

Early View

Original research article

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52-year follow-up of a birth cohort reveals a high pneumonia incidence among young men

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Summary: This prospective follow-up of Northern Finland Birth Cohorts up to 52 years shows a high peak in pneumonia incidence among young male adults and reveals pneumonia risk factors among the young and working age populations.

Abstract

Background Knowledge of pneumonia incidence and risk factors in adults is mainly based on clinical studies of selected patient data and registers with aging populations. Prospective population-based investigations, such as birth cohort studies, are needed to understand pneumonia incidence and risk factors among the young and working age populations.

Methods Northern Finland Birth Cohort (NFBC) 1966 data (n=6750) was analysed for pneumonia incidence and risk factors. Incidence analysis was replicated using data from an independent NFBC 1986 cohort (n=9207). Pneumonia in relation with chronic conditions and lifestyle factors were analysed.

Results A peak with a maximum of 227 pneumonia episodes per 10 000 among men between the ages of 19 and 21 years was found in two independent cohorts. Pneumonia was associated with male sex (RR 1.72, 95% CI 1.45-2.04, $p<0.001$), low educational level (RR 2.30, 95% CI 1.72-3.09, $p<0.001$), smoking (RR 1.55, 95% CI 1.31-1.84, $p<0.001$), asthma (RR 2.19, 95% CI 1.73-2.75, $p<0.001$), cardiovascular diseases (RR 2.50, 95% CI 2.04-3.07, $p=0.001$), kidney diseases (RR 4.14, 95% CI 2.81-6.10, $p<0.001$), rheumatoid arthritis (RR 2.69, 95% CI 1.80-4.01, $p<0.001$), psoriasis (RR 2.91, 95% CI 1.92-4.41, $p<0.001$) and type II diabetes (RR 1.80, 95% CI

1.34-2.42, $p < 0.001$). Men with excessive alcohol consumption at age 31 were at risk for future pneumonia (RR 2.40, 95% CI 1.58-3.64, $p < 0.001$).

Conclusions Birth cohort data can reveal novel high-risk subpopulations, such as young males. Our study provides understanding of pneumonia incidence and risk factors among the young and working age populations.

Introduction

Pneumonia is a major cause of hospitalisation associated with a significant health burden and increased mortality [1]. The risk of pneumonia is particularly high among the young, the elderly, and the immunocompromised patients [1][2][3][4]. The highest pneumonia burden is suffered by the elderly with male gender predominance [5][6][7]. Pneumonia risk factors include low socioeconomic status, smoking, excessive alcohol consumption, chronic respiratory disease, chronic heart, liver and kidney diseases, autoimmune conditions, diabetes or haematological conditions, which are especially described among the elderly [8][9][10][11][12][13][14][15]. Risk profiles for pneumonia among the young and working-age adult populations, however, are not as equally assessed [16] [13] [17] [18][19][20].

Prospective and lifelong health information can be collected from birth cohorts. Northern Finland Birth Cohorts (NFBC) program offers invaluable longitudinal data to investigate a high number of variables from the entire population (www.oulu.fi/nfbc). We investigated the properties associated with pneumonia episodes among the individuals

born within the 1966 birth cohort (NFBC 1966) with a prospective follow-up for 52 years. An independent cohort, the NFBC 1986, was explored until the age of 33 years to replicate selected findings of the NFBC 1966. Health and lifestyle factors were analysed, in order to understand mechanisms associated with incidence of pneumonia.

Methods

Northern Finland Birth Cohort (NFBC) 1966

The NFBC 1966 includes all individuals born with the expected date set during the year 1966, comprising 12,231 children (96.3% of all births during 1966 in the area) in the Northern provinces of Finland [21]. Lifelong health information and national register data has been collected until age 52 years (Figure 1). At age 31, clinical examination data (n=6007), questionnaire data (n=8690) and/or information from the national register data (n=9392) was available. At age 46, clinical examination data (n=5823), questionnaire data (n=7146) and consent to use their information in combination with the national register data (n=6750) was available. The study has been approved by the Ethical committee of the Northern Ostrobothnia Hospital District. The health questionnaire at age 46 is provided (Supplement 2).

Northern Finland Birth Cohort (NFBC) 1986 and pneumonia among young males

The NFBC 1986 (www.oulu.fi/nfbc) data was collected to replicate the relationship between sex and age on pneumonia incidence in an independent birth cohort. The effect of self-reported data on tobacco consumption at age 16 on pneumonia risk

among the young males was investigated [22]. The NFBC 1986 comprises subjects who were born with the expected date of birth set between July 1, 1985, and June 30, 1986, including a total of 9479 children (99% of all the deliveries taking place in the target period of the cohort). For this analysis, we included those from whom the 16-year follow-up information and consent to use their data were available (n=9207).

Statistical analysis

Two approaches to NFBC 1966 cohort data analysis were used (Figure 1). First, those with clinical and/or questionnaire data in the 46-year follow-up and consent to use their data in combination with the national register data (n=6750) were included. Second, we analysed register data of those from whom permission at age 31 (n=9392) and/or clinical and/or questionnaire data in the 31-year follow-up were available.

For the first approach, Table 1 shows the proportion of each risk factor by sex. Pearson's chi-square tests were used to evaluate association of risk factors between the males and females as well as between at least one pneumonia episode vs. no pneumonia episodes (Table 2). Risk factors with an incidence of less than ten in both genders were not evaluated. Pneumonia incidence categorised by sex at ages 19 to 21 in both cohorts were compared with Pearson's chi-square test. The life-long pneumonia incidences per 10 000 have calculated by gender with the formula $((10\,000 \cdot n)/N)$, where N is number of subjects in data and n is number of subjects with first pneumonia episode in one age group. Most of the pneumonia episodes were detected before the age of 46, therefore time correlation was not evaluated, only association in general. We used the number of pneumonia episodes by 2018 as a dependent variable and the risk

factors (Table 1) as an independent variables to evaluate relative risk and its 95% Confidence Interval (RR, 95% CI) for pneumonia with unadjusted Poisson regression models in whole data and separated by sex (Table 3).

For the second approach, with risk factors at age 31 (Table 4), we evaluated the relative risk (RR, 95% CI) for future pneumonias with unadjusted Poisson regression models in whole data and separated by sex. The number of pneumonia episodes after the 31-year follow-up was a dependent variable.

To evaluate the adjusted relative risk (RR, 95% CI) for pneumonia and future pneumonias, we used the multivariate Poisson regression models. The criterion to select the independent variables (at age 46: sex, education, smoking and cardiovascular diseases; at age 31: sex, smoking, alcohol) to the models were the significance level of unadjusted results and the sufficiency of the number of samples per category. The adjusted relative risks of pneumonia were also analysed separately by the smoking categories. The p -values of <0.05 were considered statistically significant. The statistical analyses were performed using IBM SPSS Statistics for Windows, Version 26 (IBM Corp., Armonk, NY, USA).

Pneumonia definition

Data on pneumonia episodes were obtained (until the age of 52 years for NFBC 1966 and until age 33 for NFBC 1986) from the Care Register for Health Care (CRHC), previously named Finnish Hospital Discharge Register (FHDR), maintained by the Finnish Institute for Health and Welfare. The CRHC has nationwide hospital discharge information on inpatient episodes of community acquired and hospital acquired

pneumonias (Supplemental Table 1) from all hospitals, starting from 1972 [23]. From 1998 onwards, the register also includes outpatient care episodes diagnosed by secondary or tertiary health care. In case of multiple diagnoses of pneumonia, episodes of at least 90 days apart were counted as separate events. Microbiological data was not available.

Deceased NFBC 1966 participants

The data were obtained from the Causes of Death Register (https://www.stat.fi/meta/til/ksyyt_en.html) (Statistics Finland). The number of deaths is shown in Figure 1 and the causes of deaths are summarised in Figure 2. Details of unnatural causes of deaths in the NFBC 1966 have been reported elsewhere [24].

Definitions of chronic diseases

Lifetime information of chronic conditions based on the ICD 8, 9 and 10 diagnostic codes listed in Supplemental Table 1 was collected from national registers until the age of 52 years (n=9392). Those suffering from asthma were identified based on reimbursement of medical expenses from the Social Insurance Institution. The diabetes variable was created by combining the data of hospital registers from CRHC, medicine purchases and reimbursement documentation from the Social Insurance Institution. Gestational diabetes and polycystic ovary syndrome (PCOS) were excluded. Diagnoses for diabetes type 1 (DMI) and 2 (DMII) were obtained from the care register. Metformin medication obtained from medicine purchases was used to indicate DMII in cases where the differentiation between DMI and DMII was not well defined.

Education

Information on formal education was obtained at age 46 from self-reported data classified into basic (at least 9 years of primary school), secondary (1 to 4 years of vocational or secondary school after basic education) and tertiary (applied sciences or university degree) categories.

Body weight definitions

Body mass index (BMI) and waist circumference of the NFBC 1966 participants were measured at ages 31 and 46. Obesity is defined by a waist circumference of at least 94 cm for males and 80 cm for females, respectively (International Diabetes Association) and/or body mass index (BMI) of 30 or higher.

Smoking and alcohol consumption

NFBC 1966 self-reported health information including alcohol and tobacco consumption was collected at ages 31 and 46. Daily alcohol doses exceeding 20g in women or 30g in men, respectively, were considered excessive [25].

Results

Characteristics of the NFBC 1966 cohort participants by sex at age 46

Table 1 summarises the demographic data of the NFBC 1966 (n=6750) at age 46. While women had a higher level of education ($p<0.001$), smoking ($p<0.001$) and excessive alcohol consumption ($p<0.001$) were more common among men compared to women [21]. Women had more commonly an asthma diagnosis ($p=0.003$) while men

were affected by cardiovascular diseases ($p=0.001$). Autoimmune diseases (rheumatoid arthritis ($p<0.001$), coeliac disease ($p=0.012$), vasculitis ($p=0.021$) and multiple sclerosis ($p<0.001$)) were more common among women compared to men. Men had a higher diabetes mellitus incidence compared to women ($p<0.001$).

Pneumonia incidence is high among young males in two independent birth cohorts

Pneumonia incidence among 6750 participants of NFBC 1966 (episodes per 10 000) at ages ranging from 5 to 52 years is summarised in Figure 3A. Pneumonia hospitalisation was high with a maximum of 227 episodes per 10 000 among young males between the ages of 19 to 21 years. Despite this high peak among young males, the average number of pneumonias over life course was within the range of less than 20 episodes per 10 000 with an increase of up to 50 episodes per 10 000 in the oldest age categories of the NFBC 1966 cohort. In the NFBC 1966, 25.2% of pneumonia episodes in males occurred between the ages of 19 and 21. Female cohort participants in turn had 1.8% of their pneumonia episodes within the same age category ($p<0.001$).

Data obtained from the NFBC 1986 ($n=9207$), an independent birth cohort, confirmed the high pneumonia incidence among young adult males with a maximum of 80 episodes per 10 000 (Figure 3B). 21.1% of pneumonia episodes in males and 6.7% of pneumonia episodes in females, respectively, occurred between the ages of 19 and 21 ($p<0.001$).

General properties associated with pneumonia

In general, males had a higher risk of pneumonia across their life course than females (RR 1.72, 95% CI 1.45-2.04, $p<0.001$). Although men with low education had a high number of pneumonia episodes ($p=0.006$, Table 2), the education did not explain the peak in pneumonias between the ages of 19 and 21. The episodes among the young males in the 1966 cohort appeared mostly during the cold season (Figure 3C). In the 1986 cohort, however, this seasonal association was not seen. Pneumonia at a young age was not associated with a higher risk of developing recurrent pneumonia.

Smoking and pneumonia

NFBC 1966 participants who reported at age 46 that they were “current or former smokers” (Table 2) had a higher lifetime number of pneumonia episodes (RR 1.55, 95% CI 1.31-1.84, $p<0.001$, Table 3) compared to those who had “never” smoked. In addition, we confirmed that smoking at age 31 is a significant risk factor for future pneumonia (RR 1.71, 95% CI 1.40-2.08, $p<0.001$, Table 4). Smoking at age 31 in the NFBC 1966 cohort, however, did not explain the high number of pneumonia episodes among the young males between the ages of 19 and 21. Unfortunately, our data on smoking in the NFBC 1966 at a young age was incomplete. In the NFBC 1986, we did not find a difference in the number of pneumonia episodes between those who smoked occasionally or regularly (68 pneumonia episodes), compared to those who had “never” smoked at age 16 (81 pneumonia episodes, $p=0.965$).

Excessive alcohol consumption and pneumonia

In the NFBC 1966 cohort, excessive alcohol consumption was more common among men than in women (Table 1). Excessive alcohol consumption (men 30g/day, women

20g/day) at age 31 was associated with future pneumonia especially among men (RR 2.40, 95% CI 1.58-3.64, $p<0.001$) in the NFBC 1966 cohort compared to those with low or moderate alcohol consumption (Table 4). Excessive alcohol consumption at age 46, however, was not associated with a total life-time pneumonia burden (Table 2) possibly because 36.3% of individuals with high alcohol consumption at age 31 did not participate in the study at age 46.

Asthma and pneumonia

In the NFBC 1966, asthma was more common in women compared to men (8.5% vs 6.6%, $p=0.003$, Table 1). We found an association between asthma and a life-time number of pneumonia episodes both among men ($p<0.001$) and women ($p<0.001$) (Table 2), respectively. For the most part, men who had received asthma diagnosis before the age 31, were at risk of developing pneumonia in the future (RR 2.85, 95% CI 1.85-4.40, $p<0.001$, Table 4).

Diabetes

In the NFBC 1966, an increased risk of pneumonia was associated with type II diabetes (RR 1.80, 95% CI 1.34-2.42, $p<0.001$). This risk was predominantly seen in males (RR 1.99, 95% CI 1.42-2.79, $p<0.001$). Women with type I diabetes were at risk of developing pneumonia (RR 4.10, 95% CI 1.52-11.01, $p=0.005$) (Table 3). However, low number of cases may have impact on the association that is reflected in wide confidence intervals.

Autoimmune diseases

Women of the NFBC 1966 were affected by autoimmunity (Table 1). Rheumatoid arthritis (RR 3.78, 95% CI 2.36-6.05, $p<0.001$) and psoriasis (RR 6.00, 95% CI 3.66-9.83, $p<0.001$) were associated with pneumonia among women (Table 3).

