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The Nord-Trøndelag Health Study (HUNT)

NTNU
Norwegian University of
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Doctoral thesis
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To my family!

Content

Abstract

Background: The prevalence of overweight and obesity has increased in Norway and worldwide in recent decades, and is still increasing. Important factors are probably lifestyle, environmental changes, genetic susceptibility, and interactions between these factors.

Objective: The major objective of this thesis was to investigate, in an adult population and with a prospective epidemiological perspective, the association between body mass index and selected variables that probably are linked to the metabolic syndrome. More specific, the objectives were:

- To investigate the association between leisure time physical activity and change in body mass index
- To investigate the association between change in body mass index and its impact on blood pressure
- To investigate the association between change in body weight, and especially weight loss and mortality.

Material and methods: The thesis is based on data sets from the Nord-Trøndelag Health Study (HUNT), created by linkage of data from HUNT 1 in 1984-86 and HUNT 2 in 1995-97. Additional data sets were created by linkage of data from HUNT and from The Death Registry at Statistics Norway. About 46,000 inhabitants in Nord-Trøndelag County participated in both surveys in the Nord-Trøndelag Health Study. Multivariable regression analyses were applied.

Results: In apparently healthy women with normal weight (BMI 18.5-24.9 kg/m^2) aged 20-49 years, we found a modest effect of leisure time physical activity on the

change in BMI. Those who were physically active at leisure on a high level increased less BMI compared to those who were physically active on a low level.

In apparently healthy men with normal weight aged 20-69 years we found that BMI increased less among those who were physically active at leisure compared to those who were not physically active. The study of the associations between low, moderate and high level of leisure time physical activity and change in BMI showed a U-shaped effect. In additional analyses men who were physically active with high intensity increased less in BMI compared to those who were physically active with a lower intensity. No strong linear relationship of the association between change in BMI and different levels of leisure time physical activity were found neither among women nor men.

Both in women and men the change in BMI had a substantial effect on diastolic and systolic blood pressure which was independent on the initial and attained BMI, where the odds ratio of having hypertension at the second survey was positively associated with increased BMI. Additionally, to change BMI category (World Health Organisation's categorisation) from the first to the second survey had a strong effect on systolic and diastolic blood pressure, which was independent of initial and attained BMI category.

Weight loss was positively associated with both total mortality, non-cardiovascular mortality and cardiovascular mortality in women and men, and the estimated effects did not change substantially even if initial BMI, smoking status and leisure time physical activity was considered. Weight gain was not associated with any increased mortality.

Conclusion: This thesis has shown that to be physical active at leisure had a modest effect of change in BMI at population level both among women and men. Weight gain

in apparently healthy persons was associated with unfavourable consequences for blood pressure level, but had minimal effect on mortality. However, weight loss was associated with increased mortality, although the relationship has to be explored.

Definitions and abbreviations

HUNT	The Nord-Trøndelag Health Study (Helseundersøkelsen i Nord-Trøndelag)
BMI	Body mass index (an index of weight-for-height and is defined as weight in kilograms divided by the square of height in metres, kg/m^2)
WHO	World Health Organisation
LTPA	Leisure time physical activity
NIDDM	Non-insulin-dependent diabetes mellitus
CI	Confidence Interval
SD	Standard deviation
SPSS	Statistical Package for the Social Sciences
CVD	Cardiovascular disease
ICD	International Classification of Diseases
SBP	Systolic Blood Pressure
DBP	Diastolic Blood Pressure

Biobank: A systematic collection of cell, tissue or blood samples, which is stored to be retrieved for analysis (Norwegian Research Council 2001).

WHO's classification of adults according to BMI:

Underweight	BMI <18.5 kg/m^2
Normal weight	BMI 18.5-24.9 kg/m^2
Overweight	BMI 25.0-29.9 kg/m^2

Obesity BMI $\geq$ 30 kg/m^2

Physical activity: A global term referring to 'any bodily movement produced by skeletal muscle resulting in a substantial increase over the resting energy expenditure'[1].

Leisure time physical activity: Activity undertaken in the free time and is selected on the basis of personal needs and interests and includes exercise and sports[1].

Acknowledgements

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Trondheim, 22.10.04

Wenche Brenne Drøyvold

List of papers

The thesis is based on the following papers:

I *Leisure time physical activity and change in body mass index: an 11-year follow-up study of 9357 normal weight healthy women 20-49 years old.* *J Womens Health (Larchmt)*. 2004 Jan-Feb; 13(1):55-62.

II *BMI change and leisure time physical activity (LTPA): an 11-y follow-up study in apparently healthy men aged 20-69 y with normal weight at baseline.* *Int J Obes Relat Metab Disord*. 2004 Mar; 28(3):410-7.

III *Change in body mass index and its impact on blood pressure. A prospective population study.* The Nord-Trøndelag Health Study (HUNT), Norway. (Submitted)

IV *Weight change and mortality.* The Nord-Trøndelag Health Study. (Submitted)

1. Introduction

Humans of the 21th century are mainly a product of selection and adaptation, even if the play of chance also has been involved. Sufficient energy and the ability of being physically active have been main survival factors. In the ancient past, when man lived from hunting and gathering, the availability of food was not constant and great nutritional variation between days and seasons was an inevitable part of daily life. Under such circumstances, the deposition of fat in the body served as a buffer for harder periods, and was an important survival factor.

Today, the modern human has the same mechanisms for depositing fat, but the living conditions have changed dramatically during a very short time. In general, both in developed and developing countries of today, high-energy nutrition is easily available and the need for being physically active has decreased substantially. This may disturb both the energy balance and the metabolic profile.

As a consequence and a paradox, the fat storing mechanism has become a big threat against longevity, public health and the health care systems. With this perspective, prevention of overweight and obesity, and increased knowledge about environmental and biological mechanisms involved in the obesity epidemic, is necessary.

1.1 The obesity epidemic

In a historical perspective, body weight has been considered to be part of human health as far back as Graeco-Roman times, but only little scientific progress was made towards understanding the condition and its real impact on health until the 20th century[1]. Additionally, epidemiology is a relative young science, and only since World War II a systemised body of principles on how to design and evaluate studies has emerged[2].

Body weight regulation

Total energy demands of the human body can be partitioned into basal metabolic rate (the requirement to sustain general cellular processes), resting metabolic rate and active energy expenditure in which physical activity is an important part[1,3]. Diet has the main function to balance the energy expenditure, and body weight is a function of energy and nutrient balance over an extended period of time. Energy expenditure is a continuous process, but energy intake is not. Therefore, because of the laws of thermodynamics, where energy can neither be created nor destroyed, the imbalance between intake and expenditure requires a possibility to temporarily store energy [4] (Figure 1). In energy deposition, both fat- and lean tissue are involved[5]. The main advantage by storing fat is the higher energy density. As a result of the involved processes, the body weight in adults is remarkably stable for long periods of time, and this fine balance is evidence of the presence of regulatory systems for body weight[1]. But if an imbalance is established, the body has a stronger defence against under nutrition and weight loss compared to over consumption and weight gain[6,7]. The adipose tissue mass may mainly increase by two mechanisms; by fat cell hypertrophy

or by fat cell hyperplasia. In adults, the major change in adipose cellularity following weight loss is shrinkage of adipocytes with no change in cell number[8,9]. The energy balance equation may be expressed as an equation between energy intake and energy expenditure, with energy storage as a buffer. This means that an imbalance between intake and expenditure requires mobilisation or storage of energy. Hence, an increase in body weight is a result of over nutrition or low energy expenditure, or both. Whatever mechanisms involved, the weight at which regulation occurs, differs from one person to another. This variation is partly caused by genetic and partly by developmental influences[10], where both demographic, socio-cultural, biological and lifestyle factors are shown to be associated with overweight[11] (Figure 1).

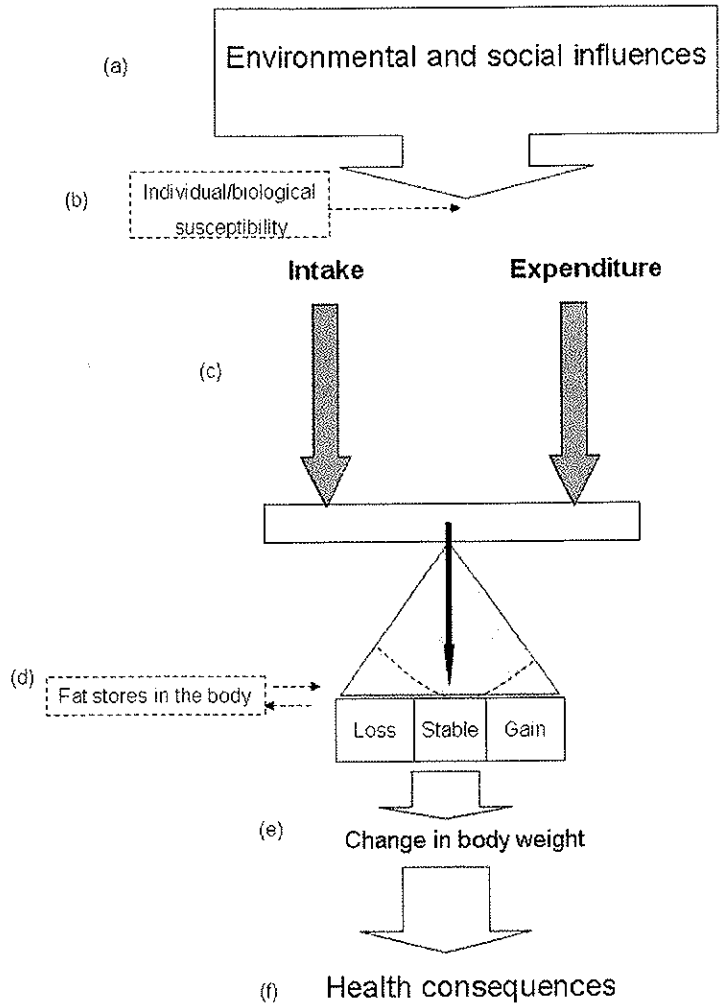

Figure 1. The principles of energy balance and regulation in human body: (a) environmental and social factors as physical activity, marital status, education and smoking. (b) Genetic and other factors. (c) Energy balance. (d) Fat storage. (e) Energy imbalance results in weight change. (f) Change of body weight might have different health consequences.

Body mass index (BMI)

People with overweight and obesity carry an excessive amount of body fat, generally estimated by combining measures of height and weight. The most widely used weight-for height index is BMI, also referred to as the Quetelet's Index[12,13]. BMI is calculated as body weight in kilograms divided by the squared value of body height in metres. Adult body height reflects both the genetic potential and the result of living conditions, e.g. nutrition, during childhood and adolescence[14,15]. A good correlation between BMI and the percentage of body fat in large populations is documented[16], and it is shown that BMI predicts amount body fat within ±5% in 7 out of every 10 people in the population[17].

BMI categorisation

The World Health Organisation has developed categories of BMI that classifies persons into four weight groups: underweight (BMI<18.5 kg/m^2), normal weight (BMI 18.5-24.9 kg/m^2), overweight (BMI 25.0-29.9 kg/m^2) or obesity (BMI≥30 kg/m^2). This categorisation is based on the association between different BMI levels and morbidity and mortality rates[1], but the limits are not strict[14,18], and smoking may be a modifier of this association[19,20]. The BMI cut points recommended from the WHO Consultation on Obesity were the first such cut-off points at international level, and they have been generally accepted even if the relevance to public health especially in Asia and the Pacific Regions is discussed[21]. Also, there is lack of consensus regarding whether the lowest risk of chronic diseases occurs among the leanest individuals, since there is some evidence that the relation between BMI and health outcomes is not linear, but rather J- or U-shaped[14,22,23]. However, when subgroups of healthy, non-smoking people are followed, those who are lean appear to

be at relatively low risk[19,20,24]. There are several reasons for classifying people as overweight or obese: to provide meaningful comparisons of body weight status within and between populations; to identify individuals and groups at increased risk of morbidity and mortality; to identify priorities for intervention at individual and community levels and establish a firm basis for evaluating diverse intervention strategies[1].

The relative relationship between body weight and mortality is similar in men and women, which explaines why the WHO categorisation is not gender specific. However, the absolute mortality is much lower in women[16]. The same relative risk and the lower absolute risk associated with overweight and obesity among women compared to men implies that women probably tolerate body fat better than men[14]. One reason may be that excess body fat in women is usually distributed as subcutaneous fat and mainly peripherally (thighs, buttocks, breasts), and in men there is a relative excess of body fat stored in the abdominal cavity and as abdominal subcutaneous fat[16]. This is an example of the importance of not regarding women just as small men, though many medical studies were restricted to men, resulting in a medical practice defined as normal human physiology and pathophysiology[25]. Within each WHO-category of BMI there can be substantial individual variation in total and visceral adiposity, and therefore also in several metabolic variables.

Fat and obesity

Obesity may develop when there has been an energy imbalance for a considerable period of time[26], and can be defined simply as the disease in which excess body fat has accumulated to such an extent that health may be adversely affected. But the amount of excess body fat, the distribution of fat within the body, and the associated

health consequences vary considerably between individuals[1,27] (Figure 1 (f)). The adipose tissue, i.e. the subcutaneous and visceral fat, serves as storage of energy in the form of fat, where triglycerides are the main storage lipid. The amount of body fat differs between men and women in the normal weight category (BMI 18.5-24.9 kg/m^2), where men has 15-20% body fat compared to 25-30% in women[16]. In extremely obese individuals the body fat might be up to 60-70% of body weight[28]. The abdominal fat mass may vary dramatically within a narrow range of total body fat or BMI, and men have on average twice the amount of abdominal fat compared to what is generally found in premenopausal women[29]. It seems that women have larger tolerance for overweight[14,30], and women accumulate relatively less abdominal adipose tissue than men[31]. Additionally, it is probably a positive correlation between a high BMI in adolescentce and adulthood[32].

Increased amount of body fat does not only mean increased body weight. In 1994 the *OB* gene and the gene product leptin was discovered[33], which links the components in the energy balance equation together: Leptin is secreted by the adipocytes to the blood and receptores in the brain are responsible for the convertion of the signal from the adipose tissue to regulatory processes counteracting the tendency to accumulate fat in the fat tissue by decreasing food intake and increasing energy expenditure[34]. These mechanisms create the possibility that development of obesity is caused by resistance in the regulatory system to the leptin signal or insufficient secretion of leptin from the adipocytes[35].

Body fat works as an endocrine organ, and central fat deposition, independent of fat storage in other anatomic areas, is associated with an altered metabolic profile. As an example, obese women have higher circulating testosterone level[36].

Studies have shown that the androgen pattern of fat accumulation is associated with a variety of metabolic derangements, including dyslipidemia, hypertension and glucose intolerance[37]. Thus, even at the same weight level, individuals with a greater amount of visceral fat are more likely to develop serious health conditions associated with overweight and obesity. Abdominal adiposity is found to be an important component of the insulin resistance syndrome, and it has been recognised that regional fat distribution, as in centrally or abdominally obese persons, might be more strongly linked to CVD than overall fatness[38].

Prevalence of overweight and obesity

Until the 1960s, obesity was relatively rare worldwide. But since the late 1970s, the prevalence of obesity has increased rapidly[30,39,40]. Today, the prevalence of overweight and obesity is increasing worldwide[41-43], and a significant weight gain has also been observed in the The Nord-Trøndelag Health Study[44]. Figure 2 illustrates the increase in the proportion of obesity among women and men aged 40-44 years in Norway during recent decades. And the prevalence of obesity has increased in both genders during the last decades, but more rapidly in men than women. According to WHO, 1.1 billion people worldwide are overweight[45], which means that the number overweight people equals the number of people who are underfed and underweight (BMI<18.5 kg/m^2). In the United States there are two million more obese women than obese men, and the prevalence of obesity and diabetes are increasing. Over the last decade there has been a 74% increase in obesity, and the highest increase has been among women[46] (Table 1). In Brazil during the 14 years between 1975 and 1989, the obesity

prevalence among women increased from 3.1% to 5.9%, and from 8.2% to 13.3% among men[47].

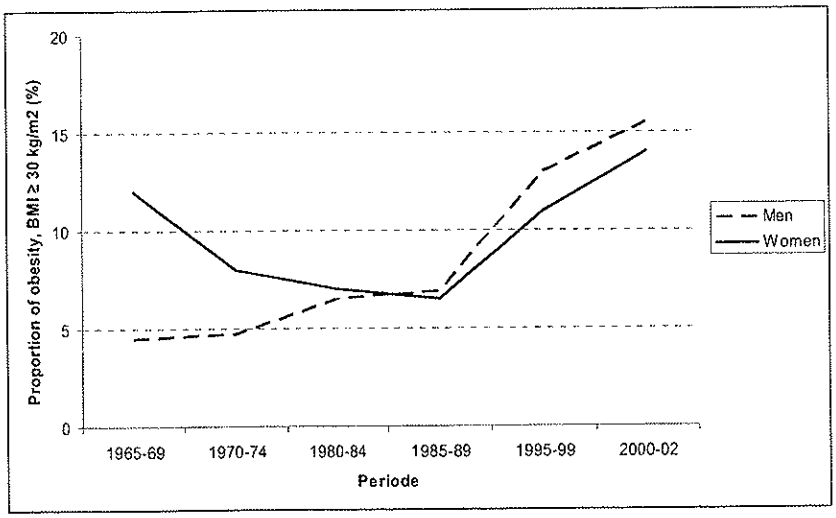

Figure 2. The prevalence of obesity in Norway among men and women aged 40-44 years (source: www.fhi.no (Engeland)).

The prevalence of obesity in European countries is estimated to be 10-12% in men and 10-25% in women[1], with the most dramaic increase in obesity prevalence in England where the proportions have more than doubled from 6 to15% in men and from 8% to 16.5% in women since 1989[48]. This dramatic increase has occurred in both genders and across the major racial and ethnic groups[49].

Table 1. Prevalence of obesity (Body mass index≥30kg/m^2 in adult men and women at two different time points in selected North American and European countries and in countries in the Far East[1].

	Period of surveys (y)		Prevalence of obesity (%)			
			Men		Women	
Place	First	Last	First	Last	First	Last
U.S.	1960-62	1988-94	10	20	15	25
Japan	1976	1993	1	2	3	3
Samoa (urban)	1978	1991	39	58	59	77
Finland	1978-79	1991-93	10	14	10	11
Australia	1980	1983	9	12	8	13
England	1980	1995	6	15	8	17
Sweden	1980-81	1988-89	5	5	9	9
Norway (HUNT)[‡]	1984-86	1995-97	7	16	11	21
Norway (HUNT)[‡]	1984-86	1995-97	8	14	13	18
Former East Germany	1985	1992	14	21	22	27
The Netherlands	1987	1995	6	8	8	8
Norway[*]	1994-96	1997-99	10	14	9	12

[†] All non-diabetic women and men who participated in HUNT 1 and HUNT 2 aged 20 years or more at HUNT 1[48].
[‡] All those who participated in both HUNT 1 and in HUNT 2 aged 20 years or more at HUNT 1.
[*] Prevalence of obesity among persons aged 40-42 years in two periods from eight counties[39].

The prevalence of obesity in the United States has been projected to be 39 % in 2008[50]. Today, the prevalence of overweight is higher in men than in women, but the prevalence of obesity is higher in women compared with men[51,52]. The increasing prevalence of obesity is documented simultaneously as the average caloric intake of American men and women may have decreased[53], but this is not consistent[54-56]. Also in Norway there is some evidence that the mean calorie intake has been stable[57].

The obesity epidemic is a growing threat to health and health care systems in both developed and developing countries[1], and next to cigarette smoking, obesity today is the second leading cause of preventable deaths in US[8]. In 1999, Allison et al [58] estimated that between 280,000 and 325,000 deaths could be attributed to obesity in the United States. And by 2000 the obesity problem had already grown to such an extent that the World Health Organisation declared it was the greatest health threat facing the Western World[1].

The increase in obesity prevalence has been too rapid to be caused by major genetic changes. Therefore, the obesity epidemic is probably not due to a defect in the biological system. Biology clearly contributes to individual differences in weight and height, but the rapid weight gain during the past three decades is most probably a result of a changing environment. Overweight and obesity has become so common that it today has replaced the more traditional public health concerns, including under nutrition and infectious diseases. The medical-care cost burden of obesity has been calculated to be 5.5-7.0% of national health expenditures in the US and to be 2.0-3.5% in some other developed countries[59]. We have no data on the economic burden of overweight and obesity in Norway, but the Norwegian Diabetic Association has estimated the direct costs of diabetes to NOK 4.4 billion in 1999[60].

Health consequences

Obesity has had disease status since 1985[61]. In addition a number of diseases can be linked to overweight and obesity, and each disease can further be classified into two pathophysiological categories[62]. The first arises from the increased mass of fat which includes the stigma of obesity and the behavioural responses it produces, musculoskeletal disorders[63], and sleep apnoea[64]. The second category comprises metabolic changes associated with excess fat, and includes diabetes type 2[65], gallbladder disease[66], hypertension[67], cardiovascular disease[68], and some forms of cancer[69,70]. It is suggested that weight change is associated with a more unfavourable relative change in fat-free mass in men than women, suggesting that the metabolic and health consequences of weight change may be dependent on gender[71].

Obesity is related to several disturbances in the cardiac structure[72], and weight loss has been found to be an important factor to reduce left ventricular hyperthrophy[73], which is one strong risk factor for morbidity and mortality[74]. At present there is no universally accepted definition of the metabolic syndrome[75]. According to WHO metabolic syndrome includes diabetes or impaired glucose tolerance or insulin resistance, and two of the following factors; elevated blood pressure, dyslipidemia, microalbuminuria and obesity[75]. Upper abdominal obesity is associated with increased risk of post-menopausal breast cancer in women[76]. Ovulatory infertility has been found to be attributable to overweight and sedentary lifestyle[77,78]. Additionally, in both overweight and non-overweight women a positive association between weight loss and psychological well-being has been found[79]. As a consequence of the close linkage between overweight/obesity and various diseases, it

is shown that use of health care resources increases proportionately with excess body fat[80].

Concern about the rising prevalence of obesity in various parts of the world has stimulated research into the health consequences of this phenomenon, and large-scale epidemiological studies have established that obesity is an independent risk factor for mortality[22,81,82]. Years of life lost due to obesity is age and gender specific, with the highest effects among young people and in men[83]. In the Framingham Study, Peeters *et al*[84] estimated that overweight women lost 3.3 years of life and men lost 3.1 years compared to those with normal weight. In the obese, years of life lost were 7.1 in women and 5.8 in men compared to those with normal weight. In a study of extremely obese individuals (BMI>45 kg/m^2), Fontaine *et al*[83] found 13 years life lost in men and 8 years life lost in women. Additionally, waist circumference is found to be a strong predictor of mortality[18]. Weight gain is associated with an increase in the health care costs, thus the observed obesity epidemic have dramatically economical consequences[85]. As a consequence of the association between overweight/obesity and morbidity/mortality, a further increase in the prevalence of obesity will lead to an increase in unhealthy life-years and in direct and indirect health care costs[86].

Blood pressure and body weight

Measuring blood pressure has a long history, but recognition of diseases associated with high blood pressure is relatively new. Until the 1940s, high blood pressure was often referred to as benign essential hypertension, indicating a condition of unknown origin and with little consequence for health[17]. Since the 1960s it is recognised that elevated blood pressure is a strong risk factor for stroke[87,88] and cardiovascular

disease[89-91], and the treatment of hypertension has increased gradually and considerably over the years.

The association between obesity and hypertension was first recognised in the early 1900s[67]. Today 220,000-322,000 patients are on anti-hypertension drugs in Norway (Irene Hetlevik, personal communication). The cost of treating hypertension has increased substantially from 1990 and today nearly 1 billion NOK is spent on anti-hypertension medication in Norway[92], which ilustrates the epidemic dimension.

Overweight and obesity is the most common cause of hypertension in most industrialised countries[75,93]. The mechanisms leading to hypertension in obese persons are not completely known, but increased sympathetic nervous system activity, insulin resistance, structural changes in the kidney, altered vascular function, the renin-angiotensin-aldosteron system, the sympathetic nervous system, and the hypothalamic pituitary and adrenal axis are probably involved[67,94]. The fact that there is a clear association between BMI and blood pressure even in non-obese, lean populations, indicates that the effect of weight gain on blood pressure regulation may be more complex than can be explained simply by increasing adiposity[93]. In cross-sectional and prospective studies there is a positive association between obesity and hypertension[95-97]. Risk estimates from the Framingham Heart Study suggest that approximately 78% of hypertension in men and 65% in women may be directly attributed to obesity[98].

Previously it is shown that a reduction of diastolic blood pressure of 5, 7.5, and 10 mm Hg were respectively associated with at least 34%, 46%, and 56% less stroke, and at least 21%, 29%, and 37% less cardiovascular disease[99]. Results from the Framingham Study has illustrated that lowering the blood pressure 10 mm Hg was associated with a 30% reduction in the total attributable mortality[100]. These examples

illustrate how important it is to get scientific knowledge about the separate association between change in blood pressure and change in weight, both in a health consequence and health prevention perspective.

The knowledge of the association between change in weight and change in blood pressure independent of initial and attained body weight is insufficient, even if short-term weight loss is associated with blood pressure reduction[101,102]. As a consequence, we need to know more about how weight changes, especially weight gain in an obesity epidemic view, affect the blood pressure development at population level.

Obesity prevention

The world wide obesity epidemic calls for preventive actions. The World Health Organisation is strongly involved in marketing both primary and secondary strategies for improving health at a population and individual level[1]. Influence on governments, the food industry, the media, and the consumers is important in the work against overweight and obesity. Effects from prevention actions in public health may not be reached in many years, because culture changes at both international and national levels must be reached[103,104]. To prevent weight gain both at population and individual level, it is necessary to identify the reasons for the energy imbalance. In search for the causes of the obesity epidemic increased intake, decreased expenditure, and increased energy storage must be considered as possible pathogenic mechanisms through which the genes or the environmental factors may operate. Jeffery has described that the current obesity epidemic is caused largely by an environment promoting excessive food intake and discouraging physical activity[103]. Possible factors in the environment that promote over-consumption of energy include the easy availability of a wide

variety of good-tasting, inexpensive, energy-dense foods, and serving of these foods in large portions[50]. In addition studies have shown that the environment and travel patterns are important and strong predictors of obesity independent on gender and ethnicity, and reducing time in a car can be effective as health interventions[105]. The urban planning and transportation systems should also be included in the prevention strategy for example by arranging for walking and bicycling[106,107].

A discrepancy has been documented between men and women in perceiving themselves as overweight. Gutiérrez-Fisac *et al* [108] found that 42% of men and 25% of women with BMI between 25.0 and 28.9 did not perceive their weight as abnormally high. If people themselves, especially men, do not see their own overweight, it will probably be hard to accept implementation of prevention actions against overweight and obesity.

It has been tried to carry out intervention at a population level, but it is hard to measure and document the effects of the program[109,110].

The most common primary and especially secondary prevention at individual level of overweight and obesity is to engage in an energy restricted diet[111], and recent surveys suggest that about 40% of people in Western societies may be engaged in some form of energy restriction at any time[112]. Almost twice as many women (61%) compared to men (32%) have tried to lose weight[113] although men are at greater risk of developing abdominal obesity. Serdula *et al* [114] confirmed that weight loss and weight maintenance are common concerns for men and women, but the recommended combination of reducing calorie intake and increasing leisure time physical activity was not often followed by the majority. Today, an 'industry' with commercial and private actors offers strategies for losing weight, especially by dieting,[115]. They offer weight loss courses with diet-recommendations and slimming products, where weight

loss effects in few weeks are almost guaranteed. There are different recommendations for diets, but it seems that caloric balance (calories in vs. calories out), rather than macronutrient composition is the major determinant of weight loss[116,117]. However, the effect of macronutrient content on long-term weight maintenance and adherence is not clear. Furthermore, it is not known whether maintenance of weight loss and dietary adherence are related to psychological issues (and brain neurochemistry), physiological parameters (e.g., hormones involved in body weight regulation such as insulin and leptin), physical activity, energy density, or some other factor(s)[116,117]. Scientifically, the current most solid recommendation for people who want to lose weight and keep weight off is a permanent switch to a diet reduced in calories and fat in combination with physical activity[118-120]. As a paradox to all the engagement and money spent for losing weight, weight stability after weight loss for an extended period of time is shown difficult, and most people regain weight after some years[121,122]. The situations where a considerable proportion of women and men are not seeing their own overweight, parallel to the focus on slimming behaviour might seem as a paradox.

Waaler[14] found a U-shaped association between BMI and mortality based on 18 million person-years. The results, however, do not tell anything about the reversibility, i.e. about the effect of actively reducing the BMI ratio by weight reduction. In animal models restricting energy intake has been shown to increase longevity[123]. In several observational studies weight loss at population level has been associated with increased mortality[124-126], but the results are not consistent[127,128]. Whether weight loss in already overweight or obese adults reduces health risk to the level of individuals who never gained weight in the first place remains unclear[129,130].

Nevertheless diet and physical activity have been found to be important factors in a weight loss strategy[131].

Although there is a general agreement that the environment of the modern societies is 'fueling' the obesity epidemic, the relative contributions of factors influencing food intake and physical activity are not clear.

Physical activity

The physical activity epidemiology has evolved from old ideas dating to the use of structured exercise for health promotion in China about 2500 B.C., the ancient Indian Ayurveda system of medicine of the ninth century B.C., and the use of vigorous exercise by ancient Greek physicians (Herodicus, Hippocrates, Asclepiades, and Galen)[17]. The modern scientific history of physical activity is short and began after World War II with focus on the epidemic of cardiovascular disease that was beginning to engulf the Western world[132]. In the early 1950s, Dr. Jeremy Morris observed that the active conductors on London's double-decker buses were at lower risk of coronary heart disease compared to the drivers[133]. As a consequence, in 1996 the US Surgeon General's report recommended '30 min of moderate activity all days of the week', which was broadly adopted throughout much of the Western world mainly to reduce the risk of heart disease. Erlichman *et al*[132] have investigated the magnitude and type of physical activity required to prevent unhealthy weight gain, and found that higher physical activity levels are needed for weight stability than for inducing substantial improvements in cardiovascular health.

Today the promotion of physical activity has emerged as an important initiative to improve public health[134]. What levels of physical activity that are needed for prevention of overweight and obesity is still unclear, even if 45-60 minutes of

moderate physical activity has been stated as a daily dose needed for prevention of transition to overweight and obesity[135]. Additionally, in individuals who are physically active the intensity may be important[136,137].

A measure of physical activity level is a surrogate/proxy of energy expenditure and depends on intensity, frequency, duration and type of the activity[1]. The energy expenditure linked to leisure time physical activity is probably the most variable component of the total energy expenditure[138,139]. Both energy used during the activity, in the restitution period after the activity, and change in resting metabolic rate are involved[140]. Physical activity at leisure has an important influence on the physiological regulation of body weight by particular affecting total energy expenditure, fat balance and food intake. It is shown that there is a weak coupling between energy intake and expenditure by physical activity[141]. Small to moderate increase in physical activity will not be accompanied by compensatory increases in intake, and a decrease in physical activity is not necessarily followed with an equal amount decrease in energy intake[142]. The total amount of energy expended depends on the characteristics of the physical activity (mode, intensity, duration and frequency) and of the individual performing the exercise (body size, level of habituation and fitness). Nevertheless, in Norway it seems that the proportion of women and men being physical active at leisure has increased parallel to the obesity epidemic[143].

Weight gain and a sedentary lifestyle are often associated with the development of the metabolic syndrome. In the light of the current obesity epidemic, the metabolic syndrome implies a serious and growing problem for public health authorities and decision makers[144]. At population level the metabolic syndrome is closely linked to lifestyle factors. A moderate level of physical activity reduces the

risk of developing the metabolic syndrome[145]. Physical activity is negatively associated with insulin consentrations independent of body weight and ethnicity[146]. Further, physical activity and cardiorespiratory fitness is shown to be inversely related to the development of the metabolic syndrome[145].

Excess weight gain more often parallels reduced physical activity than increased caloric intake[8]. Inadequate physical activity has been estimated to cause nearly 30% of all deaths from heart disease, colon cancer, and diabetes[147]. And probably the greatest health benefits at population level will derive if the most sedentary individuals start to be light-to-moderate physically active.
In an editorial Tim Bayers wrote that without regular physical activity, weight control can usually not be achieved[148]. But, regular physical activity can also improve longevity, even for those with body mass-indexes in the overweight range.

The importance of genetic factors and physical activity levels has been studied in twins by Maia *et al*[149]. In men genetic factors accounted for 63% of the total participation in physical activity, whereas in females the estimate was about 40%. Men generally respond more favourably than women to the effects of exercise on weight loss, and one possible explanation involves the gender differences in fat distribution. Fat distributed in the upper body and abdominal regions shows active lipolysis to sympathetic nervous system stimulation and becomes preferentially mobilised for energy during exercise[150,151]. Thus, upper-body fat distribution in the abdominal region has greater sensitivity to lose fat as a response to regular exercise. Large exercise-induced weight loss is associated with a preferential reduction in abdominal fat and a corresponding maintenance of fat free-mass[152].

Hill *et al*[50] suggested that increasing the amount of regular physical activity and reducing energy intake by an amount equal to 100 kcal/day could prevent weight

gain in most of the population. There is some evidence that physical activity can minimize weight gain[153-155]. However, the level of physical activity needed is not well known.

2. Main objectives

The main objective of this thesis was to study selected aspects of the weight gaining epidemic in the HUNT population, as documented by Midthjell *et al*[44]. Especially, we wanted to study the role of leisure time physical activity in the weight gaining epidemic. In addition, we wanted to study the association between change in body weight and the effect on blood pressure and mortality.

More specific, we aimed at these objectives:

- To study the association between different levels of leisure time physical activity and change in body mass index during 11-year follow-up in apparently healthy men and women with normal body weight at baseline.
- To study the association between change in body mass index and its impact on systolic and diastolic blood pressure at population level among healthy women and men aged 20 years or older. We wanted especially to separate the effect of initial and attained BMI, and the independent effect of change in BMI on blood pressure.
- To study weight change and mortality among apparently healthy men and women.

3. Material

3.1 The Nord-Trøndelag County

The Nord-Trøndelag County is located in the middle of Norway (Figure 3). The population of Norway was in 1984 about 4.1 million[156] and increased to 4.4 million in 1995[157]. The Nord-Trøndelag population was about 127,000 individuals in 1984 and 127,500 in 1995. The population was, and is still today, relative stable and the geographical, demographic and occupational structure is fairly representative of Norway. The county has coast and inland areas, but lacks densely populated areas and larger cities with over 50,000 residents. The level of education and income is lower than the national average. In accordance with these limitations, extensive generalisation to Norway should be limited[158].

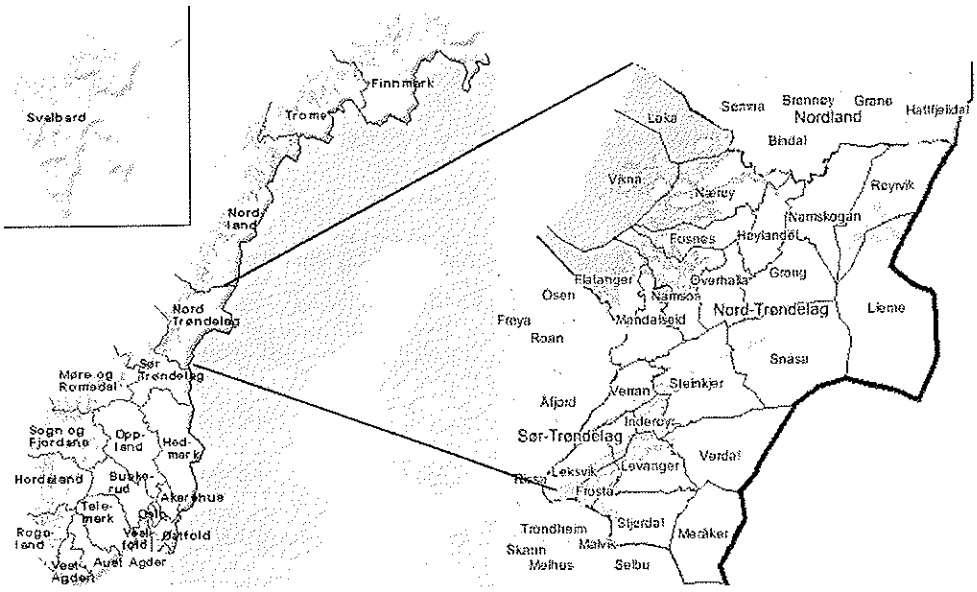

Figure 3. The Nord-Trøndelag County, Norway.

