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COPD in the elderly - diagnostic criteria, symptoms and smoking.

Quantitative and qualitative studies of persons 60 years and older in The Tromsø studies.

Astri Medbø

A dissertation for the degree of Philosophiae Doctor
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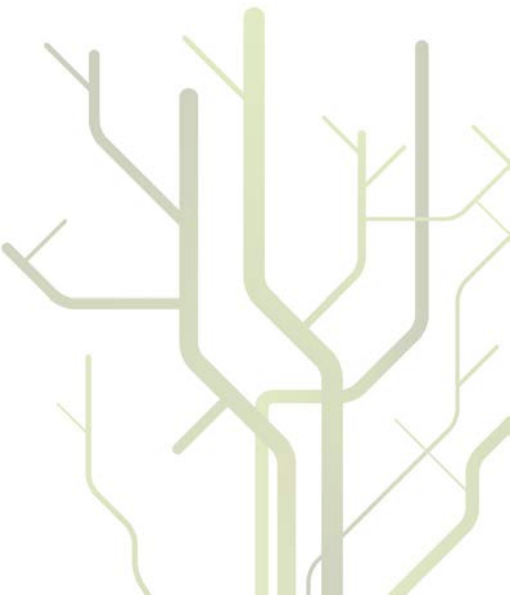

COPD in the elderly

- diagnostic criteria, symptoms and smoking.

Quantitative and qualitative studies of persons over sixty years of age in The Tromsø studies.

By

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Institute of Community Medicine

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Contents:

ABBREVATIONS

ATS: American Thoracic Society

The five As: Ask, advise, assess, assist and arrange

BTS: British Thoracic Society

COPD: Chronic obstructive pulmonary disease

ECSC: European Community for Steele and Coal

ERS: European Respiratory Society

FEV1: Forced exploratory volume in one second

FVC: Forced vital capacity

GOLD: Global Initiative for Chronic Obstructive Lung Disease

GP: General Practitioner

HSE: Health Survey of England

LLN: Lower Limit of Normal

MI: Motivational Interviewing

MoH: Ministry of Health

NHANES: National Health and Nutrition Examination Survey

NICE: National Institute for Clinical Health and Exellence

NRT: Nicotine replacement therapy

OR: Odds ratio

Packyear: Smoking 20 cigarettes a day in one year

ROC: Receiver Operating Characteristics

TTM: Transtheoretical Model of Change

ACKNOWLEDGEMENTS

I had been working as a general practitioner (GP) for 16 years, mainly at the same office, when I in 2002 began to think of doing something different, and to learn new skills. The workload in GP is considerable. It is often difficult to balance work with home-life. Doing research at the University offers the opportunity to continue to develop as a GP, whilst being an active parent with young children. I had the opportunity to participate in research in primary care lung function at the University of Tromsø.

The academic world is very different from the very practical clinical and very busy world of general practice. It has been an interesting part of my career. I have acquired many new skills and new tools to enable to better understand the medical world.

I would like to thank both of my main supervisors, Professor Hasse Melbye, who patiently introduced me to quantitative science with all my doubt and strange questions, and my qualitative supervisor Professor Carl Edvard Rudebeck, who has guided me into the broad landscape of qualitative research with patience and a steady hand.

I would also like to thank the inhabitants of the City of Tromsø who participated in the Tromsø 5 and 6 surveyes, the spirometry-technicians Anne Britt Larssen, Liv Kirsti Jørgensen and Eva Solstad, and especially Henrik Schirmer and Ann Elise Eggen who conducted the Tromsø 5 & 6 surveys, Tom Wilsgaard for his statistical skills, and Egil Arnesen for data-preparation used in papers 1 and 2.

A final thank you to all of the 18 interviewees in paper 3 for sharing their stories with me, Signe Nome Thorvaldsen for her transcription work, and Tim Crosfield for his proof reading of paper 3, and Simon Davis for proofreading of this thesis.

Science is important, and to have a giving job is important, but the most important thing in life is family and friends. To my three teenage girls Sigrid, Tora and Inga without you my life would have been dull and colorless. THANK YOU. Thank you to my dogs Vaya, (and earlier Bevri too) always happily waiting for mum to go for a walk (short or long, in rain, snow or sunshine). Thanks to my former husband Knut who encouraged me to start this university education, and a BIG HUG to all my good friends supporting me when I have been down, telling me I am good enough. THANK YOU ONE AND ALL.

Astri☺

SUMMARY

Smokers benefit from the enjoyment and fellowship smoking brings in the short term, yet may cause diseases and disability later in life.
This thesis is about COPD, the spirometry criteria for diagnosis, the predictive value of respiratory symptoms, and smoking and its cessation.