Cardiovascular diseases are associated with pneumonia in NFBC 1966

Cardiovascular conditions such as arrhythmias, ischemic heart disease, valve disease, cardiomyopathy and heart failure were associated with a life-long burden of pneumonia episodes in the NFBC 1966 (RR 2.50, 95% CI 2.04-3.07, $p=0.001$) (Table 3). Pneumonia was common both in males (15.6% vs 8.1%, $p<0.001$) and females (9.5% vs 5.0%, $p=0.001$) suffering from cardiovascular diseases (Table 2).

Multivariable analysis of NFBC 1966 pneumonia risk factors

Low educational level (male, RR 1.80, 95% CI 1.23-2.63, $p=0.003$; female RR 3.00, 95% CI 1.47-6.10, $p=0.002$) and cardiovascular diseases were associated with pneumonia (male, RR 1.83, 95% CI 1.06-3.16, $p=0.030$) when considering education, smoking and cardiovascular diseases. Among those who had never smoked, being a male (RR 1.48, 95% CI 1.13-1.93, $p=0.004$), having low educational level (RR 2.07, 95% CI 1.25-3.42, $p=0.005$) or cardiovascular diseases (RR 1.50, 95% CI 1.01-2.22, $p=0.042$) associated significantly with pneumonia risk. Similarly, among current or former smokers, male sex (RR 1.99, 95% CI 1.06-3.72, $p=0.032$), low educational level (RR 2.05, 95% CI 1.25-3.336, $p=0.005$) and cardiovascular diseases (RR 2.78, 95% CI 2.15-3.59, $p<0.001$) were associated with pneumonia. At age 31, excessive alcohol consumption was a risk factor (RR 2.99, 95% CI 1.59-5.60, $p=0.001$) for future pneumonia regardless of an individual's smoking status.

Discussion

Most epidemiological studies on pneumonia have focused on populations over 65 years of age [10][26][27]. Previously, birth cohorts have been investigated for at least Norovirus [28], influenza [29] and childhood respiratory infections [30]. To our knowledge, this current study provides for the first-time life-long information on risk factors and incidence of pneumonia from birth up to the age of 52 years in a birth cohort. Data obtained from our longitudinal birth cohorts are exceptionally well suited for providing insights on risk factors and possibilities for pneumonia prevention. We believe that extended investigation of these birth cohorts' participants above to the age of their retirement will provide valuable information on pneumonia also among the elderly.

Pneumonia incidence is well understood among the elderly [10][26]. In our study, a high pneumonia incidence among young males between the ages of 19 and 21 years was found independently in two birth cohorts (Figure 3A and 3B). In both cohorts, a need for hospitalisation due to pneumonia among the young males was comparable or even higher than that observed among the elderly [31][1]. The results cannot be explained, for example, by influenza activity [32], seasonal factors such as cold exposure (Figure 3C) or smoking at ages 16 or 31. We can only speculate that the high number of pneumonia episodes among the young males is associated with compulsory military service in Finland. Previous studies among military recruits are in agreement with this hypothesis [33] [34, 35].

Male sex is associated with pneumonia incidence and severity especially among the elderly [36]. Our study of the young and working age cohorts shows that males suffer from several unfavourable health properties such as smoking, and alcohol consumption (Table 1) and they are at an elevated pneumonia risk when compared to women (Table 3). Smoking and excessive alcohol consumption at age 31, for example, predict a future risk for pneumonia (Table 4). In addition, those who reported to be current or former smokers at age 46, had a larger life-time burden of pneumonia (Table 3). At age 46, however, excessive alcohol consumption was not associated with a life-time pneumonia burden. We believe that selection of the study population caused by alcohol related conditions or deaths especially among men (Figure 2) may have affected the results.

Chronic conditions associated with pneumonia risk are well documented in advanced age categories [8][37][26]. We confirmed that asthma, diabetes, cardiovascular diseases and selected autoimmune conditions were associated with pneumonia incidence also in our young and working age cohorts. Selected pneumonia risk factors such as malignancies, dementia, chronic obstructive pulmonary disease (COPD), chronic liver conditions and kidney diseases, however, are rare within the age categories of our cohorts. Those conditions commonly seen among the elderly do not explain the major pneumonia burden among our younger study participants at maximum of 52 years of age. Conditions involving immunity, such as rheumatoid arthritis and psoriasis, were associated with a risk of pneumonia especially among women. We believe that immunological properties, including possibility of primary or secondary immunodeficiency, may explain the pneumonia incidence among those suffering from autoimmunity and infection susceptibility.

Although the cohort participants were highly adhered to the study, selection of patients may have affected our results. It is possible that patients with a severe burden of infections, for example, were incompletely documented due to their poor health. It is also possible that patients with a high disease burden and infection susceptibility may have died, thus creating a study population selection bias. We also acknowledge that only pneumonia episodes that required hospitalisation at specialised units were included, and true pneumonia numbers are higher than those recorded in our study.

In conclusion, our study demonstrates that novel populations, such as young males, with a high pneumonia risk can be identified by exploring properties of birth cohorts. Our study also demonstrates that a burden of unhealthy habits especially among males at least in part explains the overall burden of pneumonia. Our study highlights a need for further studies of immunological properties especially among females with autoimmune diseases. The high peak among young males, which cannot be explained by the known conventional pneumonia risk factors, should also be subject to future studies. Most importantly, preventive measures for pneumonia among these novel high-risk populations should be considered.

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Declaration of interest statement

The authors report no conflict of interest.

Tables

	male, n (%)	female, n (%)	P
	3079 (45.6)	3671 (54.4)	<0.001
Education			<0.001
basic	305 (9.9)	223 (6.1)	
secondary	2069 (67.4)	2330 (63.6)	
tertiary	694 (22.6)	1113 (30.4)	
Obesity			
BMI (>30)	502 (21.0)	644 (20.7)	0.767
Waist ¹	1410 (59.7)	2079 (67.7)	< 0.001
Smoking			
Current or former	1586 (59.8)	1580 (47.7)	<0.001
Excessive alcohol consumption ²	513 (16.7)	287 (7.8)	<0.001
Asthma	202 (6.6)	312 (8.5)	0.003
Cardiovascular disease, any	339 (11.0)	316 (8.6)	0.001
Cardiac arrhythmias	171 (5.6)	188 (5.1)	0.430
Ischemic heart disease	105 (3.4)	46 (1.3)	<0.001
Valve disease	37 (1.2)	34 (0.9)	0.269
Hypertensive disease	8 (0.3)	4 (0.1)	0.143
Cardiomyopathy and heart failure	29 (0.9)	25 (0.7)	0.231
Other	60 (1.9)	82 (2.2)	0.416
Liver disease	43 (1.4)	41 (1.1)	0.302
Kidney disease	37 (1.2)	45 (1.2)	0.928
Sarcoidosis	33(1.1)	23(0.6)	0.035
Autoimmune disease			
Rheumatoid arthritis	28 (0.9)	85 (2.3)	<0.001
Psoriasis	48 (1.6)	48 (1.3)	0.317
Coeliac disease	17 (0.6)	42 (1.2)	0.012
Vasculitis	10 (0.3)	28 (0.8)	0.021
Purpura	15 (0.5)	24 (0.7)	0.413
Multiple sclerosis	2 (0.1)	24 (0.7)	<0.001
Diabetes mellitus	216 (7.0)	164 (4.4)	<0.001
Type 1 diabetes	27 (0.9)	16 (0.4)	
Type 2 diabetes	189 (6.1)	148 (4.0)	
Cancer			
Solid	21 (0.7)	18 (0.5)	0.263
Hematology	16 (0.5)	14 (0.4)	0.355

Table 1. Distribution of education, obesity, lifestyle factors and chronic diseases by sex in the NFBC 1966 (n=6750) at age 46. ¹International Diabetes Association (IDF) cut-off points for obesity are indicated with a waist circumference of at least 94 cm for males and 80 cm for females, respectively. ²Excessive alcohol consumption is defined as self-reported daily consumption of at least 30g for males and 20g for females. Smoking information compares “never” vs “current or former” participants. Pearson's chi-square test was used.

	Male (n=3079)			Female (n=3671)		
	No pneumonia	At least 1 pneumonia	p	No pneumonia	At least 1 pneumonia	p
Sex n (%)	2812 (91.3)	267 (8.7)		3489 (95.0)	182 (5.0)	
Education						
Basic	263 (86.2)	42 (13.8)	0.006	211 (94.6)	12 (5.4)	0.162
Secondary	1895 (91.6)	174 (8.4)		2193 (94.1)	137 (5.8)	
Tertiary	638 (91.9)	56 (8.1)		1065 (95.7)	48 (4.3)	
Body mass index (BMI)						
BMI<30	1728 (91.6)	158 (8.4)	0.675	2343 (94.9)	125 (5.1)	0.144
BMI≥30	457 (91.0)	45 (9.0)		602 (93.5)	42 (6.5)	
Waist circumference ¹						
Low	865 (91.1)	85 (8.9)	0.498	945 (95.3)	47 (4.7)	0.258
High	1295 (91.8)	115 (8.2)		1960 (94.3)	119 (5.7)	
Smoking						
Never	1257 (92.6)	101 (7.4)	0.020	1969 (95.4)	94 (4.6)	0.014
Current or former	1504 (90.2)	164 (9.8)		1459 (93.6)	100 (6.4)	
Alcohol consumption ²						
No	2331 (91.1)	228 (8.9)	0.920	3194 (94.6)	181 (5.4)	0.921
Yes	468 (91.2)	45 (8.8)		272 (94.8)	15 (5.2)	
Asthma						
No	2636 (91.6)	241 (8.4)	<0.001	3194 (95.1)	165 (4.9)	<0.001
Yes	169 (83.7)	33 (16.3)		280 (89.7)	32 (10.3)	
Cardiovascular diseases						
No	2519 (91.9)	221 (8.1)	<0.001	3188 (95.0)	167 (5.0)	0.001
Yes	286 (84.4)	53 (15.6)		286 (90.5)	30 (9.5)	

Cardiac arrhythmias						
No	2657 (91.4)	251 (8.6)	0.03	3303 (94.8)	180 (5.2)	0.022
Yes	148 (86.5)	23 (13.5)	1	171 (91.0)	17 (9.0)	
Ischemic heart disease						
No	2722 (91.5)	252 (8.5)	<0.0	3432 (94.7)	193 (5.3)	0.313
Yes	83 (79.0)	22 (21.0)	01	42 (91.3)	4 (8.7)	
Valve disease						
No	2775 (91.2)	267 (8.8)	0.03	3443 (94.7)	194 (5.3)	0.369
Yes	30 (81.1)	7 (18.9)	1	31 (91.2)	3 (8.8)	
Cardiomyopathy/heart failure						
No	2784 (91.3)	266 (8.7)	<0.0	3451 (94.7)	195 (5.3)	0.558
Yes	21 (72.4)	8 (27.6)	01	23 (92.0)	2 (8.0)	
Other cardiovascular disease						
No	2755 (91.3)	264 (8.7)	0.03	3401 (94.8)	188 (5.2)	0.023
Yes	50 (83.3)	10 (16.7)	3	73 (89.0)	9 (11.0)	
Liver disease						
No	2767 (91.1)	269 (8.9)	0.52	3439 (94.7)	191 (5.3)	0.008
Yes	38 (88.4)	5 (11.6)	7	35 (85.4)	6 (14.6)	
Kidney disease						
No	2776 (91.3)	266 (8.7)	0.00	3437 (94.8)	189 (5.2)	<0.001
Yes	29 (78.4)	8 (21.6)	6	37 (82.2)	8 (17.8)	
Sarcoidosis						
No	2652 (90.7)	271 (9.3)	0.97	3400 (94.5)	196 (5.5)	0.816
Yes	30 (90.9)	3 (9.1)	2	22 (95.7)	1 (4.3)	
Rheumatoid arthritis						
No	2659 (90.8)	269 (9.2)	0.11	3347 (94.7)	187 (5.3)	0.009
Yes	23 (82.1)	5 (17.9)	5	75 (88.2)	10 (11.8)	
Psoriasis						

No	2639 (90.7)	269 (9.3)	0.78	3381 (94.7)	190 (5.3)	0.005
Yes	43 (89.6)	5 (10.4)	²	41 (85.4)	7 (14.6)	
Coeliac disease						
No	2668 (90.8)	271 (9.2)	0.23	3381 (94.5)	196 (5.5)	0.379
Yes	14 (82.4)	3 (17.6)	²	41 (97.6)	1 (2.4)	
Vasculitis						
No	2674 (90.8)	272 (9.2)	0.24	3396 (94.6)	195 (5.4)	0.691
Yes	8 (80)	2 (20)	¹	26 (92.9)	2 (7.1)	
Purpura						
No	2669 (90.8)	272 (9.2)	0.58	3400 (94.6)	195 (5.4)	0.531
Yes	13 (86.7)	2 (13.3)	⁶	22 (91.7)	2 (8.3)	
Multiple sclerosis						
No	2680 (90.7)	274 (9.3)	0.65	3401 (94.6)	194 (5.4)	0.126
Yes	2 (100)	0 (0)	¹	21 (87.5)	3 (12.5)	
Diabetes						
No diabetes	2610 (91.3)	249 (8.7)	0.11	3323 (94.8)	183 (5.2)	0.002
Type 1 diabetes	26 (96.3)	1 (3.7)	²	12 (75.0)	4 (25.0)	
Type 2 diabetes	165 (87.3)	24 (12.7)		138 (93.2)	10 (6.8)	
Cancer, solid						
No	2662 (90.7)	273 (9.3)	0.45	3406 (94.6)	195 (5.4)	0.288
Yes	20 (95.2)	1 (4.8)	⁷	16 (88.9)	2 (11.1)	
Haematological						
No	2666 (90.7)	274 (9.3)	0.20	3412 (94.6)	193 (5.4)	<0.001
Yes	16 (100)	0 (0)	⁰	10 (71.4)	4 (28.6)	

Table 2. Male and female NFBC 1966 study participants by no pneumonia episodes and those with at least one pneumonia episode (age 5 to 52 years, n=6750) in relation to pneumonia risk factors. (Pearson's chi-square test was used). ¹Waist circumference indicates at least 94 cm for males and 80 cm for females, respectively. Self-reported data at age 46 on smoking (no smoking history vs former or current smokers) and ²excessive alcohol consumption (males at least 30g per day, females at least 20g per day) was considered.