3.2 The Nord-Trøndelag Health Study

The first survey (HUNT 1)

The first survey in Nord-Trøndelag was conducted in 1984-86. All citizens in the county aged 20 years or older by Dec. 31st 1983 were invited (n=85,100 persons) and 88.1% participated[158]. The survey consisted of four main studies including hypertension, diabetes, quality of life and lung diseases. The invitation letter was mailed to each participant and included questionnaire 1 which was delivered at attendance (Appendix 1.1). Questionnaire 2 (Appendix 1.2) was delivered at the survey station and returned by mail. Attached to questionnaire 2 was a specific questionnaire for those who self-reported diabetes and/or hypertension treatment (Appendix 1.3). The survey was carried out by employees of the National Health Screening Service, and they were organised in two survey teams. Each team consisted of five nurses and two technicians. All measurements were standardised. The participation rates were highest among middle aged people[159]. Women younger than 65 years had a higher participation rate than men in the same age group (Figure 4). Among those who were 65 years or older, men had the highest participation rates.

The second survey (HUNT 2)

The second cross-sectional survey in Nord-Trøndelag was partly a follow-up study of HUNT 1 and was conducted in the two-year period from 1995-97. HUNT 2 comprised, however, a larger scientific program. All aged 13 years and older were invited (n=94,194), and in the age group 20 years or older 66,140 participated

(71.2%)[160]. An information folder together with the invitation letter was sent by mail attached to questionnaire 1 (Appendix 2.1), which was to be completed prior to the screening and delivered at attendance to the screening site. A second questionnaire (Appendix 2.2) was handed out at the screening site and was completed and returned by mail. Another questionnaire was handed out for those who self-reported diabetes and/or hypertension treatment (Appendix 2.3). All analyses at the survey station were performed standardised by special trained nurses. In total, more women than men participated in the survey[160]. Women younger than 70 years had a higher participation rate than men in the same age group (Figure 4). Among those who were 70 years or older, men had the highest participation rates. The Young-HUNT Study aimed at age group 13-19 years was organised separately. In this thesis we did not include data from the Young-HUNT Study.

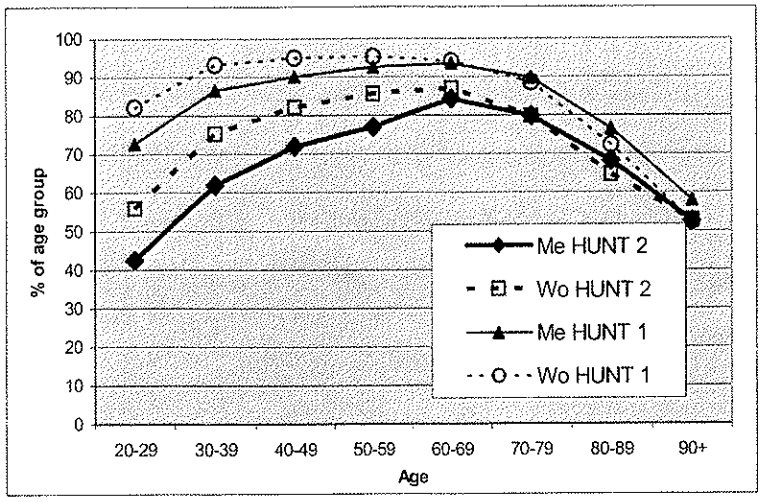

Figure 4. Participation at HUNT 1 and HUNT 2 by age in men and women[160].

Linkage of data

Every citizen of Norway is given a unique 11-digit personal identification number at birth, enabling linkage between data from both HUNT 1 and HUNT 2, and between different health- and register data sets in Norway. The use of identification number is strictly regulated through the Norwegian Data Inspectorate. A linkage was done between the first and the second survey for those who participated in both HUNT 1 and HUNT 2. In addition those who participated twice were linked to the Death Registry at Statistics Norway. Person-years and reasons of death were calculated from the date of the clinical examination until the date of death or until Dec. 31, 2001.

Statistics Norway is administratively placed under the Ministry of Finance and has its own government-appointed board. The most critical aspect in the Death Registry at Statistics Norway is the cause of death reported by the physicians. In 65

per cent of all deaths in 2002, the only sources of information were the death certificate. The main groups, where the underlying cause of death is based on this information are diseases in the genitourinary system, the respiratory system, diseases in the skin and the subcutaneous tissue and the circulatory system. The Death Registry is cooperating with The Cancer Registry and The Medical Birth Registry of Norway with extending information about diagnoses. The Death Registry is regulated by Norwegian law.

3.2.1 Study population

The study population in each paper was selected from individuals who participated in both surveys, but different selection criteria were introduced depending on the objective of the paper, and based on knowledge about possible mechanisms involved (Figure 5).

Paper I and paper II:

The objective of these papers was to investigate the association between leisure time physical activity and change in BMI. We wanted to analyse men and women separately because of gender differences both in aspects of physical activity and body weight (see also chapter 1). Physical fitness and heart rate is inversely correlated[161], and it is shown that the measured heart rate was inversly linked to self-reported leisure time physical activity also in the Nord-Trøndelag Health Study[162]. Therefore, we wanted to use an inverse association of dose-response between leisure time physical activity and heart rate at HUNT 1 as inclusion criterion. Heart rate was therefore used to validate of the information of leisure time physical activity, and of our stratification of leisure time physical activity at the first survey in different strata

of age. This explains why women 20-49 years and men aged 20-69 years were included in paper I and paper II, respectively (Figure 6). We wanted to include a relative homogenous population with a potential of being physical active, i.e. with no obvious obstacles against physical activity, like disabling diseases and obesity/overweight. The selection criterion of weight range was based on knowledge from other studies, which had shown that overweight and obese persons often over-reported their physical activity level[163]. Other criteria for selection of the normal weight group were that overweight and obesity may be a barrier to a physical active lifestyle[164], and additionally we wanted to study the potential primary prevention effect of leisure time physical activity on changes in body weight. Both diabetes, dysfunctions in daily life and cardiovascular diseases may be associated with changes in body weight or leisure time physical activity level, or both. Therefore, based on these arguments we included apparently healthy men and women with normal body weight and without diabetes, CVD and dysfunctions (psychological and physical impairements) in daily life aged 20-49 years and 20-69 years, respectively, to study the association between leisure time physical activity and change in body weight.

Paper III:

In this paper we wanted to investigate the association between change in BMI and change in blood pressure in apparently healthy men and women. Because of the linkage between both change in blood pressure and change in BMI and different diagnoses, we excluded those reporting dysfunction in daily life, CVD or diabetes. In addition we wanted to use exclusion, not adjustment, for use of blood pressure medication to increase homogeneity of the study population.

Paper IV:

We wanted to investigate the association between weight change in apparently healthy men and women and mortality. Because both cardiovascular disease and diabetes may be linked to both change in body weight and mortality, we excluded those who reported cardiovascular disease and diabetes at the first survey.

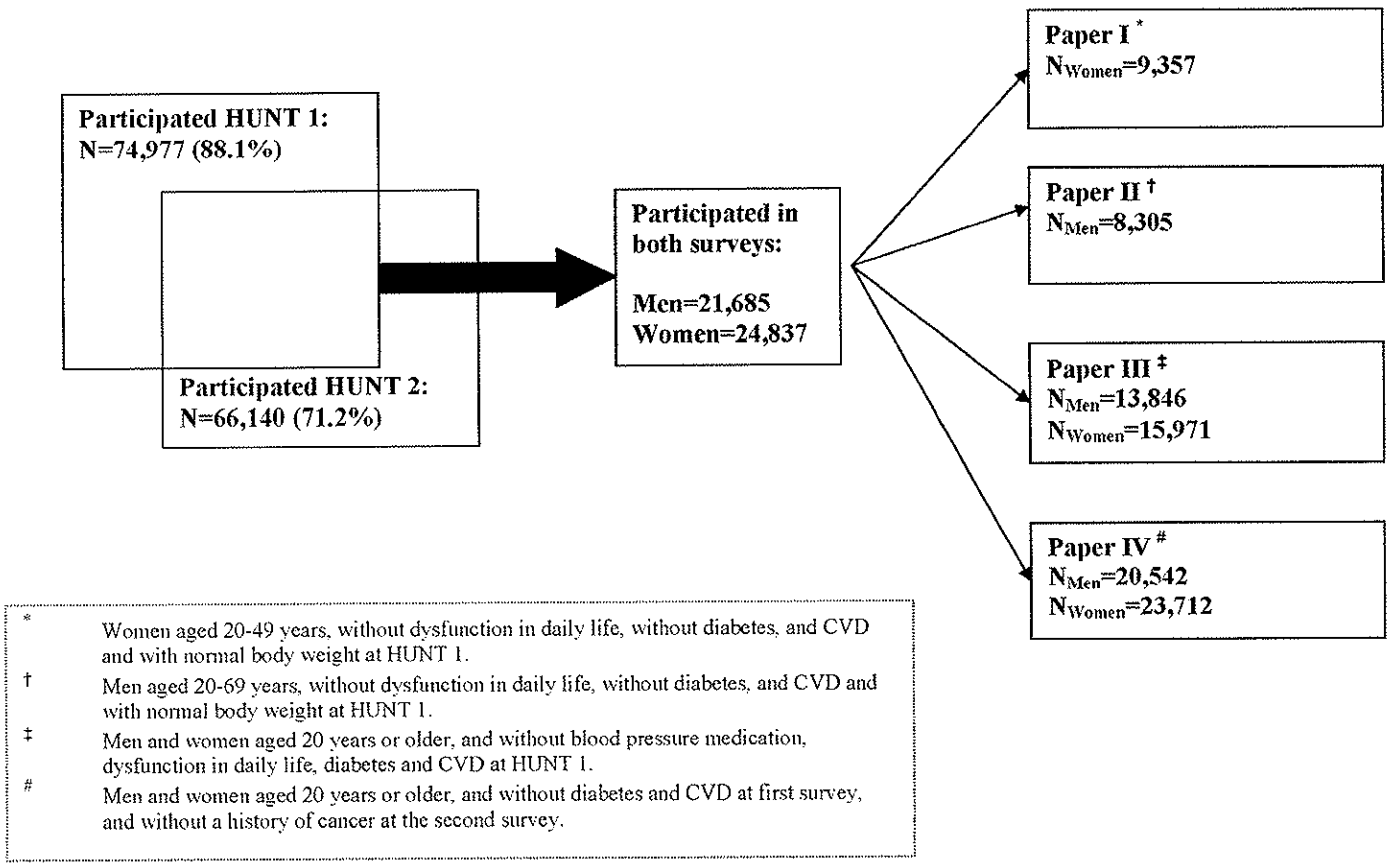

Figure 5. Participation in HUNT 1 and HUNT 2, participants in both surveys, and the study populations in each paper.

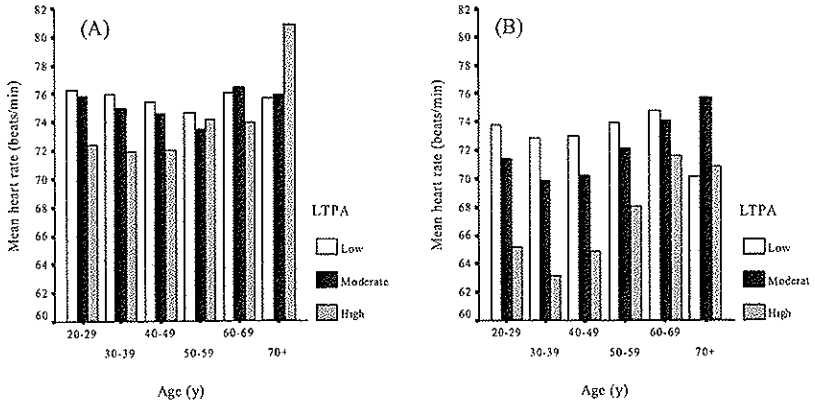

Figure 6. The association between leisure time physical activity (LTPA) and heart rate at HUNT 1 for different age-ranges for women (A) and men (B).

3.3 Variables

The first survey (HUNT 1) aimed at the study of diabetes, hypertension, tuberculosis and other lung diseases and quality of life. The main objectives of the second survey (HUNT 2) were the large public health issues like cardiovascular disease, diabetes, obstructive lung disease, osteoporosis and mental health. Exposure data in both surveys was collected from three sources; clinical data was obtained at survey stations, the self-administered questionnaires obtained information about demographic characteristics, self-reported diseases and lifestyle factors, and blood samples. To select factors to be included in our analyses, we used data from Seidell and Flegal as a basis[16], in addition to consider potential physiological mechanisms involved. We used selected comparison groups by classification of the subjects into different exposure categories[165].

Age is a proxy measure for biological aging[166], and should always be considered. Therefore, we included age in all analyses, and it may also be important

to include age simply because some might not trust results that are not age adjusted[2]. Age at HUNT 1 was defined as age at syntax data, i.e. the date of control of punched data, performed 7-21 days after the actual screening date. Age at HUNT 1 was thus defined as a mean of 14 days later than the actual date of screening. We used age either as a continuous or categorised variable.

3.3.1 Study variables

Body mass index

At both surveys weight (kg) and height (cm) were measured standardised without shoes, jacket or outdoor garments by special trained personnel[167]. Body mass index (Quetlet's index) was calculated as body weight in kilogram (kg) divided by body length in meter (m) squared (kg/m^2). We categorised change in BMI between the surveys into three categories: decreased, stable, and increased in paper III, and loss, stable, and gain in paper IV. A stable BMI was defined as +/-0.1 kg/m^2/follow-up year according to Nilsson *et al*[168]. In addition, we categorised BMI applying the World Health Organisation's (WHO) recommendation[1] (underweight: BMI<18.5 kg/m^2, normal weight: BMI 18.5-24.9 kg/m^2, overweight: BMI 25.0-29.9 kg/m^2, and obesity BMI≥30 kg/m^2).

Leisure time physical activity (Appendix 1.2)

Men seem to be more physical active than women[169], and therefore we made gender specific categorisation of low, moderate and high levels of leisure time physical activity.

At HUNT 1 leisure time physical activity was self-reported by three questions about frequency, duration and intensity, each with five, four and three possible answers, respectively. Only those who had a frequency once a week or more answered the questions about intensity and duration. We categorised leisure time physical activity into low, moderate and high levels based on the questions about frequency, intensity and duration: A frequency of never or less than once a week was categorized as low. For those with a frequency of once a week or more, a summary was calculated by adding the values of frequency, intensity and duration. The sum value was then divided into moderate and high by dichotomizing at the median value. The median value was included in the moderate level to separate the most active part of the population in the high level group.

In paper II the population was additionally dichotomised into physically active or not physically active by defining low level of leisure time physical activity as not physical active. Participants with moderate and high levels were categorised as physically active. For the physically active part of the study population the intensity was dichotomised into low and high intensity with answer 1 as low and answers 2 and 3 as high by using self-reported breath status of the physical activity as cut-point.

Systolic and diastolic blood pressure (SBP and DBP)

At both surveys, blood pressure was measured by specially trained nurses or technicians with the participant sitting with the arm resting on a table at heart-level. SBP and DBP were read off to the nearest 2 mm Hg. At the first survey, the blood pressure was measured twice on a sphygmomanometer, and the second reading was used in our analyses[170]. At the second survey, blood pressure was measured three times using a Dinamap 845XT (Criticon, Tampa, FL) based on oscillometry, and we

used the mean value of the second and third measurement in our analyses[170]. At the first survey the cuff-size was equal for all participants (15 cm x 55 cm), but at the second survey the cuff-size used was based on the arm circumference (arm ≤24 cm: cuff 12 cm x 37 cm, arm 25-35 cm: cuff 15 cm x 50 cm, arm ≥ 36 cm: cuff 17 cm x 60 cm). In paper III hypertension was defined as both systolic blood pressure ≥ 140 mm Hg and diastolic blood pressure ≥ 90 mm Hg. We calculated change in SBP and DBP between the surveys by subtracting SBP and DBP at the second survey from SBP and DBP at the first survey for each individual.

Mortality

ICD-9 and ICD-10 codes (ICD=International Classification of Diseases) were used for identification of cause specific mortality in paper IV.

3.3.2 Potentially confounding variables

Lifestyle variables (Appendix 1.2)

In paper I-III we classified information about smoking into daily or not daily smoking. In paper IV we categorised the information of smoking into never, current and former. Alcohol use was categorised into three categories (abstained, not drinking last 14 days, drinking last 14 days) or four categories (none, 1-4 times, ≥5 times, teetotaller) based on data on frequency of drinking the past two weeks. To investigate confounding effects of leisure time physical activity we used either active or not (yes/no), or low, moderate, and high levels of leisure time physical activity.

Demographic variables (Appendix 1.2)

Marital status was divided into married, unmarried, widow/widower (widowed in paper I-III), divorced/separated.

Socioeconomic variables (Appendix 1.2)

Education was categorised as ≤12 years at school, >12 years at school in paper I and paper II, or ≤ 9 years at school, 10-12 years at school and > 12 years at school in paper III. In paper IV education was categorised in four categories: middle school, high school, <4 years of college/university, ≥4 years of college/university). Difference in categorisation did not change the results.

Anthropometric variables

When BMI was considered as a potential confounder, we used BMI as a continuous or categorised variable.

Medical and other physiological variables

Heart rate was used as a continuous variable or in quartiles. In paper IV SBP was used in quintiles. Status of blood pressure medication use was dichotomised (y/n) both in the data from HUNT 1 and HUNT 2 (Appendix 1.2 and 2.1).

4. Methods

4.1 Study design

In this thesis we used a prospective cohort design. Generally, in a prospective cohort study a group of individuals is selected at random from a defined population. Then, after the cohort is selected, baseline information is collected, and the individuals are followed over a time to identify the incidence or risk of disease between those exposed and not exposed to the factors at interest. The Nord-Trøndelag Health Study (HUNT 1 and HUNT 2) gave the possibility to investigate the association between change in body weight and health with a prospective design by using HUNT 1 as baseline.

4.2 Statistical analyses

We used multivariable regression methods (linear, logistic, and Cox regression) to investigate the role of chance. The type of regression model depends on the distribution of the independent variable (Y).

In general, regression is a robust procedure and may be used in many situations where the assumptions are not met, as long as the measurements are fairly reliable and the appropriate regression model is used[171].

In epidemiological studies multivariable regression modelling gives the opportunity to include and control for variables with potential confounding effects. A confounder is a factor that is both associated with the exposure and, independent of that, is a risk factor for disease[172]. In paper I and II we used the magnitude of change

in the estimates and p-values as criteria for the variables to be included or excluded in the regression models. In paper III the inclusion of variables in the regression model was solely based on the magnitude of change in the estimated associations. We considered a change of 10-15% in the estimates as important. The evaluation of whether a variable qualified as a confounder was done by using the magnitude of discrepancy between the multivariable adjusted estimates and age-adjusted estimates. In paper IV we conducted multivariable analyses to assess potential confounding. All analyses were performed using SPSS for Windows (SPSS Inc. Illinois, US, version 11.0).

All analyses were done stratified by gender independent of statistical significance of interactions, because it is biologically plausible that gender differences are present in all the main associations under study here. Additionally, the main knowledge of health from epidemiological studies has often been based on studies of men, and an extrapolation of these results may not apply to women.

Linear regression

Linear regression attempts to model the relationship between two variables by fitting a linear equation to observed data. One variable is considered to be an explanatory variable or independent variable (X), and the other is considered to be a dependent variable (Y).

In paper I and paper II we used linear regression to investigate the association between change in BMI and baseline leisure time physical activity, and we used BMI at the second survey as the dependent variable (Y) and leisure time physical activity as the independent variable (X), adjusted for BMI at the first survey. In paper III we used linear regression to investigate the association between change in systolic and

diastolic blood pressure (Y) and change in BMI (X). Additionally, we used linear regression to investigate the association between systolic and diastolic blood pressure (Y) and BMI at HUNT 2 categorised (X) in strata of BMI at HUNT 1. Some methodological considerations should be done when linear regression is selected:

- Linearity (average value of Y for a given value of X is a linear function of X)
- Homoscedasticity (the variance of Y for a given X is the same for all Xs)
- Normality (for each value of X, the Y variable is assumed to have a normal distribution).

The linearity was investigated by bivariate scatter plots for each independent variable. The model assumptions were tested by using scatter plots of residuals against independent variables (X's), further by using histogram with frequencies plotted against residuals, and in addition by consideration of probability-probability plots (P-P plots). We checked visually for the fit of the theoretical distribution to the observed data by examining the P-P plot where the observed cumulative distribution function is plotted against the theoretical cumulative distribution function. If the theoretical cumulative distribution approximates the observed distribution well, then all points in this plot should fall onto the diagonal line.

Logistic regression

Logistic regression is commonly used when the independent variables include both numerical and nominal measures and the dependent variable is binary (dichotomised). The logistic model gives the probability that the outcome (dependent variable) occurs as an exponential function of the independent variables. A chi-square test is used to determine whether a variable adds significantly to the prediction of the outcome. We were not interested in prediction, and therefore we focused our model building on the

changes in the estimated associations. Logistic regression requires no assumptions about the distribution of the independent variables. The regression coefficients in logistic regression denote the magnitude of change in the log odds produced by one unit change in the value of the independent variable. The logistic regression coefficients are odds ratios which are estimates of the relative risks (RR) under some conditions. We used logistic regression in the paper III, where elevated blood pressure or not, according to our definition, was the binary dependent variable (Y) and change in BMI categorised was the independent variable (X).

Survival analysis

Survival analysis is concerned with studying the time between entry into a study and a subsequent event. Cox proportional hazards regression is a statistical technique for exploring the relationship between survival and explanatory variables.

The main purpose of the Cox model is to simultaneously explore the effects of several variables on survival, and this is a robust mathematical model. The Cox method assumes that the values of all covariates are determined at the point when follow-up began on each subject, and that these values do not change over the period of observation[173]. We used a graphical procedure to evaluate if the different variables were constant during the follow-up period. Parallel ln(-ln) curves indicated a constant proportional hazard during the follow-up.

4.3 Ethics

Both surveys were approved by the Norwegian Data Inspectorate. In addition the Regional Ethical Committee for Medical Research (which was not established when HUNT 1 was performed) approved HUNT 2. The participants were informed about

the nature of the study in the invitation, and signed a personal consent. Participants may withdraw from the study and refuse any of their data at any time. In the data files available for scientific actions, name of each individual and the 11-digit person number have been removed to provide anonymity.

4.3 Funding

This thesis has been completed while I have been receiving a research fellowship from the Norwegian Research Council.

The planning, data collection and primary analysis of the first survey (HUNT 1) were funded by the following institutions: The Norwegian Research Council for Science and the Humanities, The Department for Health and Social Affairs, The Nord-Trøndelag County Council, The National Institute of Public Health.

The data collection of the second survey (HUNT 2) was a financial collaboration between HUNT Research Centre (previously a part of the Norwegian Institute of Public Health), Department of Public Health and General Practice, Faculty of Medicine, Norwegian University of Science and Technology (NTNU), Verdal, Norwegian Institute of Public health, Oslo, Nord-Trøndelag County Council, and Innherred Hospital, Levanger.

5. Reviews of papers

5.1 Review of Paper I

Leisure time physical activity and change in body mass index. An 11-year follow-up study of 9,357 normal weight healthy women 20-49 years old.

The Nord-Trøndelag Health Study (HUNT), Norway, 1984-86 and 1995-97.

Wenche B. Drøyvold, Jostein Holmen, Øystein Krüger, Kristian Midthjell

Objective: To study the association between self-reported leisure time physical activity at baseline (1984-86) and change in body mass index (BMI) during an 11 year follow up period. The study population was 9,357 healthy women, aged 20-49 years who had a normal body weight (BMI 18.5-24.9 kg/m^2) at baseline.

Methods: A general population based health survey was performed both in 1984-86 (HUNT 1) and 1995-97 (HUNT 2). Leisure time physical activity at HUNT 1 was categorized into high, moderate and low levels based on self-reported intensity, duration and frequency. Women, who at baseline reported diabetes, stroke, angina, and myocardial infarction and/or long-term illnesses impairing their activities of living, were excluded.

Results: Physical activity was a significant predictor of BMI at HUNT 2 adjusted for BMI, age and education at HUNT 1. Low level of leisure time physical activity compared to high level at baseline was significantly associated with a higher BMI 11

years later. Those with high level of activity gained 0.18 kg/m^2 (95 % CI: 0.05, 0.32) less than low level of physical activity over 11 years.

Conclusion: This study has demonstrated that leisure time physical activity had a moderate effect on BMI. However, not even high level of leisure time physical activity was sufficient to prevent weight gain and BMI increased in all subgroups of the study population.

5.2 Review of Paper II

BMI change and leisure time physical activity (LTPA). An 11-y follow-up study in apparently healthy men aged 20-69 with normal weight at baseline.

The Nord-Trøndelag Health Study (HUNT), Norway.

Wenche B. Drøyvold, Jostein Holmen, Kristian Midthjell, Stian Lydersen

Objective: To study the association between self-reported leisure time physical activity (LTPA) at baseline and change in body mass index (BMI).

Design: Prospective observational study with 11-year follow-up period.

Setting: A total population based health survey in one county was performed in 1984-86 (HUNT 1) and repeated in 1995-97 (HUNT 2).

Participants: 21,685 men participated in both surveys. In the present study we included only apparently healthy 20-69 years old men participating in both surveys and who had a normal body weight (BMI 18.5-24.9 kg/m^2) at baseline – leaving 8,305 men for the analyses. 6,945 men answered all questions about leisure time physical activity and 6,749 men had complete data in the multivariate analyses.

Measurements and main results: At HUNT 1, the participants answered questions (self-reported) about intensity, frequency and duration of LTPA. The association between change in BMI and LTPA was investigated in multivariate linear regression analyses. Adjusted for smoking, education, age and BMI at baseline the physical active cohort gained less weight than the inactive cohort. Low, moderate and high levels of LTPA showed a U-shaped effect adjusted for smoking, education, age and

BMI at baseline. Adjusted for BMI and age at baseline the high intensity part of the physical active cohort gained less weight than the low intensity group.

Conclusion: This study has demonstrated a moderate BMI effect of LTPA at population level; however, even high level of LTPA did not prevent weight gain during the 11 year follow-up period.

5.3 Review of Paper III

Change in body mass index and its impact on blood pressure.

A prospective population study.

The Nord-Trøndelag Health Study (HUNT), Norway

Wenche B. Drøyvold, Kristian Midthjell, Tom Ivar Lund Nilsen, Jostein Holmen

Background: Overweight and obesity increase the risk of elevated blood pressure, but the knowledge of the effect of weight change on blood pressure is sparse.

Objective: To investigate the association between change in body mass index (BMI) and change in diastolic blood pressure (DBP), systolic blood pressure (SBP), and hypertension status.

Design: Two population based cross-sectional studies, one in 1984-86 and the other in 1995-97.

Setting: The Nord-Trøndelag Health Study (HUNT).

Participants: We included 15,971 women and 13,846 men who were 20 years or older at the first survey, without blood pressure medication at both surveys and without diabetes, cardiovascular disease or dysfunction in daily life at baseline.

Measurements: Weight, height and blood pressure were measured standardised. Change in BMI was categorised as stable (initial BMI +/- 0.1 kg/m^2 each follow up year), increased or decreased, and BMI was categorised by using World Health Organisation's categorisation (underweight BMI: <18.5 kg/m^2, normal weight BMI: 18.5-24.9 kg/m^2, overweight BMI: 25.0-29.9 kg/m^2, obesity BMI≥30 kg/m^2).

Results: An increase in BMI and a decrease in BMI were significantly associated with increased and decreased SBP and DBP, respectively, compared to a stable BMI in both genders and all age groups, although the strongest effect was found among those who were 50 years and older. The adjusted odds ratio (OR) for having hypertension at HUNT 2 was 1.8 (95% CI: 1.5, 2.2) among women and 1.6 (95% CI: 1.4,1.8) among men aged 20-49 years who increased their BMI compared to those who had stable BMI. A similar, but weaker association was found among women and men aged 50 years or more. Mean change in both SBP and DBP was higher for those who changed BMI category from first to the second survey than for those who were in the same BMI class at both surveys.

Conclusions: Our result supports an independent effect of change in BMI on change in SBP and DBP in both women and men, and that people who increase their BMI are at increased risk for hypertension.

5.4 Review of Paper IV

Weight change and mortality.

The Nord-Trøndelag Health Study (HUNT), Norway

Wenche B. Drøyvold, Kristian Midthjell, Stian Lydersen, Peter Nilsson, Jan-Åke Nilsson, Tom Ivar Lund Nilsen, Jostein Holmen

Background: The prevalence of obesity is increasing worldwide, and overweight and obese people have increased mortality compared to normal weight people. We have prospectively investigated the effect of weight change on mortality.

Methods: We utilized data from two large population-based health studies in Nord-Trøndelag, Norway, the first conducted in 1984-86 and the second in 1995-97. A total of 20,542 men and 23,712 women aged 20 years or more were followed-up on all-cause mortality for five years after the second survey. Cox proportional hazards models were used to calculate mortality rate ratios (RRs) with 95% confidence intervals (CIs) between people with a stable weight and people who lost or gained weight.

Results: We found no association between weight gain and mortality, but people who lost weight had a higher total mortality rate compared to those who were weight stable (RR was 1.6 (95% CI: 1.4, 1.8) in men and 1.7 (95% CI: 1.5, 2.0) in women). Similar associations were also found for cardiovascular and non-cardiovascular mortality. Additional analysis showed a linear increase in mortality rates across categories of weight loss for both men and women (P_{trend} <0.001). Moreover, there was a

statistically significant interaction between weight change and initial BMI, but only among men ($P_{interaction} = 0.001$).

Conclusions: Weight loss, but not weight gain, was associated with increased mortality both among men and women. Although underlying undiagnosed disease is the most plausible explanation for this finding, the similar associations found for total mortality, cardiovascular mortality, and non-cardiovascular mortality makes the causal pathway somewhat enigmatic.

6. General discussion

6.1 Methodological considerations

Epidemiology is the study of the distribution and determinants of disease frequency in human populations. Additionally, through epidemiological methods we can not only measure the occurrence of disease, but even seek to identify the causes of disease by interpreting observed patterns of variation in disease occurrence. However, we are only able to indicate whether associations are present or not. We have to evaluate both the role of chance in the observed association and the potential effect of bias and confounding.

6.1.1 Precision (Lack of random error)

In epidemiological studies sampling error will always be present, because even if all individuals in a population were included, the study subjects could be viewed as a sample of the potential biologic experience of an even broader population[2]. To evaluate and quantify the degree to which chance variability may account for the observations an appropriate test of statistical significance should be performed[172]. The p-value is defined as the probability that an effect at least as extreme as that observed could have occurred by chance alone, given that there is truly no relationship between the exposure and disease. The role of chance in the precision, also called sampling error, can primarily be improved by increasing the study size or increasing the study efficiency[2]. A more informative measure of the role of chance is the confidence

interval (CI), where the width of the confidence interval provides information about the variability in the estimates and/or the study size. The wider the confidence interval, the smaller sample size and greater variability.

Because the p-value does not give any information about whether the exposure under study is responsible for the effect or include any information about biologically importance, we have not used the p-values as strict borders. We have also assessed the confidence interval for evaluating the role of chance.

One strength of the HUNT Study is the high number of participants. In this thesis the primary study population was 46,534 individuals participating in both surveys (Figure 5). However, due to selection criteria, the study population in each paper was smaller.

6.1.2 Validity (Lack of systematic error)

The validity of a study is often divided into internal and external validity. The internal validity is defined as the degree to which the results are representative for the particular cohort being studied[2]. External validity is about whether the results are applicable to other populations. HUNT 1 and HUNT 2 were performed in a rural area without large cities and the average education and income was somewhat lower than the average of Norway as a whole. Despite high participation rates and large number of participants, a generalisation should be done with caution. Further, all epidemiological investigations require evaluation of the potential systematic error by considering bias and confounding as alternative explanations of the results[165]. Bias may be defined as the error related to the ways the targeted and sampled populations differ which threatens the validity of a study[174]. Confounding is generated by factors that are independently associated with both the exposure and the outcome under

investigation[2]. The major advantage of the prospective design is that the risk profile was established before assessment of the outcome. Therefore, any information obtained at baseline is unlikely to be biased by knowledge of the outcome status.

Survival bias

Individuals in a cohort with undiagnosed disease at baseline may be more likely to die during the follow-up period than healthy people, resulting in a cohort of healthy survivors as the length of the follow-up increases. The 11 years between HUNT 1 and HUNT 2 may have introduced losses to follow-up. This may have introduced a reduction of a potential bias linked to undiagnosed disease at baseline, because persons with an undiagnosed and underlying disease at HUNT 1 may have died during the period between the surveys, and thus not being in our study population. In addition a criterion of participation twice with 11 years between the surveys may have caused a "survival of the fittest" effect, which may have resulted in underestimated effects because of the strong association between overweight/obesity and mortality. This may have occurred because those with high body weight at the first survey and with low level of physical activity, and additionally weight gain after HUNT 1 may have died before HUNT 2.

Selection bias

The common element in selection bias is that the relation between exposure and disease differ between those who participated compared to the potentially total population for the study (participants and non-participants). If a selection bias is present the results will be a product of the association investigated and the selection. Some degree of non-participation is common in large population studies. In the

HUNT Study the participation rate in HUNT 1 was 88.1%. Among those aged 30 years or older at HUNT 2 the participation rate was 83.3%. Both in HUNT 1 and HUNT 2 a non-responder study was performed[159,160]. In paper I and paper II we used selective age-ranges (20-49 years in women, and 20-69 years in men). The total participation rate among women aged 20-49 years in HUNT 1 and HUNT 2 was 90.0% and 80.8%, respectively. The total participation rate in HUNT 1 and HUNT 2 among men aged 20-69 years was 81.0% and 73.4%. In HUNT 1 no association between health status and participation rate was found neither in men nor in women aged under 55 years[159]. Among men and women aged 55 years or more there was, however, a weak positive association between bad health and non-participation. In HUNT 2 there was no strong linkage between participation or non-participation and health status in young individuals[160], but old non-participants had significantly more health problems than old participants. In paper I and paper II 16.1% and 15.3% missing data of the variable leisure time physical activity, respectively. However, because of the prospective design it is unlikely that the results found in this thesis were a consequence of a selection bias. In paper III the medication use was based on self-report, but even here it is unlikely that the results are affected by selection effects. In paper IV the codes of deaths are critical. In Norway about 90% of the classification in the ICD-10 range I00-I99 is based on the death report from the physicians, and 7.5% of the encoding is a result of autopsy (source: http://www.ssb.no/dodsarsak). This illustrates the importance of high competence of the physicians, but it is unlikely that misclassifications present are selective in relation to weight changing categorisation.

In conclusion, it is unlikely that the results presented in this thesis are a result of selection bias, but estimated effects may have been underestimated due to selection bias.

