ever had the following diagnoses by a physician? (tick once for each line)
- 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)
- 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)
- Antibiotic ointment
- Antibiotic tablets
- Surgical drainage
- A larger surgical intervention including skin removal
- Surgical laser treatment