	All (n=6750)		Male (n=3079)		Female (n=3671)	
Factor (total number in analysis)	RR (95% CI)	p	RR (95% CI)	p	RR (95% CI)	p
Sex (n=6750) Male vs female	1.72 (1.45-2.04)	<0.001				
Education (n=6734) Basic vs tertiary	2.30 (1.72-3.09)	<0.001	2.16 (1.50-3.11)	<0.001	1.70 (0.98-2.94)	0.060
Secondary vs tertiary	1.39 (1.12-1.71)	0.003	1.17 (0.88-1.56)	0.273	1.54 (1.12-2.11)	0.008
Obesity (n=5500) BMI≥30 vs BMI<30	1.09 (0.87-1.37)	0.473	1.03 (0.76-1.41)	0.833	1.15 (0.82-1.62)	0.415
Waist (n=5431) High vs low	0.96 (0.79-1.17)	0.698	0.93 (0.71-1.20)	0.558	1.13 (0.82-1.55)	0.455
Smoking (n=5964) Current or former vs never	1.55 (1.31-1.84)	<0.001	1.50 (1.19-1.89)	0.001	1.43 (1.10-1.86)	0.007
Excessive alcohol intake (n=6734)	1.27 (1.00-1.60)	0.049	1.19 (0.90-1.56)	0.224	1.01 (0.63-1.64)	0.960
Asthma (n=6750)	2.19 (1.73-2.75)	<0.001	1.81 (1.28-2.54)	0.001	2.87 (2.09-3.95)	<0.001
Cardiovascular disease (n=6750)	2.50 (2.04-3.07)	0.001	2.43 (1.88-3.14)	<0.001	2.40 (1.72-3.35)	<0.001
Cardiac arrhythmias	1.64 (1.22-2.21)	0.001	1.64 (1.12-2.41)	0.011	1.59 (0.98-2.57)	0.060
Ischemic heart disease	3.66 (2.68-4.99)	<0.001	3.70 (2.64-5.19)	<0.001	1.77 (0.73-4.29)	0.208
Valve disease	2.43 (1.43-4.12)	0.001	2.84 (1.56-5.19)	0.001	1.43 (0.46-4.46)	0.541
Cardiomyopathy and heart failure	7.06 (4.89-10.20)	<0.001	6.45 (4.06-10.24)	<0.001	7.39 (4.03-13.55)	<0.001
Other	2.10 (1.39-3.15)	<0.001	2.24 (1.31-3.82)	0.003	2.01 (1.07-3.78)	0.031
Liver disease (n=6750)	1.60 (0.88-2.90)	0.123	1.09 (0.45-2.64)	0.849	2.39 (1.06-5.38)	0.035
Kidney disease (n=6750)	4.14 (2.81-6.10)	<0.001	5.04 (3.17-8.01)	<0.001	2.93 (1.45-5.93)	0.003
Sarcoidosis (n=6575)	0.84 (0.32-2.25)	0.732	0.81 (0.26-2.54)	0.724	0.69 (0.10-4.91)	0.710
Autoimmunity (n=6575)						
Rheumatoid arthritis	2.69 (1.80-4.01)	<0.001	1.94 (0.87-4.36)	0.107	3.78 (2.36-6.05)	<0.001
Psoriasis	2.91 (1.92-4.41)	<0.001	1.13 (0.50-2.52)	0.774	6.00 (3.66-9.83)	<0.001
Coeliac disease	1.20 (0.54-2.69)	0.653	1.59 (0.51-4.96)	0.423	1.14 (0.36-3.55)	0.827
Vasculitis	1.87 (0.84-4.19)	0.126	3.63 (1.35-9.72)	0.010	1.14 (0.28-4.57)	0.859
Purpura	1.21 (0.45-3.24)	0.701	1.20 (0.30-4.82)	0.798	1.33 (0.33-5.33)	0.691
Multiple sclerosis	1.36 (0.44-4.24)	0.592	-	-	2.00 (0.64-6.24)	0.234
Diabetes mellitus (n=6745)						
Type 1 diabetes	1.77 (0.79-3.95)	0.166	0.73 (0.18-2.94)	0.661	4.10 (1.52-11.01)	0.005
Type 2 diabetes	1.80 (1.34-2.42)	<0.001	1.99 (1.42-2.79)	<0.001	1.11 (0.59-2.09)	0.753
Cancer (n=6575)						
Solid	0.91 (0.29-2.82)	0.867	0.43 (0.06-3.03)	0.394	1.77 (0.44-7.12)	0.421
Hematology	1.58 (0.59-4.22)	0.363	-	-	4.60 (1.71-12.36)	0.002

Table 3. Risk of pneumonia by known susceptibility factors in male and female NFBC 1966 participants. The relative risk and the 95% Confidence Interval (RR, 95% CI) for pneumonia analysed with unadjusted Poisson regression models, where the number of pneumonia episodes by 2018 was a dependent variable and the risk factors were independent variables.

	All (n=9392)		Male (n=4556)			Female (n=4836)		
Risk factor at age 31	RR (95% CI)	p	n (%)	RR (95% CI)	p	n (%)	RR (95% CI)	P
Sex (n=9392)	1.44 (1.21-1.71)	<0.001	4556 (48.5)	-	-	4836 (51.5)	-	-
Obesity (n=6012) BMI>30 vs BMI<30 ¹	1.07 (0.69-1.66)	0.755	208 (7.7)	1.08 (0.58-2.01)	0.801	273 (8.2)	1.07 (0.58-2.00)	0.830
Waist (n=4289) High vs low ²	0.08 (0.73-1.33)	0.904	514 (25.9)	1.02 (0.65-1.59)	0.940	838 (36.3)	0.99 (0.65-1.50)	0.961
Smoking ³ (n=8514) Current or former vs never	1.71 (1.40-2.08)	<0.001	2537 (62.2)	1.91(1.44-2.54)	<0.001	2210 (49.8)	1.40 (1.05-1.86)	0.020
Excessive alcohol consumption ⁴ (n=585 4)	2.25 (1.60-3.17)	<0.001	297 (11.4)	2.40 (1.58-3.64)	<0.001	155 (4.8)	1.77 (0.93-3.37)	0.085
Asthma (n=9392)	1.91 (1.31-2.78)	0.001	124 (2.7)	2.85 (1.85-4.40)	<0.001	159 (3.3)	0.97 (0.46-2.05)	0.930

Table 4. Prediction of relative risk and its 95% Confidence Interval (RR, 95% CI) for future pneumonia episodes analysed by unadjusted Poisson regression models in the NFBC 1966 cohort based on risk factors determined at age 31. The number of pneumonia episodes after 31-year follow-up was a dependent variable and gender, obesity, waist, smoking, excessive alcohol consumption and asthma were as an independent variable in the models. Significance of ¹body mass index (BMI, cut-off point 30kg/m²), ²waist circumference (cut-off point ≥94cm for males and ≥80cm for females), ³smoking (any history of smoking vs never smoked), ⁴self-reported alcohol consumption (males at least 30g per day, females at least 20g per day), and diagnosis of asthma were considered.

Figure legends

Figure 1. The flow of the NFBC 1966 data collection. The study includes all individuals born with an expected date of birth in the year 1966. All study participants were subjects to careful analysis of their lifestyle and health properties at ages 31 and 46. Health data from 1971 to 2018 were obtained from national registers. Information on numbers of study participants and deceased individuals are shown.

Figure 2. The figure shows the number of deaths among the male and female NFBC 1966 participants divided into four time periods (years 1965-1970, 1971-1966, 1977-2011, 2012-2018). The number of deaths in major cause of death categories are shown.

Figure 3. A. Life-long pneumonia incidence (per 10.000) among the male and female NFBC 1966 participants between the ages of 5 and 52 years (1971 to 2018). **B.** Pneumonia incidence (per 10.000) in the NFBC 1986 study cohort between the ages of 0 and 33 years (1986 to 2019) among male and female participants. **C.** Seasonal distribution of pneumonia episodes in the NFBC 1966 and 1986 cohorts among males between 19 and 21 years of age with high pneumonia incidence. The vertical axis indicates the numbers of monthly pneumonia episodes from January to December (1 to 12) in the NFBC 1966 and 1986 cohorts.

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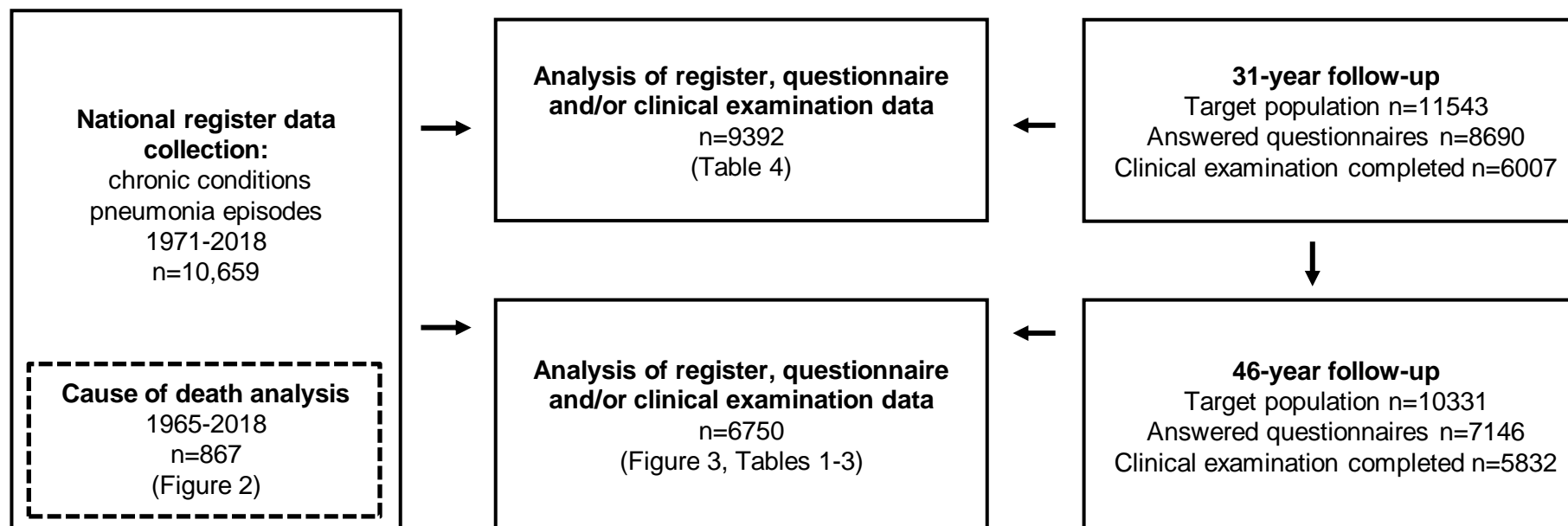
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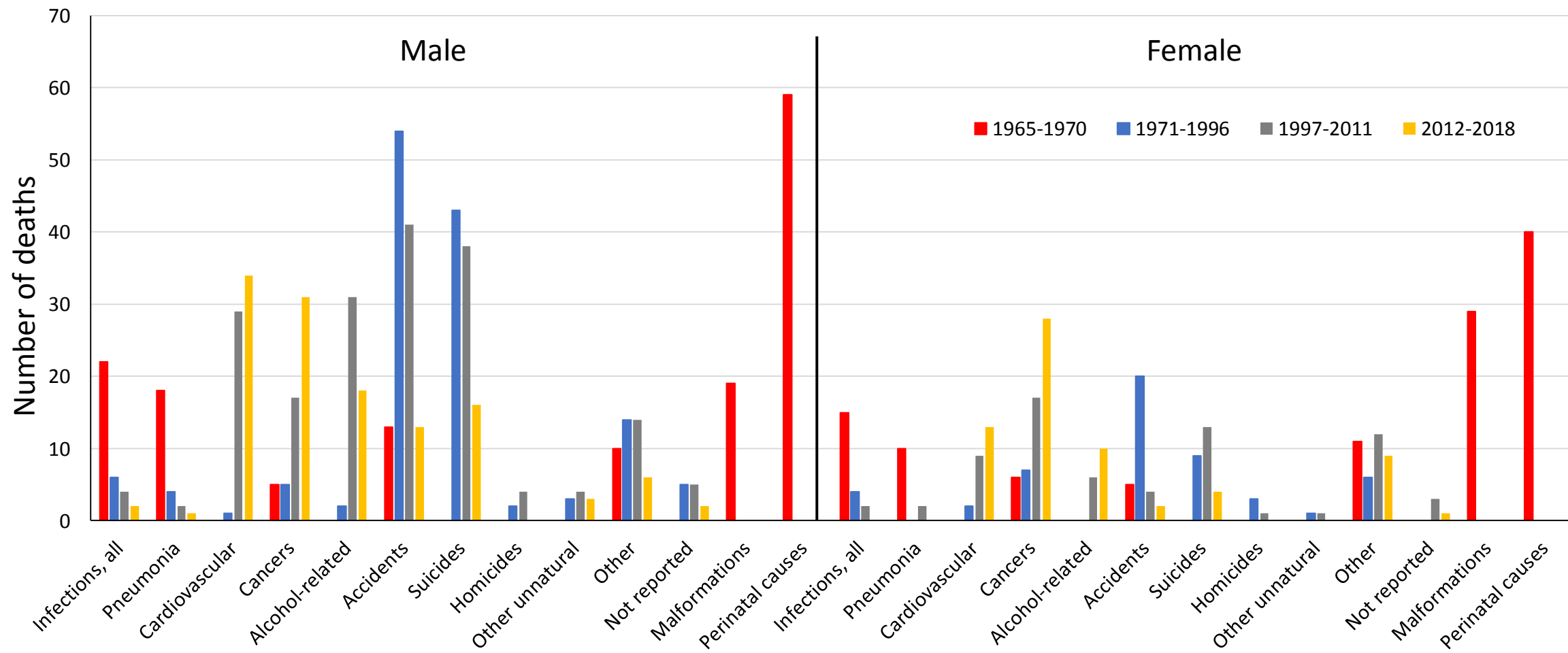
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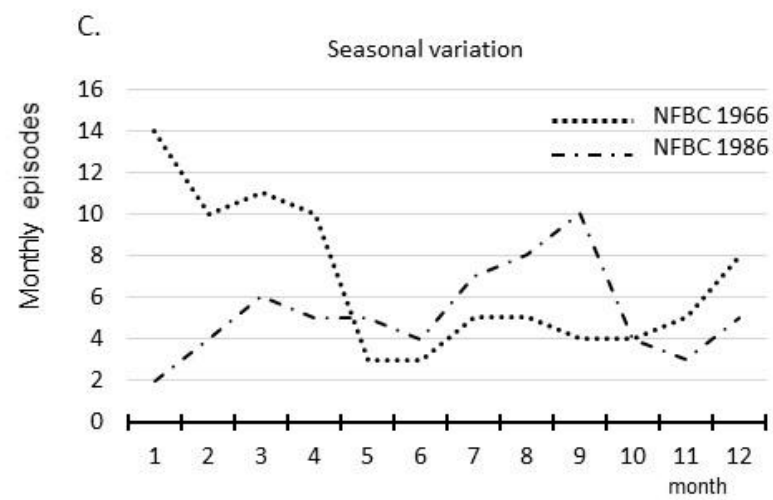
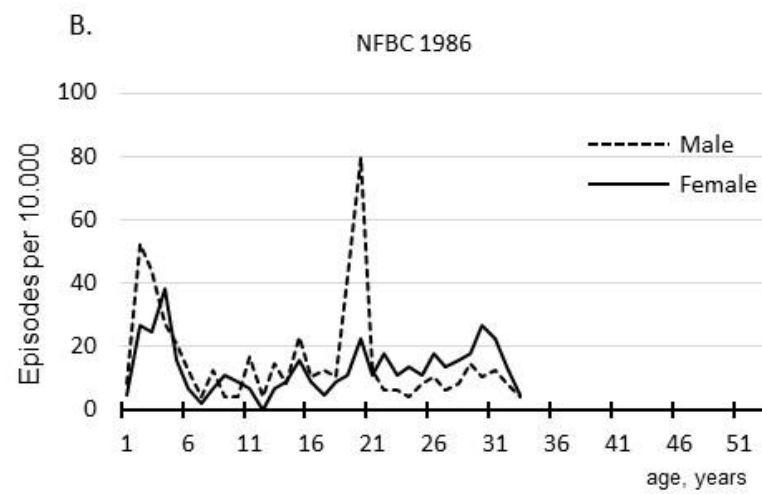
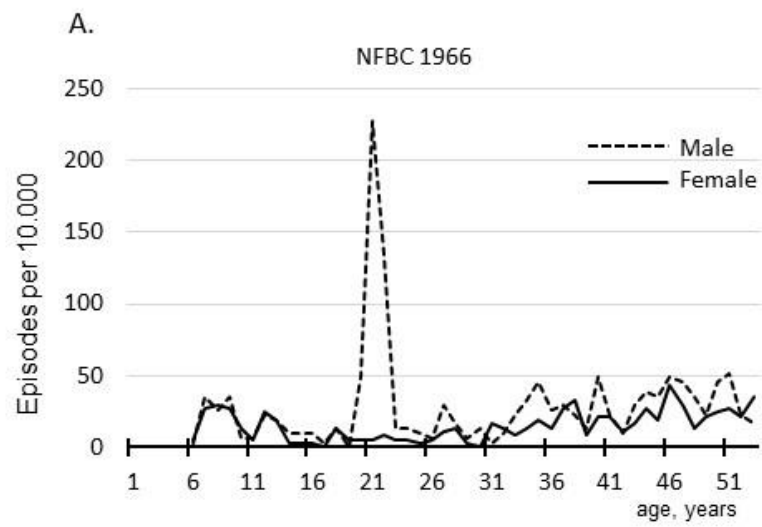
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Northern Finland Birth Cohort 1966
12,055 mothers with an expected date of delivery in 1966