Information bias

Information bias results from incorrect determination of exposure or outcome, or both[175], and can be separated into differential and non-differential. The usual consequence of non-differential misclassification in the principal exposure variable is attenuation of the measure of effect estimate; that is, bias toward the null. Non-differential misclassification of an individual by exposure status is generally difficult to avoid in observational studies based on self-reported measures of exposure like in the HUNT Study. Non-differential misclassification in a confounding variable limits the ability to control for this confounding in the analysis[176]. When misclassification is limited in only one stratum, residual confounding may be concentrated in this stratum and give the erroneous impression of effect modification.

To obtain valid and objective estimates of physical activity in large populations is difficult, because no other methods are useful in practice than self-reporting questionnaires. Even though the possible answers from the leisure time physical activity questions were quantitative, the relative effects between the participants will differ and introduce a variation in the self-reported answer that will be non-differential.

BMI is calculated as body weight divided by body height squared (kg/m^2). Even if BMI is rather well correlated with fatness in a general population, BMI does not consider the body fat distribution because only body weight and body height is

included in the formula. A description of body fatness based on BMI will therefore introduce misclassification, which will result in an underestimation of the effects. At the first survey waist circumference was not measured, and we therefore lack data for including change in body proportions in our analyses. Even other factors as bone, muscle mass and even increased plasma volume induced by exercise training may affect the numerator of the BMI equation[8], and probably give an underestimation of effects. As a consequence of the lack of inclusion of body proportion, our results may be underestimated, because of the importance of the body fat distribution, and not only the amount of body fat mass.

The HUNT Study used special trained nurses and standardised procedures to prevent systematic errors. Therefore it is unlikely that the results in this thesis are a product of systematic errors in the measurements performed by the different nurses.

In paper IV we used data from the HUNT Study and from The Death Registry at Statistics Norway. Standardised procedures can prevent selective misclassifications, but it is hard to administer registries without random misclassifications. Also the Death Registry at Statistics Norway may have some degree of misclassification, but this misclassification is probably not linked to the degree of change in BMI between the surveys, and is therefore of a non-differential nature. We used a prospective design in our studies, which means that information was collected before the 'event' of interest. Therefore it is unlikely that differential misclassification was present in our analysis.

Additionally, in paper I and paper II the association between leisure time physical activity and BMI was probably underestimated, because intra individual changes in physical activity level during follow-up were not taken into account[177]. Some individuals may have changed physical activity level during the follow-up from

low to higher level or from high to lower level, which will result in an underestimation of the body weight effects found.

The role of confounding

Confounding occurs in epidemiological research when measured association between exposure and disease occurrence is distorted by an imbalance between exposed and non-exposed persons with regard to one or more other risk factors for the disease. When confounding is present this bias can be corrected provided that the confounding was anticipated and the requisite information gathered[175]. Confounding can be controlled for, and the purpose is to achieve homogeneity between study groups. Often used methods to adjust for confounding are multivariable analyses, restriction or stratification. Many confounders may be insufficiently known or are unquantifiable; therefore in some situations a better strategy might be to use restrictions[178]. The goal of restriction is to obtain a population segment that is homogeneous in respect of a particular risk factor. Variables that have not been measured accurately, or has not been categorised or modelled in such a way as to fully capture the nature of its relationship to disease and/or exposure, will leave unquantifiable residual confounding[179]. A definition of the residual is the difference between the true estimate of effect predicted by the model[173].

To reduce residual confounding in large population based studies, as the HUNT Study, restriction to people who do not have any of such risk factors might be chosen. One disadvantage of restriction is the need of large sample sizes, but this is often not a problem in large population studies.

In all papers in this thesis we used restriction in the selection of study populations, adjustment for potential confounders and stratified analyses to adjust for confounding.

6.2 Evaluation of the results

"It makes little sense to expect individuals to behave differently from their peers; it is more appropriate to seek a general change in behavioural norms and in the circumstances which facilitate their adoption." (Rose, 1982)

A high incidence rate of a disease may reflect a shift of the underlying risk distribution in a population as whole; and a reversal of the shift may be the key to effective reduction of the incidence rate. Small shift of the distribution in either direction might imply a surprisingly large impact on the total burden of disease, because of the involvement of many individuals. As a consequence, a population wide change may be one of the most important ways to help high-risk individuals[180,181]. Geoffery Rose has discussed prevention as separated into 'high-risk' strategy and 'population' strategy, where 'high-risk' strategy has the focus on individuals at risk. The 'population' strategy is about shifting the whole distribution of exposure in a favourable direction. His conclusion is that both have to be considered, but the main priority should be to discover and to control the causes of disease at population level[100]. Other studies have shown the possibility of shifting distribution of cardiovascular risk factors for a whole population over time and thereby to influence the prevalence of corresponding disease states[181]. Figure 7 illustrates the effect on the distribution of BMI categories by mean BMI increase of 2.5 kg/m^2 (SD 2.1) (women, paper I) and 1.8 kg/m^2 (SD 1.7) (men, paper II). All had normal weight at baseline, while only 60 % and 55 % remained in the normal weight group, and about 40 % and 45 % were now categorised as overweight or obese at HUNT 2 in women and men,

respectively. This illustrates how relative small shift in mean BMI at population level may influence on the prevalence of overweight and obesity.

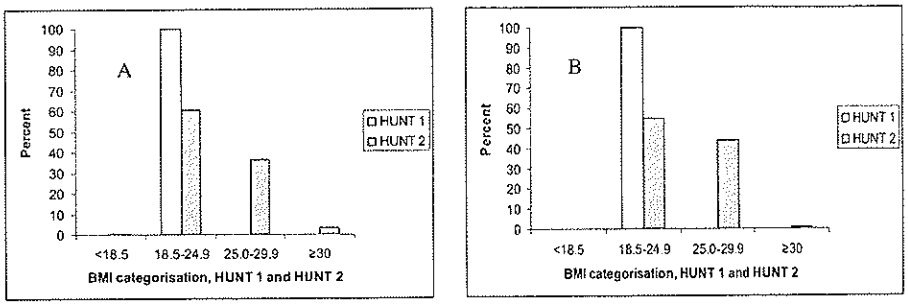

Figure 7. The effect of the distribution of BMI categories by mean BMI increase of 2.5 kg/m2 (SD 2.1) (A: women, paper I) and 1.8 kg/m2 (SD 1.7) (B: men, paper II). All had normal BMI (BMI 18.5-24.9 kg/m2) at baseline (white column). At HUNT 2, 60% of women and 55% of men remained in the normal weight category, while almost 40% women and 45% men were categorised as overweight or obese.

6.2.1 Leisure time physical activity and change in BMI (Paper I, Paper II)

In paper I on leisure time physical activity and change in BMI, including apparently healthy, normal weight women aged 20-49 years, we found that those with high level of leisure time physically activity at baseline gained less weight than those with low level.

In paper II we studied a population of apparently healthy men aged 20-69 years of normal weight in different groups based on information about frequency, intensity and duration of the leisure time physical activity. Those being physically active gained less weight compared to those being inactive. Additionally, in those being physically active, the intensity had a protective effect on BMI increase.

In an overview article Fogelholm & Kukkonen-Harjula[182] concluded that baseline physical activity, i.e. at the beginning of the observation period in population studies, was not particularly linked with the subsequent rate of weight gain. In

general, data from observational studies on the association between leisure time physical activity and change in weight is inconsistent[132]. It is possible that the discrepancy in the observations may be ascribed to the measurement of physical activity, because there is no gold-standard for measuring physical activity. In population studies, as the Nord-Trøndelag Health Study, with high participation numbers, only questionnaires can be used in collecting data on physical activity at leisure. Self-reported leisure time physical activity is a proxy measure of a part of the total energy expenditure. Also in the HUNT Study, measurement of physical activity at leisure might be inaccurate. However, the inverse association between heart rate and leisure time physical activity suggests that the reported leisure time physical activity is valid both among women and men in the selected age-groups. Previous studies have observed a significant discrepancy between objective measures and self-reported measures of body weight and height, where those being overweight or obese often under-report their body weight[183]. Therefore it is important to have standardised measurements of body height and body weight, as in the HUNT Study. The U-shaped association in men between leisure time physical activity and change in BMI may be a result of a discrepancy in the abdominal fat mass between those being low, moderate or highly physical active[152,184], because BMI does not differ between muscle and fat mass and body proportions. If those being leisure time physical active at high level had a higher increase in muscle mass compared to those being physical active at lower levels, the health effects of leisure time physical activity in our analysis might be underestimated. The insufficiency of BMI to differ between muscle and fat mass was probably of more importance among men than women, because of the gender differences in muscle mass, and additionally the wish to use physical activity to built muscles was probably higher among men.

One might argue that this moderate reduced weight gain in 11 years (0.3 kg in women and 0.9 kg in men) is hardly a strong motivating factor for physical activity, if the aim is weight control. In modern people weight control is probably a strong motive for being physical active by attending training centres or other forms of sports. There is firm evidence that physical activity is associated with improved physical[185] and mental health[186,187] and general well-being[188]. According to social-cognitive theory, an individual's motivation to engage in physical activity is based on three postulates: self-efficacy, outcome expectations, and self-evaluated satisfaction or dissatisfaction[189]. Today one might have the impression that both women and men have unrealistic expectations about the effect of physical activity on the body weight, and short-time improvements are wanted. The importance of combining physical activity with a reduced calorie diet might be undervalued. In our study we had no reliable data on energy intake, but the fact that even those with high level of leisure time physical activity gained weight, demonstrates that the general energy intake in this population was too high to prevent weight gain. On the other hand; even if the weight gain reduction was moderate on the individual level, the potential effect in an apparently healthy and normal weight population should not be underestimated. In women (based on data in paper I) an increase of mean body weigh of 0.3 kg or 0.2 kg/m^2 is corresponding to a 3% increase in the prevalence of overweight and 0.2% increase in the obesity prevalence [Calculations are based on the following: ((% increase in overweight or obesity/mean weight gain (kg/m^2)) multiplied with the mean weight change (kg/m^2)]. Based on data in paper II (men) an increase of mean body weigh of 0.3 kg/m^2 corresponds to 7.3% increase in prevalence of overweight and to 0.1% increase of obesity.

Due to the general high proportion of people trying to lose weight at any time, and because diet seems to be the favourite method, the isolated effect of leisure time physical activity on change in body weight is more difficult to study. In clinical studies[120] dieting was associated with weight loss followed by regain after intervention, whereas exercise alone produced smaller weight loss but better maintenance. Questions about slimming behaviour were not included in the Nord-Trøndelag Health Study, which may have influenced on our results in view of the factors mentioned above. If those who were physical active at low level tried to lose weight by dieting more frequent than those who were physical active at higher levels, our effects found were probably underestimated due to this circumstances.

Both in paper I and paper II the effects of leisure time physical activity on change in BMI were based on conservative estimates. Taking into account the weight gain reduction effect and the fitness effect, our results may be important in a public health perspective. But as illustrated in paper I, BMI at the first survey explained 41% of the variation in BMI at the second survey. Other variables such as age, education and leisure time physical activity explained only 0.5% of the variance at the second survey. The fact that physical activity at leisure explained only a small part of the variance in BMI at the second survey in a healthy and normal weight population of men and women might be a result of non-differential misclassification, or that the general physical activity level was quite low. At individual level there is no doubt that increased physical activity is positively related to energy expenditure, but to document effects of physical activity on changes in weight in populations seems to be hard probably because of methodological insufficiency and the complexity of the phenomenon.

6.2.2 Change in BMI and its impact on blood pressure (Paper III)

Our results confirm findings by others where change in BMI and change in blood pressure was positively associated[190,191]. In the HUNT Study both blood pressure and body weight and height were measured standardised at both surveys. Different methods were used for blood pressure measurement at HUNT 1 and HUNT 2, with sphygmomanometer and Dinamap, respectively. The change in systolic blood pressure was not significantly affected by this difference in methods, but diastolic blood pressure was measured somewhat lower at the second survey. Therefore, reduction in diastolic blood pressure might be overestimated and increase in diastolic blood pressure might be underestimated[170]. Nevertheless, the differences were so small that our results should not be seriously affected by these changes in methods.

Hypertension is also linked to waist circumference[192]. Therefore, our results may be underestimated because of potential confounding or effect modification effects on change in waist circumference parallel to changes in weight. This could not be ruled out. We have illustrated that not only high BMI, but also an increase in BMI independent of initial BMI, was associated with blood pressure elevation. Weight gaining women aged 20-49 years and 50+ had 80% and 50% increased risk of having blood pressure ≥140/90 mm Hg after 11 years, respectively, compared to those being weight stable. Weight gaining men aged 20-49 years and 50+ had 60% and 50% increased risk of having blood pressure ≥140/90 mm Hg after 11 years, respectively, compared to those being weight stable.

Today about 220,000-322,000 patients are taking blood pressure medication, the government is spending 1 billion NOK each year on blood pressure treatment, and the treatment volume is increasing each year (Irene Hetlevik, personal communication). The prevalence of blood pressure medication use has been rapidly

increasing during the past decades both in women and men[193]. If the obesity epidemic is still increasing in the years to come, an additional increase in the number of blood pressure patients and increase in health care consumption and increased morbidity and mortality due to the obesity is easily predicted (Figure 8).

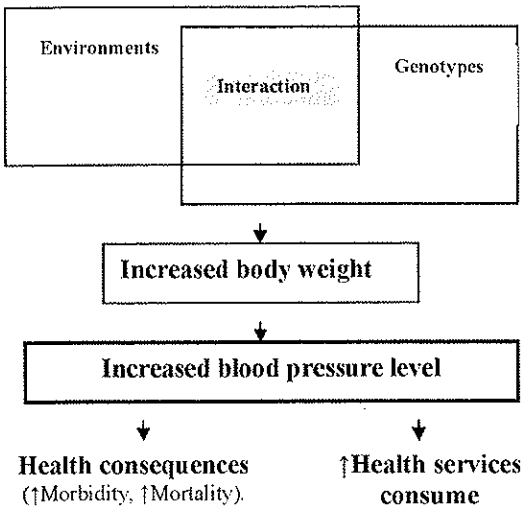

Figure 8. Increased body weight, the association between increased body weight and blood pressure level, and consequences for health and for health care services: Increased body weight gives increased blood pressure level, which in turn is resulting in increased morbidity and mortality, and increased health services consumption. Today 1 billion NOK is spent on antihypertensive drug treatment alone.

6.2.3 Change in BMI and mortality (Paper IV)

The traditional view is that weight gain is unhealthy and weight loss is healthy, especially in overweight and obese individuals. Our data showed, however, that weight loss was associated with increased mortality. The rate ratios for both total mortality, cardiovascular mortality and non-cardiovascular mortality were

consistently increased for those losing weight. In additional analyses we found no increased rate ratios of sudden death associated with weight loss (data not shown). Neither BMI nor physical activity and smoking explained or modified the results significantly. One might suspect that the findings might be explained by underlying disease. Even if we cannot exclude this possibility, the results were robust and consistent through all analyses and despite all effort to control for underlying disease. Similar results are found in other studies[125,126,168]. Therefore we conclude that our data support that losing weight is associated with increased mortality. The biological explanation behind the increased mortality at weight loss are not yet established. Results from the SOS Study demonstrated that the initial positive effects on blood pressure associated with weight loss in obese individuals had vanished after eight years[194]. In the future when even more events can be included, HUNT data should be reanalysed to study the long-term effects of these associations.

Another striking result was that the data did not show increased mortality among those gaining weight, as one might expect. Given the high number of cases and the confidence intervals, lack of statistical power can hardly explain the results. However, in our study mean follow-up period after the second survey was only five years, i.e. shorter follow-up compared to other studies[168]. Some diseases associated with weight gain might be delayed, i.e. it might take many years to erupt, like type 2 diabetes. Cardiovascular diseases might also take many years to develop, though in epidemiological studies effect on mortality is often obvious after only few years. The lack of association between weight gain and mortality in our data is therefore unexplained.

If the results from the present mortality analyses should be confirmed in other populations, one might speculate if weight gain in the 1990-ies probably was more

benign than some decades ago. May be that the total cardiovascular risk profile was lower than previously, and therefore not resulted in increased mortality. Only future populations studies with longer follow-up will answer this question.

6.3 The obesity epidemic in the future

"May be we have to handle the obesity epidemic like driving a car:
With full speed ahead there is no good idea
to reverse the direction before the car has stopped.
(Drøyvold, 2004)

Obesity has been recognised as a chronic disease only since 1985, but since then huge resources are spent to achieve better scientific knowledge. So far it seems reasonable to involve more the intellect than the instinct to maintain a healthy weight[195]. It is probably unlikely that we will ever return to an environment where body weight regulation can be handed over to the instinct. In future, each individual must probably know which diet balance the energy expenditure, or vice versa, as a prerequisite to achieve a stable body weight. A perspective of this is 'what happens to the health when we have to ignore our instincts throughout life'?

To substantially reduce the number of overweight or obese persons in the world may be a goal totally out of reach in a short-term. The public health response to overweight and obesity is largely based on the individual need to change behaviour, though this approach has generally been ineffective[106]. A more feasible public health goal might be to implement weight stability population strategies to stop the weight gaining epidemic. The experience so far is that we do not have much success in getting overweight people maintaining weight loss for a period of time. May be weight loss is not even healthy. Therefore, it is important to put emphasis on

developing methods and policies to prevent weight gain, and probably with children and adolescents as prioritized target groups.

In a public health perspective it is important to consider that during the last 50 years the prevalence has increased within a genetically stable population, suggesting the importance of obesity promoting and inhibitory characteristics of the macro-environment. As I have shown in this thesis, leisure time physical activity is probably one factor in the puzzle to prevent weight gain, but the effects were not strong, illustrating the complexity of the obesity epidemic. The 'society forces' involved in the obesity epidemic today is so strong, that even high levels of leisure time physical activity at population level do not prevent weight gain. It is documented that social factors as family, friends etc. are more important in promoting physical activity in women compared to men. To increase the physical activity level, different strategies in women and men are probably needed.

On a individually level leisure time physical activity is an important factor in energy expenditure. However, in order to identify effects of leisure time physical activity on body weight at population level in epidemiological studies may be more difficult. Of major concern is the risk of developing a vicious circle in which physical activity level decreases as a consequence of higher prevalence of overweight and obesity. There is overwhelming scientific evidence that a physically active lifestyle is one important factor for optimal health[196]. Regular physical activity[197] and reduced dietary fat intake[198] reduce weight gain in normal weight subjects and weight regain after weight loss in obese individuals. One challenge is to find what level of physical activity can balance the established environments to prevent weight gain, and to maintain a relative good health at population level. In addition, it is important to understand more about the often found increased mortality associated with weight

loss. One question is: 'Is the increased mortality associated with weight loss only a measure of the unknown and undiagnosed disease at population level present at any time, or are there biological destructive mechanisms involved when the body lose weight?'. It is important to decide if weight loss should be recommended as secondary prevention, as is common practice today, or if weight stability should be focused both in primary and secondary prevention.

6.4 Future research

Generally

Most prospective population studies up to day have not been especially designed to investigate overweight and obesity aspects. In future surveys data should be recorded according to a standard protocol including standardised measurements systems as WHO classification of body weight, and especially anthropometric values made on standardised measurements rather than self-report. Several studies have demonstrated that waist circumference at population level has increased independently of BMI in recent years[112,199]. In addition, the properties and distribution of fat and the changes in body fat amount, are important arguments for especially including measurements of body proportions, at least waist circumference, to reduce the inadequacies of BMI. Waist circumference has been found to be an independent risk factor for elevated blood pressure[97,192,200], and a measure of body proportion should probably be included in most health investigations because of both the mechanical and endocrinological properties of the body fat. The normal weight category defined by WHO is defined to be the most healthy weight category based on previous available mortality-data, but due to the global obesity epidemic the normal weight category is now less common[30].

As a consequence, a probably more precise name of the normal weight category is now the healthy weight category. In a pessimistic view, the normal weight category might only be useful as a historical documentation. As the shift of the population is skewed to higher BMI values, new categorisations should probably be constructed.

In general, the physical activity level is decreasing worldwide and the effects of being physical active or not, the interactions, should be investigated in detail in all plausible associations. The trend with decreasing physical activity level and increasing proportion of overweight and obesity, may introduce a vicious circle. As a consequence, an interesting aspect will be what happens to the variance of leisure time physical activity by time. Epidemiological science needs variation within a population to identify relative risk effects. Valid and reliable measurements of physical activity at leisure are necessary, and there is a need to describe more clearly the involvement of intensity, frequency and duration of leisure physical activity associated with outcomes as change in body weight.

The health consequences of weight loss should be further investigated in well designed studies to get closer to the enigmatic association between weight loss and mortality. The degree of intentionality of the weight loss should probably be included, even if valid measure of intentionality is difficult to achieve in epidemiologically population studies based on questionnaires. May be, to study the association between weight loss and mortality in randomised and controlled trials would theoretically be the best design to study this issue. However, because of the high prevalence of people trying to lose weight, and because of ethical considerations, it will be exceedingly difficult to perform such a study. The most practical approach to study weight loss and mortality is probably careful designed observational studies. Even if a considerable part of obesity is due to environmental factors and lifestyle, between 40

and 70% of the variation of BMI is estimated to be heritable[201]. The weight gaining epidemic is multifactorial, and is linked to several genes and environmental factors. Because of the high prevalence of obesity, but also the great variations between individuals and populations, the role of the genetics in human body weight regulation has to be focused. Population based biobanks will probably introduce new ways to study the obesity epidemic. George Bray stated in 1996 that 'genetics load the gun, but the environment pulls the trigger'[202].The scientist will be able to include biological material and genetic data in their analyses. One main question why some do not gain weight, while others do, living in almost equal environments.

Genes involved in weight gain increase the susceptibility of an individual to the development of obesity when exposed to environmental conditions that favour a positive energy balance. It is likely that mutations of genes favouring energy storage and metabolic efficiency have conferred a survival advantage to individuals when food supply was scarce and during periods of famine. The combination of an easy access to energy-dense food and a decrease in physical activity has made these genes maladaptive. Thus obesity is most likely a polygenic disease characterised by interactions between genetic and environmental factors. One hypothesis is the 'thrifty genotype hypothesis' which was put forward by James Neel in 1962 [203] where he postulated that an imbalance in energy could be traced by genotype.
The 825T allele associated with the metabolic syndrome has a high prevalence in 'old' ethnicities, e.g. bushmen and Australian aborigines as well as in black populations (80-90%)[204], and is one of several genotypes which should be studied in association with phenotypes.

The technological development will likely introduce better methods and more precision in making the disease diagnosis, which may reduce the degree of non-

differential misclassification in epidemiological studies. Consequently, stronger estimates than were found in this thesis might be the result. The technological skills and the medical expertise, and therefore the quality level of a diagnosis, is not equal for all diseases. This might be one good argument for performing 'reproduction studies' of associations considered as 'well known'. High quality end-point registers for a number of diagnoses are a prerequisite for future epidemiological studies. The quality of end-point registries is of vital importance, even in national registries like The Death Registry. There are concerns about the misclassification of the cause of death today, and in the future the problem might even increase due to the reduced capacity for post-mortem autopsies[205].

Including foetal life, childhood, and adolescents as well as adulthood is important for performing life-course analyses. Additionally, future data might answer if overweight and obesity in the future has equal impact on public health as today.

More effort should be invested in clinical and controlled intervention studies using comprehensive interventions, as physical activity and diet. One way of introducing changes in diet at population level is to influence and making regulations for the food industry. Prevention actions should be directed at population level as well as at high-risk groups.

In HUNT

In near future the most exiting research area of the HUNT Study will probably be the genetic epidemiology. By including data from the HUNT biobank, analyses of the associations between various genotypes and phenotypes will probably improve our understanding of the obesity epidemic.

The association between weight change and physical activity at leisure and different diseases (such as cancer, osteoporosis and mental health) can also be generated from the HUNT Study.

A third health survey (HUNT 3) is planned in Nord-Trøndelag, and will probably be performed during the period 2006-2008, including all inhabitants in the county aged 10-13 or older, i.e. ca. 105,000 invited individuals. Measurements of body proportion as waist and hip in the whole population and fat-mass measurements in selected groups are needed. In addition, a valid measure of physical activity is important, which can be achieved through validated questionnaires, which often is the only feasible method in population studies. Questionnaires could be combined with objective measurements in sub-samples. (Nanna Kurtze is performing a validation study of the leisure time physical activity questions used in the HUNT Study). Excellent statistics can not align a bad designed study. May be also some smaller sub-studies with streamlined design could be included in HUNT 3. Additionally, by including children, life-course studies could be conducted.

7. Conclusion

- In apparently healthy women aged 20-49 and men aged 20-69 with normal body weight, leisure time physical activity was associated with change in BMI during an 11-year period. Among women, we found that being leisure time physical active at a high level was associated with less increase in BMI compared to those being leisure time physical active at low level. Among men we found that both being physical active at leisure, and the intensity of the leisure time physical activity, were associated with less increase in BMI compared to those not being physical active (leisure time physical active at low level) and to those being physical active with low intensity, respectively.

- Change in BMI was strongly associated, independent of initial BMI, with change in both systolic and diastolic blood pressure in apparently healthy women and men. The odds ratio of having hypertension at the second survey was positively associated with increased BMI. Additinally, changing BMI category (World Health Organisation's categorisation) from the first to the second survey had a strong effect on systolic and diastolic blood pressure, independently of initial and attained BMI category.

- Weight loss was associated with increased mortality both in apparently healthy women and men. The estimated effects did not change substantially even if initial BMI, smoking status and leisure time physical activity was considered. The effect was consistent for total mortality, cardiovascular mortality and non-

cardiovascular mortality. Weight gain was not associated with increased mortality in this study.

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Paper I-IV

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Paper III

Change in body mass index and its impact on blood pressure.

A prospective population study.

The Nord-Trøndelag Health Study (HUNT), Norway.

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ABSTRACT

Background: Overweight and obesity increase the risk of elevated blood pressure, but the knowledge of the effect of weight change on blood pressure is sparse.

Objective: To investigate the association between change in body mass index (BMI) and change in diastolic blood pressure (DBP), systolic blood pressure (SBP), and hypertension status.

Design: Two population based cross-sectional studies, one in 1984-86 and the other in 1995-97.

Setting: The Nord-Trøndelag Health Study (HUNT).

Participants: We included 15971 women and 13846 men who were 20 years or older at the first survey, without blood pressure medication at both surveys and without diabetes, cardiovascular disease or dysfunction in daily life at baseline.

Measurements: Weight, height and blood pressure were measured standardised. Change in BMI was categorised as stable (initial BMI +/- 0.1 kg/m^2 each follow up year), increased or decreased, and BMI was categorised by using World Health Organisation's categorisation (underweight BMI: <18.5 kg/m^2, normal weight BMI: 18.5-24.9 kg/m^2, overweight BMI: 25.0-29.9 kg/m^2, obesity BMI≥30 kg/m^2).

Results: An increase in BMI and a decrease in BMI were significantly associated with increased and decreased SBP and DBP, respectively, compared to a stable BMI in both genders and all age groups, although the strongest effect was found among those who were 50 years and older. The adjusted odds ratio (OR) for having hypertension at HUNT 2 was 1.8 (95% CI: 1.5, 2.2) among women and 1.6 (95% CI: 1.4,1.8) among men aged 20-49 years who increased their BMI

compared to those who had stable BMI. A similar, but weaker association was found among women and men aged 50 years or more.

The mean change in both SBP and DBP was higher for those who changed BMI category from first to the second survey than for those who were in the same BMI class at both surveys.

Conclusions: Our result supports an independent effect of change in BMI on change in SBP and DBP in both women and men, and that people who increase their BMI are at increased risk for hypertension.

INTRODUCTION

The prevalence of overweight and obesity is increasing worldwide[1], and overweight and obesity are associated with elevated blood pressure[2,3]. Further, studies have shown a progressive increase in blood pressure with ageing in developed countries. This effect begins in childhood and continues into adulthood[4] and may be caused by weight gaining by age[3]. The exact mechanism whereby change in body weight causes elevated blood pressure is still unknown. Hypertension and the risk of having cardiovascular disease is strongly linked[5,6] and to investigate the effect on blood pressure when the body weight change is important in a public health perspective.

In Nord-Trøndelag County, Norway, two large health surveys were conducted in 1984-86 (HUNT 1) and 1995-97 (HUNT 2), respectively, with information on weight, height and blood pressure. This gave us the opportunity to prospectively examine the association between change in body mass index (BMI) and its impact on blood pressure during 11-year follow-up in a large population of both men and women aged 20 years or more.

METHODS

Study population

In the first health survey (HUNT 1, 1984-86) all citizens residing in the county aged 20 years and older (n=85100) were invited and 74994 participated (88.1%)[7]. In the second health survey (HUNT 2, 1995-97) 66140 adults aged 20 years or older participated (71.2%)[8]. All together 21685 men and 24837 woman participated in both surveys. Information was collected from self-reported questionnaires and a standardised clinical examination. In total, 15971 women and 13862 men without self-reported diabetes, cardiovascular disease (angina pectoris, stroke and myocardial infarction) and dysfunction in daily life in the first survey were included. In addition the participants reported no use of blood pressure medication at the first or at the second survey. Each participant's record was linked to the 11-digit personal identification number, which is unique to every citizen in Norway, enabling a linkage of data from the first and the second survey for each individual.

Standardised measurements (height, weight and blood pressure)

In both surveys, height was measured without shoes to the nearest centimetre, and weight was measured wearing light clothes without shoes to the nearest half kilogram. Similar methods were applied in both surveys and are described elsewhere[8,9]. Body mass index (BMI) was calculated as body weight in kilogram divided by the squared value of body height in meter (kg/m^2). Change in BMI between the surveys was categorised into stable, increased and decreased with stable defined as BMI at first survey +/- 0.1 kg/m^2 each follow-up year according

to Nilsson *et al*[10]. At both surveys, blood pressure was measured by specially trained nurses or technicians with the participant sitting with the arm resting on a table at heart-level. SBP and DBP were read off to the nearest 2 mm Hg. At the first survey, the blood pressure was measured twice on a sphygmomanometer after the participants had been seated for at least four minutes with the cuff placed on the right upper arm, and we used the second measurement in our analysis. At the second survey, blood pressure was measured using a Dinamap 845XT (Criticon, Tampa, FL) based on oscillometry. The Dinamap was started when the participant had been seated for two minutes with the cuff on the arm. The blood pressure was measured three times, and the mean of the second and third measurement has been used in our analyses. At the first survey the cuff-size was equal for all participants (15 cm x 55 cm), but at the second survey the cuff-size was based on the arm circumference (arm ≤24 cm: cuff 12 cm x 37 cm, arm 25-35 cm: cuff 15 cm x 50 cm, arm ≥ 36 cm: cuff 17 cm x 60 cm). Hypertension was defined as having both a systolic blood pressure ≥ 140 mm Hg and a diastolic blood pressure ≥ 90 mm Hg. We calculated change in SBP and DBP between the surveys by subtracting SBP and DBP at the second survey from SBP and DBP at the first survey for each individual.

Statistical analysis

The association between change in blood pressure and change in BMI was investigated using multivariable linear regression with change in SBP and change in DBP as the dependent variable. Additionally, the association between BMI categorisation at the first and the second survey and change in SBP and DBP was investigated by linear regression analysis. Multivariable logistic

regression was used to investigate the association between change in BMI and hypertension (BP≥140/90) at the second survey. All analyses included age in one-year categories, and confounding by other factors was evaluated by the magnitude of change from the age-adjusted results. These potentially confounding variables included baseline BMI (continuous), pulse (quartiles), smoking status (daily smoker, not daily smoker), education (≤ 9 years at school, 10-12 years at school, > 12 years at school), leisure time physical active (yes/no), alcohol consumption (abstainer, not drinking last 14 days, drinking last 14 days) and marital status (unmarried, married, separated/divorced and widowed).

The analyses were done separately by gender and stratified by age (50 years as cut-point). All analyses were performed using SPSS, version 11.0 (SPSS, Chicago, Ill, USA).

Ethics

The participation was completely voluntary and each participant signed a written consent. Both studies were recommended by the Norwegian Data Inspectorate. The second study was approved by the Regional Ethical Committee for Medical Research. (At the first survey the Regional Ethical Committee was not yet established).

RESULTS

Men and women who decreased BMI between the surveys had the highest age-adjusted mean BMI, systolic- and diastolic blood pressure at baseline compared to those who were stable in BMI or increased BMI, but at the second survey the situation was reversed (Table 1). In both genders the age-adjusted mean BMI was within the overweight category (BMI: 25.0-29.9 kg/m^2) in both surveys.

Women and men who increased BMI had a significantly higher increase in SBP compared to those with a stable BMI (Table 2). Participants with reduced BMI between the surveys had a significant lower increase in SBP compared to those who were stable. The greatest effect on change in SBP was observed among those who lost BMI and were 50 years or older both among women [-5.0 (95% CI: -7.0, -3.0) mmHg] and men [-6.6 (95% CI: -8.6, -4.4) mmHg] with stable BMI used as reference. Women and men who reduced BMI had a lower change in DBP compared to participants who were stable in BMI, but for women aged 20-49 years the association was marginally significant. In both genders and both age-groups, an increase in BMI was associated with significantly higher DBP compared to those who had stable BMI. The greatest effects of weight change on DBP were observed among men aged 50 years or more.

The odds ratio (OR) of having hypertension at the second survey adjusted for age at the first survey was significantly higher in participants who increased their BMI compared to those with a stable BMI (Table 3). These results were not changed after adjustment for BMI at baseline, and further adjustment for hypertension status at the first survey did not change the estimates. The OR for hypertension at the second survey was lower in men who

decreased their BMI compared to those with a stable BMI, both in the age group 20-49 years [multivariable adjusted OR=0.7 (95% CI: 0.5, 1.0)] and in the age group 50 years or older [multivariable adjusted OR=0.6 (95% CI: 0.5, 0.8)]. In women who decreased their BMI between the surveys we found non-significantly reduced OR for hypertension among the oldest [0.8 (95% CI: 0.6, 1.0), and no effect among the youngest [1.0 (95% CI: 0.7, 1.5)] after adjustment for baseline BMI and blood pressure level.

In additional analysis we found that people who advanced from one BMI category to a higher level category between the surveys had a greater change in both SBP and DBP than those who were classified within the same category at both surveys (Table 4). Compared to men who were classified as normal weight at both surveys, men who changed from normal weight to obese had a 4.9 mmHg (95% CI: 1.2, 8.6) higher increase in SBP. Women who changed BMI classification from normal weight to obese had a 7.6 mmHg (95% CI: 5.7, 9.5) higher increase in SBP than those who were normal weight at both surveys. We also found that people who reduced their BMI between the surveys had a significantly lower blood pressure than those who were normal weight at both surveys.

DISCUSSION

In this 11-year prospective population study we found a strong association between change in BMI and change in SBP and DBP both among women and men, but the effect was strongest among the oldest. Further we found that the risk for hypertension at the second survey was linked to change in BMI, but with the strongest effect in the youngest. Additinally, to change BMI category (WHO's categorisation) from the first to the second survey had a strong effect on systolic and diastolic blood pressure, which was independent of initial and attained BMI category.

The exact underlying pathophysiological mechanisms between change in BMI and blood pressure are still not clear. What is known is that weight gain stimulates sympathetic activation, and also that probably insulin and leptin are involved[11]. Also activation of the renin-angiotensin system as well as physical compression of the kidney may be important factors in linking body weight and elevated blood pressure[12].

Our data confirmed results from previous studies reporting a positive association between change in BMI and change in blood pressure[13,14]. Additionally, the relation between change in BMI and blood pressure stratified for initial and attained BMI has been previously studied in men by other investigators[15], and our results supported these results, even if different limits for categorisation of BMI was used.