12,231 children born;
12,058 alive and 173 stillborns









OULUN YLIOPISTO
UNIVERSITY of OULU

NORTHERN FINLAND BIRTH COHORT 1966 WELFARE
AND HEALTH RESEARCH PROGRAMME

Background, lifestyle and health survey

INSTRUCTIONS ON HOW TO FILL IN THE SURVEY FORM

Give your answers by circling the number of the best-suited option and/or write your answer in the specified field. Some of the questions are in table format; give your answers by writing the information in the table. Remember to answer all the questions – if your answer is “no”, mark it either by circling the corresponding number or by writing “0” in the specified field. Do not write your name on the survey form.

Certain response options are followed by: “Go to question...”, in which case you can go straight to that question, skipping the ones that come before it. If necessary, a close relative or a practical nurse can assist you with completing the form.

Example 1.

What is your basic education?

- 1 less than 9 years of comprehensive school
- ② comprehensive school
- 3 matriculation examination

Example 2.

How many cups of coffee or tea do you normally drink in a day?

(mark 0 if none)

of coffee | _ | _ 0 | cups
of tea | _ | _ 3 | cups

Example 3.

How often do you currently use the following medications?

	never	some- times	regularly or all the time
Medication for back, joint or muscle problems...	1	②	3
Medication for headache...	①	2	3
Asthma medication...	1	2	③

SITUATION IN LIFE AND BACKGROUND INFORMATION

1. Your current marital status

- 1 married
- 2 cohabiting
- 3 partner in a registered partnership
- 4 unmarried
- 5 divorced
- 6 divorced from a registered partnership
- 7 widowed
- 8 widowed after a registered partnership

2. Do other people live in your household besides you?

- 1 no, I live alone
- 2 yes; what are their ages?

	no	yes	how many
spouse or cohabiting partner	1	2	
children aged 0–6 years	1	2	_ _ _ _
children aged 7–18 years	1	2	_ _ _ _
adults aged 19–64 years	1	2	_ _ _ _
adults aged over 64 years	1	2	_ _ _ _

3. Do you provide assistance or care to those close to you outside your home, e.g. your own parents or your spouse's parents?

- 1 no
- 2 yes: |_|_|_|_| hours/month

4. What is your basic education?

- 1 less than 9 years of comprehensive school
- 2 comprehensive school
- 3 matriculation examination

5. What vocational qualifications do you have? (circle the highest level of qualifications you have attained so far, and option 8, if you are in the middle of training)

- 1 no vocational training
- 2 vocational course
- 3 vocational school
- 4 college-level training
- 5 degree from a university of applied sciences
- 6 university or other higher education degree
- 7 other; please specify? _____
- 8 training not finished;
please specify? _____

6. How satisfied are you with your current situation in life in general?

- 1 very satisfied
- 2 somewhat satisfied
- 3 somewhat dissatisfied
- 4 very dissatisfied
- 5 cannot say

7. Have you ever lived outside of Finland for a year or more?

- 1 no
- 2 yes; how many years? |_|_|_|_|

8. If you have lived outside of Finland for a year or more, what was the main reason for your stay?

- 1 work
- 2 studies
- 3 other

LIFESTYLE

SLEEP AND SLEEPING

9. At what time do you normally go to bed (when you go to sleep)?

On workdays/weekdays around |__| |__| : |__| |__| (e.g. 21:30; 24h clock)

On days off/weekends around |__| |__| : |__| |__|

10. At what time do you normally get out of bed (and not go back again)?

On workdays/weekdays around |__| |__| : |__| |__| (e.g. 07:30; 24h clock)

On days off/weekends around |__| |__| : |__| |__|

11. How many hours do you sleep on average? (e.g. 10 hours 45 minutes)

At night? |__| |__| hours |__| |__| minutes

Per day? (including naps) |__| |__| hours |__| |__| minutes

12. People tend to be categorised into “morning persons” (early birds) and “evening persons” (night owls). Which one are you?

- 1 definitely a morning person
- 2 more of a morning than an evening person
- 3 more of an evening than a morning person
- 4 definitely an evening person

14. How tired do you feel for the first half hour in the morning?

- 1 very tired
- 2 somewhat tired
- 3 somewhat rested
- 4 well-rested

13. Assuming the conditions are suitable, how easy is it for you to get up in the morning?

- 1 not easy at all
- 2 not very easy
- 3 somewhat easy
- 4 very easy

The following questions are meant to identify whether you have experienced difficulty in sleeping in the last month. Circle the option you think describes the degree of difficulty of the problem with sleeping you have experienced (if any), if you have experienced the problem at least three times a week during the last month.

15. Falling asleep? (the time it takes for you to fall asleep after the lights have been turned off in order to go to sleep)

- 1 No problem
- 2 Somewhat delayed
- 3 Significantly delayed
- 4 Very long delay

16. Waking up at night?

- 1 No problem
- 2 Slight problem
- 3 Moderate problem
- 4 Serious problem

17. Night sleep ends too early in the morning?

- 1 Not at all
- 2 Slightly earlier
- 3 Significantly earlier
- 4 Very much earlier

18. Total amount of sleep?

- 1 Sufficient
- 2 Somewhat sufficient
- 3 Significantly insufficient
- 4 Totally insufficient

19. Quality of sleep? (regardless of how long you slept)

- 1 Satisfactory
- 2 Somewhat unsatisfactory
- 3 Significantly unsatisfactory
- 4 Totally unsatisfactory

20. Let's assume you have decided to take up a sports activity. Your friend recommends that your training programme should be twice a week for one hour at a time. The best time for your friend is in the morning from 7:00 to 8:00. Bearing in mind the daily rhythm that is best suited to you, how do you think you would manage?

- 1 I am in great shape
- 2 I am in reasonable shape
- 3 It would feel somewhat challenging
- 4 It would feel very challenging

21. Let's assume that you have to do two hours of hard manual labour. You can freely decide your own schedule. Bearing in mind the daily rhythm that is best suited to you, which option would you choose?

- 1 8:00–10:00
- 2 11:00–13:00
- 3 15:00–17:00
- 4 19:00–21:00

22. Let's assume you are free to decide your working hours. Let's assume that the working day is five hours long, that the work is interesting and that the pay is performance-based. Which FIVE CONSECUTIVE hours would you choose? (circle five options)

01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13
13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-01

EXERCISE AND SITTING

23. How often do you exercise in your leisure time?

		Once a month or less	2-3 times a month	Once a week	2-3 times a week	4-6 times a week	Daily
1	Light exercise (no sweating or getting out of breath)	1	2	3	4	5	6
2	Brisk exercise (you get out of breath and sweat at least mildly)	1	2	3	4	5	6

24. How long do you exercise for at any one time?

		none	less than 20 minutes	20-39 minutes	40-59 minutes	1-1.5 hours	more than 1.5 hours
1	Light exercise (no sweating or getting out of breath)	1	2	3	4	5	6
2	Brisk exercise (you get out of breath and sweat at least mildly)	1	2	3	4	5	6

25. How much do you exercise and strain yourself physically in your leisure time? (If this differs much between seasons, circle the option that best describes an average situation)

- 1 In my leisure time, I read, watch television and do chores that do not involve much movement or straining myself physically.
- 2 In my leisure time, I walk, ride a bike or do other types of exercise at least for four hours a week. This includes walking, fishing and hunting, light gardening, etc. but not commuting.
- 3 In my leisure time, I do actual fitness training, such as running, jogging, skiing, gymnastics, swimming and ball games, or strenuous gardening or other similar tasks on average at least for two hours a week.
- 4 In my leisure time, I regularly do competitive training several times a week; running, orienteering, skiing, swimming, ball games, or other strenuous sports activities.

26. How many hours do you sit on average during weekdays? (Mark 0 if none)

During the workday at the office or other such place |__|__| h |__|__| min

At home watching TV or videos |__|__| h |__|__| min

At home at the computer |__|__| h |__|__| min

In a vehicle |__|__| h |__|__| min

Other |__|__| h |__|__| min

NUTRITION

27. Do you normally eat the following meals?

	On weekdays		On weekends	
	no	yes	no	yes
Breakfast	1	2	1	2
Lunch (daytime meal around 11-13)	1	2	1	2
Dinner (evening meal)	1	2	1	2
Light snack in the evening	1	2	1	2
Snacks between meals (06–22)	1	2	1	2
Night-time meal (warm dish between 22–06)	1	2	1	2
Snacks during the night (22–06)	1	2	1	2

28. How many snacks do you eat ing a day?

on weekdays |__|__|

on weekends |__|__|

on the night shift |__|__|

29. Where do you most often eat your lunch (daytime meal)?

- 1 I do not eat lunch
- 2 at home
- 3 I bring my own food to eat at the workplace
- 4 in the workplace canteen/staff restaurant
- 5 in a restaurant, in a bar
- 6 other; please specify: _____

30. Do you have a special diet?

	no	yes
1 lactose-free diet	1	2
2 gluten-free diet (I avoid domestic cereals)	1	2
3 food allergy	1	2
4 diabetic diet	1	2
5 cholesterol-lowering diet	1	2
6 weight loss diet	1	2
7 vegetarian diet	1	2
8 low-sodium diet	1	2
9 other; please specify: _____	1	2

31. How often do you normally consume the following foodstuffs? (Think of the last six months.)

Circle one option from each line, based on whichever is the closest to your frequency of use.)

	less than once a month or not at all	once or twice a month	once a week	a couple of times a week	nearly every day	once a day or more
<u>CEREAL PRODUCTS:</u>						
Rye bread or crispbread	1	2	3	4	5	6
Yeast bread, graham bread or mixed grain bread, whole wheat baguette	1	2	3	4	5	6
French bread, white flour baguette/toast	1	2	3	4	5	6
Sweet pastry	1	2	3	4	5	6
Rye porridge, oatmeal, barley porridge or four grain porridge	1	2	3	4	5	6
Sugar-free muesli	1	2	3	4	5	6
Whole-grain (dark) macaroni/pasta or (brown) rice	1	2	3	4	5	6

DAIRY PRODUCTS:

Low-fat (1% or less fat) yoghurt or soured whole milk	1	2	3	4	5	6
Full-fat yoghurt or soured whole milk	1	2	3	4	5	6
Organic yoghurt or soured whole milk	1	2	3	4	5	6
Low-fat cheeses, 17% or less fat	1	2	3	4	5	6
Full-fat cheeses, more than 17% fat	1	2	3	4	5	6
Ice cream	1	2	3	4	5	6

VEGETABLES:

Potatoes, boiled or mashed	1	2	3	4	5	6
Fried potatoes or french fries	1	2	3	4	5	6
Fresh vegetables, root vegetables, fresh salad	1	2	3	4	5	6
Boiled vegetable side dish	1	2	3	4	5	6
Vegetarian food (soups, casseroles, stews)	1	2	3	4	5	6

	less than once a month or not at all	once or twice a month	once a week	a couple of times a week	nearly every day	once a day or more
<u>FRUIT, BERRIES:</u>						

Fruit	1	2	3	4	5	6
Fresh or frozen berries	1	2	3	4	5	6

FISH, MEAT, EGGS:

Oily fish (salmon, rainbow trout, herring, eel, anchovy, mackerel)	1	2	3	4	5	6
Medium-fat fish (whitefish, bream, vendace, flatfish, Baltic herring, common roach, tuna)	1	2	3	4	5	6
Low-fat fish (pike, pike perch, perch, burbot, cod, coalfish)	1	2	3	4	5	6
Broiler chicken, turkey, chicken dishes	1	2	3	4	5	6
Sausage dishes, frankfurters, sausages	1	2	3	4	5	6
Cold cuts – sausage (e.g. 'lauantaimakkara', salami)	1	2	3	4	5	6
Cold cuts – meat (e.g. cooked ham)	1	2	3	4	5	6
Reindeer, elk, game birds	1	2	3	4	5	6
Eggs	1	2	3	4	5	6

OTHER:

Oil-based salad dressing	1	2	3	4	5	6
Hamburgers, pizza	1	2	3	4	5	6
Sugar-sweetened soft drinks	1	2	3	4	5	6
Sweets	1	2	3	4	5	6
Chocolate	1	2	3	4	5	6
Potato crisps	1	2	3	4	5	6
Sports drinks	1	2	3	4	5	6
Energy drinks	1	2	3	4	5	6
Xylitol chewing gum or pastilles	1	2	3	4	5	6

STIMULANTS

32. Are you currently using any alcoholic beverages, even occasionally? (e.g. beer, cider, mild wines, wine or spirits)

- 1 no, I never have; *go to question 39*
- 2 no, because I stopped using alcohol
|___| |___| years ago, *go to question 39*
- 3 yes, less than once a month
- 4 yes, at least once a month

33. How often do you normally drink beer (IVA or III), **cider or Finnish long drink?**

- 1 never
- 2 once a year or less
- 3 a couple of times a year
- 4 3–4 times a year
- 5 once every couple of months
- 6 once a month
- 7 a couple of times a month
- 8 once a week
- 9 a few times a year
- 10 daily

34. How much beer (IVA or III), **cider or Finnish long drink do you normally drink at a time?** (1 bottle = 1/3 l)

- 1 less than one bottle
- 2 1 bottle
- 3 2 bottles
- 4 3 bottles
- 5 4–5 bottles
- 6 6–9 bottles
- 7 10–14 bottles
- 8 15 bottles or more
- 9 I do not drink these beverages

35. How often do you normally drink wine? (Mild or fortified, including homemade)

- 1 never
- 2 once a year or less
- 3 a couple of times a year
- 4 3–4 times a year
- 5 once every couple of months
- 6 once a month
- 7 a couple of times a month
- 8 once a week
- 9 a few times a year
- 10 daily

36. How much do you normally drink mild, fortified or homemade wine at a time?

- 1 half a glass
- 2 one glass (= 16cl)
- 3 a couple of glasses
- 4 about half a bottle (bottle = 3/4l)
- 5 slightly more than a bottle
- 6 approximately one bottle
- 7 1–2 bottles
- 8 more than two bottles
- 9 I do not drink wine

37. How often do you normally drink spirits?

- 1 never
- 2 once a year or less
- 3 a couple of times a year
- 4 3–4 times a year
- 5 once every couple of months
- 6 once a month
- 7 a couple of times a month
- 8 once a week
- 9 a few times a year
- 10 daily

38. How much do you normally drink spirits at a time?

- 1 less than one restaurant measure at a time (less than 4 cl)
- 2 one restaurant measure (approximately 4 cl)
- 3 a couple of restaurant measures
- 4 3–4 restaurant measures
- 5 5–6 restaurant measures
- 6 7–10 restaurant measures
- 7 approximately one half-litre bottle
- 8 more than one half-litre bottle
- 9 I do not drink spirits

39. Have you ever smoked tobacco?

- 1 no (→ go to question 45)
- 2 yes, I started when I was I____I____I years old

40. Have you ever smoked regularly? (= one cigarette, cigar, cigarillo or a pipe of tobacco nearly every day for at least a year)

- 1 no
- 2 yes, I have smoked regularly in total for I____I____I years

41. If you have stopped smoking, at what age was this?

I____I____I

42. Do you currently smoke?

- 1 7 days a week
- 2 5-6 days a week
- 3 2-4 days a week
- 4 one day a week
- 5 occasionally
- 6 no

43. When did you last smoke?

(If you smoke constantly, circle option 1)

- 1 yesterday or today
- 2 2 days – 1 month ago
- 3 1 month – 6 months ago
- 4 7 months – 11 months ago
- 5 1 – 5 years ago; go to question 45
- 6 6 – 10 years ago; go to question 45
- 7 more than 10 years ago; go to question 45

44. How much do you smoke now, or used to smoke before you stopped, on average per day? (answer each section; if you do not smoke the product, mark '0')

- 1 filtered cigarettes I____I____I a day
- 2 other cigarettes I____I____I a day
- 3 pipes of tobacco I____I____I a day
- 4 cigars I____I____I a day

45. Do you currently use snuff or chewing tobacco?

- 1 no
- 2 occasionally
- 3 yes, regularly

46. How many hours a day do you spend on premises where you have to inhale tobacco smoke produced by other people? (if none, mark '0')

I____I____I hours

LIVING ENVIRONMENT

47. What type of accommodation do you live in?

- 1 owner-occupied flat
- 2 rental accommodation
- 3 right of occupancy flat
- 4 company-owned flat
- 5 student accommodation
- 6 subsidised housing

48. How many rooms, including the kitchen, does your flat have?

|_|_|_| rooms

49. Do you live on a working, agricultural or animal production, farm?

- 1 No (*go to question 52*)
- 2 Yes

50. What production animals are kept on your farm?

	Number of production animals				
	0	1-10	11-50	51-100	>100
Cows	1	2	3	4	5
Horses	1	2	3	4	5
Pigs	1	2	3	4	5
Sheep	1	2	3	4	5
Other (e.g. domestic fowls, rabbits)	1	2	3	4	5

51. How many hours a day on average have you worked/spent time in a cowshed or an animal shelter during the last twelve months?

|_|_| hours a day

52. How often have you visited a farm where animals are kept or horse stables during the last twelve months?

- 1 none
- 2 no more than a couple times a year
- 3 1–2 times a month
- 4 once a week or more

53. Circle the number for 'yes' or 'no' based on whether or not you currently have any of the following pets at home?

	no	yes	how many
Cat	1	2	_ _
Dog	1	2	_ _
Other furry or feathered animals	1	2	_ _

54. Has there ever been any major water damage to your current flat (e.g. leaky pipes, storm damage, flooding, etc.), in which large areas/parts of the building have been soaked by large quantities of water?

- 1 no
- 2 yes, in the last twelve months
- 3 yes, more than twelve months ago
- 4 I do not know

55. Does any of the living space of your flat currently have water damage?

- 1 no
- 2 yes

56. In your current flat:

	no	yes	I do not know
<u>has there ever been</u>			
visible mould	1	2	3
smell of mould or an underground basement smell	1	2	3
<u>is there currently</u>			
visible mould	1	2	3
smell of mould or an underground basement smell	1	2	3

57. Symptoms/illnesses indoors

	no	yes, in the last year	yes, but more than a year ago
1 Have you had any symptoms/illnesses related to spending time in your flat?	1	2	3
2 Have you had any symptoms/illnesses related to spending time in your work space?	1	2	3

58. Do you heat your flat by burning wood in a fireplace, an oven or a stove?

- 1 no (*go to question 60*)
- 2 yes

59. How often do you burn wood in such an apparatus during the cold season (October–April)?

- 1 less than once a month
- 2 1–2 days a month
- 3 1–2 days a week
- 4 3–4 days a week
- 5 5–7 days a week

STATE OF HEALTH

60. How would you estimate your current state of health?

- 1 very good
- 2 good
- 3 moderate
- 4 poor
- 5 very poor

61. Your weight |__| |__| |__| kg

62. Your height |__| |__| |__| cm

63. Do you currently have, or have you ever had, any of the following symptoms, diseases or injuries diagnosed or treated by a doctor?

	No	Yes
Cardiovascular diseases		
High blood pressure, hypertension	1	2
Congenital heart disease; please specify: _____	1	2
Congestive heart failure	1	2
Coronary artery disease (angina pectoris)		2
.	1	
Diabetes		
Juvenile diabetes (Type 1)	1	2
Adult-onset diabetes (Type 2)	1	2
Thyroid dysfunction		
Hypothyroidism	1	2
Hyperthyroidism	1	2
Gastric and intestinal diseases		
Gastric or duodenal ulcer	1	2
Celiac disease	1	2
Inflammatory bowel disease (Chrohn's disease or ulcerative colitis)	1	2
Skin diseases		
Psoriasis	1	2
Hand dermatitis (allergic or other)	1	2
Other skin disease	1	2

Do you currently have, or have you ever had, any of the following symptoms, diseases or injuries diagnosed or treated by a doctor?

Continued...

No Yes

Infections

Gallstone, gallbladder infection	1	2
Long-term urinary tract infection, nephritis	1	2
Ovarian inflammation (women)	1	2
Prostatitis (men)	1	2
Chlamydia inflammation	1	2
Condyloma	1	2
Genital herpes	1	2
Other genital infection	1	2

Ear disease or trauma to the ear	1	2
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Eye diseases and symptoms

Eye disease or injury to the eye	1	2
Increased intraocular pressure	1	2
Glaucoma	1	2
Cataract	1	2
Macular degeneration	1	2
Impaired vision due to amblyopia (lazy eye)	1	2
Strabismus (squint)	1	2
Diabetic retinopathy	1	2
Colour retinopathy	1	2
Other intraocular inflammation	1	2

Brain and nervous system diseases

Epilepsy	1	2
Migraine headaches	1	2
Cerebrovascular disorder (cerebral infarction, apoplexy)	1	2
Other disease of the nervous system	1	2

Cancers

Skin cancer or precancerous conditions	1	2
Other type of cancer	1	2

Hernia	1	2
---------------------	---	---

Anaemia (low haemoglobin)	1	2
--	---	---

Oral diseases and disorders

Malocclusion that required orthodontic treatment	1	2
Cleft lip and palate	1	2

Do you currently have, or have you ever had, any of the following symptoms, diseases or injuries diagnosed or treated by a doctor?

Continued...

No Yes

Mental health

Mental disorder, psychosis	1	2
Depression	1	2
Other mental health problem	1	2

Substance abuse

Alcohol problem	1	2
Other substance abuse	1	2

Sleep apnoea	1	2
---------------------------	---	---

Musculoskeletal disorders and rheumatic diseases

Fibromyalgia	1	2
Rheumatoid arthritis	1	2
Psoriatic arthritis	1	2
Reactive arthritis	1	2
Juvenile rheumatoid arthritis	1	2
Ankylosing spondylitis	1	2
Gout	1	2
Other types of arthritis	1	2
Other rheumatic or autoimmune disease; please specify: _____	1	2
Bone loss (osteoporosis)	1	2
Bone fractures; how many? _____	1	2
Tendon injuries; please specify: _____	1	2
Tendonitis; please specify: _____	1	2
Back pain due to wear and tear, other back disease	1	2
Osteoarthritis:	1	2
1 Knee	1	2
2 Hip	1	2
3 Spine	1	2
4 Finger	1	2
5 Temporomandibular joint	1	2
6 Ankle joint	1	2
7 Foot	1	2
8 Shoulder	1	2
9 Other; please specify: _____	1	2
10 Other joint disease; please specify: _____	1	2

Other disease or injury; please specify: _____	1	2
---	---	---

64. Questions about infections:

	No	Yes
Have you had pneumonia at least two times in your life?	1	2
Have you been hospitalised due to an infectious disease?	1	2
Have your sinuses been operated on due to recurrent infections?	1	2
Have you had recurrent inflammation of the ear in adulthood?	1	2
Do you have other recurrent infections endangering your health?	1	2
In your perception, do you have more bouts of flu than what is normal?	1	2
In your perception, are you more susceptible to infections than other people?	1	2
Does any of your close relatives have innately reduced defence capability against infections?	1	2

65. Have you experienced any of the following symptoms:

	No	Yes
Dry eyes?	1	2
Dry mouth?	1	2
White finger syndrome (Raynaud's phenomenon)?	1	2
Solar dermatitis?	1	2
Skin burns easily in the sun?	1	2
Mild fever, over 37 degrees?	1	2
Low white cell count?	1	2
Low platelet count (thrombocyte count)?	1	2
Joint pain?	1	2
Joint swelling?	1	2
Pain under or at the back of the heel?	1	2
Sausage-shaped swelling of the fingers and toes?	1	2

66. In this section, write down the names, strengths and dosages of the medicines you are using. Do you use these medicines regularly or on a needs basis, and for which purpose? (on-the-shelf drugs, prescription drugs, ointments, vitamins and food supplements)

Medicine	Strength	Dosage	On a needs basis	Regularly	Purpose of use
<i>e.g. Burana</i>	<i>800 mg</i>	<i>1 tablet</i>	<i>X</i>		<i>For back pain</i>
<i>e.g. vitamin D</i>	<i>15 µg</i>	<i>1 tablet/day</i>		<i>X</i>	<i>Vitamin supplement</i>

Continued...

... list of medications continues

Medicine	Strength	Dosage	On a needs basis	Regularly	Purpose of use

67. How many of the following types of accidents requiring treatment by a doctor have you had? (mark '0' if none)

- 1 Accidents at work |__|__|
- 2 Traffic accidents |__|__|
- 3 Accidents at home |__|__|
- 4 Exercise-related accidents |__|__|
- 5 Other leisure-time accidents |__|__|
- 6 Violence, assault |__|__|

SENSES

68. Do you have symptoms of presbyopia?
(problems with near-sightedness without reading glasses or bifocals, or when using distance glasses only)

- 1 no
- 2 yes; the symptoms started |__|__| years ago

69. Do you wear contact lenses?

- 1 no
- 2 sometimes
- 3 yes

70. Have you had your vision checked within the least five years?

- 1 no
- 2 yes

71. Do you use terminal glasses for reading from the computer screen?

- 1 No, I use my normal eyeglasses during computer work
- 2 I do not use eyeglasses during computer work
- 3 Yes, I have an intermediate prescription for computer work (terminal glasses)

72. Do you have difficulties with the following functions (even if you are wearing your eyeglasses):

	none	slight	moderate	major
1 Recognising traffic signs and signals?	1	2	3	4
2 Reading TV subtitles from a distance of 2–3 metres?	1	2	3	4
3 Reading a regular newspaper?	1	2	3	4
4 Reading the labels on medicine bottles, the product descriptions of foodstuffs and the text in the phone book	1	2	3	4
5 Reading text from a computer screen?	1	2	3	4

73. Within the last two weeks, have you had:

	no	yes
1 A foreign body sensation/a feeling that you have something in your eye?	1	2
2 Watery eyes?	1	2
3 Sensitivity to light (photophobia)?	1	2
4 Eye pain/sore eyes?	1	2
5 Visual disturbances (e.g. distorted/blurred vision)	1	2
6 Night-blindness (nyctalopia)?	1	2

74. Have you had occlusion therapy for impaired vision due to amblyopia (lazy eye) in your childhood?

- 1 no
- 2 yes
- 3 cannot say

- 1 no
- 2 yes, to my right eye
When (year)?
Where were you treated? _____
- 3 yes, to my left eye
When (year)?
Where were you treated? _____

75. Have you had any eye injuries that required treatment (e.g. a blow to the eye)?

- 1 no
- 2 yes, to my right eye
 - a. In
 - b. Where were you treated?