In a large study, Huang *et al*[16] included 82473 US nurses and investigated the association between change in body weight and incident cases of hypertension based on self-report and recall of body weight, and found that weight gain substantially increased the risk for hypertension. In contrast to our

results, a reduced risk of hypertension associated with body weight reduction was found amomg women.

Additionally, the association between change in body weight and blood pressure has also been investigated in randomized intervention studies. In The Hypertension Optimal Treatment Study, a randomized intervention study among overweight individs, it was reported that weight loss, even after only three months follow-up, was associated with improved blood pressure[17].

One strength of the present study was the large number of both women and men participating in two health surveys, permitting a prospective design with a mean follow-up period of 11 years. Another strength was the standardised and similar methods for measuring body weight and body height at both surveys, because others have found a significant discrepancy between self-reported and objective values for weight and height[18,19]. However, as described in the method part in this article blood pressure was measured standardised, but not similar, at both surveys. Different methods, cuff-size and cuff-time may have introduced some bias to our results[20]. However, this bias is likely to be non-differential, and may thus have underestimated our results.

Another bias to our results could have been that our study population consisted of those who had survived until the second survey and accepted to participate twice. In addition, medication was an exclusion criterion, with the strongest effect in the oldest age groups[21]. Because of the prospective design, it is unlikely that these aspects have influenced considerably on the results.

We had the opportunity to adjust for the potentially confounding effect of different variables, but only baseline blood pressure and BMI had impact on the results. In contrast to the findings among men, women who

decreased in BMI did not reduce the risk of hypertension compared with women with a stable BMI. One possible explanation is the gender differences in fat distribution and adipose tissue metabolism[22,23]. Additionally, the gender differences in body proportion is also a plausible explanation for why hypertension-estimates were considerably changed by adjustment for initial BMI ecpecially for women aged 20-49 years.

Unintentional weight loss can be considered as marker for underlying disease. In our study participants who decreased their BMI improved their blood pressure, but we were not able to distinguish subjects who intended to lose weight from those who not intended.

Previous studies have shown that waist circumference displays a stronger association with cardiovascular outcomes and risk factors than does BMI[24]. However, waist circumference was not measured in the first survey, and hence, we were not able to evaluate this association.

Residual confounding due to other unmeasured factors can not be ruled out.

Elevated blood pressure is a risk factor for morbidity and mortality, and odds ratios of 1.9 and 3.7 for coronary heart disease related to elevated blood pressure have been found in non-diabetic and diabetics men, respectively[25]. Additionally, previous studies have found a reduced incidence of stroke (42%) and myocardial infarction (14%) by lowering diastolic blood pressure with 5 mm Hg[26]. In a study by Levy *et al*[27] hypertension was found to carry the greatest attributable risk at population level for developing congestive heart failure (39% in men and 59% in women). This illustrates the potential for

prevention of morbidity by stabiliting BMI, but also the consequence of not intervening against the obesity epidemic.

In conclusion, our results support a causal association between change in blood pressure and change in BMI in both genders independent of initial and attained BMI. By this, stabilisation or reduction of BMI may serve to prevent or reduce future increase in blood pressure and to reduce the prevalence of hypertension.

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Table 1. Age-adjusted mean body mass index (BMI), systolic blood pressure (SBP) and diastolic blood pressure (DBP) at first and second survey stratified for categories of change in BMI (decreased, stable, increased) during the follow-up with 95% confidence interval (2Standard Errors (SE)) in parentheses.

Gender	Variables	BMI change categorisation			Total
		Decreased (2SE)	Stable (2SE)*	Increased (2SE)	
Women	N	985	3928	11058	15971
	Mean age (y)	50.2 (1.1)	44.2 (0.38)	38.4 (0.26)	40.9 (0.22)
	BMI first survey (kg/m^2)	26.6 (0.28)	24.2 (0.22)	24.3 (0.22)	25.0 (0.22)
	BMI second survey (kg/m^2)	24.0 (0.34)	24.3 (0.26)	27.4 (0.24)	25.2 (0.24)
	SBP first survey (mmHg)	134.3 (1.2)	131.7 (1.0)	131.5 (1.0)	132.5 (0.9)
	SBP second survey (mmHg)	142.0 (1.6)	142.5 (1.2)	146.1 (1.2)	143.5 (1.2)
	DBP first survey (mmHg)	81.3 (0.8)	80.0 (0.6)	80.3 (0.6)	80.5 (0.6)
	DBP second survey (mmHg)	79.6 (1.0)	79.8 (0.8)	82.0 (0.8)	80.5 (0.8)
Men	N	680	4693	8473	13846
	Mean age (y)	47.7 (1.06)	43.4 (0.46)	39.4 (0.22)	40.9 (0.20)
	BMI first survey (kg/m^2)	26.4 (0.26)	24.8 (0.18)	24.9 (0.18)	25.4 (0.18)

BMI second survey (kg/m^2)	24.4 (0.28)	27.5 (0.2)	27.5 (0.2)	25.7 (0.2)
SBP first survey (mmHg)	139.3 (1.4)	136.0 (1.0)	135.3 (0.9)	136.8 (0.9)
SBP second survey (mmHg)	142.1 (1.6)	143.4 (1.2)	146.5 (1.1)	144.0 (1.2)
DBP first survey (mmHg)	85.1 (0.9)	82.9 (0.6)	82.8 (0.6)	83.6 (0.6)
DBP second survey (mmHg)	81.0 (1.0)	82.1 (0.7)	84.9 (0.6)	82.7 (0.6)

*Stable defined as initial BMI ± 0.1 kg/m^2 each follow-up time.

Table 2. The association between change in systolic and diastolic blood pressure and change in body mass index (BMI) between the first (HUNT 1, 1984-86) and second survey (HUNT 2, 1995-97) in age and multivariable linear regression. Totally, 15971 women and 13846 men were included. 95% confidence interval (CI) in parentheses.

Gender	Age	BMI change *	n	Change in systolic blood pressure			Change in diastolic blood pressure		
	HUNT 1	HUNT 2 – HUNT 1		HUNT 2 – HUNT 1			HUNT 2 – HUNT 1		
				Age-adj	Multi adj†	p-value	Age-adj	Multi adj†	p-value
Women	20-49	Stable	2596	Reference	Reference	-	Reference	Reference	-
		Decreased	506	-1.4	-2.2 (-3.6, -0.8)	0.001	-1.2	-1.0 (-1.9,0.0)	0.058
		Increased	8870	3.8	3.8 (3.2, 4.4)	<0.001	1.9	1.9 (1.4, 2.3)	<0.001
	50+	Stable	1332	Reference	Reference	-	Reference	Reference	-
		Decreased	479	-5.0	-5.0 (-7.0,-3.0)	<0.001	-1.9	-1.7 (-3.0, -0.4)	0.012
		Increased	2188	3.9	3.9 (2.6,5.3)	<0.001	2.2	2.2 (1.4, 3.1)	<0.001
Men	20-49	Stable	3084	Reference	Reference	-	Reference	Reference	-
		Decreased	319	-2.5	-2.6 (-4.2,-1.0)	0.002	-3.0	-2.6(-3.7,-1.4)	<0.001
		Increased	7004	4.2	4.2 (3.6, 4.7)	<0.001	2.9	2.9 (2.5, 3.3)	<0.001
	50+	Stable	1609	Reference	Reference	-	Reference	Reference	-

	Decreased	361	-6.6	-6.6 (-8.6,-4.4)	<0.001	-3.8	-3.5 (-4.8,-2.1)	<0.001
	Increased	1469	3.0	3.0 (1.7, 4.4)	<0.001	2.8	2.9 (2.1, 3.7)	<0.001

* Stable defined as initial BMI ± 0.1 kg/m^2 each follow-up year.
† Adjusted for age at first survey and BMI at second survey.

Table 3. Adjusted odds ratio (OR) for having hypertension (defined as blood pressure ≥140/90 mm Hg) at the second survey (HUNT 2) and 95% confidence interval (CI) stratified by gender, age (years) at first survey and change in body mass index (BMI). The Nord-Trøndelag Health Study (HUNT).

	Age		Hypertension (HUNT 2)	
		Change BMI *	Age adj. OR (95% CI)	Multi adj. OR† (95% CI)
Women	20-49	Decreased	1.6 (1.2, 2.2)	1.0 (0.7, 1.5)
		Stable	1.0	1.0
		Increased	1.7 (1.4, 2.0)	1.8 (1.5, 2.2)
	50+	Decreased	0.9 (0.7, 1.2)	0.8 (0.6, 1.0)
		Stable	1.0	1.0
		Increased	1.4 (1.2, 1.7)	1.5 (1.2, 1.7)
Men	20-49	Decreased	1.1 (0.8, 1.5)	0.7 (0.5, 1.0)
		Stable	1.0	1.0
		Increased	1.5 (1.4, 1.7)	1.6 (1.4, 1.8)
	50+	Decreased	0.8 (0.6, 1.0)	0.6 (0.5, 0.8)
		Stable	1.0	1.0
		Increased	1.4 (1.2, 1.6)	1.5 (1.3, 1.7)

* Stable defined as ± 0.1 kg/m^2 each follow-up year.

† OR adjusted for: Age and BMI at first survey (HUNT 1) and blood pressure status HUNT 1.

Table 4. Age-adjusted change in mean systolic and diastolic blood pressure (SBP and DBP) with normal weight at both surveys as reference group and 95% confidence interval (CI) stratified by women and men and by WHO[†] categories of body mass index (BMI) at first and second survey

		Change in SBP (95% CI), mmHg				Change in DBP (95% CI), mmHg			
	BMI at first survey	BMI at second survey				BMI at second survey			
		Underweight	Normal weight	Overweight	Obese	Underweight	Normal weight	Overweight	Obese
Women									
	Underweight	1.7 (-2.0, 5.3)	2.0 (0.0, 4.0)	11.9 (4.2, 19.6)	NC*	0.7 (-1.7, 3.2)	1.0 (-0.3, 2.4)	8.2 (3.0, 13.5)	NC*
	Normal weight	-5.0 (-9.7, -0.3)	Reference	3.7 83.0, 4.39	7.6 (5.7, 9.5)	-2.4 (-5.5, 0.8)	Reference	1.8 (1.4, 2.2)	5.3 (4.0, 6.7)
	Overweight	NC*	-2.3 (-4.3, -0.3)	2.0 (1.2, 2.8)	6.8 (5.9, 7.8)	NC*	-1.3 (-2.6, 0.04)	0.3 (-0.2, 0.9)	2.7 (2.0, 3.3)
	Obese	NC*	-12.0 (-21.3, -2.7)	-4.8 (-8.0, -1.6)	2.5 (1.4, 3.6)	NC*	-7.8 (-14.1, -1.4)	-5.1 (-7.2, -2.9)	-1.3 (-2.0, -0.5)
Men									
	Underweight	0.7 (-7.3, 8.6)	0.3 (-4.9, 5.6)	NC*	NC*	-4.1 (-9.6, 1.5)	1.4 (-2.2, 5.0)	NC*	NC*
	Normal weight	-9.4 (-16.3, -2.5)	Reference	2.7 (2.0, 3.4)	4.9 (1.2, 8.6)	-3.5 (-8.3, 1.2)	Reference	2.1 (1.6, 2.6)	5.7 (3.1, 8.2)
	Overweight	NC*	-3.5 (-5.5, -1.5)	1.6 (0.9, 2.2)	3.9 (2.9, 4.9)	NC*	-2.5 (-3.9, -1.2)	0.4 (-0.03, 0.9)	1.9 (1.3, 2.6)
	Obese	NC*	NC*	-3.7 (-7.1, -0.2)	1.5 (0.0, 3.0)	NC*	NC	-4.9 (-7.2, -2.5)	-2.4 (-3.3, -1.4)

[†] World Health Organisation's categorisation of BMI (underweight: BMI <18.5 kg/m^2, normal weight: BMI 18.5-24.9 kg/m^2, overweight: BMI 25.0-29.9 kg/m^2, obese: BMI ≥ 30 kg/m^2) of BMI

* NC = not calculated due to N≤10

Paper IV

Weight change and mortality

The Nord-Trøndelag Health Study

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Abstract

Background: The prevalence of obesity is increasing worldwide, and overweight and obese people have increased mortality compared to normal weight people. We have prospectively investigated the effect of weight change on mortality.

Methods: We utilized data from two large population-based health studies in Nord-Trøndelag, Norway, the first conducted in 1984-86 and the second in 1995-97. A total of 20 542 men and 23 712 women aged 20 years or more were followed-up on all-cause mortality for five years after the second survey. Cox proportional hazards models were used to calculate mortality rate ratios (RRs) with 95% confidence intervals (CIs) between people with a stable weight and people who lost or gained weight.

Results: We found no association between weight gain and mortality, but people who lost weight had a higher total mortality rate compared to those who were weight stable (RR was 1.6 (95% CI: 1.4, 1.8) in men and 1.7 (95% CI: 1.5, 2.0) in women). Similar associations were also found for cardiovascular and non-cardiovascular mortality. Additional analysis showed a linear increase in mortality rates across categories of weight loss for both men and women (P_{trend} <0.001). Moreover, there was a statistically significant interaction between weight change and initial BMI, but only among men ($P_{interaction}$ = 0.001).

Conclusions: Weight loss, but not weight gain, was associated with increased mortality both among men and women. Although underlying undiagnosed disease is the most plausible explanation for this finding, the similar associations found for total mortality, cardiovascular mortality, and non-cardiovascular mortality makes the causal pathway somewhat enigmatic.

Keywords: weight change, physical activity, smoking, body mass index

Introduction

A body mass index (BMI) outside the normal weight range (18.5-24.9 kg/m^2) is associated with increased mortality[1,2], and the nadir of the mortality curve has been found at a BMI of 22-24 kg/m^2[3,4]. Obesity has had disease status since 1985[2]. Additionally, a number of diseases can be linked to overweight and obesity, and each disease can in main be classified into two pathophysiological categories[5]. The first arises from the increased mass of fat which may include the stigma of obesity and the behavioural responses it produces, and musculoskeletal disorders[6,7]. The second category comprises metabolic changes associated with excess fat, and examples of these includes diabetes type 2[8], gallbladder disease[9], hypertension[10], cardiovascular disease[11], and some forms of cancer[12].

The prevalence of overweight and obesity is rapidly increasing[2,13], and consequently a large proportion of people are trying to lose weight. Weight loss is associated with short-time improvements in risk factors such as blood pressure[14], cholesterol[15] and diabetes[16,17]. Controversially, weight loss has also been associated with increased mortality in observational studies[18-24], but the results are not consistent[1,25,26]. Additionally, the knowledge about the association between change in BMI and subsequent mortality is mainly based on studies on men[19,27,28].

We have utilized information on height, weight and cause specific mortality data in a large population of Norwegian men and women who participated in the Nord-Trøndelag Health Study both in 1984-86 and in 1995-97, to investigate the association between weight change and mortality.

We wanted especially to study the potential effect modification of initial BMI, leisure time physical activity and smoking status on the association between weight change and mortality.

Materials and methods

Study population

In 1984-86 and 1995-97, two general health surveys were conducted in Nord-Trøndelag County (127 000 inhabitants), the Nord-Trøndelag Health Study, Norway. The participation rates were 88.1% and 71.2%, respectively. Data collection was based on self-reported questionnaires and standardised measurements of physiological variables such as height and weight. In total 24 837 women and 21 685 men participated in both surveys. We excluded participants who reported pre-existing diabetes or cardiovascular disease at baseline or who had a history of cancer at the second survey. A total of 23712 women and 20542 men aged 20 years or more at the first survey and with information on body weight and body height at both surveys were available for analyses.

Follow-up

The unique 11-digit identification number of every Norwegian citizen enabled linkage between the collected information and the Death Registry at Statistics Norway to determine vital status (alive, emigrated, dead) and cause-specific deaths. Each participant contributed person-years from the date of the second survey until the date of death, emigration, or end of follow-up (December 31th, 2001). Mean time between the surveys was 11 years (range 9-13 years), and mean follow-up after the second survey was 5 years (range 0-6 years). Cardiovascular mortality was classified using the 9th revision of the International Classification of Diseases (cardiovascular

diagnosis codes 390-459) before 1997, and the 10th revision (codes I00-I99) thereafter.

Body mass index

Body mass index was calculated as body weight in kilograms divided by the squared value of body height in meters (kg/m^2). In both surveys height was measured without shoes to the nearest centimetre and weight was measured wearing light clothes without shoes to the nearest half-kilogram at the survey site. Change in BMI between the surveys was categorised into loss, stable, gain. A stable BMI was defined as a change in BMI equal to or less than 0.1 kg/m^2 per follow-up year[29]. We categorised BMI at the first survey applying the World Health Organisation's (WHO) recommendation (underweight: <18.5 kg/m^2, normal weight 18.5-24.9 kg/m^2, overweight 25.0-29.9 kg/m^2, and obesity ≥30 kg/m^2).

Leisure time physical activity

At the first survey, leisure time physical activity was self-reported by three questions about frequency, duration and intensity, each with five, four and three possible answers, respectively. Only those who reported a frequency of once a week or more answered the questions about intensity and duration. We categorised leisure time physical activity into low, moderate and high levels based on the questions about frequency, intensity and duration: A frequency of never or less than once a week was categorized as low. For those with a frequency of once a week or more, a summary was calculated by adding the values of frequency, intensity and duration. The sum value was then divided into moderate and high by dichotomizing at the median value.

Smoking status

We classified smoking status at the first survey in three categories, where never were individuals who had never smoked daily, and those who reported previous or present daily smoking were classified as former or current smokers, respectively.

Statistical Analyses

Cox regression analysis was used to calculate age-adjusted and multivariable adjusted mortality rate ratios (RRs) with 95% confidence intervals (CIs) associated with change in BMI (loss, stable, gain), using the weight stable group as reference. The analyses were performed separately for males and females, and in strata of initial BMI (WHO categorisation), leisure time physical activity levels and smoking status (never, former, current). Due to few cases, adjusted RR estimates were not calculated for men and women in the underweight group. We conducted multivariable analyses to assess potential confounding by the following variables measured at the first survey: age (<40, 40-44, …, ≥80 years), body mass index (<18.5, 18.5-24.9, 25.0-29.9, ≥30 kg/m^2), systolic blood pressure (quintiles), blood pressure medication (no, yes), smoking (never, former, current), alcohol drinking past two weeks (none, 1-4 times, ≥5 times, teetotaller), leisure time physical activity (low, moderate, high), marital status (married, unmarried, widow/widower, divorced/separated), education (middle school, high school, <4 years of college/university, ≥4 years of college/university). All analyses were performed using the statistical software SPSS for Windows, version 11.0 (SPSS, Chicago, ILL, USA).

Ethics

The participation was completely voluntary and each participant signed a written consent. The Norwegian Data Inspectorate recommended both surveys, and the second survey was also approved by the Regional Ethical Committee for Medical Research. At the time of the first survey, the Regional Ethical Committee was not yet established.

Results

During five years of follow-up (mean = 5.4 years) we observed 2672 deaths altogether, 1551 among men and 1119 among women (Table 1). Out of these, 709 men and 475 women died from cardiovascular causes. Among men who lost weight we found that 24.2% died during follow-up, while 8.8% of men who were weight stable and 5.0% who gained weight died. Similar figures for women were 16.6%, 5.9% and 2.8%, respectively. However, only 6.5% of men and 8.3% of women had lost weight between the surveys, while as much as 58.9% of men and 66.0% of women had gained weight. Persons who lost weight had on average a higher BMI at the first survey than those who were weight stable or gained weight. The mean weight loss was 2.2 kg/m^2 in men and 2.7 kg/m^2 in women, while mean weight gain was 2.7 kg/m^2 and 3.4 kg/m^2 for men and women, respectively. (Table 1 here).

In analyses of weight change and mortality (Table 2) we found that people who lost weight had a higher total mortality rate compared to those who were weight stable (multivariable RR was 1.6, 95% CI: 1.4, 1.8 in men and 1.7, 95% CI: 1.5, 2.0 in women). Similar associations were also found in analyses of cardiovascular and non-cardiovascular mortality. People who gained weight between the studies had the same mortality rate as those who were weight stable (total mortality RR = 1.0, 95% CI: 0.9, 1.1 in men and 0.9, 95% CI: 0.8, 1.0 in women). (Table 2 here). Additional analysis showed a statistically significant linear increase in mortality rates across categories of weight loss for both men and women (P_{trend} <0.001), but no linear relation across categories of weight gain (P_{trend} = 0.26 among men and 0.11 among women) (Figure 1). (Figure 1 here).

In subsequent analyses on total mortality we found a statistically significant interaction between weight change and initial BMI among men ($P_{interaction}$ = 0.001),

but not among women ($P_{interaction}$ = 0.31) (Table 3). Among men who had a normal weight (BMI: 18.5-24-9 kg/m^2) at the first survey the total mortality RR where 2.0 (95% CI: 1.6, 2.4) for those who lost weight compared to those who were weight stable. Among overweight or obese men, the RRs comparing weight loss and weight stable were 1.4 (95% CI: 1.2, 1.8) and 1.5 (95% CI: 1.0, 2.3), respectively. Although no statistically significant interaction was found for women, we observed that overweight women who lost weight had a higher RR than normal weight women who lost weight (2.0, 95% CI: 1.6, 2.6 vs. 1.5, 95% CI: 1.1, 1.9). We found no statistically significant interaction with physical activity or smoking status, although the results may indicate some effect modification by smoking status. Current smoking men who lost weight had an RR of 2.1 compared to weight stable men, while the same association among former smoking men was 1.2. However, among women the findings were somewhat opposite those for men, since the strongest association was found among former smokers (RR = 2.5 comparing loss and stable) and the weakest among never and current smokers (RR = 1.6 in both groups). (Table 3 here).

In supplementary analyses we explored potential confounding by disease status reported at the second survey for events that could have occurred between the two surveys, such as myocardial infarction, stroke, diabetes, angina, chronic obstructive lung syndrome, and asthma, but none of these factors influenced the estimated association between weight change and mortality (data not shown). In an attempt to evaluate the role of pre-diagnosed disease as a plausible cause for our findings we excluded the first three years of follow-up, but the results remained similar (total mortality RR comparing weight loss and weight stable was 1.5 (95% CI: 1.3, 1.8) among men and 1.7 (95% CI: 1.4, 2.1) among women).

Discussion

In this prospective study we found a statistically significant higher mortality rate among people who had lost weight compared to people with a stable weight, both in analysis of total mortality, CV mortality and non-CV mortality. Also previous studies have reported that people who have lost weight have higher rates of both total mortality and cause specific mortality than those who are weight stable[20-24,30], although some studies have not found this association[1,25,26]. Additionally, we observed a linearly increasing mortality rate ratio with increasing weight loss, which is somewhat contradictory to the findings by Williamson *et al*[31], who reported a J-shaped association with increasing weight loss. However, they studied the effect of self- reported intentional weight loss, while we did not have the ability to distinguish between intentional and unintentional loss. It has been argued that this distinction is necessary[32,33], since those who intend to lose weight are doing so for health promotion and disease prevention rather than treatment of weight-related health conditions. The validity about the knowledge of intentional vs. non-intentional weight loss in observational studies has been questionned[34], and in a general population a large proportion will state that they try to lose weight at any time[35,36], but the effort put into it will probably be extremely variable. In addition, others have suggested that both intentional and unintentional weight loss may follow the development of disease[37].

In agreement with previous studies[11], we found that weight loss was associated with increased mortality in all categories of initial body mass index. However, the highest mortality rates associated with weight loss was seen among normal weight men and overweight women, indicating some effect modification by initial body mass index.

The higher mortality rate among normal weight men may indicate that weight loss is more hazardous if the initial body mass is low, although a similar reasoning is not as obvious for women. Previous data has suggested that weight change is associated with a more unfavourable relative change in fat-free mass in men than women, suggesting that the metabolic and health consequences of weight change may be dependent on gender[38]. Due to the low number of people who initially were underweight and then lost weight, we have not presented results for this strata.

Smoking status is likely to be an important factor when studying weight loss and mortality, since it is associated both with lower body weight and increased morbidity[39] and mortality[40]. However, only few prospective studies have investigated the potential effect modification of smoking on the association between weight loss and mortality[11,41]. In our study weight loss was associated with increased mortality both in never, former and current smoking men and women, although the strongest association was found among current smoking men and former smoking women. Current smoking men may both lose more weight and have a higher mortality rate than never and former smoking men, and our results confirm findings by others[11]. The increased mortality among former smoking women who lost weight could be a result of 'confounding by indication'; i.e. some women may have received information on high blood pressure and/or high cholesterol levels and thus ceased smoking, but still remained at a higher risk for dying.

Weight loss was also associated with increased mortality within all levels of leisure time physical activity, and none of the associations were markedly different between the activity strata. Hence, effect modification by innitial physcial activity level are not likely to be present. To our knowledge, this has not been explored in any other studies.

Previous studies have found that weight gain is associated with increased mortality[11,42], but contradictory to these studies we found that people who gained weight between the studies had similar mortality rates as those who were weight stable. One might speculate that weight gain among generally healthy people is not linked to increased mortality. Moreover a relatively short follow-up time in this study may have contributed to this finding, since the effect of weight gain on mortality is likely a relatively slow process? It is likely that future analyses based on HUNT-data with longer follow-up time included may answer this question.

Previous studies have shown that pre-existing disease is associated with both weight loss and mortality[24,43,44]. In our study we have excluded participants who reported diabetes or cardiovascular disease at the first study, and also those who reported a history of cancer at the second survey. Additionally, adjustment for diabetes, cardiovascular disease, Chronic Obstructive Pulmonary Disease (COBD) and asthma at the second survey did not reduce the increased mortality rate associated with weight loss. In an attempt to assess the potential importance of undiagnosed disease at baseline, we excluded the first three years of follow-up, but the results still remained similar as in the overall analysis. This method has also been applied in other studies[45,46], but the validity of this method is not entirely agreed upon. In a meta-analysis, Allison *et al*[47] supported not to exclude early deaths in BMI-mortality studies.

The strengths of our study includes the high numbers of participants both in women and men, the wide age-range, information on a large number of potential confounders, the standardised measurements of height and weight, and the linkage of the data to the national Registry of Death at Statistics Norway ensuring complete follow-up on vital status. The potential bias due to misclassification in the death

certificates is unlikely to be related to different levels of change in body weight and thus to explain the results. Additionally, the prospective design of the study makes it unlikely that the results may be biased due to selection of participants or differential misclassification of information.

Although undiagnosed disease is probably the most plausible explanation for the observed increase in mortality among people who lost weight, one may speculate in other explanations for the finding. One possible mechanism may be that a reduction in weight initiates a stress response in the body, and it has been shown that more biological mechanisms are involved in prevention of weight loss than of weight gain[48].

In conclusion, this study has shown that weight loss, but not weight gain, is associated with increased mortality rates in apparently healthy men and women, compared to people with a stable weight. This finding was similar in analysis of both total mortality, CV mortality, and non-CV mortality. Stratified analysis indicates that this effect may be modified by initial body mass index and smoking status. The most plausible explanation for this finding is the existence of undiagnosed disease, although the consistent results between different causes of death may suggest a role for other potential mechanisms.

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Table 1. Characteristics of 20 542 men and 23 712 women aged 20 years or more who participated in the Nord-Trøndelag Health Study, Norway in 1984-86 and in 1995-97, stratified by gender and 11-year change in body mass index (BMI) in three categories[a] (loss, stable, gain)

Variables	Men			Women		
	Loss	Stable	Gain	Loss	Stable	Gain
No. of participants (% within gender)	1319 (6.4)	7121 (34.7)	12 102 (58.9)	1971 (8.3)	6092 (25.7)	15 649 (66.0)
No. of all deaths (% within weight category)	319 (24.2)	627 (8.8)	607 (5.0)	327 (16.6)	357 (5.9)	435 (2.8)
Mean follow-up time, yrs (SD)	4.9 (1.4)	5.3 (1.0)	5.4 (0.8)	5.2 (1.2)	5.4 (0.8)	5.4 (0.7)
Mean age at death from all causes, yrs (SD)	68.2 (9.1)	65.4 (10.5)	62.8 (11.1)	70.5 (8.9)	67.7 (10.1)	62.5 (12.1)
Mean age at first survey, yrs (SD)	54.3 (13.8)	47.2 (13.5)	41.0 (12.8)	54.0 (15.8)	47.8 (14.8)	42.4 (12.9)
Mean BMI at first survey, kg/m^2 (SD)	26.9 (3.6)	25.1 (2.9)	25.0 (2.9)	27.7 (5.2)	24.6 (4.1)	24.2 (3.8)
Mean BMI at second survey, kg/m^2 (SD)	24.8 (3.4)	25.4 (2.9)	27.7 (3.3)	25.0 (4.6)	24.9 (4.0)	27.6 (4.4)
Mean change in BMI, kg/m^2 (SD)	-2.2 (1.1)	0.2 (0.6)	2.7 (1.4)	-2.7 (1.9)	0.2 (0.6)	3.4 (1.9)

[a] Stable defined as a change in body mass index ≤ 0.1 kg/m^2 per year; a negative or positive change beyond this were classified as loss or gain, respectively

Table 2. Multivariable-adjusted rate ratios and 95% confidence intervals (CIs) of total mortality, cardiovascular (CV) mortality, and non-CV mortality associated with 10-year change in body mass index (BMI) in three categories[a] (loss, stable, gain) and stratified by gender: five year follow-up of 44 254 healthy[b] Norwegian men and women who participated in the Nord-Trøndelag Health Study in 1984-86 and 1995-97

		Total mortality			CV mortality			Non-CV mortality		
Change in BMI[a]	Person-years	No. of deaths	Age-adj. RR	Multivariable[c] RR (95% CI)	No. of deaths	Age-adj. RR	Multivariable[c] RR (95% CI)	No. of deaths	Age-adj. RR	Multivariable[c] RR (95% CI)
Males										
Loss	6521	319	1.7	1.6 (1.4-1.8)	150	1.7	1.5 (1.2-1.9)	169	1.8	1.6 (1.4-1.9)
Stable	37 617	627	1.0	1.0	285	1.0	1.0	342	1.0	1.0
Gain	65 124	607	1.0	1.0 (0.9-1.1)	274	1.0	1.0 (0.9-1.2)	333	0.9	1.0 (0.8-1.1)
Females										
Loss	10 214	327	1.8	1.7 (1.5-2.0)	150	1.8	1.7 (1.3-2.1)	177	1.7	1.7 (1.4-2.0)
Stable	32 683	357	1.0	1.0	147	1.0	1.0	210	1.0	1.0
Gain	84 931	435	0.8	0.9 (0.8-1.0)	178	1.0	1.0 (0.8-1.3)	257	0.8	0.8 (0.7-1.0)

[a] Stable defined as a change in BMI ≤0.1 kg/m^2 per year; a negative or positive change beyond this were classified as loss or gain, respectively

[b] Subjects without diabetes and cardiovascular disease at the first survey, and without a history of cancer at the second survey

[c] Adjusted for the following variables measured at the first survey: age (<40, 40-44, …, ≥80 years), body mass index (<18.5, 18.5-24.9, 25.0-29.9, ≥30 kg/m^2), systolic blood pressure (quintiles), blood pressure medication (no, yes), smoking (never, former, current), alcohol drinking past two weeks (none, 1-4 times, ≥5 times, teetotaller), leisure time physical activity (low, moderate, high), marital status (married, unmarried, widow/widower, divorced/separated), education (middle school, high school, <4 years of college/university, ≥4 years of college/university)

Table 3. Multivariable-adjusted rate ratios (RRs) with 95% confidence intervals (CIs) of total mortality associated with 11-year change in body mass index (BMI) in three categories[a] (loss, stable, gain) among men and women; analyses are stratified by either BMI, physical activity, or smoking status at the first survey

	Men			Women		
	Multivariable[b] RR (95% CI)			Multivariable[b] RR (95% CI)		
Stratifying variable	Loss	Stable	Gain	Loss	Stable	Gain
Initial body mass index[c]						
Normal weight	2.0 (1.6-2.4)	1.0	0.9 (0.8-1.1)	1.5 (1.1-1.9)	1.0	0.8 (0.6-1.0)
Overweight	1.4 (1.2-1.8)	1.0	1.0 (0.9-1.2)	2.0 (1.6-2.6)	1.0	1.0 (0.8-1.2)
Obesity	1.5 (1.0-2.3)	1.0	1.1 (0.8-1.6)	1.8 (1.3-2.6)	1.0	1.1 (0.8-1.6)
		$P_{interaction} = 0.001$			$P_{interaction} = 0.08$	
Physical activity level						
Low	1.7 (1.3-2.1)	1.0	1.0 (0.8-1.2)	1.7 (1.3-2.3)	1.0	0.9 (0.7-1.1)
Moderate	1.3 (1.0-1.7)	1.0	0.9 (0.7-1.1)	1.8 (1.4-2.4)	1.0	0.9 (0.7-1.1)
High	1.7 (1.2-2.3)	1.0	1.2 (0.9-1.5)	1.5 (0.9-2.4)	1.0	0.8 (0.5-1.2)
		$P_{interaction} = 0.31$			$P_{interaction} = 0.95$	
Smoking status						
Never	1.4 (1.0-1.9)	1.0	0.9 (0.7-1.2)	1.6 (1.3-2.0)	1.0	0.9 (0.7-1.1)
Former	1.2 (0.9-1.6)	1.0	1.0 (0.8-1.2)	2.5 (1.4-4.5)	1.0	1.1 (0.7-1.8)
Current	2.1 (1.6-2.7)	1.0	0.9 (0.7-1.2)	1.6 (1.1-2.4)	1.0	1.0 (0.7-1.4)
		$P_{interaction} = 0.14$			$P_{interaction} = 0.46$	

[a] Stable defined as a change in BMI ≤0.1 kg/m^2 per year; a negative or positive change beyond this were classified as loss or gain, respectively

[b] Adjusted for the following variables measured at the first survey: age (<40, 40-44, …, ≥80 years), body mass index (<18.5, 18.5-24.9, 25.0-29.9, ≥30 kg/m^2), systolic blood pressure (quintiles), blood pressure medication (no, yes), smoking (never, former, current), alcohol drinking past two weeks (none, 1-4 times, ≥5 times, teetotaller), leisure time physical activity (inactive, active), marital status (married, unmarried, widow/widower, divorced/separated), education (middle school, high school, <4 years of college/university, ≥4 years of college/university)

[c] Normal weight (18.5-24.9 kg/m^2), overweight (25.0-29.9 kg/m^2), and obesity (≥ 30 kg/m^2); underweight (<18.5 kg/m^2) excluded due to small numbers

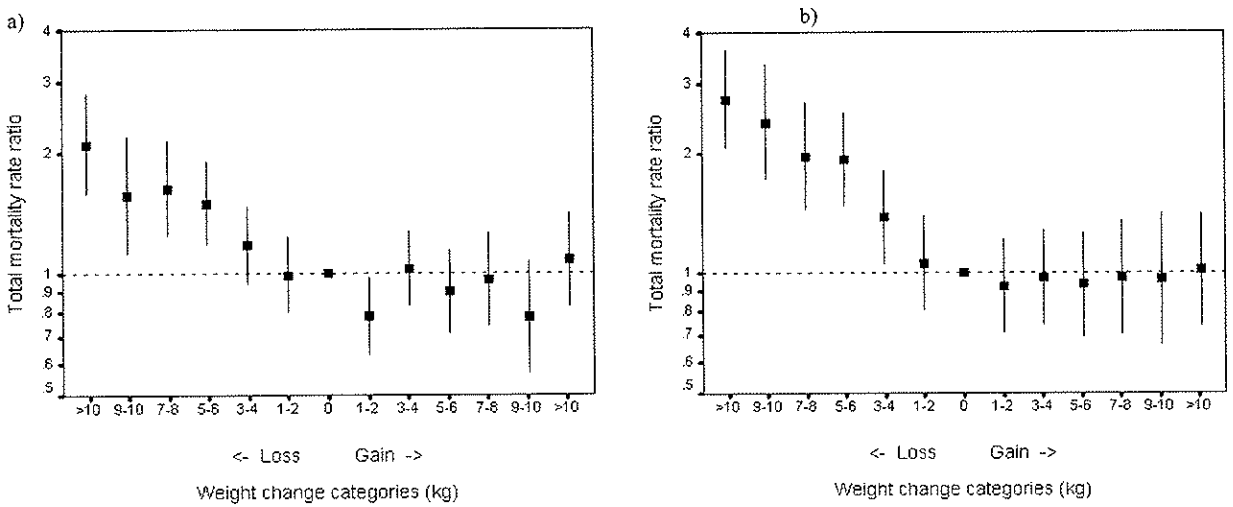


Figure 1. Total mortality rate ratios among men a) and women b) associated with categories of weight loss and weight gain when treated as an indicator variable in a Cox proportional hazards model; rate ratios are represented by ■, with a 95% confidence interval (|)

Appendix

Appendix 1

Questionnaires used in HUNT 1

A 1.1 Questionnaire 1

A 1.2Questionnaire 2 (English translation found in[167])

A 1.3 Questionnaire 3

Appendix 2

Questionnaires used in HUNT 2

A 2.1 Questionnaire 1

A 2.2 Questionnaire 2

A 2.3 Questionnaire 3

Appendix 1

Questionnaires used in HUNT 1

A 1.1 Questionnaire 1

A 1.2Questionnaire 2 (English translation found in[167])

A 1.3 Questionnaire 3

MELDING OM SKJERMBILDEFOTOGRAFERING OG UNDERSØKELSE AV BLODTRYKK OG BLODSUKKER

Skjermbildefotograferingen kommer nå til ditt distrikt. Denne gangen inngår fotograferingen i en større helseundersøkelse, og vi viser til orienteringen som er gitt i den vedlagte brosjyre.

Tid og sted for frammøte vil du finne nedenfor.

Vennligst fyll ut spørreskjemaet på baksiden og ta det med til undersøkelsen. Ta også med skjermbildebevis, tuberkulinkort eller helsebok om du har.

Det er viktig at du møter fram selv om du nylig har fått kontrollert blodtrykk eller blodsukker, og selv om du er under behandling for høyt blodtrykk eller for sukkersyke.

Med vennlig hilsen

Statens skjermbildefotografering

Postboks 8155 Dep, Oslo 1

Fylkeslegen • Helserådet • Statens Institutt For Folkehelse

Født dato | Personr. | Kommune | Kretsnr.

Møtested | Kjønn | Første bokstav etternavn | Dag og dato | Klokkeslett

H. 14 | V. 18 | SBT_1 21 | DBT_1 24 | PULS 27 | SBT_2 30 | DBT_2 33 | SYKEPL 35

TID 36 | GLUC 39 | GLUC 42 | GLUC 45 | HG 46 | RT 47 | P 48 | Ø.M. 49

A. Hvordan er helsa di for tida?
(Sett kryss i bare *en* rute.)

Dårlig	50	1
Ikke helt god		2
God		3
Svært god		4

B. Har du i løpet av de siste 12 måneder vært hos?

		JA	NEI
Almenpraktiserende lege (distriktslege, privatpraktiserende lege,turnuskandidat)	51		
Bedriftslege	52		
Militærlege	53		
Lege ved sykehus (uten at du var innlagt)	54		
Annen lege	55		

C. Har du vært innlagt i sykehus de siste 5 åra? 56 JA NEI

D. Bruker du, eller har du brukt, medisin for høyt blodtrykk? 57 JA NEI

E. Har du eller har du hatt noen av disse sykdommene?

		JA	NEI
Sukkersyke	58		
Hjerteinfarkt	59		
Angina pectoris (hjertekrampe)	60		
Hjerneslag eller hjerneblødning	61		

F. Har du noen langvarig sykdom, skade eller lidelse av fysisk eller psykisk art som nedsetter dine funksjoner i ditt daglige liv? (Med langvarig menes at det har vart, eller vil vare i minst ett år.) 62 JA NEI

Hvis «JA», vil du si at dine funksjoner er litt, middels eller mye nedsatt?

		LITT	MIDDELS	MYE
Er bevegelseshemmet	63			
Har nedsatt syn	64			
Har nedsatt hørsel	65			
Hemmet pga. kroppslig sykdom	66			
Hemmet pga. psykiske plager	67			

G. Har du noen søsken? (Nålevende eller døde) 68 JA NEI

Hvis «JA», har en eller flere av dem hatt noen av disse sykdommene?

		JA	NEI	VET IKKE
Sukkersyke	69			
Hjerteinfarkt/hjertekrampe	70			
Forhøyet blodtrykk	71			

H. Når du tenker på hvordan du har det for tida, er du stort sett fornøyd med tilværelsen, eller er du stort sett misfornøyd?
(Sett kryss i bare *en* rute.)

Svært fornøyd	72	1
Meget fornøyd		2
Ganske fornøyd		3
Både/og		4
Nokså misfornøyd		5
Meget misfornøyd		6
Svært misfornøyd		7

SPØRSMÅL VED AVLESING AV BLODTRYKKSMÅLINGEN I DEN VEDLAGTE BROSJYREN

		JA	NEI	VET IKKE
I. Er blodtrykket ditt målt noen gang før? Hvis «NEI», gå videre til spørsmål M	73			

J. Hvilket år ble blodtrykket målt siste gang?
19 [ ] vet ikke 74
Skriv årstallet her (ca.)

K. Hvor ble blodtrykket målt siste gang?
(Sett kryss i bare *en* rute.)

Hos almenpraktiserende lege (distriktslege, privatpraktiserende lege, turnuskandidat	76	1
Hos bedriftslege		2
Hos militærlege		3
På sykehus		4
Hos annen lege		5
Vet ikke		6

L. Hva ble resultatet av målingen?
(Sett kryss i bare *en* rute.)

Jeg skulle begynne med eller fortsette med medisin for høyt blodtrykk	77	1
Jeg skulle komme til kontroll, men skulle *ikke* ta medisin		2
Jeg skulle *ikke* ta medisin og *ikke* komme til kontroll		3

M. Dersom denne helseundersøkelsen viser at du bør undersøkes nærmere: Hvilken almenpraktiserende lege ønsker du da å bli henvist til?
Skriv navnet på legen her

IKKE SKRIV HER

Ingen spesiell lege 78

OM ARBEIDET DITT

N. Er du i arbeid for tida?
(Sett kryss i bare *en* rute.)

Ja, heltidsarbeid (utenom husarbeid)	81	1
Ja, deltidsarbeid (utenom husarbeid)		2
Ja, heltids husarbeid		3
Nei, ikke i arbeid		4

O. Hvis du ikke er i heltids arbeid, er det på grunn av:
(Sett kryss i bare *en* rute.)

Arbeidsløshet, permittering	82	1
Pensjon eller trygd		2
Utdanning eller militærtjeneste		3
Annet		4

HVIS DU ER I ARBEID, VENNLIGST SVAR PÅ DE NESTE TO SPØRSMÅLENE

P. Er det mye stress og mas på arbeidet ditt?
(Sett kryss i bare *en* rute.)

Nei, ikke i det hele tatt	83	1
Sjelden		2
Ja, en god del		3
Ja, nesten hele tida		4

Q. Kan du sjøl bestemme hvordan arbeidet ditt skal legges opp? (Sett kryss i bare *en* rute)

Nei, ikke i det hele tatt	84	1
I liten grad		2
Ja, stort sett		3
Ja, det bestemmer jeg sjøl		4

Vi takker for frammøtet til undersøkelsen.

Vi vil også be deg være vennlig å fylle ut dette spørreskjemaet. Opplysninger vil bli brukt i et større forskningsarbeid om forhold som har betydning for helsen.

Svar etter beste skjønn. Kryss av for bare en av svar-mulighetene (dersom det ikke står nevnt noe annet). Det utfylte skjema returneres i vedlagte svarkonvolutt. Porto er betalt.

Alle opplysningene er underlagt streng taushetsplikt.

Med hilsen

Statens skjermbildefotografering
Fylkeslegen ● Helserådet ● Statens Institutt For Folkehelse
Institutt for anvendt sosialvitenskapelig forskning/
Institutt for samfunnsforskning

Til etikett

Navn: _____

Adr.: _____

_____

_____

Postnr. Postkontor

F.nr.: _____

MOSJON

Med mosjon mener vi at du f.eks. går tur, går på ski, svømmer eller driver trening/idrett.

Hvor ofte driver du mosjon?
(Ta et gjennomsnitt)

Aldri	12	1
Sjeldnere enn en gang i uka		2
En gang i uka		3
2–3 ganger i uka		4
Omtrent hver dag		5

Dersom du driver slik mosjon så ofte som en eller flere ganger i uka:
Hvor hardt mosjonerer du?
(Ta et gjennomsnitt)

Tar det rolig uten å bli andpusten eller svett	13	1
Tar det så hardt at jeg blir andpusten og svett		2
Tar meg nesten helt ut		3

Hvor lenge holder du på hver gang?
(Ta et gjennomsnitt)

Mindre enn 15 minutter	14	1
16–30 minutter		2
30 minutter–1 time		3
Mer enn 1 time		4

SALT

Hvor ofte bruker du salt kjøtt eller salt fisk/sild til middag?

Aldri, eller sjeldnere enn en gang i måneden	15	1
1–2 ganger i måneden		2
Opptil en gang i uka		3
Opptil to ganger i uka		4
Mer enn to ganger i uka		5

Hvor ofte pleier du å strø ekstra salt på middagsmaten?

Sjelden eller aldri	16	1
Av og til		2
Ofte		3
Alltid eller nesten alltid		4

RØYKEVANER

		JA	NEI
Røyker du daglig for tiden?	17		
Hvis du svarte «JA», røyker du DAGLIG for tiden:		JA	NEI
Sigaretter?	18		
Pipe?	19		
Sigarer (eller serutter/sigarillos)?	20		
Hvis du IKKE røyker SIGARETTER daglig for tiden: Har du røykt SIGARETTER daglig tidligere?	21	JA	NEI

Hvis du svarte «JA», hvor lenge er det siden du sluttet å røyke sigaretter daglig?

Mindre enn 3 måneder	22	1
3 måneder– 1 år		2
1–5 år		3
Mer enn 5 år		4

Hvis du røyker SIGARETTER daglig nå, eller har gjort det tidligere:

Hvor mange sigaretter røyker eller røykte du pr. dag? (Oppgi antall pr. dag medregnet håndrullede) 23 — Antall

Besvares av dem som røyker daglig nå eller har røykt daglig tidligere:
(Gjelder både sigarett-, pipe- og sigar-røykere)

Hvor gammel var du da du begynte å røyke daglig?	25	år
Hvor mange år tilsammen har du røykt daglig?	27	år

ALKOHOLBRUK

Hvor ofte har du drukket alkohol (øl, vin eller brennevin) de SISTE 14 DAGENE?

Jeg har ikke drukket alkohol, men er ikke totalavholdende	29	1
Jeg har drukket 1–4 ganger		2
Jeg har drukket 5–10 ganger		3
Jeg har drukket mer enn 10 ganger		4
Jeg er totalavholdende, drikker aldri alkohol		5

		JA	NEI
Dersom du har drukket alkohol de siste 14 dagene, har det ført til at du noen gang har følt deg beruset?	30		

Har det vært perioder i livet ditt da du har drukket for mye, eller i hvert fall i meste laget?

Nei	31	1
I tvil, kanskje		2
Ja		3

BOSITUASJONEN

Bor du alene eller sammen med andre?
Kryss av for de du bor sammen med. (Her kan du sette flere kryss.)

- Bor alene ... 32
- Ektefelle eller samboer ... 33
- Foreldre eller svigerforeldre ... 34
- Andre voksne personer ... 35
- Barn under 5 år ... 36
- Barn 6–15 år ... 37
- Barn over 15 år ... 38

Bor du fast i institusjon?
(sykehjem, aldershjem eller liknende) ... 39

JA | NEI

UTDANNINGEN

Hvilken utdanning har du fullført?
Oppgi bare høyest fullførte utdanning.

- 7-årig folkeskole eller kortere ... 40 — 1
- Framhalds- eller fortsettelsesskole ... 2
- 9-årig grunnskole ... 3
- Real- eller middelskole, grunnskolens 10. år ... 4
- Ett- eller to-årig videregående skole ... 5
- Artium, økonomisk gymnas eller almenfaglig retning i videregående skoler ... 6
- Høyskole eller universitet, mindre enn 4 år ... 7
- Høyskole eller universitet, 4 år eller mer ... 8

Har du fullført annen heldags utdanning, og i tilfelle i hvor mange år?

Skriv antall år her .... 41 ... år

ARBEID

Hvis du er eller har vært i inntektsgivende arbeid, kan du angi hvilken av disse yrkesgruppene ditt yrke faller innenfor? (Hvis du ikke er i arbeid nå, svarer du ut fra det yrket du hadde sist.)

Hvis du har en ektefelle (eller samboer) som er i inntektsgivende arbeid nå, eller har vært det tidligere, angi tilsvarende hvilken yrkesgruppe han/hun tilhører. (Evt. angi om han/hun *ikke* har hatt inntektsgivende arbeid.)

	Deg selv	Ektefellen
Spesialarbeider, ufaglært arbeider ... 43.44		1
Fagarbeider, håndverker, formann ...		2
Underordnet funksjonær (butikk, kontor, offentlige tjenester) ...		3
Fagfunksjonær (f.eks. sykepleier, tekniker, lærer) ...		4
Overordnet stilling i offentlig eller privat virksomhet ...		5
Gårdbruker eller skogeier ...		6
Fisker ...		7
Selvstendig i akademisk erverv (f.eks. tannlege, advokat) ...		8
Selvstendig næringsdrivende (Industi, transport, handel) ...		9
Har *ikke* hatt inntektsgivende arbeid (f.eks. pga. heltids husarbeid, studier, trygd) ...		0

Hvis du er i arbeid (gjelder også heltids husarbeid), **ber vi deg fylle ut de neste spørsmålene:**

Er arbeidet ditt så fysisk anstrengende at du ofte er sliten i kroppen etter en arbeidsdag?

- Ja, nesten alltid ... 45 — 1
- Ganske ofte ... 2
- Ganske sjelden ... 3
- Aldri, eller nesten aldri ... 4

Krever arbeidet ditt så mye konsentrasjon og oppmerksomhet at du ofte føler deg utslitt etter en arbeidsdag?

- Ja, nesten alltid ... 46 — 1
- Ganske ofte ... 2
- Ganske sjelden ... 3
- Aldri, eller nesten aldri ... 4

Hvordan trives du alt i alt med arbeidet ditt?

- Veldig godt ... 47 — 1
- Ganske godt ... 2
- Godt ... 3
- Ikke særlig godt ... 4
- Dårlig ... 5

Hvis du er gårdbruker eller annen selvstendig næringsdrivende, har du noen ansatte som arbeider fast for deg?

- Ingen fast ansatte ... 48 — 1
- 1–2 fast ansatte ... 2
- 3–10 fast ansatte ... 3
- Mer enn 10 fast ansatte ... 4

HVORDAN HAR DU DET?

Når du tenker på hvordan du har det for tida, er du stort sett fornøyd med tilværelsen, eller er du stort sett misfornøyd?

- Svært fornøyd ... 49 — 1
- Meget fornøyd ... 2
- Nokså fornøyd ... 3
- Både - og ... 4
- Nokså misfornøyd ... 5
- Meget misfornøyd ... 6
- Svært misfornøyd ... 7

Føler du deg stort sett sterk og opplagt, eller trett og sliten?

- Meget sterk og opplagt ... 50 — 1
- Sterk og opplagt ... 2
- Ganske sterk og opplagt ... 3
- Både - og ... 4
- Ganske trett og sliten ... 5
- Trett og sliten ... 6
- Svært trett og sliten ... 7

MEDISIN/PLAGER

Har du vanligvis:

		JA	NEI
Hoste om morgenen?	51		
Oppspytt fra brystet om morgenen?	52		

Hvor ofte har du brukt smertestillende medisin den siste måneden?

Daglig	53	1
Hver uke, men ikke hver dag		2
Sjeldnere enn hver uke		3
Aldri		4

Hvor ofte har du brukt avslappende/beroligende medisin eller sovemedisin den siste måneden?

Daglig	54	1
Hver uke, men ikke hver dag		2
Sjeldnere enn hver uke		3
Aldri		4

Har du i løpet av siste måned vært plaget av nervøsitet (irritabel, urolig, anspent eller rastløs)**?**

Nesten hele tida	55	1
Ofte		2
Av og til		3
Aldri		4

Har du i løpet av siste måned hatt innsoving- eller søvnproblemer?

Nesten hver natt	56	1
Ofte		2
Av og til		3
Aldri		4

Har du i det store og hele en rolig og god følelse inne i deg?

Nesten hele tida	57	1
Ofte		2
Av og til		3
Aldri		4

VENNER/HJELP

Dersom du ble syk og måtte holde senga i lengre tid, hvor sannsynlig tror du det er at du kunne få nødvendig hjelp og støtte av familie, venner eller naboer?

Svært sannsynlig	58	1
Nokså sannsynlig		2
Usikkert		3
Usannsynlig		4
Helt usannsynlig		5

Hender det ofte at du føler deg ensom?

Meget ofte	59	1
Ofte		2
Av og til		3
Meget sjelden		4
Aldri		5

HVORDAN ER DU?

Har du tendens til å ta dine oppgaver mer alvorlig enn folk flest?

Ja, nettopp slik er jeg	60	1
Ja, stort sett		2
Både - og		3
Nei, stort sett ikke		4
Nei, tvert imot		5

		JA	NEI	VET IKKE
Har du i løpet av det siste året ofte følt at du har presset deg, eller stadig drevet deg selv framover?	61			

Føler du deg alltid under tidspress, også når det gjelder daglige gjøremål?

Alltid, eller nesten alltid	62	1
Noen ganger		2
Aldri		3

Er du vanligvis glad eller nedstemt?

Svært nedstemt	63	1
Nedstemt		2
Nokså nedstemt		3
Både - og		4
Nokså glad		5
Glad		6
Svært glad		7

HVA ER VIKTIG?

Synes du det er viktig at man prøver å være fornøyd med det man har?

Dette er særlig viktig	64	1
Dette er viktig		2
Både - og		3
Dette er mindre viktig		4
Dette er overhodet ikke viktig		5

Synes du det er viktig at man kan slå av på kravene?

Dette er særlig viktig	65	1
Dette er viktig		2
Både - og		3
Dette er mindre viktig		4
Dette er overhodet ikke viktig		5

Synes du det er viktig at man alltid er i godt humør?

Dette er særlig viktig	66	1
Dette er viktig		2
Både - og		3
Dette er mindre viktig		4
Dette er overhodet ikke viktig		5

Tusen takk for den hjelp du har gitt oss ved å fylle ut dette skjema.

TILLEGGS-SKJEMA OM BLODTRYKK

På skjemaet du leverte ved helseundersøkelsen, svarte du at du har, eller har brukt, medisin for høyt blodtrykk.

I Nord-Trøndelag har det siden 1980 pågått en undersøkelse om blodtrykksbehandling. Formålet ved undersøkelsen er å gjøre behandlingen bedre. En viktig del av undersøkelsen er å få opplysninger om hvordan du og alle andre med høyt blodtrykk har det, og hvilke erfaringer dere har gjort.

Det er derfor meget viktig at du fyller ut dette skjemaet så nøye som mulig.

Enkelte spørsmål kan være vanskelig å svare på. Prøv likevel å svare etter beste skjønn, og legg vekt på det som er vanlig eller gjennomsnittlig for deg.

Alle opplysninger blir behandlet av oss med streng taushetsplikt.

På forhånd takk!

Når ble det påvist at du hadde høyt blodtrykk første gang? (Skriv årstallet i ruta)

19 ____

Vet ikke ... 67

Hvor ble det påvist?
(Sett kryss i bare *en* av rutene)

Hos almenpraktiserende lege (distriktslege, privatpraktiserende lege, turnuskandidat)	69	1
Hos militærlege		2
På sykehus		3
Vet ikke		4

Bruker du medisin for blodtrykk nå? ... 70 JA NEI
Hvis «NEI»: Gå til de to siste spm. nederst til venstre.

Hvis «JA»: Når begynte du med medisiner for blodtrykket? (Skriv årstallet i ruta)

19 ____

Vet ikke ... 71

Bruker du doserings-eske for tabletter? ... 220 JA NEI

Har du medisinkort som viser hva slags medisin du skal ta? ... 221

Hender det at du glemmer å ta medisinene?
(Sett kryss i bare *en* av rutene)

Aldri	73	1
Sjelden (ca. en gang i mnd.)		2
Oftere		3

Hvor viktig mener du at det er for deg at du tar blodtrykksmedisinen(e) akkurat som foreskrevet?
(Sett kryss i bare *en* av rutene)

Ikke så viktig	74	1
Viktig		2
Meget viktig		3

Vet du hva blodtrykket ditt var ved siste kontroll?
(Sett kryss i bare *en* rute)

Nei	75	1
Ja		2
Usikker		3

Hvis «JA» eller «USIKKER», skriv hvor mye du tror det var: 76

Ikke skriv her

_____ 79
Skriv her

Hvis du har brukt medisin for blodtrykket før, men ikke nå: Når slutta du med medisiner?
(Skriv årstallet i ruta)

19 ____

Vet ikke ... 82

Hvorfor slutta du med medisinene?
(Sett ett eller flere kryss)

Legen bestemte det	84
Jeg fikk plager av medisinene	85
Jeg mente det ikke var nødvendig med medisiner	86
Jeg var redd medisinene var skadelige	87
Annen årsak (skriv hvilken nedenfor)	88

Ikke skriv her

_____ 89
Skriv hvilken årsak det evt. var

Har legen gitt deg andre råd i forbindelse med at du har for høyt blodtrykk?
(Sett kryss i bare *en* av rutene)

Nei	91	1
Ja		2
Husker ikke		3

Hvis «JA»: Hvilke råd?

_____ 92

_____ 94

Ikke skriv her

Hvordan opplever du behandlingen for blodtrykket? Gir det deg:
(Sett ett eller flere kryss)

Lettelse, ro, trygghet	96
Anspenthet, engstelse, redsel, uro	97
Dårlig humør, depresjon	98
Ingen spesielle følelser	99

Synes du at det er noen ulemper ved det at du må ha behandling for høyt blodtrykk?

Nei, ingen ulemper	100
Ja	

Hvis «JA»: Hva synes du er mest plagsomt?
(Sett ett eller flere kryss)

At du må bruke medisiner hver dag	101
At du må gå til legekontroll	102
At du må følge de råd som legen har gitt	103
At du har ubehag av medisinene	104
At du er engstelig for at det er noe alvorlig som feiler deg	105
At du synes det er leit å bli betraktet som «pasient»	106
Annet	107

TILLEGGS-SKJEMA FOR SUKKERSYKE

Du har opplyst at du har sukkersyke. Et viktig mål for helseundersøkelsen er å finne ut hvordan sukkersyke best kan behandles for å gi minst mulig plager.

Alle som har eller har hatt sukkersyke, bes derfor om å svare så godt som mulig på disse spørsmålene om sukkersyke.

Noen har svart på et lignende skjema høsten 1982. Det er likevel av stor betydning at disse fyller ut dette skjemaet.

Alle opplysninger blir behandlet av oss med streng taushetsplikt.

På forhånd takk!

När ble sukkersyken din oppdaget? ... 19 108
(Skriv årstallet i ruta)

Hvordan ble sukkersyken din oppdaget?

Jeg søkte lege på grunn av symptomer 110 1
Ble oppdaget uten at jeg hadde symptomer (ved legeattest, bedriftskontroll, undersøkelse for annen sykdom i eller utenfor sykehus) 2

Hva slags plager hadde du i tilfelle da sukkersyken ble oppdaget? (kryss evt. i flere ruter).

Ingen plager 111
Unormal tørste 112
Stor vannlating 113
Slapphet 114
Vekttap 115
Underlivskløe 116
Andre plager 117

Hvis «ANDRE PLAGER», skriv hvilke:

_____ 118
Ikke skriv her
_____ 120

JA NEI

Har noen av dine foreldre, søsken eller barn hatt sukkersyke? 122

Hvis «JA», bruker eller brukte noen av disse insulinsprøyter? 123

BEHANDLING

JA NEI

Bruker du insulinsprøyter mot sukkersyken? 124

Hvis «JA», bruker du sprøyter daglig?

Sprøyte en gang daglig 125 1
Sprøyte to eller flere ganger daglig 2

Om du bruker sprøyter, hvor mye insulin tar du tilsammen hver dag?
(Skriv antall ml i ruta – 1 «strek» svarer til 0,1 ml) 126
ml

Om du bruker sprøyter, hva heter den insulinen du bruker?
(Skriv navnet som står på glasset, begge dersom du bruker to sorter).

_____ 128
Ikke skriv her
_____ 130

JA NEI

Bruker du tabletter mot sukkersyken? 132

Om du bruker tabletter mot sukkersyken, skriv nedenfor hva de heter, antall mg. som står på glasset/pakningen og hvor mange slike tabletter du tar hver dag:
(Skriv om begge sorter dersom du bruker mer enn en type tabletter mot sukkersyke)

133 mg. pr. tabl. , 138 antall pr. dag
Skriv navn på tabletten her 139
Ikke skriv her

140 mg. pr. tabl. , 145 antall pr. dag
Skriv navn på tabletten her 146

Hvor mange måltider spiser du hver dag? 147
Antall

JA NEI

Føler du at du vet nok om hva slags mat du kan spise? 148

Hvis du skal svare på hva du virkelig spiser, og ikke hva legen din har sagt du bør spise, vil du da si at du: (Kryss av bare i den ruta som kommer nærmest det du virkelig gjør)

Spiser stort sett det samme som de som ikke har sukkersyke 149 1
Spiser hva jeg vil unntatt sukker og søtsaker 2
Bruker på øyemål bestemt mengde brød, potet, melk og frukt 3
Veier/måler bestemt mengde brød, potet, melk og evt. frukt en eller flere dager i uka 4

JA NEI

Kontrollerer du hjemme hvor mye sukker du har i urinen? (Kryss av også om noen hjelper deg eller gjør det for deg) 150

Hva heter den metoden du i tilfelle bruker til å måle sukker i urinen?

_____ 151
Ikke skriv her
Skriv navnet som står på pakningen her

JA NEI

Kontrollerer du noen gang hjemme hvor mye sukker du har i blod (blodsukker)?
(Kryss av også om noen hjelper deg eller gjør det for deg) 152

Hva heter den metoden du i tilfelle bruker til å måle blodsukker?

_____ 153
Ikke skriv her
Skriv navnet på pakningen og navn på evt. apparat du måler med.

Hvis du selv kontrollerer sukker i urin eller blod, hvor ofte gjør du det?
(Kryss av også om noen hjelper deg eller gjør det for deg)

Hver dag 154 1
2-3 dager i uka 2
En dag i uka 3
En dag hver 14. dag 4
En dag i måneden 5
Sjeldnere enn en dag i måneden 6

VENDI

Hvis du selv kontrollerer sukker i urin eller blod: måler du flere ganger om dagen de dagene du gjør det? 155

JA | NEI

Dersom du tar urin- eller blodprøve selv, tar du resultatene med til legen ved kontroll?
(kryss av i den ruta som passer best)

Aldri ..... 156 — 1
Av og til ..... — 2
Oftest ..... — 3
Alltid ..... — 4

Går du til regelmessig kontroll hos lege for sukkersyken din? 157

JA | NEI

Hvis «JA», hvor lenge var det mellom de to siste gangene du var hos legen din til kontroll for sukkersyken?

Antall måneder (skriv i ruta) 158

mndr.

Hva slags lege går du til kontroll hos for sukkersyken?
(Sett kryss i bare *en* rute)

Vanlig lege (distriktslege, allmenpraktiserende lege, bedriftslege osv.) ..... 160 — 1
Sykehuslege (poliklinikk på sykehus) ..... — 2
Er innlagt i sykehjem eller annen institusjon og får kontroll der ..... — 3
Andre ..... — 4

Ikke skriv her

Hvis «andre», skriv hva slags lege på linja over 161

ANNEN SYKDOM

Bruker du regelmessig medisin for annet enn sukkersyken? 162

JA | NEI

Dersom «JA», skriv hva disse medisinene heter
(Skriv det navnet som står på glasset eller pakningen. Ta med alle sortene du bruker regelmessig. Skriv x bak navnet om du brukte dette også *før* du fikk sukkersyke).

163
166
169
172
175
178
181

Ikke skriv her

Tror du man er mer utsatt for å få enkelte andre sykdommer dersom man har dårlig kontrollert sukkersyke? 184

JA | NEI

Hvis «JA», nevn navnet på 3 slike sykdommer:
(Du behøver ikke å ha hatt disse sykdommene selv).

185
187
189

Ikke skriv her

Har du selv hatt noen vedvarende (kroniske) plager etter at du fikk sukkersyke?
(Skriv hva slags sykdom/plager på linjene under).

191
193
195
197
199
201

Ikke skriv her

UNDERVISNING - STØTTE

JA | NEI

Er du medlem av Norges Landsforbund for Sukkersyke? 203

Har du noen gang deltatt på kurs eller møte om sukkersyke? 204

Får du grunnstønad gjennom trygdekontoret for sukkersyken? 205

Har du søkt om og fått særfradrag i skattelikninga fordi du har sukkersyke? 206

HVORDAN HAR DU DET?

Synes du det er vanskelig å ha sukkersyke?
(kryss av i den ruta som passer best).

Ja, jeg føler det er som en plage hver dag ..... 207 — 1
Ja, jeg tenker ofte på det ..... — 2
Ja, av og til ..... — 3
Nei, sjelden ..... — 4
Nei, jeg tenker nesten aldri på det ..... — 5
Føler meg akkurat som alle som ikke har sukkersyke .. — 6

Dersom du synes det er vanskelig å ha sukkersyke, hva synes du er verst?
(Skriv det du mener på linja nedenfor).

Skriv her

Ikke skriv her

Forteller du til andre at du har sukkersyke?
(kryss av i den ruta som passer best).

Ja, alltid når jeg mener de bør vite det ..... 210 — 1
Ja, men bare om de spør ..... — 2
Nei, helst ikke ..... — 3
Jeg er redd for at andre skal få greie på det ..... — 4

JA | NEI

Har du noen gang hatt for lavt blodsukker?
(«føling», «insulinsjokk») 211

Hvis «JA», hvor mange ganger har du hatt det den siste uka? (Skriv antall ganger i ruta) 212

Hvor mange ganger har du vært innlagt i sykehus de siste 5 årene? (Skriv antall ganger i ruta) 213

Dersom du har ligget i sykehus de siste 5 årene, hva har du ligget der for?
(Skriv på linjene nedenfor)

214
216
218

Ikke skriv her

Appendix 2

Questionnaires used in HUNT 2

A 2.1 Questionnaire 1

A 2.2 Questionnaire 2

A 2.3 Questionnaire 3

HELSEUNDERSØKELSEN
I NORD-TRØNDELAG

Personlig innbydelse

Spørreskjemaet er en viktig del av Helseundersøkelsen. Her finner du spørsmål om tidligere sykdom og om andre forhold som har betydning for helsa. Vennligst fyll ut skjemaet på forhånd og ta det med til Helseundersøkelsen. Dersom enkelte spørsmål er uklare, lar du dem bare stå ubesvarte til du møter fram, og drøfter dem med personalet som gjennomfører undersøkelsen. Alle svar vil bli behandlet strengt fortrolig.

Flere steder i skjemaet ber vi deg oppgi din alder da eventuell sykdom inntrådte. Hvis du ikke husker nøyaktig hvor gammel du var, skriver du et tall som er nærmest det du antar er korrekt.

Når resultatene fra undersøkelsen foreligger, vil det være enkelte som trenger ny undersøkelse hos egen lege. Dette vil du få beskjed om i det brevet som vi sender deg om dine resultater. Samtidig sender vi melding om resultatene dine til legen din. Det er derfor om å gjøre at du i rubrikken helt til slutt i skjemaet oppgir navnet på den allmennpraktiserende lege, kommunelege eller det helsesenter som du ønsker skal ta hånd om eventuell etterundersøkelse, og som vi skal sende resultatene til.

Med vennlig hilsen

Helsetjenesten i Nord-Trøndelag • Statens helseundersøkelser • Statens Institutt for Folkehelse

DET HANDLER OM HELSA DI

Hvordan er helsa di nå?
Bare ett kryss

Dårlig	12	1
Ikke helt god		2
God		3
Svært god		4

LUFTVEGSPLAGER

	JA	NEI
Hoster du daglig i perioder av året?		
Hvis JA:		
Er hosten vanligvis ledsaget av oppspytt? 14		
Har du hatt hoste med oppspytt i minst 3 mnd. sammenhengende i hvert av de to siste åra?		
Har du hatt noe anfall med pipende eller tung pust de siste 12 måneder? 16		

	JA	NEI	Alder første gang
Har du eller har du hatt astma? 17			år

	JA	NEI
Har du brukt eller bruker du astmamedisiner? 20		

HJERTE-KARSYKDOMMER, DIABETES

Har du, eller har du hatt:	JA	NEI	Alder første gang
Hjerteinfarkt 21			år
Angina pectoris (hjertekrampe) 24			år
Hjerneslag/hjerneblødning 27			år
Diabetes (sukkersyke) 30			år

Hva ble resultatet siste gang du målte blodtrykket ditt?
Bare ett kryss

Begynne med/fortsette med blodtrykksmedisin 33		1
Komme til kontroll, men ikke ta blodtrykksmedisin		2
Ingen kontroll og ingen medisin nødvendig		3
Har aldri fått målt blodtrykket		4

Bruker du medisin mot høyt blodtrykk?
Bare ett kryss

Nå	34	1
Før, men ikke nå		2
Aldri brukt		3

	JA	NEI	VET IKKE
Har en eller flere av foreldre eller søsken hatt hjerteinfarkt (sår på hjertet) eller angina pectoris (hjertekrampe)?			

STOFFSKIFTE

Har du noen gang fått påvist:	JA	NEI	Alder første gang
for høyt stoffskifte 36			år
for lavt stoffskifte 39			år
struma 42			år
annen sykdom i skjoldbruskkjertelen			år

Bruker du eller har du brukt noen av disse medisinene:			
Thyroxin 48			år
Neo-Mercazole 51			år
Er du operert i skjoldbruskkjertelen			år
Har du fått radiojodbehandling 57			år

MUSKEL/SKJELETT-PLAGER

	JA	NEI
Har du i løpet av det siste året vært plaget med smerter og/eller stivhet i muskler og ledd som har vart i minst 3 måneder sammenhengende? 60		

Hvis NEI, gå videre til neste side øverst.
Hvis JA, svar på følgende:

Hvor har du hatt disse plagene?	JA	NEI
Nakke 61		
Skuldre (aksler)		
Albuer		
Håndledd, hender		
Bryst/mage 65		
Øvre del av ryggen		
Korsryggen		
Hofter		
Knær		
Ankler, føtter 70		

Hvis du har hatt plager i flere områder i minst 3 mnd. det siste året, setter du ring rundt det ja-krysset hvor plagene har vart lengst

Hvor lenge har plagene vart sammenhengende?
Svar for det området hvor plagene har vart lengst

	Antall mnd.	Antall år
Hvis under 1 år, oppgi antall mnd. 71		
Hvis 1 år eller mer, oppgi antall år. 73		

Har plagene redusert din arbeidsevne det siste året?
Gjelder også hjemmearbeidende. Bare ett kryss

Nei/ubetydelig	I noen grad	I betydelig grad	Vet ikke

	JA	NEI	IKKE I ARBEID
Har du vært sykmeldt pga. disse plagene det siste året? 76			

	JA	NEI
Har plagene ført til redusert aktivitet i fritida?		