- 3 yes, to my left eye
 - a. In
 - b. Where were you treated?

77. Have you had other types of eye surgery?

- 1 no
- 2 yes, to my right eye
When (year)?
Where were you treated? _____
- 3 yes, to my left eye
When (year)?
Where were you treated? _____

76. Have you had refractive surgery (e.g. LASIK/PRK)?

78. Is it difficult for you to follow a conversation in noisy conditions,

such as when the TV or radio is on,
or the kids are playing?

- 1 no
- 2 yes

that usually last for more than five
minutes?

- 1 no
- 2 yes

**79. Do you currently hear sounds inside
your head or in your ears (tinnitus)**

ORAL HEALTH

80. How often do you brush your teeth?

- 1 Never or hardly ever
- 2 Once a day
- 3 Twice a day
- 4 More than twice a day
- 5 Now and then during the week

81. Do you use the following products?

	never or hardly ever	daily or almost eve- ry day	now and then during the week
1 An electric toothbrush	1	2	3
2 Dental floss	1	2	3
3 Toothpicks	1	2	3
4 Interdental brush	1	2	3
5 Fluoride toothpaste	1	2	3

82. How many teeth do you have in your mouth in total? |____|____|

83. In your opinion, do you currently have:

	no	yes
1 Holes in your teeth?	1	2
2 Bleeding from your gums when you brush your teeth?	1	2
3 A tooth or teeth that should be removed?	1	2
4 Aching or other symptoms in your mouth?	1	2
5 A healthy mouth that does not need dental care?	1	2

HEART

84. Have you experienced any pain in your chest that occurs under strain within the last 12 months?

- 1 no
- 2 yes

STOMACH

85. Have you ever had problems with heartburn or acid reflux?

- 1 no (*go to question 91*)
- 2 yes

86. Have you had problems with heartburn or acid reflux within the last year?

- 1 no
- 2 yes
- ☐ Heartburn (you can tick both boxes)
- ☐ Acid reflux

87. What age were you when you had these symptoms for the first time?

Age |____|____|

88. How often do you have problems with heartburn/acid reflux?

- 1 Less than once a month
- 2 At least once a month
- 3 Weekly
- 4 Daily

89. Do you wake up at night on account of heartburn/acid reflux?

- 1 no
- 2 yes

90. Have you used any medication for heartburn/acid reflux within the last year?

- 1 no
- 2 yes,
☐ daily; what medication?

- ☐ on a needs basis; what medication?

91. Have you ever had recurring gastric/intestinal problems (excluding heartburn/acid reflux)?

- 1 no (*go to question 98*)
- 2 yes

92. Have you had recurring gastric/intestinal problems (excluding heartburn/acid reflux) that started more than six months ago?

- 1 no
- 2 within the last three months
- 3 earlier during the last year

93. Have you had these problems at least three days per month?

- 1 no
- 2 yes

94. How long ago did the gastric/intestinal problems start?

- 1 6 months to 5 years ago
- 2 5 to 10 years ago
- 3 10 to 20 years ago
- 4 more than 20 years ago

96. Have you experienced pain, aches or problems anywhere in the abdominal area? (circle only one of the options)

- 1 In the upper part of the abdomen
- 2 In the lower part of the abdomen
- 3 In both the upper and lower part of the abdomen

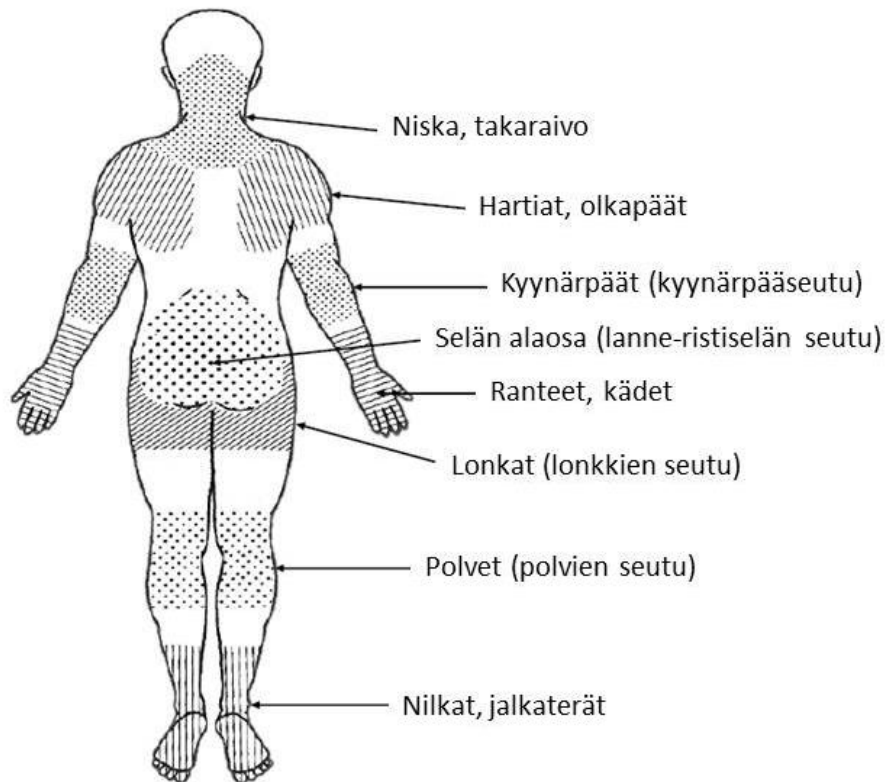
95. What type of symptoms did you have? (you can circle more than one)

- 1 Pain or ache in the upper part of the abdomen
- 2 A burning sensation in the upper part of the abdomen
- 3 An unpleasant feeling of fullness after a meal
- 4 An early feeling of becoming full after a meal

97. Gastric and intestinal problems

	no	yes
1 Do the problems go away during bowel movements/passing of faeces?	1	2
2 Do the problems start when your bowel movements become more/less frequent than normal?	1	2
3 Do the problems start when your faeces are harder/softer than usual?	1	2
4 Do you often have diarrhoea (completely watery or fluffy, pasta-like faeces in 25% or more of the times of passing of faeces)?	1	2
a. On such occasions, do you have blood in your faeces?	1	2
5 Do you often have constipation?	1	2
a. On such occasions, do you see blood when you wipe yourself?	1	2
6 Do you have gastric problems or diarrhoea when you use milk (lactose-intolerance)?	1	2
7 Have you had any gastroscopic or intestinal endoscopic examinations?	1	2
a. What?		
b. Where?		

PAINS AND ACHES



98. Have you <u>ever</u> had any pain or aches in the following parts of your body? (the relevant parts of the body have been named in the adjacent picture; please refer to it when answering the following questions)			Please answer these questions only if you have had pain or aches in the area in question.			
	no	yes	Have you <u>ever</u> been examined or treated for such pain by a doctor, physiotherapist, chiropractor, or other such professional?		Have you had pain or aches in this area <u>within the last 12 months</u> ?	
	no	yes	no	yes	n o	yes
Neck, back of the head	1	2	1	2	1	1. 1–7 days 2. 8–30 days 3. More than 30 days, but not daily 4. Daily
Neck pain that radiates to the forearm or hand	1	2	1	2	1	1. 1–7 days 2. 8–30 days 3. More than 30 days, but not daily 4. Daily
Shoulder(s)	1	2	1	2	1	1. 1–7 days 2. 8–30 days 3. More than 30 days, but not daily 4. Daily
Arms or elbows	1	2	1	2	1	1. 1–7 days 2. 8–30 days 3. More than 30 days, but not daily 4. Daily

Have you <u>ever</u> had any pain or aches in the following parts of your body? (the relevant parts of the body have been named in the adjacent picture; please refer to it when answering the following questions)			Please answer these questions only if you have had pain or aches in the area in question.			
			Have you <u>ever</u> been examined or treated for such pain by a doctor, physiotherapist, chiropractor, or other such professional?		Have you had pain or aches in this area <u>within the last 12 months</u> ?	
	no	yes	no	yes	n o	yes
Wrists, hands or fingers	1	2	1	2	1	1. 1–7 days 2. 8–30 days 3. More than 30 days, but not daily 4. Daily
Lower back (= pelvic/lumbar area)	1	2	1	2	1	1. 1–7 days 2. 8–30 days 3. More than 30 days, but not daily 4. Daily
Lower back pain associated with a pain that radiates to a lower limb below the knee or numbness (sciatica)	1	2	1	2	1	1. 1–7 days 2. 8–30 days 3. More than 30 days, but not daily 4. Daily
Long-term lower back pain of more than three months, associated with a pain that radiates to a lower limb below the knee or numbness (sciatica)	1	2	1	2	1	1. 1–7 days 2. 8–30 days 3. More than 30 days, but not daily 4. Daily
Hips	1	2	1	2	1	1. 1–7 days 2. 8–30 days 3. More than 30 days, but not daily 4. Daily
Knees	1	2	1	2	1	1. 1–7 days 2. 8–30 days 3. More than 30 days, but not daily 4. Daily
Ankles, feet	1	2	1	2	1	1. 1–7 days 2. 8–30 days 3. More than 30 days, but not daily 4. Daily

99. If you have had the listed musculoskeletal pain within the last 2 months, how intense and interfering was the pain in your experience?

0 = "not at all interfering"/"no pain"

10 = "totally interfering"/"worst possible pain"

Every type of musculoskeletal pain in total

Intensity	0	1	2	3	4	5	6	7	8	9	10
Interference											
at work	0	1	2	3	4	5	6	7	8	9	10
during leisure time	0	1	2	3	4	5	6	7	8	9	10
while asleep	0	1	2	3	4	5	6	7	8	9	10

Neck, back of the head

Intensity	0	1	2	3	4	5	6	7	8	9	10
Interference (= in total, work, leisure time and sleep)	0	1	2	3	4	5	6	7	8	9	10

Neck pain that radiates to the forearm or hand

Intensity	0	1	2	3	4	5	6	7	8	9	10
Interference (= in total, work, leisure time and sleep)	0	1	2	3	4	5	6	7	8	9	10

Shoulder(s)

Intensity	0	1	2	3	4	5	6	7	8	9	10
Interference (= in total, work, leisure time and sleep)	0	1	2	3	4	5	6	7	8	9	10

Arms or elbows

Intensity	0	1	2	3	4	5	6	7	8	9	10
Interference (= in total, work, leisure time and sleep)	0	1	2	3	4	5	6	7	8	9	10

Wrists, hands or fingers

Intensity	0	1	2	3	4	5	6	7	8	9	10
Interference (= in total, work, leisure time and sleep)	0	1	2	3	4	5	6	7	8	9	10

Lower back (= pelvic/lumbar area)

Intensity

0	1	2	3	4	5	6	7	8	9	10
0	1	2	3	4	5	6	7	8	9	10

Interference (= in total, work, leisure time
and sleep)

**Lower back pain associated with a pain that
radiates to a lower limb below the knee or
numbness (sciatica)**

Intensity

0	1	2	3	4	5	6	7	8	9	10
0	1	2	3	4	5	6	7	8	9	10

Interference (= in total, work, leisure time
and sleep)

**Long-term lower back pain of more than three
months, associated with a pain that radiates
to a lower limb below the knee or numbness
(sciatica)**

Intensity

0	1	2	3	4	5	6	7	8	9	10
0	1	2	3	4	5	6	7	8	9	10

Interference (= in total, work, leisure time
and sleep)

Hips

Intensity

0	1	2	3	4	5	6	7	8	9	10
0	1	2	3	4	5	6	7	8	9	10

Interference (= in total, work, leisure time
and sleep)

Knees

Intensity

0	1	2	3	4	5	6	7	8	9	10
0	1	2	3	4	5	6	7	8	9	10

Interference (= in total, work, leisure time
and sleep)

Ankles, feet

Intensity

0	1	2	3	4	5	6	7	8	9	10
0	1	2	3	4	5	6	7	8	9	10

Interference (= in total, work, leisure time
and sleep)

**100. Have you experienced the following sensations in your lower back (pelvic/lumbar) area
for periods of more than three months:****no yes**

Morning stiffness that lasts for more than 30 minutes from when you wake up?

1

2

Pain that eases when you move but not when you rest?

1

2

Pain that wakes you up in the early hours of the morning?

1

2

Pain in the buttocks that varies from side to side?