Har lege noen gang sagt at du har/har hatt noen av disse sykdommene:

	JA	NEI
Beinskjørhet (osteoporose) 78		
Fibromyalgi (fibrositt/kronisk smertesyndrom)		
Leddgikt (reumatoid artritt)		
Slitasjegikt (artrose)		
Bechterews sykdom 82		
Andre langvarige skjelett- eller muskelsykdommer		

Har du noen gang hatt:

	JA	NEI	Alder *siste* gang
Lårhalsbrudd 84			år
Brudd i håndledd/underarm 87			år
Nakkesleng (whiplash) 90			år
Skade som førte til sykehusinnleggelse			år

ANDRE PLAGER

I hvilken grad har du hatt disse plagene i de siste 12 månedene?

	Ikke plaget	Litt plaget	Mye plaget
Kvalme 96	☐	☐	☐
Brystbrann/sure oppstøt	☐	☐	☐
Diaré	☐	☐	☐
Treg mage	☐	☐	☐
Hjertebank	☐	☐	☐
Åndenød 101	☐	☐	☐

ANDRE SYKDOMMER

Har du eller har du noen gang hatt:

	JA	NEI	Alder første gang
Epilepsi 102			år
Psykiske plager hvor du har søkt hjelp			år
Kreftsykdom 108			år
Annen langvarig sykdom 111			

DAGLIGE FUNKSJONER

Har du noen langvarig sykdom, skade eller lidelse av fysisk eller psykisk art som nedsetter dine funksjoner i ditt daglige liv? 112 JA ☐ NEI ☐

Langvarig: minst ett år

Hvis JA:

Hvor mye vil du si at dine funksjoner er nedsatt?

	Litt nedsatt	Middels nedsatt	Mye nedsatt
Er bevegelseshemmet 113	☐	☐	☐
Har nedsatt syn	☐	☐	☐
Har nedsatt hørsel	☐	☐	☐
Hemmet pga. kroppslig sykdom.	☐	☐	☐
Hemmet pga. psykiske plager... 117	☐	☐	☐

MENN fortsetter øverst neste spalte

BESVARES BARE AV KVINNER

Hvor mange barn har du født? 118 — Antall barn
Sett 0 hvis du ikke har født barn

Hvis du har født barn, besvar:

Hvor gammel var du da du fødte ditt første barn? 120 — Alder ___ år

Hvor gammel var du da du fødte ditt siste barn? 122 — ___ år
Besvares ikke hvis du har født bare ett barn

Hvor gammel var du da du fikk menstruasjon? 124 — ___ år
Sett 0 hvis du ikke noen gang har hatt menstruasjon

Fortsett neste spalte øverst

RØYKING

Røykte noen av de voksne hjemme da du vokste opp? 126 JA ☐ NEI ☐

Bor du, eller har du bodd, sammen med noen dagligrøykere etter at du fylte 20 år? 127 JA ☐ NEI ☐

Hvor lenge er du vanligvis daglig til stede i røykfylt rom? 128 — Antall timer
Sett 0 hvis du ikke oppholder deg i røykfylt rom

Røyker du selv?

	JA	NEI
Sigaretter daglig? 130		
Sigarer/sigarillos daglig?		
Pipe daglig? 132		

Aldri røykt daglig *(Sett kryss)* ☐

Hvis du har røykt daglig tidligere, hvor lenge er det siden du sluttet? 134 — Antall år

Hvis du røyker daglig nå eller har røykt tidligere:

Hvor mange sigaretter røyker eller røykte du vanligvis daglig? 136 — Antall sigaretter

Hvor gammel var du da du begynte å røyke daglig? 140 — Alder ___ år

Hvor mange år tilsammen har du røykt daglig? 142 — Antall år

KAFFE/TE/ALKOHOL

Hvor mange kopper kaffe/te drikker du daglig?
Sett 0 hvis du ikke drikker kaffe/te daglig

	Antall kopper
Kokekaffe 144	
Annen kaffe 146	
Te 148	

Alkohol:
Er du total avholdsmann/-kvinne? 150 JA ☐ NEI ☐

Hvor mange ganger i måneden drikker du vanligvis alkohol? 151 — Antall ganger
Regn ikke med lettøl. Sett 0 hvis mindre enn 1 gang i mnd.

Hvor mange glass øl, vin eller brennevin drikker du vanligvis i løpet av to uker?

Regn ikke med lettøl.
Sett 0 hvis du ikke drikker alkohol 153

Øl	Vin	Brennevin
glass	glass	glass

FYSISK AKTIVITET

I FRITIDA

Hvordan har din fysiske aktivitet i fritida vært det siste året? *Tenk deg et ukentlig gjennomsnitt for året.*

Arbeidsveg regnes som fritid

	Timer pr. uke: Ingen	Under 1	1-2	3 og mer
Lett aktivitet *(ikke svett/andpusten)* 159	☐	☐	☐	☐
Hard fysisk aktivitet *(svett/andpusten)* 160	☐ 1	☐ 2	☐ 3	☐ 4

UNDER ARBEID
Hvis du er i lønnet eller ulønnet arbeid:

Hvorledes vil du beskrive arbeidet ditt?
Bare ett kryss

For det meste stillesittende arbeid
(f.eks. skrivebordsarbeid, montering) 161 ☐ 1

Arbeid som krever at du går mye
(f.eks. ekspedisjonsarb., lett industriarb., undervisning) ☐ 2

Arbeid hvor du går og løfter mye
(f.eks. postbud, pleier, bygningsarbeid) ☐ 3

Tungt kroppsarbeid
(f.eks. skogsarbeid, tungt jordbruksarb.,tungt bygningsarb.) ☐ 4

Bla om!

HVORLEDES FØLER DU DEG?

Har du de siste to ukene følt deg:

	Nei	Litt	En god del	Svært mye
Trygg og rolig? 162	☐	☐	☐	☐
Glad og optimistisk?	☐	☐	☐	☐
Har du følt deg:				
Nervøs og urolig?	☐	☐	☐	☐
Plaget av angst? 165	☐	☐	☐	☐
Irritabel?	☐	☐	☐	☐
Nedfor/deprimert?	☐	☐	☐	☐
Ensom? 166	☐ 1	☐ 2	☐ 3	☐ 4

Her kommer noen flere spørsmål om hvorledes du føler deg. For hvert spørsmål setter du kryss for ett av de fire svarene som best beskriver dine følelser ***den siste uka.*** *Ikke tenk for lenge på svaret - de spontane svarene er best*

Jeg gleder meg fortsatt over ting slik jeg pleide før 169
Avgjort like mye ..... ☐ 1 Bare lite grann ..... ☐ 3
Ikke fullt så mye ..... ☐ 2 Ikke i det hele tatt ..... ☐ 4

Jeg har en urofølelse som om noe forferdelig vil skje 170
Ja, og noe svært ille .... ☐ 1 Litt, bekymrer meg lite . ☐ 3
Ja, ikke så veldig ille ... ☐ 2 Ikke i det hele tatt ..... ☐ 4

Jeg kan le og se det morsomme i situasjoner 171
Like mye nå som før .... ☐ 1 Avgjort ikke som før .... ☐ 3
Ikke like mye nå som før ☐ 2 Ikke i det hele tatt ..... ☐ 4

Jeg har hodet fullt av bekymringer 172
Veldig ofte ..... ☐ 1 Av og til ..... ☐ 3
Ganske ofte ..... ☐ 2 En gang i blant ..... ☐ 4

Jeg er i godt humør 173
Aldri ..... ☐ 1 Ganske ofte ..... ☐ 3
Noen ganger ..... ☐ 2 For det meste ..... ☐ 4

Jeg kan sitte i fred og ro og kjenne meg avslappet 174
Ja, helt klart ..... ☐ 1 Ikke så ofte ..... ☐ 3
Vanligvis ..... ☐ 2 Ikke i det hele tatt ..... ☐ 4

Jeg føler meg som om alt går langsommere 175
Nesten hele tiden ..... ☐ 1 Fra tid til annen ..... ☐ 3
Svært ofte ..... ☐ 2 Ikke i det hele tatt ..... ☐ 4

Jeg føler meg urolig som om jeg har sommerfugler i magen 176
Ikke i det hele tatt ..... ☐ 1 Ganske ofte ..... ☐ 3
Fra tid til annen ..... ☐ 2 Svært ofte ..... ☐ 4

Jeg bryr meg ikke lenger om hvordan jeg ser ut 177
Ja, har sluttet å bry meg ☐ 1 Kan hende ikke nok .... ☐ 3
Ikke som jeg burde ..... ☐ 2 Bryr meg som før ..... ☐ 4

Jeg er rastløs som om jeg stadig må være aktiv 178
Uten tvil svært mye ..... ☐ 1 Ikke så veldig mye ..... ☐ 3
Ganske mye..... ☐ 2 Ikke i det hele tatt ..... ☐ 4

Jeg ser med glede frem til hendelser og ting 179
Like mye som før ..... ☐ 1 Avgjort mindre enn før . ☐ 3
Heller mindre enn før ... ☐ 2 Nesten ikke i det hele tatt ☐ 4

Jeg kan plutselig få en følelse av panikk 180
Uten tvil svært ofte ..... ☐ 1 Ikke så veldig ofte ..... ☐ 3
Ganske ofte ..... ☐ 2 Ikke i det hele tatt ..... ☐ 4

Jeg kan glede meg over gode bøker, radio og TV 181
Ofte ..... ☐ 1 Ikke så ofte ..... ☐ 3
Fra tid til annen ..... ☐ 2 Svært sjelden ..... ☐ 4

UTDANNING

Hvilken utdanning er den høyeste du har fullført?

Grunnskole 7-10 år, framhaldsskole, folkehøgskole ..... 182 ☐ 1
Realskole, middelskole, yrkesskole, 1-2 årig videregående skole ..... ☐ 2
Artium, øk.gymnas, allmennfaglig retning i videregående skole ..... ☐ 3
Høgskole/universitet, mindre enn 4 år ..... ☐ 4
Høgskole/universitet, 4 år eller mer ..... ☐ 5

ARBEID

Hva slags arbeidssituasjon har du nå?
Ett eller flere kryss

Lønnet arbeid ..... 183 ☐
Selvstendig næringsdrivende ..... ☐
Heltids husarbeid ..... ☐
Utdanning, militærtjeneste ..... ☐
Arbeidsledig, permittert ..... ☐
Pensjonist/trygdet ..... 188 ☐

Hvor mange timer lønnet arbeid har du i uka? ..... 189 | Antall timer |

Har du skiftarbeid, nattarbeid eller går vakt? | JA | NEI |

ALT I ALT

Når du tenker på hvordan du har det for tida, er du stort sett fornøyd med tilværelsen eller er du stort sett misfornøyd?
Bare ett kryss

Svært fornøyd ..... 192 ☐ 1
Meget fornøyd ..... ☐ 2
Ganske fornøyd ..... ☐ 3
Både/og ..... ☐ 4
Nokså misfornøyd ..... ☐ 5
Meget misfornøyd ..... ☐ 6
Svært misfornøyd ..... ☐ 7

DIN LEGE

Hvis denne helseundersøkelsen viser at du bør undersøkes nærmere, hvilken allmennpraktiserende lege/kommunelege ønsker du skal foreta undersøkelsen?
Skriv navnet på legen her: 193

Ikke skriv her

Takk for utfyllingen!

Nok en gang:

Velkommen til undersøkelsen!

IE 332 5201 - 50.000 - 09.96

hunt

Helseundersøkelsen i Nord-Trøndelag

SKJEMA FOR KVINNER 20–69 ÅR

Takk for frammøtet til undersøkelsen!

Vi vil også be deg fylle ut dette spørreskjemaet. Opplysningene vil bli brukt i større forskningsarbeider om forebyggende helsearbeid. Noen av spørsmålene likner på spørsmål du har svart på i det skjemaet du fylte ut heime og leverte ved frammøte til helseundersøkelsen. Det er likevel viktig at du svarer på alle spørsmålene også i dette skjemaet. Det utfylte skjemaet returneres i vedlagte svarkonvolutt. Porto er betalt.

Alle opplysningene er underlagt streng taushetsplikt.

Vennlig hilsen
Helsetjenesten i Nord-Trøndelag
Statens Institutt for Folkehelse Statens helseundersøkelser

Hvis du ikke ønsker å besvare spørreskjemaet, sett kryss her og returner skjemaet. Da slipper du purring.
Jeg ønsker ikke å besvare skjemaet ○

UTFYLLING

Dato for utfylling av skjema: / 19 (19)

OPPVEKST

I hvilken kommune bodde du da du fylte 1 år?
*Hvis du ikke bodde i Norge, oppgi **land** i stedet for kommune.*

(24)

ARBEID

Nåværende eller tidligere arbeid:
Hva slags inntektsgivende arbeid har du og event. din ektefelle/samboer? *Hvis du/dere ikke har inntektsgivende arbeid nå: Oppgi det siste yrket.*

		Deg selv	Ektefelle/ samboer	
Spesialarbeider eller ufaglært arbeider	25	☐	☐	36
Fagarbeider, handverker, formann		☐	☐	
Underordnet funksjonær (f.eks. butikk, kontor, off. tjenester)		☐	☐	
Fagfunksjonær (f.eks. sykepleier, tekniker, lærer)		☐	☐	
Overordnet stilling i off. eller privat virksomhet		☐	☐	
Sjåfør	30	☐	☐	41
Gårdbruker eller skogeier		☐	☐	
Fisker		☐	☐	
Selvstendig i akademisk erverv (f.eks. tannlege, advokat)		☐	☐	
Annen selvstendig næringsvirksomhet		☐	☐	
Har ikke vært i inntektsgivende arbeid	35	☐	☐	46

Hvis du NÅ ikke har inntektsgivende arbeid eller du ikke har heltids husarbeid: Gå til BOLIG.

Har du i løpet av de siste 12 månedene hatt sykefravær:		Ja	Nei
med egenmelding	47	☐	☐
med sykmelding fra lege	48	☐	☐

Hvis «Ja»: **Hvor lenge *tilsammen*?** *Bare ett kryss*

2 uker eller mindre	49	☐ 1
2-8 uker		☐ 2
Mer enn 8 uker		☐ 3

Har du i løpet av de siste 12 månedene vurdert å skifte yrke eller arbeidsplass?		Ja	Nei
	50	☐	☐

Er arbeidet ditt så fysisk anstrengende at du ofte er sliten i kroppen etter en arbeidsdag? *Bare ett kryss* (51)

Ja, nesten alltid	☐ 1	Ganske sjelden	☐ 3
Ganske ofte	☐ 2	Aldri, eller nesten aldri	☐ 4

Krever arbeidet ditt så mye konsentrasjon og oppmerksomhet at du ofte føler deg utslitt etter en arbeidsdag? (52)

Ja, nesten alltid	☐ 1	Ganske sjelden	☐ 3
Ganske ofte	☐ 2	Aldri, eller nesten aldri	☐ 4

Hvordan trives du alt i alt med arbeidet ditt? (53)

Veldig godt	☐ 1	Ikke særlig godt	☐ 3
Godt	☐ 2	Dårlig	☐ 4

BOLIG

Hvem bor du sammen med?
Ett kryss for hver linje og angi antall

		Ja	Nei	Antall
Ektefelle/samboer	54	☐	☐	
Andre personer over 18 år	55	☐	☐	
Personer under 18 år	58	☐	☐	Antall

Hvor mange av barna har plass i barnehage? (61) Antall

Hvilken type bolig bor du i? *Bare ett kryss*

Enebolig/villa	63	☐ 1
Gårdsbruk		☐ 2
Blokk/terrasseleilighet		☐ 3
Rekkehus/2-4 mannsbolig		☐ 4
Annen bolig		☐ 5

Hvor stor er din boenhet? (64) kvm

		Ja	Nei
Er det heldekkende tepper i stua?	67	☐	☐
Er det heldekkende tepper på ditt soverom?		☐	☐
Er det katt i boligen?	69	☐	☐
Er det hund i boligen?		☐	☐
Er det andre pelskledde dyr eller fugler i boligen?		☐	☐

ØKONOMI

Mottar du noen av følgende *offentlige* ytelser?		Ja	Nei
Sykepenger/sykelønn/rehabiliteringspenger	72	☐	☐
Ytelser under yrkesrettet attføring		☐	☐
Uførepensjon	74	☐	☐
Alderspensjon		☐	☐
Sosialstøtte		☐	☐
Arbeidsløshetstrygd		☐	☐
Overgangsstønad		☐	☐
Etterlattepensjon	79	☐	☐
Andre ytelser		☐	☐

Har det i løpet av det siste året hendt at husholdningen har hatt vansker med å klare de løpende utgifter til mat, transport, bolig og liknende? *Bare ett kryss* (81)

Ja, ofte	☐ 1	Ja, en sjelden gang	☐ 3
Ja, av og til	☐ 2	Nei, aldri	☐ 4

VENNER

Hvor mange gode venner har du?
Regn med de du kan snakke fortrolig med og som kan gi deg god hjelp når du trenger det (82) Antall
Tell ikke med de du bor sammen med, men regn med andre slektninger

		Ja	Nei
Føler du at du har mange nok gode venner?	84	☐	☐

Hvor ofte tar du vanligvis del i foreningsvirksomhet som f.eks. syklubb, idrettslag, politiske lag, religiøse eller andre foreninger? (85)

Aldri, eller noen få ganger i året	☐ 1	Omtrent en gang i uka	☐ 1
1-2 ganger i måneden	☐ 2	Mer enn en gang i uka	☐ 2

DER DU BOR

Svar ut fra nærmiljøet, dvs. nabolaget/grenda:
Ett kryss for hvert spørsmål

Jeg føler et sterkt fellesskap med de som bor her 89
Helt enig ☐ 1 Delvis enig ☐ 2 Usikker ☐ 3 Delvis uenig ☐ 4 Helt uenig ☐ 5

Selv om noen tar initiativ, er det ingen som blir med på det som settes i gang her 87
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Hvis jeg flytter herfra, vil jeg lengte tilbake 88
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Man kan ikke stole på hverandre her 89
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Når noe skal gjøres her, er det lett å få folk med 90
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Det er vanskelig å få kontakt med folk her 91
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Det er godt samhold her 92
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Ingen orker å ta initiativ til noe lenger her 93
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Folk trives godt her 94
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Folk her kan ha store problemer uten at naboen vet noe 95
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Det er alltid noen som tar initiativ til å løse nødvendige oppgaver her 96
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Folk snakker lite med hverandre her 97
Helt enig ☐ 1 Delvis enig ☐ 2 Usikker ☐ 3 Delvis uenig ☐ 4 Helt uenig ☐ 5

SYKDOM I FAMILIEN

Kryss av for de slektningene som har eller har hatt noen av sykdommene. Kryss av for "ingen" hvis ingen av slektningene har hatt denne sykdommen: *Evt. flere kryss på hver linje*

	Mor	Far	Bror	Søster	Barn	Ingen
Hjerneslag eller hjerneblødning 98	☐	☐	☐	☐	☐	☐
Hjerteinfarkt før 60 års alder 104	☐	☐	☐	☐	☐	☐
Astma 110	☐	☐	☐	☐	☐	☐
Allergi 116	☐	☐	☐	☐	☐	☐
Kreftsykdom 122	☐	☐	☐	☐	☐	☐
Høyt blodtrykk 128	☐	☐	☐	☐	☐	☐
Psykiske plager 134	☐	☐	☐	☐	☐	☐
Osteoporose (benskjørhet) 140	☐	☐	☐	☐	☐	☐
Diabetes (sukkersyke) 146	☐	☐	☐	☐	☐	☐
Alder da de fikk diabetes 152	år	år	år	år	år	

Har du *selv* høysnue eller neseallergi? ..... 162 Ja ☐ Nei ☐

BRUK AV HELSETJENESTER

Har du i løpet av de siste 12 månedene vært hos:
Ett kryss på hver linje

	Ja	Nei
allmennpraktiserende lege (kommunelege, privatpraktiserende lege, tumuskandidat) 163	☐	☐
bedriftslege	☐	☐
lege ved sykehus (uten at du var innlagt)	☐	☐
annen lege	☐	☐
fysioterapeut	☐	☐
kiropraktor	☐	☐
homøopat 169	☐	☐
annen behandler (naturmedisiner, fotsoneterapeut, håndspålegger, "healer", "synsk", e.l.)	☐	☐

	Ja	Nei
Har du vært innlagt i sykehus de siste 5 åra? 171	☐	☐

ALKOHOL

Hvis du er totalavholdskvinne: Gå til KOSTHOLD.

Ett kryss for hver spørsmål

	Ja	Nei
Har du noen gang følt at du burde redusere alkoholforbruket ditt? 172	☐	☐
Har andre noen gang kritisert alkoholbruken din? 173	☐	☐
Har du noen gang følt ubehag eller skyldfølelse pga. alkoholbruken din? 174	☐	☐
Har det å ta en drink noen gang vært det første du har gjort om morgenen for å roe nervene, kurere bakrus eller som en oppkvikker? 175	☐	☐

KOSTHOLD

Hvor mange måltider spiser du vanligvis daglig (middag og brødmåltid)? ..... 176 — Antall

Hvor mange dager i uka spiser du varm middag?

Hva slags type brød (kjøpt eller hjemmebakt) spiser du vanligvis? *Inntil to kryss*

Brødtypen ligner mest på 178	Loff	Fint brød	Knepp-brød	Grov-brød	Knekke-brød
	☐	☐	☐	☐	☐

Hva slags *fett* blir vanligvis brukt i din husholdning?
Ett kryss for matlaging og ett kryss for brød

	Til matlaging	På brød
Bruker *ikke* smør eller margarin	183 ☐ 1	184 ☐ 1
Meierismør	☐ 2	☐ 2
Hard margarin	☐ 3	☐ 3
Bløt (soft) margarin	☐ 4	☐ 4
Smør/margarin blanding	☐ 5	☐ 5
Lettmargarin	☐ 6	☐ 6
Oljer	☐ 7	

MEDISINBRUK

	Ja	Nei
Har du i deler av de siste 12 måneder brukt noen medisiner daglig eller nesten daglig? 185	☐	☐

Hvis «Ja»:
Angi hvor mange måneder du brukte følgende medisiner: *Sett 0 hvis du ikke har brukt medisinene*

	Antall mndr.		Antall mndr.
smertestillende 186		hjertemedisin (ikke blodtrykksmedisin)	
sovemedisin 188		blodtrykksmedisin	
beroligende medisin		annen medisin	
medisin mot depresjon		*Kosttilskudd:*	
allergimedisin 194		jerntabletter 202	
astmamedisin 196		vitamintilskudd	
		tran/fiskeoljer 206	

Hvor ofte har du brukt avslappende/beroligende medisin eller sovemedisin den siste måneden? 208
Daglig ..... ☐ 1 Sjeldnere enn hver uke ☐ 3
Hver uke, men ikke hver dag . ☐ 2 Aldri ..... ☐ 4

HODEPINE

Har du vært plaget av hodepine i løpet av de siste 12 måneder? 209
Ja, anfallsvis (migrene)..... ☐ 1
Ja, annen slags hodepine.... ☐ 2
Nei ..... ☐ 3

Antall anfall siste 12 mndr. 210 ☐☐

Hvis «Nei»: Gå til MUSKEL-/SKJELETTPLAGER

Omtrent hvor mange dager i pr. måned har du hodepine?
Mindre enn 7 dager ☐ 1 7 til 14 dager ☐ 2 Mer enn 14 d. ☐ 3

Hvor lenge varer hodepinen vanligvis hver gang? 213
Mindre enn 4 timer ☐ 1 4 timer–3 døgn ☐ 2 Mer enn 3 døgn ☐ 3

Hvor ofte er hodepinen preget av eller ledsaget av:

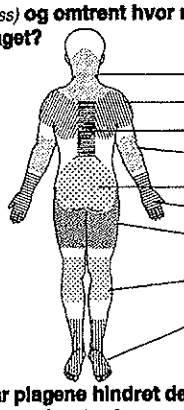
Ett kryss på hver linje	*Sjelden eller aldri*	*Av og til*	*Ofte*
bankende/dunkende smerte 214	☐	☐	☐
pressende smerte	☐	☐	☐
halvsidighet, alltid samme side	☐	☐	☐
halvsidighet, vekselvis h. og v. side	☐	☐	☐
smerter i «hele hodet»	☐	☐	☐
kvalme 219	☐	☐	☐
lys- og/eller lydskyhet	☐	☐	☐
forverring ved fysisk aktivitet.....	☐	☐	☐
synsforstyrrelser *før* hodepine 222	☐	☐	☐

Hvor mange tabletter/stikkpiller har du eventuelt brukt av disse medisinene *alt i alt i løpet av den siste måneden?*
Skriv 0 hvis du ikke har brukt medisinen.
Cafergot 223 ☐☐ Anervan 225 ☐☐ Imigran 227 ☐☐

MUSKEL-/SKJELETTPLAGER

Har du hatt plager (smerter, verk, ubehag) i muskler og/eller ledd i *den siste måneden?* 229 *Ja* ☐ *Nei* ☐

Hvis «Ja»: **Hvor har du hatt disse plagene** *(ett eller flere kryss)* **og omtrent hvor mange dager tilsammen var du plaget?**



Plager (Sett kryss)	Antall dager
Nakke 230	☐☐
Skuldre/aksler.....233	☐☐
Øvre del av ryggen	☐☐
Albuer 239	☐☐
Korsryggen 242	☐☐
Handledd/hender 245	☐☐
Hofter.....248	☐☐
Knær.....251	☐☐
Ankler/føtter 254	☐☐

Dersom flere kryss: Sett ring rundt krysset der plagen var verst

Har plagene hindret deg i å utføre daglige aktiviteter den siste måneden?

	Ja	*Nei*
I arbeidet.....257	☐	☐
I fritida 258	☐	☐

SMERTER I BEINA

	Ja	*Nei*
Har du sår på tå, fot eller ankel som ikke vil gro? 259	☐	☐
Har du smerter i det ene eller i begge beina når du går? 260	☐	☐
Har du oppsøkt lege p.g.a. smerter i beina? 261	☐	☐

Hvis «NEI» på disse spørsmålene: Gå til MENSTRUASJON

	Ja	*Nei*
Kan du gå lenger enn 50 meter? 262	☐	☐
Forsvinner smerten når du står stille en stund? 263	☐	☐
Må du sette deg for at smerten skal gå over? 264	☐	☐

Hvor gjør det mest vondt? *Ett kryss* 265
Fot ☐ Legg ☐ Lår ☐ Hofte ☐

	Ja	*Nei*
Har du smerter i beina når du er i ro? 266	☐	☐
Er smertene verst når du ligger i senga? 267	☐	☐
Blir søvnen forstyrret av smertene? 268	☐	☐
Får du mindre vondt når beinet ligger høyt? 269	☐	☐
Får du mindre vondt når beinet ligger lavt, f.eks. om beinet henger utfor sengekanten? 270	☐	☐
Bedres smertene når du står opp og går litt? 271	☐	☐

MENSTRUASJON

Har du menstruasjon fremdeles?..... 272 *Ja* ☐ *Nei* ☐

Hvis «Nei»: **Hvor gammel var du da den sluttet?** 273 ☐☐ år

Er du gravid nå? ..... 275 *Ja* ☐ *Nei* ☐ *Vet ikke* ☐

Har du innsatt spiral nå? ..... 276 *Ja* ☐ *Nei* ☐

Når hadde du siste menstruasjon? ..... 277 *Dag Måned År* ☐☐ ☐☐ ☐☐☐☐
Husker du ikke dag, bare angi måned og år, husker du bare år, angi år.

Menstruasjonen din de siste 12 måneder:

Har du det siste året hatt regelmessige menstruasjoner? *Ja* ☐ *Nei* ☐ *Usikker* ☐
At menstruasjonen har vart omtrent like lenge hver gang med omtrent like lange mellomrom 283

Hvor mange dager hadde du blødning siste gang du hadde menstruasjon? ..... 284 *Antall dager* ☐☐

Hvor mange dager var du uten blødning mellom nest siste og siste menstruasjon? ... 286 *Antall dager* ☐☐

Har menstruasjonen din det siste året uteblitt i mer enn 3 måneder uten at du var gravid? 289 *Ja* ☐ *Nei* ☐

Hvis «Ja»: **Hvor mange måneder i trekk har du vært uten menstruasjonsblødninger?** ..... 290 *Antall mndr.* ☐☐

Hvis «Ja»: **Oppsøkte du lege?** ..... 292 *Ja* ☐ *Nei* ☐

Menstruasjonen tidligere (dvs. før de siste 12 månedene):

Har menstruasjonen din tidligere uteblitt uten at du var gravid? ..... 293 *Ja* ☐ *Nei* ☐

Hvis «Ja»: **Hvor lenge og hvor ofte var den borte sammenhengende?** *Sett kryss eventuelt flere steder*

	1 gang	*2 ganger*	*Oftere*
3–6 måneder..... 294	☐	☐	☐
6–12 måneder.....	☐	☐	☐
Over ett år..... 296	☐	☐	☐

OPERASJONER I UNDERLIVET

	Ja	Nei	Vet ikke
Har du noen gang blitt operert i underlivet? 297	☐	☐	☐

Hvis «Ja»: **Kryss av for hver operasjon:**

	Ja	Nei	Vet ikke
Fjernet deler av eller bare én eggstokk 298	☐	☐	☐
Fjernet begge eggstokkene (totalt) 299	☐	☐	☐

Hvis du har fjernet begge eggstokkene, hvor gammel var du da? 300 ___ år

	Ja	Nei	Vet ikke
Operert for endometriose 302	☐	☐	☐
Sterilisert	☐	☐	☐
Utskraping fra livmor (sykehus)	☐	☐	☐
Fjernet hele livmoren 305	☐	☐	☐

Hvis du har fjernet hele livmoren, hvor gammel var du da? 306 ___ år

P-PILLER

	Ja	Nei
Har du noen gang brukt p-piller, minipiller inkludert? 308	☐	☐

Hvis «Ja»: **Hvor gammel var du første gang du brukte p-piller?** 309 ___ år

Hvor lenge har du brukt p-piller i alt? 311 ___ år ___ mndr.

Hvis under ett år, antall måneder 313

	Ja	Nei
Bruker du p-piller nå?	☐	☐

Hvilket merke bruker du? 316 ___

HORMONBEHANDLING

Utenom p-piller

Har du noen gang brukt medisiner som inneholder østrogen? Vanlige navn på slike medisiner er: Cyclabil, Estraderm, Kilogest, Ovesterin, Progynova, Trisekvens.

	Nå	Før	Aldri
Tabletter eller plaster 318	☐	☐	☐
Krem eller stikkpiller 319	☐	☐	☐

Hvis «Ja»: **Hvor gammel var du første gang du fikk østrogenmedisin, og omtrent hvor mange år brukte du slik medisin?**

	Din alder	Antall år
Tabletter eller plaster 320		
Krem eller stikkpiller 324		

Hvis du bruker østrogenmedisin nå, hvilket merke bruker du? 328 ___

PROBLEMER MED Å BLI GRAVID

	Ja	Nei
Har du noen gang prøvd i mer enn ett år å bli gravid? 329	☐	☐

Hvis «Ja»: **Hvor gammel var du første gang du hadde problemer med å bli gravid?** 330 ___ år

	Ja	Nei
Har du noen gang oppsøkt lege fordi du hadde problemer med å bli gravid? 332	☐	☐

GRAVIDITETER, FØDSLER OG AMMING

Hvor mange ganger har du vært gravid totalt?
Regn med alle svangerskap, spontane eller selvbestemte aborter, så vel som fødsler (også dødfødsler) 333 ___ ganger

Hvor mange barn har du født? 335 ___ barn

Fyll ut for hvert barn (de første 7) opplysninger om fødselsår og omtrent antall måneder du ammet hvert barn og antall måneder menstruasjonen din var borte etter fødselen (fylles ut også for dødfødte eller for barn som er døde senere i livet).

Barn	Fødselsår	Antall måneder med amming	Antall blødningsfrie måneder
1 336	19		
2 342	19		
3 348	19		
4 354	19		
5 360	19		
6 366	19		
7 372	19		

URINLEKKASJE

	Ja	Nei
Har du ufrivillig urinlekkasje? 378	☐	☐

Hvis «Nei»: Gå til KALK I KOSTEN ...

Hvor ofte har du urinlekkasje? 379
- sjeldnere enn en gang pr. måned ☐
- en eller flere ganger pr. måned ☐
- en eller flere ganger pr. uke ☐
- hver dag og/eller natt ☐

Hvor mye urin lekker du vanligvis hver gang? 380
dråper eller lite ☐ små skvetter ☐ større mengder ☐

	Ja	Nei
Har du lekkasje av urin i forbindelse med hosting, nysing, latter, tunge løft 381	☐	☐
Har du lekkasje av urin i forbindelse med plutselig og sterk vannlatingstrang? 382	☐	☐

Hvor lenge har du hatt urinlekkasje? 383
0-5 år ☐ 5-10 år ☐ Over 10 år ☐

	Ja	Nei
Har du søkt lege på grunn av urinlekkasje? 384	☐	☐

Hvordan opplever du lekkasjeplagene dine? 385 *Ett kryss*
- ikke noe problem ☐
- en liten plage ☐
- en del plaget ☐
- mye plaget ☐
- svært stort problem ☐

KALK I KOSTEN OG KOSTTILSKUDD

Hvor mange glass melk (alle sorter, også drikkeyoghurt) drikker du vanligvis daglig? *Bare ett kryss* 386
- Ingen ☐ 1
- Mindre enn ett ☐ 2
- 1–2 glass ☐ 3
- 3 eller mer ☐ 4

Hvor mange brødskiver med kvitost spiser du vanligvis daglig? *Bare ett kryss*
- Ingen ☐ 1
- Mindre enn en ☐ 2
- 1–2 skiver ☐ 3
- 3 eller mer ☐ 4

Bruker du vanligvis noen av disse kosttilskuddene?