1

2

101. Have you had the following symptoms?

	no	once a week	more frequently
1 Pain in your temples, temporomandibular joints, face or jaws	1	2	3
2 Pain when you open your mouth wide or when you chew	1	2	3
3 A locked jaw	1	2	3

102. Have you had a recurring headache with the following characteristics?

	no	yes
1 Exercise/strain makes the headache worse, or I have to lie down when my head hurts	1	2
2 The intensity of my headache prevents me from performing my normal daily activities	1	2
3 My headache is often one-sided	1	2
4 My headache is often throbbing or pulsating	1	2
5 My periods often include a headache	1	2
6 My headache includes nausea and vomiting	1	2
7 Bright lights and/or loud sounds irritate me when I have a headache	1	2

ALLERGIES AND RESPIRATION**103. Have you had the following respiratory and/or allergic symptoms or diseases?**

	Personal opinion			Diagnosed or treated by a doctor	
	never	yes, within the last 12 months	yes, but more than a year ago	no	yes
1 Asthma	1	2	3	1	2
2 A cough that included wheezing	1	2	3	1	2
3 Recurring respiratory tract infections	1	2	3	1	2
4 Emphysema, long-term bronchitis, inflammation of the lungs	1	2	3	1	2
5 Allergic rhinitis (associated with animals and pollen, e.g. hay fever)	1	2	3	1	2
6 Eczema, also referred to as atopic dermatitis, dermatitis or atopic eczema	1	2	3	1	2
7 Symptoms of eye allergy (itching, watery eyes around animals and during the pollen season) . .	1	2	3	1	2

104. Have you had the following respiratory symptoms?

(circle the number for 'yes' or 'no' in each line)

	no	yes
1 Do you normally cough when you wake up on winter mornings?	1	2
2 Do you normally cough during the day or at night in winter?	1	2
3 Have you been coughing in the above-mentioned manner on most days for at least three months on an annual basis?	1	2
4 Do you normally cough up slimy mucous when you wake up on winter mornings? .	1	2
5 Do you normally cough up slimy mucous during the day or at night in winter?	1	2
6 Have you been coughing up slimy mucous on most days for at least three months on an annual basis?	1	2

SKIN**105. How easily does your skin burn in the sun in Finland?**

- 1 Every time
- 2 Often
- 3 Occasionally
- 4 Never

106. How often have you burned your skin in the sun?

- 1 Several dozen times
- 2 10–20 times
- 3 Less than 10 times
- 4 5–10 times
- 5 Less than 5 times
- 6 Never

107. How often have you gone on a holiday in the sun abroad within the last ten years?

- 1 Several times a year
- 2 Annually
- 3 Every other year
- 4 3–4 times in 10 years
- 5 Not once

108. How often do you normally put on sunscreen in various situations?

	Not at all	Sometimes	Regularly	I do not spend time in the sun
While spending longer periods of time in the sun in Finland	1	2	3	4
While spending longer periods of time in the sun abroad	1	2	3	4

109. How often do you have itchy skin?

	Not at all	Very rarely	Monthly	Weekly	Daily
1 Itching in small areas of skin (e.g. scalp)	1	2	3	4	5
2 Extensive itching	1	2	3	4	5

QUESTIONS FOR WOMEN ONLY (Men, go straight to question 122)

Instructions: If you have never been pregnant, go straight to question 112.

110. If you have been pregnant, how many times have you (mark '0' if none)

Had a miscarriage? |____|____| times

Had an abortion? |____|____| times

Had an ectopic pregnancy? |____|____| times

Given birth? |____|____| times

111. If you have been pregnant, during the pregnancy, have you been diagnosed with

Gestational diabetes?

☐ No

☐ Yes; when (year): _____

How was it treated?

☐ Diet and meal plan; when (year): _____

☐ Insulin or other medical treatment; when (year): _____

High blood pressure during pregnancy, including protein in the urine (= pre-eclampsia)?

☐ No

☐ Yes; when (year): _____

How was it treated?

☐ Monitoring only; when (year): _____

☐ Medical treatment; when (year): _____

High blood pressure during pregnancy?

☐ No

☐ Yes; when (year): _____

During how many pregnancies: |__|__|

How was it treated?

☐ Monitoring only; when (year): _____

☐ Medical treatment; when (year): _____

112. Do you still have periods?

- 1 Yes, regularly; I had my last period in |__|_|_|.|__|_|_|.20 |__|_|_|
- 2 Yes, irregularly; I had my last period in |__|_|_|.|__|_|_|.20 |__|_|_|
- 3 No; I had my last period in _____ |__|_|_|_|_| (month/year).
- 4 No; I have had a hysterectomy
- 5 No, due to hormone therapy; which medication? _____

113. Have you had menopausal symptoms?

- 1 no
- 2 Yes (If the answer is 'yes', mark in the table, which of the symptoms you have had)

Symptom occurrence rate:		not at all	some what low	some	some what high	very high
1	Hot flushes and/or night sweats	1	2	3	4	5
2	Mood symptoms (irritability, dejection, mood swings)	1	2	3	4	5
3	Insomnia or sleep disorders	1	2	3	4	5
4	Memory lapses or difficulty concentrating	1	2	3	4	5
5	Loss of libido	1	2	3	4	5
6	Vaginal dryness	1	2	3	4	5
7	Muscle and/or joint pain	1	2	3	4	5

Symptom interference on a scale of 1 to 7:		not at all interfering					very interfering	
1	Hot flushes and/or night sweats	1	2	3	4	5	6	7
2	Mood symptoms (irritability, dejection, mood swings)	1	2	3	4	5	6	7
3	Insomnia or sleep disorders	1	2	3	4	5	6	7
4	Memory lapses or difficulty concentrating	1	2	3	4	5	6	7
5	Loss of libido	1	2	3	4	5	6	7
6	Vaginal dryness	1	2	3	4	5	6	7
7	Muscle and/or joint pain	1	2	3	4	5	6	7

114. Have you been diagnosed with endometriosis?

- 1 no
2 Yes, at the age of |____|____|

If yes, how? (you can select more than one option)

- ☐ In a gynaecological examination
☐ In an ultrasound examination
☐ In an abdominal endoscopy/during abdominal surgery

115. Have you been diagnosed with myomia (uterine fibroids)?

- 1 no
2 Yes, at the age of |____|____|

If yes, how? (you can select more than one option)

- ☐ In a gynaecological examination
☐ In an ultrasound examination
☐ In an abdominal endoscopy/during abdominal surgery

116. Have you been diagnosed with polycystic ovaries and/or polycystic ovary syndrome (PCOS)?

- 1 no
2 yes

117. Have you used hormonal contraceptives ever in your life?

- 1 No
2 Yes

If you answered 'yes', circle in the table which products you have used and for how long (you can circle more than one option)

	Less than 5 years	5 to 10 years	More than 10 years
Combination hormonal contraception			
- pills	1	3	3
- patch or vaginal ring	1	3	3
Progestogen-only contraceptive pill ("mini-pill")	1	3	3
Hormonal coil	1	3	3
Contraceptive implant	1	3	3
Other type of hormonal contraception; please specify:	1	3	3

118. Are you currently using any of the following products for contraception or other reason (e.g. heavy menstrual bleeding, menopausal symptoms). How long have you used it for, continuously? (you can select more than one option)

- 1 no
- 2 yes

	Less than 5 years	5 to 10 years	More than 10 years
1 Pills, patch or vaginal ring	1	2	3
2 Progestogen-only contraceptive pill ("mini-pill")	1	2	3
3 Hormonal coil	1	2	3
4 Contraceptive implant	1	2	3
5 Copper coil	1	2	3
6 Condoms	1	2	3
7 Sterilisation:			
a. myself	1	2	3
b. my spouse/partner	1	2	3
8 Hormone replacement therapy for menopausal symptoms	1	2	3
9 Other; please specify: _____	1	2	3

119. Urinary difficulty or incontinence

	never	rarely	often	all the time
1 Does urine leak out at times when your bladder is under pressure (e.g. when you cough, sneeze or lift something)?	1	2	3	4
2 Do you feel such a sudden, intense urge to pass urine that you cannot get to the toilet in time?	1	2	3	4

120. If you have urinary difficulty or incontinence, how much of a problem is it for you?

- 1 not at all
- 2 a slight problem
- 3 a moderate problem
- 4 a major problem

121. Do you have faecal difficulty or incontinence that interferes with your life?

- 1 no
- 2 yes

QUESTIONS FOR MEN ONLY (*Women, go straight to question 123*)

122. How often when you wake up in the morning do you currently have penile stiffening (an erection)?

- 1 two or more times a week
- 2 once a week
- 3 2–3 times a month
- 4 once a month
- 5 never

QUESTIONS FOR BOTH MEN AND WOMEN

123. Do you currently have difficulties with sexual intercourse?

- 1 no
- 2 yes
 - I am on medication
 - ☐ no
 - ☐ yes
- 3 I do not have a partner

124. How often do you think about sex? (including interest in sex, sexual fantasies, desire to have sex)?

- 1 Never
- 2 Once a month
- 3 Once a week
- 4 2–3 times a week
- 5 Daily

125. How often do you have sexual intercourse and/or masturbate?

- 1 Never
- 2 Once a month
- 3 Once a week
- 4 2–3 times a week
- 5 Daily

126. Has infertility ever been a problem for you?

- 1 no
- 2 yes
- 3 I have not tried to get pregnant
(→ go to question 130)

127. Have you or your current/former partner been examined for infertility?

- 1 no (*go to question 130*)
- 2 yes
 - ☐ Myself
 - ☐ My partner
 - ☐ Both

128. Has the cause of infertility been identified?

- 1 In me
- 2 In my partner
- 3 In us both
- 4 The cause has not been identified

129. Have you or your partner been treated for infertility whilst you were trying to get pregnant together? (select more than one option, if necessary)

	Which treatments and in which year (mark as accurately as you remember)	A pregnancy that led to the birth of a child began as the result of/during the treatment	
		Yes	No
1 no (go to question 130)			
2 Ovarian stimulation using Clomifen	_____	in: _____	_____
3 insemination (injecting sperm into the uterus)	_____	in: _____	_____
4 surgical treatment; please specify _____	_____	in: _____	_____
5 in vitro fertilisation (IVF)	_____	in: _____	_____
6 intracytoplasmic sperm injection (ICSI)	_____	in: _____	_____
7 other; please specify: _____	_____	in: _____	_____

130. Listed below are problems and signs that most people have now and then. Circle the option that best describes how much the said problem has bothered you within the last week?

	not at all	some	considerably	very much
Headache	1	2	3	4
Difficulty in falling asleep	1	2	3	4
Feeling like there is no hope for the future	1	2	3	4
Tension or over-exhaustion	1	2	3	4
A feeling of loneliness	1	2	3	4
Feeling like your whole life has been a constant uphill battle	1	2	3	4
Bursts of panic or anxiety	1	2	3	4
Such a strong feeling of restlessness that it has been hard to sit still	1	2	3	4
A feeling of worthlessness	1	2	3	4
Nervousness and restlessness	1	2	3	4
Dizziness or a fainting feeling	1	2	3	4
Worry	1	2	3	4
Lack of sexual interest or pleasure	1	2	3	4
Lack of energy or impotency	1	2	3	4
Thoughts of ending your life	1	2	3	4
Tremor	1	2	3	4
Loss of appetite	1	2	3	4
Tearfulness	1	2	3	4
Feeling of being locked in or held captive	1	2	3	4
Sudden feeling of restlessness without an actual reason	1	2	3	4
Self-accusations	1	2	3	4
Dejection	1	2	3	4
Lack of interest	1	2	3	4
Distress	1	2	3	4
Heart palpitations	1	2	3	4

ADDITIONAL QUESTIONS

131. Your most recent visual acuity as you know it (*visual acuity, or Visus, abbreviation V, no +/- sign in front*)

Mark the box of the correct option with an (X)

Right eye (Right = OD = o.dx. = R)		Left eye (Left = OS = o.sin. = L)	
<input type="checkbox"/>	2.0	<input type="checkbox"/>	2.0
<input type="checkbox"/>	1.6	<input type="checkbox"/>	1.6
<input type="checkbox"/>	1.4	<input type="checkbox"/>	1.4
<input type="checkbox"/>	1.2	<input type="checkbox"/>	1.2
<input type="checkbox"/>	1.0	<input type="checkbox"/>	1.0
<input type="checkbox"/>	0.8	<input type="checkbox"/>	0.8
<input type="checkbox"/>	0.63	<input type="checkbox"/>	0.63
<input type="checkbox"/>	0.6	<input type="checkbox"/>	0.6
<input type="checkbox"/>	0.5	<input type="checkbox"/>	0.5
<input type="checkbox"/>	0.4	<input type="checkbox"/>	0.4
<input type="checkbox"/>	0.3	<input type="checkbox"/>	0.3
<input type="checkbox"/>	0.2	<input type="checkbox"/>	0.2
<input type="checkbox"/>	0.1	<input type="checkbox"/>	0.1
<input type="checkbox"/>	CF = count fingers, correctly identify how many fingers	<input type="checkbox"/>	CF = count fingers, correctly identify how many fingers
<input type="checkbox"/>	HM= hand motion/movement, can see hand movement	<input type="checkbox"/>	HM= hand motion/movement, can see hand movement
<input type="checkbox"/>	PL= perceives light	<input type="checkbox"/>	PL= perceives light
<input type="checkbox"/>	0 = no light perception, totally blind	<input type="checkbox"/>	0 = no light perception, totally blind
<input type="checkbox"/>	I do not know	<input type="checkbox"/>	I do not know

132. Do you wear eyeglasses?

- 1 No
- 2 Yes (fill in the details of your most used eyeglasses below)

1. Eyeglasses

Are your glasses: 1. distance glasses
2. bifocals
3. reading glasses

How long have had your current glasses? ____/____/ years

Fill in the following details from the eyeglass prescription (see example images on the following pages)

The strength of the glasses (from the eyeglass prescription/card; note: + or - signs, or at least the amount)

Right (OD/dx)	____/____/	(e.g. -1.25)	Left (OS/sin)	____/____/	(e.g. +3.25)
cyl	____/____/	(e.g. +0.75)	cyl	____/____/	(e.g. -0.25)
ax	____/____/	(e.g. 120)	ax	____/____/	(e.g. 10)
Add ____/____/ (e.g. 1.75)					

2. Eyeglasses

Are your glasses: 1. distance glasses
2. bifocals
3. reading glasses

How long have had your current glasses? ____/____/ years

Fill in the following details from the eyeglass prescription (see example images on the following pages)

The strength of the glasses (from the eyeglass prescription/card; note: + or - signs, or at least the amount)

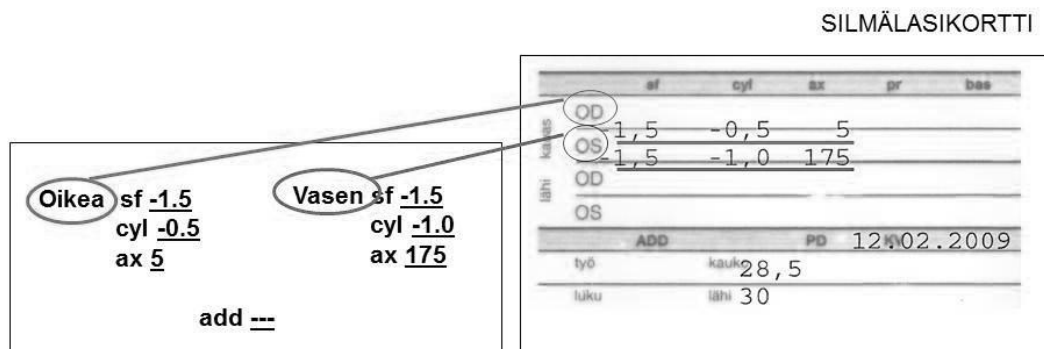
Right (OD/dx)	____/____/	(e.g. -1.25)	Left (OS/sin)	____/____/	(e.g. +3.25)
cyl	____/____/	(e.g. +0.75)	cyl	____/____/	(e.g. -0.25)
ax	____/____/	(e.g. 120)	ax	____/____/	(e.g. 10)
Add ____/____/ (e.g. 1.75)					