	Ja	Nei
vitamin D-tilskudd 388	☐	☐
kalktabletter eller benmel	☐	☐

HUMØR OG TRIVSEL

Ett kryss på hver linje

Angi hvordan du har følt deg den siste måneden:	*Aldri*	*Noen ganger*	*Ganske ofte*	*For det meste*
i godt humør 390	☐	☐	☐	☐
i dårlig humør 391	☐	☐	☐	☐

Er du rask til å oppfatte et humoristisk poeng? 392	*Svært treg*	*Ganske treg*	*Ganske rask*	*Svært rask*
	☐	☐	☐	☐

Er du enig i at det er noe ansvarsløst over folk som stadig prøver å være morsomme? 393

Nei, slett ikke ☐1 Ganske enig ☐3
I noen grad ☐2 Ja, absolutt ☐4

Er du en munter person? 394

Nei, slett ikke ☐1 Ganske munter ☐3
I noen grad ☐2 Ja, absolutt ☐4

SINNE

Sett kryss på det svaret som best beskriver deg i forhold til de to påstandene nedenfor:

Jeg gir uttrykk for mitt sinne, og andre mennesker vet at jeg er sint 395

Nesten aldri ☐1 Ganske ofte ☐3
Noen ganger ☐2 Nesten alltid ☐4

Jeg koker av sinne, men jeg viser det ikke til andre 396

Nesten aldri ☐1 Ganske ofte ☐3
Noen ganger ☐2 Nesten alltid ☐4

HVILE OG AVSLAPPING

Hvor mange timer tilbringer du *vanligvis* i *liggende* stilling i løpet av et døgn?
(nattesøvn, middagshvil) ....397 Antall timer ____

Hvor mange timer tilbringer du *vanligvis* i *sittende* stilling i løpet av et døgn?
(arbeid, måltider, TV, bil etc.) ....399 Antall timer ____

Hvor ofte er du plaget av søvnløshet? 401

Aldri, eller noen få ganger i året ☐1
1–2 ganger i måneden ☐2
Omtrent 1 gang i uka ☐3
Mer enn en gang i uka ☐4

Har du siste år vært plaget av søvnløshet slik at det har gått ut over arbeidsevnen? 402	*Ja*	*Nei*
	☐	☐

Har du i løpet av siste måned hatt innsovningsproblemer? *Bare ett kryss* 403

Nesten hver natt ☐1 Av og til ☐3
Ofte ☐2 Aldri ☐4

Har du i løpet av siste måned våknet for tidlig og ikke fått sove igjen? *Bare ett kryss* 404

Nesten hver natt ☐1 Av og til ☐3
Ofte ☐2 Aldri ☐4

Har du i løpet av siste måned vært plaget av nervøsitet (irritabel, urolig, anspent eller rastløs)? 405

Nesten hele tida ☐1
Ofte ☐2
Av og til ☐3
Aldri ☐4

HVORDAN DU HAR HATT DET

Har det noen gang i løpet av ditt liv vært *sammenhengende perioder på 2 uker eller mer* da du:	*Ja*	*Nei*
følte deg deprimert, trist og nedfor 406	☐	☐
hadde problemer med mattrysten eller spiste alt for lite	☐	☐
var plaget av kraftløshet eller mangel på overskudd	☐	☐
virkelig bebreidet deg selv og følte deg verdiløs	☐	☐
hadde problemer med å konsentrere deg eller vanskelig for å ta beslutninger	☐	☐
hadde minst tre av de problemene som er nevnt ovenfor samtidig 411	☐	☐

HVORDAN DU SER PÅ DEG SELV

Folk ser på seg selv på ulike måter. Kryss av for hvert utsagn hvor enig eller uenig du er. *Ett kryss på hver linje*

	Svært enig	*Enig*	*Uenig*	*Svært uenig*
Jeg har en positiv holdning til meg selv 412	☐	☐	☐	☐
Jeg føler meg virkelig ubrukelig til tider 413	☐	☐	☐	☐
Jeg føler at jeg ikke har mye å være stolt av 414	☐	☐	☐	☐
Jeg føler at jeg er en verdifull person, i allefall på lik linje med andre 415	☐	☐	☐	☐

	Ja	*Nei*
Synes du at du har funnet et virkelig betydningsfullt innhold i livet ditt? 416	☐	☐
Føler du at du lever fullt ut? 417	☐	☐

HVORDAN DU FØLER DEG NÅ

*Sett kryss i den ruta utenfor det svaret som best beskriver dine følelser **den siste uka.** Bare ett kryss*

Er du vanligvis glad eller nedstemt? 418

Svært nedstemt ☐1
Nedstemt ☐2
Nokså nedstemt ☐3
Både – og ☐4
Nokså glad ☐5
Glad ☐6
Svært glad ☐7

Har du i det store og hele en rolig og god følelse inne i deg? 419

Nesten hele tida ☐1
Ofte ☐2
Av og til ☐3
Aldri ☐4

Føler du deg stort sett sterk og opplagt, eller trøtt og sliten? 420

Meget sterk og opplagt ☐1
Sterk og opplagt ☐2
Ganske sterk og opplagt ☐3
Både – og ☐4
Ganske trøtt og sliten ☐5
Trøtt og sliten ☐6
Svært trøtt og sliten ☐7

Legg det utfylte spørreskjemaet i den vedlagte svarkonvolutten og postlegg den så snart som mulig!
Porto er betalt.
Hjertelig takk for hjelpa!

Steinkjer Trykkeri AS – 74 16 30 00

hunt

Helseundersøkelsen i Nord-Trøndelag

SKJEMA FOR MENN 20–69 ÅR

Takk for frammøtet til undersøkelsen!

Vi vil også be deg fylle ut dette spørreskjemaet. Opplysningene vil bli brukt i større forskningsarbeider om forebyggende helsearbeid. Noen av spørsmålene likner på spørsmål du har svart på i det skjemaet du fylte ut heime og leverte ved frammøte til helseundersøkelsen. Det er likevel viktig at du svarer på alle spørsmålene også i dette skjemaet. Det utfylte skjemaet returneres i vedlagte svarkonvolutt. Porto er betalt.

Alle opplysningene er underlagt streng taushetsplikt.

Vennlig hilsen

Helsetjenesten i Nord-Trøndelag

Statens Institutt for Folkehelse Statens helseundersøkelser

Hvis du ikke ønsker å besvare spørreskjemaet, sett kryss her og returner skjemaet. Da slipper du purring.
Jeg ønsker ikke å besvare skjemaet ○

UTFYLLING

Dato for utfylling av skjema: / 19 [19]

OPPVEKST

I hvilken kommune bodde du da du fylte 1 år?
Hvis du ikke bodde i Norge, oppgi land i stedet for kommune.

[24]

ARBEID

Nåværende eller tidligere arbeid:

Hva slags inntektsgivende arbeid har du og event. din ektefelle/samboer? *Hvis du/dere ikke har inntektsgivende arbeid nå: Oppgi det siste yrket.*

	Deg selv	Ektefelle/ samboer
Spesialarbeider eller ufaglært arbeider [25]	☐	☐ [30]
Fagarbeider, handverker, formann	☐	☐
Underordnet funksjonær (f.eks. butikk, kontor, off. tjenester)	☐	☐
Fagfunksjonær (f.eks. sykepleier, tekniker, lærer)	☐	☐
Overordnet stilling i off. eller privat virksomhet	☐	☐
Sjåfør [30]	☐	☐ [41]
Gårdbruker eller skogeier	☐	☐
Fisker	☐	☐
Selvstendig i akademisk erverv (f.eks. tannlege, advokat)	☐	☐
Annen selvstendig næringsvirksomhet	☐	☐
Har ikke vært i inntektsgivende arbeid [35]	☐	☐ [46]

Hvis du NÅ ikke har inntektsgivende arbeid eller du ikke har heltids husarbeid: Gå til BOLIG.

Har du i løpet av de siste 12 månedene hatt sykefravær:

	Ja	Nei
med egenmelding [47]	☐	☐
med sykmelding fra lege [48]	☐	☐

Hvis «Ja»: **Hvor lenge *tilsammen*?** *Bare ett kryss*

2 uker eller mindre [49]	☐ 1
2-8 uker	☐ 2
Mer enn 8 uker	☐ 3

Har du i løpet av de siste 12 månedene vurdert å skifte yrke eller arbeidsplass? [50] Ja ☐ Nei ☐

Er arbeidet ditt så fysisk anstrengende at du ofte er sliten i kroppen etter en arbeidsdag? *Bare ett kryss* [51]

Ja, nesten alltid	☐ 1	Ganske sjelden	☐ 3
Ganske ofte	☐ 2	Aldri, eller nesten aldri	☐ 4

Krever arbeidet ditt så mye konsentrasjon og oppmerksomhet at du ofte føler deg utslitt etter en arbeidsdag? [52]

Ja, nesten alltid	☐ 1	Ganske sjelden	☐ 3
Ganske ofte	☐ 2	Aldri, eller nesten aldri	☐ 4

Hvordan trives du alt i alt med arbeidet ditt? [53]

Veldig godt	☐ 1	Ikke særlig godt	☐ 3
Godt	☐ 2	Dårlig	☐ 4

BOLIG

Hvem bor du sammen med?
Ett kryss for hver linje og angi antall

	Ja	Nei	Antall
Ektefelle/samboer [54]	☐	☐	
Andre personer over 18 år [55]	☐	☐	
Personer under 18 år [58]	☐	☐	

Hvor mange av barna har plass i barnehage? [61] Antall

Hvilken type bolig bor du i? *Bare ett kryss*

Enebolig/villa [63]	☐ 1
Gårdsbruk	☐ 2
Blokk/terrasseleilighet	☐ 3
Rekkehus/2-4 mannsbolig	☐ 4
Annen bolig	☐ 5

Hvor stor er din boenhet? [64] kvm

	Ja	Nei
Er det heldekkende tepper i stua? [67]	☐	☐
Er det heldekkende tepper på ditt soverom?	☐	☐
Er det katt i boligen? [69]	☐	☐
Er det hund i boligen?	☐	☐
Er det andre pelskledde dyr eller fugler i boligen?	☐	☐

ØKONOMI

Mottar du noen av følgende *offentlige* ytelser?

	Ja	Nei
Sykepenger/sykelønn/rehabiliteringspenger [72]	☐	☐
Ytelser under yrkesrettet attføring	☐	☐
Uførepensjon [74]	☐	☐
Alderspensjon	☐	☐
Sosialstøtte	☐	☐
Arbeidsløshetstrygd	☐	☐
Overgangsstønad	☐	☐
Etterlattepensjon [79]	☐	☐
Andre ytelser	☐	☐

Har det i løpet av det siste året hendt at husholdningen har hatt vansker med å klare de løpende utgifter til mat, transport, bolig og liknende? *Bare ett kryss* [81]

Ja, ofte	☐ 1	Ja, en sjelden gang	☐ 3
Ja, av og til	☐ 2	Nei, aldri	☐ 4

VENNER

Hvor mange gode venner har du?
Regn med de du kan snakke fortrolig med og som kan gi deg god hjelp når du trenger det [82]
Tell ikke med de du bor sammen med, men regn med andre slektninger

Antall

	Ja	Nei
Føler du at du har mange nok gode venner? [84]	☐	☐

Hvor ofte tar du vanligvis del i foreningsvirksomhet som f.eks. sykiubb, idrettslag, politiske lag, religiøse eller andre foreninger? [85]

Aldri, eller noen få ganger i året	☐ 1	Omtrent en gang i uka	☐ 3
1-2 ganger i måneden	☐ 2	Mer enn en gang i uka	☐ 4

DER DU BOR

Svar ut fra nærmiljøet, dvs. nabolaget/grenda.
Ett kryss for hvert spørsmål

Jeg føler et sterkt fellesskap med de som bor her 86
Helt enig ☐ 1 Delvis enig ☐ 2 Usikker ☐ 3 Delvis uenig ☐ 4 Helt uenig ☐ 5

Selv om noen tar initiativ, er det ingen som blir med på det som settes i gang her 87
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Hvis jeg flytter herfra, vil jeg lengte tilbake 88
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Man kan ikke stole på hverandre her 89
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Når noe skal gjøres her, er det lett å få folk med 90
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Det er vanskelig å få kontakt med folk her 91
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Det er godt samhold her 92
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Ingen orker å ta initiativ til noe lenger her 93
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Folk trives godt her 94
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Folk her kan ha store problemer uten at naboen vet noe 95
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Det er alltid noen som tar initiativ til å løse nødvendige oppgaver her 96
Helt enig ☐ Delvis enig ☐ Usikker ☐ Delvis uenig ☐ Helt uenig ☐

Folk snakker lite med hverandre her 97
Helt enig ☐ 1 Delvis enig ☐ 2 Usikker ☐ 3 Delvis uenig ☐ 4 Helt uenig ☐ 5

SYKDOM I FAMILIEN

Kryss av for de slektningene som har eller har hatt noen av sykdommene. Kryss av for «ingen» hvis ingen av slektningene har hatt denne sykdommen. *Evt. flere kryss på hver linje*

		Mor	Far	Bror	Søster	Barn	Ingen
Hjerneslag eller hjerneblødning	98	☐	☐	☐	☐	☐	☐
Hjerteinfarkt før 60 års alder	104	☐	☐	☐	☐	☐	☐
Astma	110	☐	☐	☐	☐	☐	☐
Allergi	116	☐	☐	☐	☐	☐	☐
Kreftsykdom	122	☐	☐	☐	☐	☐	☐
Høyt blodtrykk	128	☐	☐	☐	☐	☐	☐
Psykiske plager	134	☐	☐	☐	☐	☐	☐
Osteoporose (benskjørhet)	140	☐	☐	☐	☐	☐	☐
Diabetes (sukkersyke)	146	☐	☐	☐	☐	☐	☐
Alder da de fikk diabetes	152	år	år	år	år	år	

Har du *selv* høysnue eller neseallergi? 152 ☐ Ja ☐ Nei

BRUK AV HELSETJENESTER

Har du i løpet av de siste 12 månedene vært hos :
Ett kryss på hver linje

		Ja	Nei
allmennpraktiserende lege (kommunelege, privatpraktiserende lege, turnuskandidat)	163	☐	☐
bedriftslege		☐	☐
lege ved sykehus (uten at du var innlagt)		☐	☐
annen lege		☐	☐
fysioterapeut		☐	☐
kiropraktor		☐	☐
homøopat	169	☐	☐
annen behandler (naturmedisiner, fotsoneterapeut, håndspålegger, "healer", "synsk", e.l.)		☐	☐

Har du vært innlagt i sykehus de siste 5 åra? 171 ☐ Ja ☐ Nei

ALKOHOL

Hvis du er totalavholdsmann: Gå til KOSTHOLD.

Ett kryss for hver spørsmål

		Ja	Nei
Har du noen gang følt at du burde redusere alkoholforbruket ditt?	172	☐	☐
Har andre noen gang kritisert alkoholbruken din?	173	☐	☐
Har du noen gang følt ubehag eller skyldfølelse pga. alkoholbruken din?	174	☐	☐
Har det å ta en drink noen gang vært det første du har gjort om morgenen for å roe nervene, kurere bakrus eller som en oppkvikker?	175	☐	☐

KOSTHOLD

Hvor mange måltider spiser du vanligvis daglig (middag og brødmåltid)? 176 — Antall

Hvor mange dager i uka spiser du varm middag?

Hva slags type brød (kjøpt eller hjemmebakt) spiser du vanligvis? *Inntil to kryss.*

Brødtypen ligner mest på		Loff	Fint brød	Kneipp-brød	Grov-brød	Knekke-brød
	178	☐	☐	☐	☐	☐

Hva slags *fett* blir vanligvis brukt i din husholdning?
Ett kryss for matlaging og ett kryss for brød

	Til matlaging		På brød	
Bruker *ikke* smør eller margarin	183	☐ 1	184	☐ 1
Meierismør		☐ 2		☐ 2
Hard margarin		☐ 3		☐ 3
Bløt (soft) margarin		☐ 4		☐ 4
Smør/margarin blanding		☐ 5		☐ 5
Lettmargarin		☐ 6		☐ 6
Oljer		☐ 7		

MEDISINBRUK

Har du i deler av de siste 12 måneder brukt noen medisiner daglig eller nesten daglig? 185 ☐ Ja ☐ Nei

Hvis «Ja»:
Angi hvor mange måneder du brukte følgende medisiner: *Sett 0 hvis du ikke har brukt medisinene*

		Antall mndr.		Antall mndr.
smertestillende	186		hjertemedisin (ikke blodtrykksmedisin)	
sovemedisin	188		annen medisin	
beroligende medisin			*Kosttilskudd:*	
medisin mot depresjon			jerntabletter	202
allergimedisin	194		vitamintilskudd	
astmamedisin	196		tran/fiskeoljer	206

Hvor ofte har du brukt avslappende/beroligende medisin eller sovemedisin den siste måneden? 208
Daglig ☐ 1 Sjeldnere enn hver uke ☐ 3
Hver uke, men ikke hver dag ☐ 2 Aldri ☐ 4

HODEPINE

Har du vært plaget av hodepine i løpet av de siste 12 måneder? 209
Ja, anfallsvis (migrene) ☐ 1
Ja, annen slags hodepine ☐ 2
Nei ☐ 3

Antall anfall siste 12 mndr. 210 ☐☐

Hvis «Nei»: Gå til MUSKEL-/SKJELETTPLAGER

Omtrent hvor mange dager i pr. måned har du hodepine?
Mindre enn 7 dager ☐ 1 7 til 14 dager ☐ 2 Mer enn 14 d. ☐ 3

Hvor lenge varer hodepinen vanligvis hver gang? 213
Mindre enn 4 timer ☐ 1 4 timer–3 døgn ☐ 2 Mer enn 3 døgn ☐ 3

Hvor ofte er hodepinen preget av eller ledsaget av:

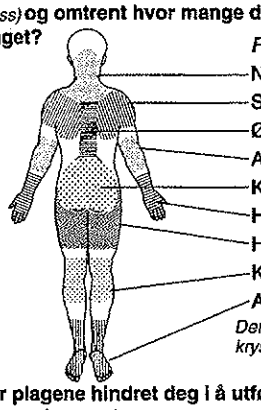
Ett kryss på hver linje	*Sjelden eller aldri*	*Av og til*	*Ofte*
bankende/dunkende smerte 214	☐	☐	☐
pressende smerte	☐	☐	☐
halvsidighet, alltid samme side	☐	☐	☐
halvsidighet, vekselvis h. og v. side	☐	☐	☐
smerter i «hele hodet»	☐	☐	☐
kvalme 219	☐	☐	☐
lys- og/eller lydskyhet	☐	☐	☐
forverring ved fysisk aktivitet	☐	☐	☐
synsforstyrrelser *før* hodepine 222	☐	☐	☐

Hvor mange tabletter/stikkpiller har du eventuelt brukt av disse medisinene *alt i alt i løpet av den siste måneden*?
Skriv 0 hvis du ikke har brukt medisinen.
Cafergot 223 ☐☐ Anervan 225 ☐☐ Imigran 227 ☐☐

MUSKEL-/SKJELETTPLAGER

Har du hatt plager (smerter, verk, ubehag) i muskler og/eller ledd i *den siste måneden*? 229 Ja ☐ Nei ☐

Hvis «Ja»: **Hvor har du hatt disse plagene** *(ett eller flere kryss)* **og omtrent hvor mange dager tilsammen var du plaget?**



Plager (Sett kryss)	Antall dager
Nakke 230	☐☐
Skuldre/aksler 233	☐☐
Øvre del av ryggen	☐☐
Albuer 239	☐☐
Korsryggen 242	☐☐
Handledd/hender 245	☐☐
Hofter 248	☐☐
Knær 251	☐☐
Ankler/føtter 254	☐☐

*Dersom flere kryss: Sett **ring** rundt krysset **der plagen var verst***

Har plagene hindret deg i å utføre daglige aktiviteter den siste måneden?

	Ja	Nei
I arbeidet 257	☐	☐
I fritida 258	☐	☐

SMERTER I BEINA

	Ja	Nei
Har du sår på tå, fot eller ankel som ikke vil gro? 259	☐	☐
Har du smerter i det ene eller i begge beina når du går? 260	☐	☐
Har du oppsøkt lege p.g.a. smerter i beina? 261	☐	☐

Hvis «NEI» på disse spørsmålene: Gå til URINVEGS...

	Ja	Nei
Kan du gå lenger enn 50 meter? 262	☐	☐
Forsvinner smerten når du står stille en stund? 263	☐	☐
Må du sette deg for at smerten skal gå over? 264	☐	☐

Hvor gjør det mest vondt? *Ett kryss* 265
Fot ☐ Legg ☐ Lår ☐ Hofte ☐

	Ja	Nei
Har du smerter i beina når du er i ro? 265	☐	☐
Er smertene verst når du ligger i senga? 267	☐	☐
Blir søvnen forstyrret av smertene? 268	☐	☐
Får du mindre vondt når beinet ligger høyt? 269	☐	☐
Får du mindre vondt når beinet ligger lavt, f.eks. om beinet henger utfor sengekanten? 270	☐	☐
Bedres smertene når du står opp og går litt? 271	☐	☐

URINVEGS- OG PROSTATAPLAGER

Ett kryss på hver linje

Har du noen gang blitt fortalt av lege at du har:	Ja	Nei
forstørret prostata 272	☐	☐
prostatakreft 273	☐	☐

Har du gjennomgått noe av følgende:	Ja	Nei
sterilisering 274	☐	☐
tatt vevsprøve (biopsi) av prostata 275	☐	☐
kirurgisk fjerning av prostata (helt eller delvis) 276	☐	☐

De neste spørsmålene gjelder siste måned
Bare ett kryss for hvert hver spørsmål

Hvor ofte har du hatt følelsen av at blæren ikke er blitt fullstendig tømt etter avsluttet vannlating? 277
Aldri ☐ 1 Omtrent annenhver gang ☐ 4
Omtrent 1 av 5 ganger ☐ 2 Omtrent 2 av 3 ganger ☐ 5
Omtrent 1 av 3 ganger ☐ 3 Nesten alltid ☐ 6

Hvor ofte har du måttet late vannet på nytt mindre enn 2 timer etter forrige vannlating? 278
Aldri ☐ 1 Omtrent annenhver gang ☐ 4
Omtrent 1 av 5 ganger ☐ 2 Omtrent 2 av 3 ganger ☐ 5
Omtrent 1 av 3 ganger ☐ 3 Nesten alltid ☐ 6

Hvor ofte har du måttet stoppe og starte flere ganger under vannlatingingen? 279
Aldri ☐ 1 Omtrent annenhver gang ☐ 4
Omtrent 1 av 5 ganger ☐ 2 Omtrent 2 av 3 ganger ☐ 5
Omtrent 1 av 3 ganger ☐ 3 Nesten alltid ☐ 6

Hvor ofte syns du det har vært vanskelig å holde igjen når du har følt trang til å late vannet? 280
Aldri ☐ 1 Omtrent annenhver gang ☐ 4
Omtrent 1 av 5 ganger ☐ 2 Omtrent 2 av 3 ganger ☐ 5
Omtrent 1 av 3 ganger ☐ 3 Nesten alltid ☐ 6

Hvor ofte har du hatt svak urinstråle? 281
Aldri ☐ 1 Omtrent annenhver gang ☐ 4
Omtrent 1 av 5 ganger ☐ 2 Omtrent 2 av 3 ganger ☐ 5
Omtrent 1 av 3 ganger ☐ 3 Nesten alltid ☐ 6

Hvor ofte har du måttet trykke eller presse for å begynne vannlatingen? 282
Aldri ☐ 1 Omtrent annenhver gang ☐ 4
Omtrent 1 av 5 ganger ☐ 2 Omtrent 2 av 3 ganger ☐ 5
Omtrent 1 av 3 ganger ☐ 3 Nesten alltid ☐ 6

Hvor mange ganger har du vanligvis måttet stå opp i løpet av natta for å late vannet? 283
Ingen ☐ 1 2 ganger ☐ 3 4 ganger ☐ 5
1 gang ☐ 2 3 ganger ☐ 4 5 ganger eller mer ☐ 6

Hvis du resten av livet måtte leve med de vannlatings-problemene du har nå, hvordan ville du føle det? 284
Være meget godt fornøyd ☐ 1 Være for det meste utilfreds ☐ 5
Være fornøyd ☐ 2 Være misfornøyd ☐ 6
Være for det meste tilfreds ☐ 3 Ha det forferdelig ☐ 7
Ha blandete følelser ☐ 4

HUMØR OG TRIVSEL

Ett kryss på hver linje

Angi hvordan du har følt deg den siste måneden:	*Aldri*	*Noen ganger*	*Ganske ofte*	*For det meste*
i godt humør 285	☐	☐	☐	☐
i dårlig humør 286	☐	☐	☐	☐

Er du rask til å oppfatte et humoristisk poeng? 287	*Svært treg*	*Ganske treg*	*Ganske rask*	*Svært rask*
	☐	☐	☐	☐

Er du enig i at det er noe ansvarsløst over folk som stadig prøver å være morsomme? 288

Nei, slett ikke ☐1 Ganske enig ☐3
I noen grad ☐2 Ja, absolutt ☐4

Er du en munter person? 289

Nei, slett ikke ☐1 Ganske munter ☐3
I noen grad ☐2 Ja, absolutt ☐4

SINNE

Sett kryss på det svaret som best beskriver deg i forhold til de to påstandene nedenfor:

Jeg gir uttrykk for mitt sinne, og andre mennesker vet at jeg er sint. 290

Nesten aldri ☐1 Ganske ofte ☐3
Noen ganger ☐2 Nesten alltid ☐4

Jeg koker av sinne, men jeg viser det ikke til andre. 291

Nesten aldri ☐1 Ganske ofte ☐3
Noen ganger ☐2 Nesten alltid ☐4

HVILE OG AVSLAPPING

Hvor mange timer tilbringer du *vanligvis* i *liggende* stilling i løpet av et døgn?
(nattesøvn, middagshvil) 292 — Antall timer: ____

Hvor mange timer tilbringer du *vanligvis* i *sittende* stilling i løpet av et døgn?
(arbeid, måltider, TV, bil etc.) 294 — Antall timer: ____

Hvor ofte er du plaget av søvnløshet? 296

Aldri, eller noen få ganger i året ☐1
1–2 ganger i måneden ☐2
Omtrent 1 gang i uka ☐3
Mer enn en gang i uka ☐4

Har du siste år vært plaget av søvnløshet slik at det har gått ut over arbeidsevnen? 297	*Ja*	*Nei*
	☐	☐

Har du i løpet av siste måned hatt innsovningsproblemer? *Bare ett kryss* 298

Nesten hver natt ☐1 Av og til ☐3
Ofte ☐2 Aldri ☐4

Har du i løpet av siste måned våknet for tidlig og ikke fått sove igjen? *Bare ett kryss* 299

Nesten hver natt ☐1 Av og til ☐3
Ofte ☐2 Aldri ☐4

Har du i løpet av siste måned vært plaget av nervøsitet (irritabel, urolig, anspent eller rastløs)? 300

Nesten hele tida ☐1
Ofte ☐2
Av og til ☐3
Aldri ☐4

HVORDAN DU HAR HATT DET

Har det noen gang i løpet av ditt liv vært *sammenhengende perioder på 2 uker eller mer* da du:	*Ja*	*Nei*
følte deg deprimert, trist og nedfor 301	☐	☐
hadde problemer med matlysten eller spiste alt for lite	☐	☐
var plaget av kraftløshet eller mangel på overskudd	☐	☐
virkelig bebreidet deg selv og følte deg verdiløs	☐	☐
hadde problemer med å konsentrere deg eller vanskelig for å ta beslutninger	☐	☐
hadde minst tre av de problemene som er nevnt ovenfor samtidig 305	☐	☐

HVORDAN DU SER PÅ DEG SELV

Folk ser på seg selv på ulike måter. Kryss av for hvert utsagn hvor enig eller uenig du er. *Ett kryss på hver linje*

	Svært enig	*Enig*	*Uenig*	*Svært uenig*
Jeg har en positiv holdning til meg selv 307	☐	☐	☐	☐
Jeg føler meg virkelig ubrukelig til tider 308	☐	☐	☐	☐
Jeg føler at jeg ikke har mye å være stolt av 309	☐	☐	☐	☐
Jeg føler at jeg er en verdifull person, i allefall på lik linje med andre 310	☐	☐	☐	☐

	Ja	*Nei*
Synes du at du har funnet et virkelig betydningsfullt innhold i livet ditt? 311	☐	☐
Føler du at du lever fullt ut? 312	☐	☐

HVORDAN DU FØLER DEG NÅ

*Sett kryss i den ruta utenfor det svaret som best beskriver dine følelser **den siste uka.** Bare ett kryss*

Er du vanligvis glad eller nedstemt? 313

Svært nedstemt ☐1
Nedstemt ☐2
Nokså nedstemt ☐3
Både – og ☐4
Nokså glad ☐5
Glad ☐6
Svært glad ☐7

Har du i det store og hele en rolig og god følelse inne i deg? 314

Nesten hele tida ☐1
Ofte ☐2
Av og til ☐3
Aldri ☐4

Føler du deg stort sett sterk og opplagt, eller trøtt og sliten? 315

Meget sterk og opplagt ☐1
Sterk og opplagt ☐2
Ganske sterk og opplagt ☐3
Både – og ☐4
Ganske trøtt og sliten ☐5
Trøtt og sliten ☐6
Svært trøtt og sliten ☐7

Legg det utfylte spørreskjemaet i den vedlagte svarkonvolutten og postlegg den så snart som mulig!
Porto er betalt.
Hjertelig takk for hjelpa!

Steinkjer Trykkeri AS – 74 16 30 00

hunt
Helseundersøkelsen i Nord-Trøndelag

SKJEMA FOR KVINNER 70 ÅR OG ELDRE

Takk for frammøtet til undersøkelsen!
Vi vil også be deg fylle ut dette spørreskjemaet. Opplysningene vil bli brukt i større forskningsarbeider om forebyggende helsearbeid. Noen av spørsmålene likner på spørsmål du har svart på i det skjemaet du fylte ut heime og leverte ved frammøte til helseundersøkelsen. Det er likevel viktig at du svarer på alle spørsmålene også i dette skjemaet. Det utfylte skjemaet returneres i vedlagte svarkonvolutt. Porto er betalt.
Alle opplysningene er underlagt streng taushetspliKt.

Vennlig hilsen
Helsetjenesten i Nord-Trøndelag
Statens Institutt for Folkehelse Statens helseundersøkelser

Hvis du ikke ønsker å besvare spørreskjemaet, sett kryss her og returner skjemaet. Da slipper du purring
Jeg ønsker ikke å besvare skjemaet ○

UTFYLLING

Dato for utfylling av skjema: / 19 19

OPPVEKST

I hvilken kommune bodde du da du fylte 1 år?
Hvis du ikke bodde i Norge, oppgi land i stedet for kommune
24

BOLIG

Hvilken type bolig bor du i? *Bare ett kryss*
- Enebolig/villa 25 ☐ 1
- Gårdsbruk ☐ 2
- Blokk/terrasseleilighet ☐ 3
- Rekkehus/2-4 mannsbolig ☐ 4
- Trygdebolig/aldersbolig/servicebolig ☐ 5
- Sykeheim/aldersheim ☐ 6
- Annen bolig ☐ 7

Hvor stor er din boenhet? 26 kvm

	Ja	Nei
Er det heldekkende tepper i stua? 29	☐	☐
Er det heldekkende tepper på ditt soverom?	☐	☐
Er det katt i boligen? 31	☐	☐
Er det hund i boligen?	☐	☐
Er det andre pelskledde dyr eller fugler i boligen?	☐	☐

Hvem bor du sammen med? *Ett eller flere kryss*
- Ektefelle/samboer 34 ☐
- Barn/svigerbarn ☐
- Bor alene 36 ☐
- Søster/bror 37 ☐
- Annen familie/slekt ☐
- Andre 39 ☐

SYKDOM I FAMILIEN

Kryss av for de slektningene som har eller har hatt noen av sykdommene. Kryss av for "ingen" hvis ingen av slektningene har hatt denne sykdommen. *Evt. flere kryss på hver linje*

	Mor	Far	Bror	Søster	Barn	Ingen
Hjerneslag eller hjerneblødning 40	☐	☐	☐	☐	☐	☐
Hjerteinfarkt før 60 års alder 46	☐	☐	☐	☐	☐	☐
Astma 52	☐	☐	☐	☐	☐	☐
Allergi 58	☐	☐	☐	☐	☐	☐
Kreftsykdom 64	☐	☐	☐	☐	☐	☐
Høyt blodtrykk 70	☐	☐	☐	☐	☐	☐
Psykiske plager 76	☐	☐	☐	☐	☐	☐
Osteoporose (benskjørhet) 82	☐	☐	☐	☐	☐	☐
Diabetes (sukkersyke) 88	☐	☐	☐	☐	☐	☐
Alder da de fikk diabetes 94	år	år	år	år	år	

	Ja	Nei
Har du *selv* høysnue eller neseallergi? 104	☐	☐

SIVILSTAND

Hva er din sivilstand? 105
- Gift ☐ 1
- Skilt/separert ☐ 2
- Enke ☐ 3
- Har aldri vært gift ☐ 4

BRUK AV HELSETJENESTER

Har du i løpet av de siste 12 månedene vært hos:
Ett kryss på hver linje

	Ja	Nei
allmennpraktiserende lege (kommunelege, privatpraktiserende lege, turnuskandidat) 106	☐	☐
lege ved sykehus (uten at du var innlagt)	☐	☐
annen lege	☐	☐
fysioterapeut	☐	☐
kiropraktor	☐	☐
homøopat 111	☐	☐
annen behandler (naturmedisiner, fotsoneterapeut, håndspålegger, "healer", "synsk", e.l.)	☐	☐

SYKEHUS

	Ja	Nei
Har du vært innlagt i sykehus de siste 5 åra? 113	☐	☐

Hvis «Ja»: Svar ut fra siste gang du var innlagt

Synes du at du ble utskrevet for tidlig, i passe tid eller for seint? 114
- For tidlig ☐
- I passe tid ☐
- For seint ☐

Hvor ble du utskrevet til? 115
- Heim ☐
- Kuropphold ☐
- Sykeheim ☐

	Ja	Nei
Fikk du tilstrekkelig hjelp og oppfølging etter utskrivingen? 116	☐	☐

HEIMEHJELP

	Ja	Nei
Har du heimehjelp?		
Privat 117	☐	☐
Kommunal 118	☐	☐

Dersom du har KOMMUNAL heimehjelp: **Har du nok kommunal heimehjelp, eller trenger du mer?** 119
- Ja, jeg har nok ☐
- Nei, jeg trenger mer ☐

	Ja	Nei
I tilfelle du IKKE har kommunal heimehjelp: **Trenger du kommunal heimehjelp?** 120	☐	☐

HEIMESYKEPLEIE

	Ja	Nei
Har du heimesykepleie? 121	☐	☐

Hvis «Ja»:

Har du nok heimesykepleie, eller trenger du mer?

- Ja, jeg har nok ☐
- Nei, jeg trenger mer ☐

SYKEHEIM

Har du vært innlagt på sykeheim i løpet av de siste 12 månedene? 123

- Nei ☐
- Ja, jeg har vært der en periode ☐
- Ja, jeg bor der fast ☐

Hvis «Nei», kan du hoppe over de neste to spørsmålene

Hvis «Ja»:

Hvor var du FØR du ble innlagt på sykeheimen siste gang? 124

- Bodde i egen heim ☐
- Var innlagt i sykehus ☐
- Var annet sted ☐

Hvis du har vært på sykeheimen EN PERIODE i løpet av de siste 12 mndr.:

Bodde du på sykeheimen passe lenge? 125

- Det var for kort tid ☐
- Passe tid ☐
- Det var for lang tid ☐

KOMMUNAL HJELP ALT I ALT

Hvordan er du alt i alt fornøyd med hjelpa du får fra kommunen? 126

- Meget fornøyd ..... ☐ 1
- Nokså fornøyd ..... ☐ 2
- Nokså misfornøyd .. ☐ 3
- Meget misfornøyd .. ☐ 4
- Jeg får ingen hjelp, men burde ha hatt det .... ☐ 5
- Jeg får ingen hjelp, og trenger det ikke ..... ☐ 6

KOSTHOLD

Hvor mange måltider spiser du vanligvis daglig (middag og brødmåltid)? 127 — Antall

Hvor mange dager i uka spiser du varm middag?

Hva slags type brød (kjøpt eller hjemmebakt) spiser du vanligvis? *Inntil to kryss*

Brødtypen ligner mest på 129	*Loff*	*Fint brød*	*Knepp-brød*	*Grov-brød*	*Knekke-brød*
	☐	☐	☐	☐	☐

Hva slags *fett* blir vanligvis brukt i din husholdning?