If you have had refractive surgery (e.g. LASIK/PRK), how much was the refractive error before the surgery (at least the amount, note the example, + or - sign)

Right (OD/dx)	____/____/	(e.g. -1.25)	Left (OS/sin)	____/____/	(e.g. +3.25)
cyl	____/____/	(e.g. +0.75)	cyl	____/____/	(e.g. -0.25)
ax	____/____/	(e.g. 120)	ax	____/____/	(e.g. 10)

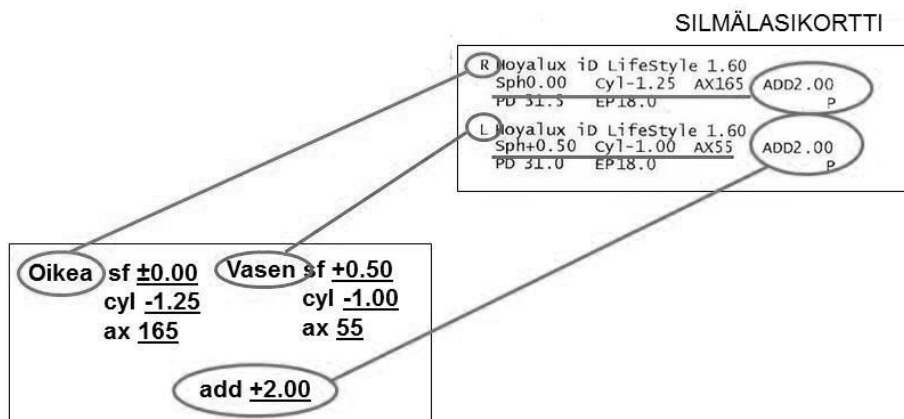
Example images

Esimerkki 1: Kaukolasit



Oikea = OD = o.dx. = R Vasen = OS = o.sin. = L add = lähiläsä

Esimerkki 2: Moniteholasit A



Oikea = OD = o.dx. = R Vasen = OS = o.sin. = L add = lähiläsä

Esimerkki 3: Moniteholasit

SILMÄLASIRESEPTI

KAUAS

sf -5.0 ax 15

cyl +2.75 ax 175

pr _____ bas _____

LÄHELLE

sf _____ ax _____

cyl _____ ax _____

pr _____ bas _____

12 TA 12
1.4 V 1.4

TAI

Oikea sf -5.0
cyl +2.75
ax 15

Vasen sf -5.5
cyl +3.0
ax 175

add +1.25

SILMÄLASIKORTTI

Silmälasit	Peruspari	
Linssimääräys Nro.	694	378680
Päivämäärä	15.05.2010	
Moniteho	Oikea	Vasen
Sf	-5.00	-5.50
Cyl	+2.75	+3.00
Ax	15	175
Prisma	0.00	0.00
Basis		
Add	1.25	1.25
Lukukorkeus	21.0	21.0
Kv	30.0	30.0
Des	0.0	0.0
Des.suun	0	180
Materiaali	RI7	RI7
Halkaisija	70.00	70.00
Tyyppi	IPR	IPR
Lukuosa	0	0
Lisäkäsittelyt		

Oikea = OD = o.dx. = R Vasen = OS = o.sin. = L add = lähilisä

Esimerkki 4: Lukulasit

Oikea sf +2.75
cyl -1.00
ax 155

Vasen sf +3.00
cyl -1.50
ax 55

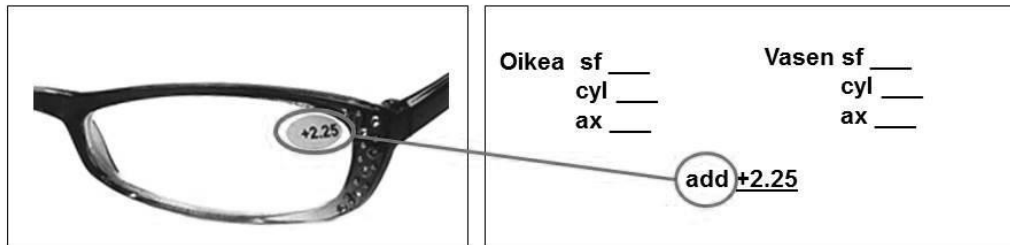
add ---

Silmälasit	Peruspari	
Linssimääräys Nro.	694	379641
Päivämäärä	14.10.2010	
Lähi	Oikea	Vasen
Sf	+2.75	+3.00
Cyl	-1.00	-1.50
Ax	155	55
Prisma	0.00	0.00
Basis		
Add	0.00	0.00
Lukukorkeus	17.0	17.0
Kv	30.0	30.0
Des	0.0	0.0
Des.suun	0	180
Materiaali	BN6	BN6
Halkaisija	66.00	66.00
Tyyppi	200	200
Lukuosa	0	0
Lisäkäsittelyt	sar	

SILMÄLASIKORTTI

Oikea = OD = o.dx. = R Vasen = OS = o.sin. = L add = lähilisä

Esimerkki 5: Lukulasit A



VALMISLUKULASIT

Oikea = OD = o.dx. = R Vasen = OS = o.sin. = L add = lähilisä

THANK YOU FOR TAKING THE TIME TO RESPOND TO THIS SURVEY!

I completed the survey

1 myself

2 with the help of a carer, an assistant or other close relative

Date of completing the survey |__|__|__| 20 |__|__|

ID

Consent form

I have been given sufficient information about the “Northern Finland Birth Cohort 1966 Welfare and Health Research Programme”, and I wish to take part in it. I am aware that my participation is voluntary and that I can terminate my participation at any time without it affecting the way I am treated now or in the future.

I hereby give or do not give my consent as marked by an (X):

- | | Yes | No |
|---|--------------------------|--------------------------|
| 1. The information collected about me under this research programme and the survey results <u>may be used now or at a later time</u> in anonymised format in scientific research. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. National registration data about me may be combined with the information collected now under this research programme and earlier in anonymised format. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. With respect to this research programme, the necessary patient record information about me can be requested from the relevant health care units. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. The information collected about me earlier and under this research programme and the survey results <u>may be disclosed</u> without name and personal identity code, i.e. in anonymised format, for the purposes of cooperation with businesses. | <input type="checkbox"/> | <input type="checkbox"/> |

Place _____

Date ____/____/____

Signature _____ Name in block letters _____

Personal ID code _____ Telephone number: _____

Address: _____

Supplement table 1.

Pneumonia			
Viral pneumonia	J12	480	480
Pneumococcal pneumonia	J13	481	481
Pneumonia due to Hemophilus influenzae	J14	482	482
Other bacterial pneumonia	J15	482	482
Pneumonia due to other specified organism	J16	483	483
Pneumonia in infectious diseases classified elsewhere	-	484	-
Acute interstitial pneumonia	-	-	484
Bronchopneumonia, organism unspecified	J18	485	485
Pneumonia, unspecified organism	J18	486	486
Asthma and other chronic obstructive pulmonary disease			
Simple and mucopurulent chronic bronchitis	J41	491	491
Unspecified chronic bronchitis	J42	491	491
Emphysema	J43	492	492
Other chronic obstructive pulmonary disease	J44	496	-
Asthma	J45	493	493
Cystic fibrosis with pulmonary manifestations	E84.0	277.02	-
Bronchopulmonary dysplasia originating in the perinatal period	P27.1	-	-
Chronic heart diseases			
Cardiac arrhythmias and conduction disorders	I44-145, I47-149	426, 427 (excl. 427.5)	427.3-427.9
Atrioventricular and left bundle-branch block	I44	426	427.3-427.9
Other conduction disorders	I45	-	-
Paroxysmal tachycardia	I47	427	427
Atrial fibrillation and flutter	I48	427	427
Other cardiac arrhythmias	I49	427	427
Ischemic Heart Disease	I20-I22, I25	410-414	410-414
Angina pectoris	I20	411, 413	411, 413
ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction	I21	410	410
Subsequent ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction	I22	412	412
Chronic Ischemic Heart Disease	I25	414	414
Valve disease	I05-I09, I33-139	393-398, 421, 424	393-398, 421, 424
Rheumatic mitral valve diseases	I05	394	394
Rheumatic aortic valve diseases	I06	395	395
Rheumatic tricuspid valve diseases	I07	-	-
Multiple valve diseases (Rheumatic)	I08	396	396
Other rheumatic heart diseases	I09	393, 397-398	393, 397-398
Acute and subacute endocarditis	I33	421	421
Nonrheumatic mitral valve disorders	I34	424.0	424.0
Nonrheumatic aortic valve disorders	I35	424.1	424.1
Nonrheumatic tricuspid valve disorders	I36	424.2	-
Nonrheumatic pulmonary valve disorders	I37	424.3	-
Endocarditis, valve unspecified	I38	424.9	424.9
Endocarditis and heart valve disorders in diseases classified elsewhere	I39	424.9	424.9

Supplement table 1.

Hypertensive heart and kidney diseases	I11-I13	402-404	402-404
Hypertensive heart disease	I11	402	402
Hypertensive chronic kidney disease	I12	403	403
Hypertensive heart and chronic kidney disease	I13	404	404
Cardiomyopathy and heart failure	I42-I43, I50-I51	425, 428-429	425, 427.0-427.2, 428-429
Cardiomyopathy	I42	425	425
Cardiomyopathy in diseases classified elsewhere	I43	425	425
Heart failure	I50	428	427.0-427.2, 428
Complications and ill-defined descriptions of heart disease including cardiomegaly	I51	429	429
Other heart diseases	I27-I28, I30-I32, I40-I41, 152, Q20-Q28	416-417, 420, 422-423, 745-747	420, 422-423, 426, 746-747
Other pulmonary heart diseases	I27	416	426
Other diseases of pulmonary vessels	I28	417	-
Acute pericarditis	I30	420	420
Other diseases of pericardium	I31	423	423
Pericarditis in diseases classified elsewhere	I32	420	420
Acute myocarditis	I40	422	422
Myocarditis in diseases classified elsewhere	I41	-	-
Other heart disorders in diseases classified elsewhere	I52	-	-
Congenital malformations of cardiac chambers and connections	Q20	745-747	746-747
Congenital malformations of cardiac septa	Q21		
Congenital malformations of pulmonary and tricuspid valves	Q22		
Congenital malformations of aortic and mitral valves	Q23		
Other congenital malformations of heart	Q24		
Congenital malformations of great arteries	Q25		
Congenital malformations of great veins	Q26		
Other congenital malformations of peripheral vascular system	Q27		
Other congenital malformations of circulatory system	Q28		
Chronic kidney disease	N00-N08, N11-N12, N14-N16, N18-N19, N25, Q60-Q61	580-583, 585, 586, 588, 753.0, 753.1	580-583, 585, 586, 588, 753.0, 753.1
Acute nephritic syndrome	N00	-	-
Rapidly progressive nephritic syndrome	N01	-	-
Recurrent and persistent hematuria	N02	-	-
Chronic nephritic syndrome	N03	-	-
Nephrotic syndrome	N04	581	581
Unspecified nephritic syndrome	N05	-	-
Isolated proteinuria with specified morphological lesion	N06	-	-
Hereditary nephropathy, not elsewhere classified	N07	-	-
Glomerular disorders in diseases classified elsewhere	N08	-	-
Chronic tubulo-interstitial nephritis	N11	-	-
Tubulo-interstitial nephritis, not specified as acute or chronic	N12	-	-

Supplement table 1.

Drug- and heavy-metal-induced tubulo-interstitial and tubular conditions	N14	-	-
Other renal tubulo-interstitial diseases	N15	-	-
Renal tubulo-interstitial disorders in diseases classified elsewhere	N16	-	-
Glomerulonephritis and nephrotic syndrome	-	580-583	580-583
Chronic kidney disease (CKD)	N18	585	-
Unspecified kidney failure	N19	586	-
Disorders resulting from impaired renal tubular function	N25	588	-
Renal agenesis and other reduction defects of kidney	Q60	753.0	753.0
Cystic kidney disease	Q61	753.1	753.1
Chronic liver disease	K70-K77, P78.8, Q44	570-573, 751.6, 777.8	570-573, 751.6, 777.8
Alcoholic liver disease	K70	571	571
Toxic liver disease	K71	573	573
Hepatic failure, not elsewhere classified	K72	-	-
Chronic hepatitis, not elsewhere classified	K73	571	571
Fibrosis and cirrhosis of liver	K74	571	571
Other inflammatory liver diseases	K75	-	-
Other diseases of liver	K76	-	-
Liver disorders in diseases classified elsewhere	K77	570-573	570-573
Other specified perinatal digestive system disorders	P78.8	777.8	-
Congenital malformations of gallbladder, bile ducts and liver	Q44	751.6	751.6
Sarcoidosis	D86	135	135
Autoimmune disorders			
Coeliac disease	K90.0	579.0	-
Purpura and other hemorrhagic conditions	D69	287	287
Multiple sclerosis	G35	340	340
Psoriasis	M07, L40	696	696
Rheumatoid arthritis			
Seropositive rheumatoid arthritis	M05	714	712
Other rheumatoid arthritis	M06	714	712
Juvenile arthritis	M08	714	712
Juvenile arthritis in diseases classified elsewhere	M09	714	712
Vasculitis			
Polyarteritis nodosa and related conditions	M30	446.0	446.0
Other necrotizing vasculopathies incl Wegener	M31	446.4	446.2*
Systemic lupus erythematosus	M32	710.0	734.1
Dermatopolymyositis	M33	710.3	716
Systemic sclerosis	M34	710.1	734.0
Lupus erythematosus	L93	695.4	695.4
Cancer			
Solid**	C00-C80	140-199	140-199
Hematology incl. lymphomas	C81-C97	200-208	200-207

* ICD-code differs from Wolfbane ICD8 database, where diagnosis code of Wegener's granulomatosis is 446.3

** Basal cell carcinoma of skin is excluded: ICD10: C44.11, C44.21, C44.31, C44.41, C44.51, C44.61, C44.71, C44.81, C44.91. ICD8 and ICD9: 173.01, 173.11, 173.21, 173.31, 173.41, 173.51, 173.61, 173.71, 173.81, 173.91.