Ett kryss for matlaging og ett kryss for brød	*Til matlaging*	*På brød*
Bruker *ikke* smør eller margarin	134 ☐ 1	135 ☐ 1
Meierismør	☐ 2	☐ 2
Hard margarin	☐ 3	☐ 3
Bløt (soft) margarin	☐ 4	☐ 4
Smør/margarin blanding	☐ 5	☐ 5
Lettmargarin	☐ 6	☐ 6
Oljer	☐ 7	

Hvor mange glass melk (alle sorter, også drikkeyoghurt) drikker du vanligvis daglig? *Bare ett kryss* 136

- Ingen ..... ☐ 1
- Mindre enn ett ..... ☐ 2
- 1–2 glass ..... ☐ 3
- 3 eller mer ..... ☐ 4

Hvor mange brødskiver med kvitost spiser du vanligvis daglig? *Bare ett kryss* 137

- Ingen ..... ☐ 1
- Mindre enn en ..... ☐ 2
- 1–2 skiver ..... ☐ 3
- 3 eller mer ..... ☐ 4

HVILE OG AVSLAPPING

Hvor mange timer tilbringer du *vanligvis* i *liggende* stilling i løpet av et døgn? (nattesøvn, middagshvil) ..... 138 — Antall timer

Hvor mange timer tilbringer du *vanligvis* i *sittende* stilling i løpet av et døgn? (arbeid, måltider, TV, bil etc.) ..... 140 — Antall timer

Har du i løpet av siste måned hatt innsovningsproblemer? *Bare ett kryss* 142

- Nesten hver natt ..... ☐ 1
- Ofte ..... ☐ 2
- Av og til ..... ☐ 3
- Aldri ..... ☐ 4

Har du i løpet av siste måned våknet for tidlig og ikke fått sove igjen? *Bare ett kryss* 143

- Nesten hver natt ..... ☐ 1
- Ofte ..... ☐ 2
- Av og til ..... ☐ 3
- Aldri ..... ☐ 4

MEDISINBRUK

	Ja	Nei
Har du i deler av de siste 12 måneder brukt noen medisiner daglig eller nesten daglig? 144	☐	☐

Hvis "Ja":

Angi hvor mange måneder du brukte følgende medisiner: *Sett 0 hvis du ikke har brukt medisinene*

	Antall mndr
smertestillende 145	
sovemedisin 147	
beroligende medisin	
medisin mot depresjon	
allergimedisin 153	
astmamedisin 155	

	Antall mndr
hjertemedisin (ikke blodtrykksmedisin)	
annen medisin.....	
Kosttilskudd:	
jerntabletter 161	
vitamin D-tilskudd	
andre vitamintilskudd	
tran/fiskeoljer..... 167	

Hvor ofte har du brukt avslappende/beroligende medisin eller sovemedisin den siste måneden? 169

- Daglig ..... ☐ 1
- Hver uke, men ikke hver dag ☐ 2
- Sjeldnere enn hver uke ☐ 3
- Aldri..... ☐ 4

VENNER

Hvor mange gode venner har du? Regn med de du kan snakke fortrolig med og som kan gi deg god hjelp når du trenger det ..... 170 — Antall

Tell ikke med de du bor sammen med, men regn med andre slektninger

	Ja	Nei
Føler du at du har mange nok gode venner? 172	☐	☐

Hvor ofte tar du vanligvis del i foreningsvirksomhet som f.eks. syklubb, eldresenter, pensjonistforening, politiske lag, religiøse eller andre foreninger? *Bare ett kryss* 173

Aldri, eller noen
få ganger i året ..... ☐1 Omtrent en gang i uka ... ☐3
1–2 ganger i måneden ... ☐2 Mer enn en gang i uka ... ☐4

HUMØR OG TRIVSEL

Ett kryss på hver linje

Angi hvordan du har følt deg den siste måneden:	*Aldri*	*Noen ganger*	*Ganske ofte*	*For det meste*
i godt humør 174	☐	☐	☐	☐
i dårlig humør 175	☐	☐	☐	☐

	Svært treg	*Ganske treg*	*Ganske rask*	*Svært rask*
Er du rask til å oppfatte et humoristisk poeng? 176	☐	☐	☐	☐

Er du enig i at det er noe ansvarsløst over folk som stadig prøver å være morsomme? 177

Nei, slett ikke ..... ☐1 Ganske enig ..... ☐3
I noen grad ..... ☐2 Ja, absolutt ..... ☐4

Er du en munter person? 178

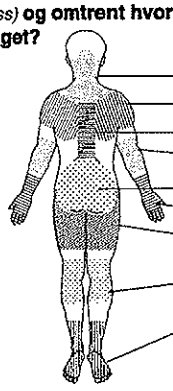
Nei, slett ikke ..... ☐1 Ganske munter ..... ☐3
I noen grad ..... ☐2 Ja, absolutt ..... ☐4

MUSKEL-/SKJELETTPLAGER

Har du hatt plager (smerter, verk, ubehag) i muskler og/eller ledd i *den siste måneden*? ..... 179 *Ja* ☐ *Nei* ☐

Hvis «Nei»: Gå til HODEPINE

Hvis «Ja»: Hvor har du hatt disse plagene *(ett eller flere kryss)* **og omtrent hvor mange dager tilsammen var du plaget?**



Plager (Sett kryss)	Antall dager
Nakke 180	
Skuldre/aksler.....183	
Øvre del av ryggen	
Albuer 189	
Korsryggen 192	
Handledd/hender	
Hofter.....198	
Knær.....201	
Ankler/føtter 204	

*Dersom flere kryss: Sett **ring** rundt krysset **der plagen var verst***

Har plagene hindret deg i å utføre daglige aktiviteter den siste måneden? ..... 207 *Ja* ☐ *Nei* ☐

HODEPINE

Har du vært plaget av hodepine i løpet av de siste 12 måneder? 208

Ja, anfallsvis (migrene)..... 1☐
Ja, annen slags hodepine.. 2☐
Nei ..... 3☐

Antall anfall siste 12 mndr. 209 ☐☐☐

Hvis «Nei»: Gå til URINLEKKASJE

Omtrent hvor mange dager pr. måned har du hodepine?

Mindre enn 7 dager ☐1 7 til 14 dager ☐2 Mer enn 14 d. ☐3

Hvor lenge varer hodepinen vanligvis hver gang? 212

Mindre enn 4 timer ☐1 4 timer–3 døgn ☐2 Mer enn 3 døgn ☐3

Hvor ofte er hodepinen preget av eller ledsaget av:

Ett kryss på hver linje

	Sjelden eller aldri	*Av og til*	*Ofte*
bankende/dunkende smerte 213	☐	☐	☐
pressende smerte	☐	☐	☐
halvsidighet, alltid samme side	☐	☐	☐
halvsidighet, vekselvis h. og v. side	☐	☐	☐
smerter i «hele hodet»	☐	☐	☐
kvalme 218	☐	☐	☐
lys- og/eller lydskyhet	☐	☐	☐
forverring ved fysisk aktivitet.....	☐	☐	☐
synsforstyrrelser *før* hodepine 221	☐	☐	☐

Hvor mange tabletter/stikkpiller har du eventuelt brukt av disse medisinene *alt i alt i løpet av den siste måneden*?

Skriv 0 hvis du ikke har brukt medisinen.

Cafergot ☐☐ 222 Anervan ☐☐ 224 Imigran ☐☐ 226

URINLEKKASJE

Har du lekkasje av urin (uansett mengde) minst to ganger per måned? ..... 228 *Ja* ☐ *Nei* ☐

Hvis «Nei»: Gå til MENSTRUASJON OG OVERGANG...

Hvor ofte har du urinlekkasje? 229

noen få ganger per måned ..... ☐
en eller flere ganger per uke ..... ☐
hver dag og/eller natt ..... ☐

Hvor mye urin lekker du vanligvis hver gang? 230

dråper eller lite ..... ☐
små skvetter eller mer ..... ☐

Har du lekkasje av urin i forbindelse med	*Ja*	*Nei*
hosting, nysing eller latter 231	☐	☐
løft	☐	☐

Hender det at du har lekkasje av urin i forbindelse med plutselig og sterk vannlatingstrang? 233 *Ja* ☐ *Nei* ☐

Hvordan opplever du lekkasjeplagene dine? *Bare ett kryss*

Ikke noe problem ..... ☐
en liten plage ..... ☐
en del plaget ..... ☐
mye plaget ..... ☐
svært stort problem ..... ☐

Har du søkt lege pga. urinlekkasje? ..... 235 *Ja* ☐ *Nei* ☐

MENSTRUASJON OG OVERGANGSALDER

Hvor gammel var du da menstruasjonen sluttet? ☐☐ år

HORMONBEHANDLING

Utenom p-piller

Har du noen gang brukt medisiner som inneholder østrogen? Vanlige navn på slike medisiner er: Cyclabil, Estraderm, Kilogest, Ovesterin, Progynova, Trisekvens.

	Nå	*Før*	*Aldri*
Tabletter eller plaster 238	☐	☐	☐
Krem eller stikkpiller 239	☐	☐	☐

Hvis «Ja»: Hvor gammel var du første gang du fikk østrogenmedisin, og omtrent hvor mange år brukte du slik medisin?

	Din alder	*Antall år*
Tabletter eller plaster 240	☐☐	☐☐
Krem eller stikkpiller 244	☐☐	☐☐

Hvis du bruker østrogenmedisin nå, hvilket merke bruker du? 248

OPERASJONER I UNDERLIVET

	Ja	Nei	Vet ikke
Har du fått fjernet begge eggstokkene (totalt)? 249	☐	☐	☐

Hvis du har fjernet begge eggstokkene, hvor gammel var du da? 250 ☐ år

	Ja	Nei	Vet ikke
Har du fått fjernet hele livmoren? 252	☐	☐	☐

Hvis du har fjernet hele livmoren, hvor gammel var du da? 253 ☐ år

GRAVIDITETER, FØDSLER OG AMMING

Hvor mange ganger har du vært gravid totalt?
Regn med alle svangerskap, spontane eller selvbestemte aborter, så vel som fødsler (også dødfødsler). 255 ☐ ganger

Hvor mange barn har du født? 257 ☐ barn

Fyll ut for hvert barn (de første 6) opplysninger om fødselsår og omtrent antall måneder du ammet hvert barn og antall måneder menstruasjonen din var borte etter fødselen (fylles ut også for dødfødte eller for barn som er døde senere i livet).

Barn	Fødselsår	Antall måneder med amming	Antall blødningsfrie måneder
1 258	19		
2 264	19		
3 270	19		
4 276	19		
5 282	19		
6 288	19		

HVORDAN DU SER PÅ DEG SELV

Folk ser på seg selv på ulike måter. Kryss av for hvert utsagn hvor enig eller uenig du er. *Ett kryss på hver linje*

	Svært enig	Enig	Uenig	Svært uenig
Jeg har en positiv holdning til meg selv 294	☐	☐	☐	☐
Jeg føler meg virkelig ubrukelig til tider 295	☐	☐	☐	☐
Jeg føler at jeg ikke har mye å være stolt av 296	☐	☐	☐	☐
Jeg føler at jeg er en verdifull person, i allefall på lik linje med andre 297	☐	☐	☐	☐

	Ja	Nei
Synes du at du har funnet et virkelig betydningsfullt innhold i livet ditt? 298	☐	☐
Føler du at du lever fullt ut? 299	☐	☐

HVORDAN DU FØLER DEG NÅ

*Sett kryss i den ruta utenfor det svaret som best beskriver dine følelser **den siste uka.** Bare ett kryss*

Føler du deg stort sett sterk og opplagt, eller trøtt og sliten? 300

- ☐ 1 Meget sterk og opplagt
- ☐ 2 Sterk og opplagt
- ☐ 3 Ganske sterk og opplagt
- ☐ 4 Både – og
- ☐ 5 Ganske trøtt og sliten
- ☐ 6 Trøtt og sliten
- ☐ 7 Svært trøtt og sliten

Har du i det store og hele en rolig og god følelse inne i deg? 301

- ☐ 1 Nesten hele tida
- ☐ 2 Ofte
- ☐ 3 Av og til
- ☐ 4 Aldri

Er du vanligvis glad eller nedstemt? 302

- ☐ 1 Svært nedstemt
- ☐ 2 Nedstemt
- ☐ 3 Nokså nedstemt
- ☐ 4 Både – og
- ☐ 5 Nokså glad
- ☐ 6 Glad
- ☐ 7 Svært glad

LEGEMLIGE FUNKSJONER

Klarer du selv, uten hjelp av andre, i det daglige å:
Ett kryss på hver linje

	Ja	Med noe hjelp	Nei
Gå innendørs i samme etasje 303	☐	☐	☐
Gå på toalettet	☐	☐	☐
Vaske deg på kroppen 305	☐	☐	☐
Bade eller dusje	☐	☐	☐
Kle på og av deg 307	☐	☐	☐
Legge deg og stå opp	☐	☐	☐
Spise selv 309	☐	☐	☐

Hvis du har hatt hjelp til noe av dette, omtrent hvor lenge har du hatt hjelp? *Bare ett kryss* 310

- ☐ 1 Under 3 måneder
- ☐ 2 3 – 6 måneder
- ☐ 3 1/2 – 1 år
- ☐ 4 1 – 5 år
- ☐ 5 Mer enn 5 år

Hvis du trenger hjelp til ett eller flere av disse gjøremålene, hvem er det som for det meste hjelper deg?
Bare ett kryss

- ☐ 1 Ektefelle/samboer
- ☐ 2 Barn/svigerbarn
- ☐ 3 Søster/bror
- ☐ 4 Annen familie/slekt
- ☐ 5 Andre

DAGLIGE OPPGAVER

Klarer du selv disse gjøremålene i det daglige uten hjelp fra andre? *Ett kryss på hver linje*

	Ja	Med noe hjelp	Nei
Lage varm mat 312	☐	☐	☐
Gjøre lett husarbeid (f.eks. oppvask)	☐	☐	☐
Gjøre tyngre husarbeid (f.eks. gulvvask) 314	☐	☐	☐
Vaske klær	☐	☐	☐
Betale regninger 316	☐	☐	☐
Ta medisinene	☐	☐	☐
Komme deg ut 318	☐	☐	☐
Gjøre innkjøp	☐	☐	☐
Ta bussen 320	☐	☐	☐

Hvis du trenger hjelp til ett eller flere av disse gjøremålene, omtrent hvor lenge har du hatt hjelp?
Bare ett kryss 321

- ☐ 1 Under 3 måneder
- ☐ 2 3 – 6 måneder
- ☐ 3 1/2 – 1 år
- ☐ 4 1 – 5 år
- ☐ 5 Mer enn 5 år

Hvis du trenger hjelp til ett eller flere av disse gjøremålene, hvem er det som for det meste hjelper deg?
Bare ett kryss 322

- ☐ 1 Ektefelle/samboer
- ☐ 2 Barn/svigerbarn
- ☐ 3 Søster/bror
- ☐ 4 Annen familie/slekt
- ☐ 5 Andre

Legg det utfylte spørreskjemaet i den vedlagte svarkonvolutten og postlegg den så snart som mulig!
Porto er betalt.

Hjertelig takk for hjelpa!

Steinkjer Trykkeri AS – 74 16 30 00

hunt

Helseundersøkelsen i Nord-Trøndelag

SKJEMA FOR MENN 70 ÅR OG ELDRE

Takk for frammøtet til undersøkelsen!
Vi vil også be deg fylle ut dette spørreskjemaet. Opplysningene vil bli brukt i større forskningsarbeider om forebyggende helsearbeid. Noen av spørsmålene likner på spørsmål du har svart på i det skjemaet du fylte ut heime og leverte ved frammøte til helseundersøkelsen. Det er likevel viktig at du svarer på alle spørsmålene også i dette skjemaet. Det utfylte skjemaet returneres i vedlagte svarkonvolutt. Porto er betalt.
Alle opplysningene er underlagt streng taushetsplikt.

Vennlig hilsen
Helsetjenesten i Nord-Trøndelag
Statens Institutt for Folkehelse Statens helseundersøkelser

Hvis du ikke ønsker å besvare spørreskjemaet, sett kryss her og returner skjemaet. Da slipper du purring.
Jeg ønsker ikke å besvare skjemaet ○

UTFYLLING

Dato for utfylling av skjema: / 19 19

OPPVEKST

I hvilken kommune bodde du da du fylte 1 år?
Hvis du ikke bodde i Norge, oppgi land i stedet for kommune

24

BOLIG

Hvilken type bolig bor du i? *Bare ett kryss*

Enebolig/villa	25	1
Gårdsbruk		2
Blokk/terrasseleilighet		3
Rekkehus/2-4 mannsbolig		4
Trygdebolig/aldersbolig/servicebolig		5
Sykeheim/aldersheim		6
Annen bolig		7

Hvor stor er din boenhet? 26 kvm

		Ja	Nei
Er det heldekkende tepper i stua?	29		
Er det heldekkende tepper på ditt soverom?			
Er det katt i boligen?	31		
Er det hund i boligen?			
Er det andre pelskledde dyr eller fugler i boligen?			

Hvem bor du sammen med? *Ett eller flere kryss*

Ektefelle/samboer	34	Søster/bror	37
Barn/svigerbarn		Annen familie/slekt	
Bor alene	36	Andre	38

SYKDOM I FAMILIEN

Kryss av for de slektningene som har eller har hatt noen av sykdommene. Kryss av for "ingen" hvis ingen av slektningene har hatt denne sykdommen. *Evt. flere kryss på hver linje*

		Mor	Far	Bror	Søster	Barn	Ingen
Hjerneslag eller hjerneblødning	40						
Hjerteinfarkt før 60 års alder	46						
Astma	52						
Allergi	58						
Kreftsykdom	64						
Høyt blodtrykk	70						
Psykiske plager	76						
Osteoporose (benskjørhet)	82						
Diabetes (sukkersyke)	88						
Alder da de fikk diabetes	94	år	år	år	år	år	

		Ja	Nei
Har du *selv* høysnue eller neseallergi?	104		

SIVILSTAND

Hva er din sivilstand? 105

Gift	1	Enkemann	3
Skilt/separert	2	Har aldri vært gift	4

BRUK AV HELSETJENESTER

Har du i løpet av de siste 12 månedene vært hos:

Ett kryss på hver linje		Ja	Nei
allmennpraktiserende lege (kommunelege, privatpraktiserende lege, turnuskandidat)	108		
lege ved sykehus (uten at du var innlagt)			
annen lege			
fysioterapeut			
kiropraktor			
homøopat	111		
annen behandler (naturmedisiner, fotsoneterapeut, håndspålegger, "healer", "synsk", e.l.)			

SYKEHUS

		Ja	Nei
Har du vært innlagt i sykehus de siste 5 åra?	113		

Hvis «Ja»: Svar ut fra siste gang du var innlagt

Synes du at du ble utskrevet for tidlig, i passe tid eller for seint? 114

For tidlig	
I passe tid	
For seint	

Hvor ble du utskrevet til? 115

Heim	
Kuropphold	
Sykeheim	

		Ja	Nei
Fikk du tilstrekkelig hjelp og oppfølging etter utskrivingen?	116		

HEIMEHJELP

Har du heimehjelp?		Ja	Nei
Privat	117		
Kommunal	118		

Dersom du har KOMMUNAL heimehjelp: **Har du nok kommunal heimehjelp, eller trenger du mer?** 119

Ja, jeg har nok	
Nei, jeg trenger mer	

I tilfelle du IKKE har kommunal heimehjelp:		Ja	Nei
Trenger du kommunal heimehjelp?	120		

HEIMESYKEPLEIE

Ja Nei

Har du heimesykepleie? ..... 121 ☐ ☐

Hvis «Ja»:

Har du nok heimesykepleie, eller trenger du mer?

Ja, jeg har nok ..... ☐
Nei, jeg trenger mer ..... ☐

SYKEHEIM

Har du vært innlagt på sykehelm i løpet av de siste 12 månedene? 123

Nei ..... ☐
Ja, jeg har vært der en periode ..... ☐
Ja, jeg bor der fast ..... ☐

Hvis «Nei», kan du hoppe over de neste to spørsmålene

Hvis «Ja»:

Hvor var du FØR du ble innlagt på sykeheimen siste gang? 124

Bodde i egen heim ..... ☐
Var innlagt i sykehus ..... ☐
Var annet sted ..... ☐

Hvis du har vært på sykeheimen EN PERIODE i løpet av de siste 12 mndr.:

Bodde du på sykehelmen passe lenge? 125

Det var for kort tid ..... ☐
Passe tid ..... ☐
Det var for lang tid ..... ☐

KOMMUNAL HJELP ALT I ALT

Hvordan er du alt i alt fornøyd med hjelpa du får fra kommunen? 126

Meget fornøyd ..... ☐1
Nokså fornøyd ..... ☐2
Nokså misfornøyd .. ☐3
Meget misfornøyd .. ☐4

Jeg får ingen hjelp, men burde ha hatt det ..... ☐5
Jeg får ingen hjelp, og trenger det ikke ..... ☐6

KOSTHOLD

Hvor mange måltider spiser du vanligvis daglig (middag og brødmåltid)? ..... 127 Antall

Hvor mange dager i uka spiser du varm middag?

Hva slags type brød (kjøpt eller hjemmebakt) spiser du vanligvis? *Inntil to kryss*

Brødtypen ligner mest på 129	*Loff* ☐	*Fint brød* ☐	*Kneipp-brød* ☐	*Grov-brød* ☐	*Knekke-brød* ☐

Hva slags *fett* blir vanligvis brukt i din husholdning?

Ett kryss for matlaging og ett kryss for brød	*Til matlaging* 134	*På brød* 135
Bruker *ikke* smør eller margarin	☐1	☐1
Meierismør	☐2	☐2
Hard margarin	☐3	☐3
Bløt (soft) margarin	☐4	☐4
Smør/margarin blanding	☐5	☐5
Lettmargarin	☐6	☐6
Oljer	☐7	

Hvor mange glass melk (alle sorter, også drikkeyoghurt) drikker du vanligvis daglig? *Bare ett kryss* 136

Ingen ..... ☐1 1–2 glass ..... ☐3
Mindre enn ett ..... ☐2 3 eller mer ..... ☐4

Hvor mange brødskiver med kvitost spiser du vanligvis daglig? *Bare ett kryss* 137

Ingen ..... ☐1 1–2 skiver ..... ☐3
Mindre enn en ..... ☐2 3 eller mer ..... ☐4

HVILE OG AVSLAPPING

Hvor mange timer tilbringer du *vanligvis* i *liggende* stilling i løpet av et døgn? (nattesøvn, middagshvil) ..... 139 Antall timer

Hvor mange timer tilbringer du *vanligvis* i *sittende* stilling i løpet av et døgn? (arbeid, måltider, TV, bil etc.) ..... 140 Antall timer

Har du i løpet av siste måned hatt innsovnings-problemer? *Bare ett kryss* 142

Nesten hver natt ..... ☐1 Av og til ..... ☐3
Ofte ..... ☐2 Aldri ..... ☐4

Har du i løpet av siste måned våknet for tidlig og ikke fått sove igjen? *Bare ett kryss* 143

Nesten hver natt ..... ☐1 Av og til ..... ☐3
Ofte ..... ☐2 Aldri ..... ☐4

MEDISINBRUK

Ja Nei

Har du i deler av de siste 12 måneder brukt noen medisiner daglig eller nesten daglig? ..... 144 ☐ ☐

Hvis "Ja":

Angi hvor mange måneder du brukte følgende medisiner: *Sett 0 hvis du ikke har brukt medisinene*

	Antall mndr		Antall mndr
smertestillende 145		hjertemedisin (ikke blodtrykksmedisin)	
sovemedisin 147		annen medisin	
beroligende medisin		*Kosttilskudd:*	
medisin mot depresjon		jerntabletter 161	
allergimedisin 153		vitamin D-tilskudd	
astmamedisin 155		andre vitamintilskudd	
		tran/fiskeoljer 167	

Hvor ofte har du brukt avslappende/beroligende medisin eller sovemedisin den siste måneden? 169

Daglig ..... ☐1 Sjeldnere enn hver uke ☐3
Hver uke, men ikke hver dag ☐2 Aldri ..... ☐4

VENNER

Hvor mange gode venner har du?
Regn med de du kan snakke fortrolig med og som kan gi deg god hjelp når du trenger det ..... 170 Antall

Tell ikke med de du bor sammen med, men regn med andre slektninger

Ja Nei

Føler du at du har mange nok gode venner? .... 172 ☐ ☐

Hvor ofte tar du vanligvis del i foreningsvirksomhet som f.eks. syklubb, eldresenter, pensjonistforening, politiske lag, religiøse eller andre foreninger? *Bare ett kryss* 173

Aldri, eller noen
få ganger i året ..... ☐1 Omtrent en gang i uka ... ☐3
1–2 ganger i måneden ... ☐2 Mer enn en gang i uka ... ☐4

HUMØR OG TRIVSEL

Ett kryss på hver linje

Angi hvordan du har følt deg den siste måneden:	*Aldri*	*Noen ganger*	*Ganske ofte*	*For det meste*
i godt humør 174	☐	☐	☐	☐
i dårlig humør 175	☐	☐	☐	☐

Er du rask til å oppfatte et humoristisk poeng? 176	*Svært treg*	*Ganske treg*	*Ganske rask*	*Svært rask*
	☐	☐	☐	☐

Er du enig i at det er noe ansvarsløst over folk som stadig prøver å være morsomme? 177

Nei, slett ikke ..... ☐1 Ganske enig ..... ☐3
I noen grad ..... ☐2 Ja, absolutt ..... ☐4

Er du en munter person? 178

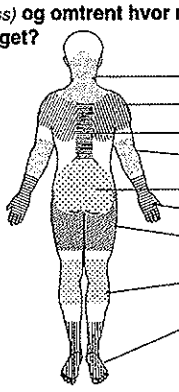
Nei, slett ikke ..... ☐1 Ganske munter ..... ☐3
I noen grad ..... ☐2 Ja, absolutt ..... ☐4

MUSKEL-/SKJELETTPLAGER

Har du hatt plager (smerter, verk, ubehag) i muskler og/eller ledd i *den siste måneden*? 179	*Ja*	*Nei*
	☐	☐

Hvis «Nei»: Gå til HODEPINE

Hvis «Ja»: Hvor har du hatt disse plagene *(ett eller flere kryss)* **og omtrent hvor mange dager tilsammen var du plaget?**



Plager (Sett kryss)	Antall dager
Nakke 180	
Skuldre/aksler.....183	
Øvre del av ryggen	
Albuer 189	
Korsryggen 192	
Handledd/hender	
Hofter.....198	
Knær.....201	
Ankler/føtter 204	

*Dersom flere kryss: Sett **ring** rundt krysset **der plagen var verst***

Har plagene hindret deg i å utføre daglige aktiviteter den siste måneden? 207	*Ja*	*Nei*
	☐	☐

HODEPINE

Har du vært plaget av hodepine i løpet av de siste 12 måneder? 208

Ja, anfallsvis (migrene)..... 1☐
Ja, annen slags hodepine.. 2☐
Nei ..... 3☐

Antall anfall siste 12 mndr. 209 ☐

Hvis «Nei»: Gå til URINLEKKASJE

Omtrent hvor mange dager pr. måned har du hodepine?

Mindre enn 7 dager ☐1 7 til 14 dager ☐2 Mer enn 14 d. ☐3

Hvor lenge varer hodepinen vanligvis hver gang? 212

Mindre enn 4 timer ☐1 4 timer–3 døgn ☐2 Mer enn 3 døgn ☐3

Hvor ofte er hodepinen preget av eller ledsaget av:

Ett kryss på hver linje	*Sjelden eller aldri*	*Av og til*	*Ofte*
bankende/dunkende smerte 213	☐	☐	☐
pressende smerte	☐	☐	☐
halvsidighet, alltid samme side	☐	☐	☐
halvsidighet, vekselvis h. og v. side	☐	☐	☐
smerter i «hele hodet»	☐	☐	☐
kvalme 218	☐	☐	☐
lys- og/eller lydskyhet	☐	☐	☐
forverring ved fysisk aktivitet.....	☐	☐	☐
synsforstyrreiser *før* hodepine 221	☐	☐	☐

Hvor mange tabletter/stikkpiller har du eventuelt brukt av disse medisinene *alt i alt i løpet av den siste måneden*?

Skriv 0 hvis du ikke har brukt medisinen.

Cafergot 222 ☐ Anervan 224 ☐ Imigran 226 ☐

URINVEGS- OG PROSTATAPLAGER

Ett kryss på hver linje

Har du noen gang blitt fortalt av lege at du har:	*Ja*	*Nei*
forstørret prostata 228	☐	☐
prostatakreft 229	☐	☐

Har du gjennomgått noe av følgende:	*Ja*	*Nei*
sterilisering.....230	☐	☐
tatt vevsprøve (biopsi) av prostata.....231	☐	☐
kirurgisk fjerning av prostata (helt eller delvis).....232	☐	☐

De neste spørsmålene gjelder siste måned

Bare ett kryss for hvert hver spørsmål

Hvor ofte har du hatt følelsen av at blæren ikke er blitt fullstendig tømt etter avsluttet vannlating? 233

Aldri ..... ☐1 Omtrent annenhver gang ... ☐4
Omtrent 1 av 5 ganger .... ☐2 Omtrent 2 av 3 ganger ..... ☐5
Omtrent 1 av 3 ganger .... ☐3 Nesten alltid ..... ☐6

Hvor ofte har du måttet late vannet på nytt mindre enn 2 timer etter forrige vannlating? 234

Aldri ..... ☐1 Omtrent annenhver gang ... ☐4
Omtrent 1 av 5 ganger .... ☐2 Omtrent 2 av 3 ganger ..... ☐5
Omtrent 1 av 3 ganger .... ☐3 Nesten alltid ..... ☐6

Hvor ofte har du måttet stoppe og starte flere ganger under vannlatingingen? 235

Aldri ..... ☐1 Omtrent annenhver gang ... ☐4
Omtrent 1 av 5 ganger .... ☐2 Omtrent 2 av 3 ganger ..... ☐5
Omtrent 1 av 3 ganger .... ☐3 Nesten alltid ..... ☐6

Hvor ofte syns du det har vært vanskelig å holde igjen når du har følt trang til å late vannet? 236

Aldri ..... ☐1 Omtrent annenhver gang ... ☐4
Omtrent 1 av 5 ganger .... ☐2 Omtrent 2 av 3 ganger ..... ☐5
Omtrent 1 av 3 ganger .... ☐3 Nesten alltid ..... ☐6

Hvor ofte har du hatt svak urinstråle? 237

Aldri ..... ☐1 Omtrent annenhver gang ... ☐4
Omtrent 1 av 5 ganger .... ☐2 Omtrent 2 av 3 ganger ..... ☐5
Omtrent 1 av 3 ganger .... ☐3 Nesten alltid ..... ☐6

Hvor ofte har du måttet trykke eller presse for å begynne vannlatingen? 238

Aldri ☐1 Omtrent annenhver gang ☐4
Omtrent 1 av 5 ganger ☐2 Omtrent 2 av 3 ganger ☐5
Omtrent 1 av 3 ganger ☐3 Nesten alltid ☐6

Hvor mange ganger har du vanligvis måttet stå opp i løpet av natta for å late vannet? 239

Ingen ☐1 2 ganger ☐3 4 ganger ☐5
1 gang ☐2 3 ganger ☐4 5 ganger eller mer ☐6

Hvis du resten av livet måtte leve med de vannlatingsproblemene du har nå, hvordan ville du føle det? 240

Være meget godt fornøyd ☐1 Være for det meste utilfreds ☐5
Være fornøyd ☐2 Være misfornøyd ☐6
Være for det meste tilfreds ☐3 Ha det forferdelig ☐7
Ha blandete følelser ☐4

HVORDAN DU SER PÅ DEG SELV

Folk ser på seg selv på ulike måter. Kryss av for hvert utsagn hvor enig eller uenig du er. *Ett kryss på hver linje*

	Svært enig	*Enig*	*Uenig*	*Svært uenig*
Jeg har en positiv holdning til meg selv 241	☐	☐	☐	☐
Jeg føler meg virkelig ubrukelig til tider 242	☐	☐	☐	☐
Jeg føler at jeg ikke har mye å være stolt av 243	☐	☐	☐	☐
Jeg føler at jeg er en verdifull person, i allefall på lik linje med andre 244	☐	☐	☐	☐

	Ja	*Nei*
Synes du at du har funnet et virkelig betydningsfullt innhold i livet ditt? 245	☐	☐
Føler du at du lever fullt ut? 246	☐	☐

HVORDAN DU FØLER DEG NÅ

Sett kryss i den ruta utenfor det svaret som best beskriver dine følelser ***den siste uka.*** *Bare ett kryss*

Føler du deg stort sett sterk og opplagt, eller trøtt og sliten? 247

Meget sterk og opplagt ☐1 Ganske trøtt og sliten ☐5
Sterk og opplagt ☐2 Trøtt og sliten ☐6
Ganske sterk og opplagt ☐3 Svært trøtt og sliten ☐7
Både – og ☐4

Har du i det store og hele en rolig og god følelse inne i deg? 248

Nesten hele tida ☐1 Av og til ☐3
Ofte ☐2 Aldri ☐4

Er du vanligvis glad eller nedstemt? 249

Svært nedstemt ☐1 Nokså glad ☐5
Nedstemt ☐2 Glad ☐6
Nokså nedstemt ☐3 Svært glad ☐7
Både – og ☐4

LEGEMLIGE FUNKSJONER

Klarer du selv, uten hjelp av andre, i det daglige å:

Ett kryss på hver linje

	Ja	*Med noe hjelp*	*Nei*
Gå innendørs i samme etasje 250	☐	☐	☐
Gå på toalettet	☐	☐	☐
Vaske deg på kroppen 252	☐	☐	☐
Bade eller dusje	☐	☐	☐
Kle på og av deg 254	☐	☐	☐
Legge deg og stå opp	☐	☐	☐
Spise selv 256	☐	☐	☐

Hvis du har hatt hjelp til noe av dette, omtrent hvor lenge har du hatt hjelp? *Bare ett kryss* 257

Under 3 måneder ☐1 1 – 5 år ☐4
3 – 6 måneder ☐2 Mer enn 5 år ☐5
1/2 – 1 år ☐3

Hvis du trenger hjelp til ett eller flere av disse gjøremålene, hvem er det som for det meste hjelper deg?

Bare ett kryss

Ektefelle/samboer ☐1 Annen familie/slekt ☐4
Barn/svigerbarn ☐2 Andre ☐5
Søster/bror ☐3

DAGLIGE OPPGAVER

Klarer du selv disse gjøremålene i det daglige uten hjelp fra andre? *Ett kryss på hver linje*

	Ja	*Med noe hjelp*	*Nei*
Lage varm mat 259	☐	☐	☐
Gjøre lett husarbeid (f.eks. oppvask)	☐	☐	☐
Gjøre tyngre husarbeid (f.eks. gulvvask) 261	☐	☐	☐
Vaske klær	☐	☐	☐
Betale regninger 263	☐	☐	☐
Ta medisinene	☐	☐	☐
Komme deg ut 265	☐	☐	☐
Gjøre innkjøp	☐	☐	☐
Ta bussen 267	☐	☐	☐

Hvis du trenger hjelp til ett eller flere av disse gjøremålene, omtrent hvor lenge har du hatt hjelp?

Bare ett kryss 268

Under 3 måneder ☐1 1 – 5 år ☐4
3 – 6 måneder ☐2 Mer enn 5 år ☐5
1/2 – 1 år ☐3

Hvis du trenger hjelp til ett eller flere av disse gjøremålene, hvem er det som for det meste hjelper deg?

Bare ett kryss 269

Ektefelle/samboer ☐1 Annen familie/slekt ☐4
Barn/svigerbarn ☐2 Andre ☐5
Søster/bror ☐3

Legg det utfylte spørreskjemaet i den vedlagte svarkonvolutten og postlegg den så snart som mulig!
Porto er betalt.

Hjertelig takk for hjelpa!

Stein Kjær Trykkeri AS – 74 16 30 00

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179.Marcus Schmitt-Egenolf: THE RELEVANCE OF THE MAJOR hISTOCOMPATIBILITY COMPLEX FOR THE GENETICS OF PSORIASIS
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