Paper 1 and 2 are quantitative, epidemiological studies, which were based on a cross sectional population study in the city of Tromsø, Norway, in 2001. We chose to do our research on people aged 60 years and above since COPD is usually detected in this age group, and we had access to a representative sample from the Tromsø 5 study. In addition to spirometry the papers are based on data from questionnaires.

The research question in paper 1was: *Can we use FEV_1 /FVC<70% as a criterion of COPD in all ages?* Main results paper 1: The frequency of FEV_1 /FVC ratio <70% was approximately 7% in never smokers aged 60–69 years compared to 16–18% in those of 70 years of age or more ($p<0.001$). FEV_1 /FVC ratio <70% among never smokers aged 60–69 years was as frequent as FEV_1 /FVC ratio <65% among never smokers older than 70 years.
Conclusion: Adjustments of the GOLD criteria for diagnosing COPD are needed, and FEV_1 / FVC ratios down to 65% should be regarded as normal when aged 70 years and older.

The research question in paper 2 was: *What role may symptoms play in the diagnosis of airflow limitation?* Main results paper 2: The prevalence of any airflow limitation, (defined as FEV_1 /FVC ratio <70% in subjects <70 years old and <65% in subjects ≥70 years old) was 15.5% and 20.8%, in women and men, respectively. Whereas the corresponding prevalences of severe airflow limitation (FEV_1 <50% predicted) were 3.4% and 4.9%. The increased risk of having any airflow limitation corresponded to an OR 2.4 among ex-smokers and OR 5.8 among current smokers compared to never smokers. The prevalence of airflow limitation was more than doubled amongst never-and ex-smokers when two or more of the symptoms wheeze, dyspnoea or cough with phlegm were reported, compared to only one. Ex-smokers reporting two symptoms had a similar risk of airflow limitation as current smokers not reporting any symptoms.

Conclusion: Respiratory symptoms are valuable predictors of airflow limitation, and should be emphasized when selecting patients for spirometry.

Paper 3 is a qualitative document, based on interviews with 18 participants of 58 years of age and older.

Research question in paper 3: *"What makes people start smoking, and a smoker to quit and maintain quitted?"*

Main results: The influence of "all the others" is essential when starting to smoke. In the process of stopping smoking, relapses and continued smoking, the spouses have a vital influence. Smoking cessation often seemed to be unplanned. Finally with an increasingly negative social attitude towards smoking, increased the informant`s awareness of the risks of smoking.

Conclusion: "All the others" is a clue in the smoking story. For smoking cessation, it is essential to be aware of the influence of friends and family members, especially a spouse. People may stop smoking unplanned, even when motivation is not obvious. Information from the community and doctors on the negative aspects of smoking should continue. Eliciting life-long smoking narratives may open up for a fruitful dialogue, as well as prompting reflection about smoking and adding to the motivation to stop.

LIST OF PAPERS

1. Medbo A, Melbye H**. Lung function testing in the elderly-Can we still use $FEV_1/FVC<70\%$ as a criterion of COPD?** Respir Med. 2007; 101: 1097-1105.

2. Medbo A, Melbye H**. What role may symptoms play in the diagnosis of airflow limitation?** Scand J Prim Health Care, 2008. 26:2, 92-98.

3. Medbø A, Melbye H, Rudebeck CE. **"I did not intend to stop. I just could not stand cigarettes any more." A qualitative interview study of smoking cessation among the elderly.** BMC Fam Pract. 2011 May 31;12:42.

INTRODUCTION

Why did we do this research?

Spirometry has been part of several studies in many countries for several years, and will contribute to many studies of lung diseases. When we had the opportunity to join the 5th Tromsø study we wanted to include spirometry for the first time. I was engaged as a research fellow when Tromsø 5 was finished. I did not participate in the practical part of the spirometry, but in the actual selection of spirograms of adequate quality for inclusion in the analysis.

The criteria for diagnosing chronic obstructive pulmonary disease (COPD) are still under debate (1-7). Although the risk of under-diagnosis of COPD is important, the issue of over-diagnosis and over-treatment in the elderly also needs discussion. We therefore wanted to contribute to the discussion on how to distinguish between normal lung function in the elderly and pathologic bronchial obstruction in the same age group.

We also wanted to explore the role of symptoms in the diagnosis of COPD in order to enable best advices to our GP colleagues on diagnosis.

Smoking is one of the most important causes of self-inflicted health burdens in the world. GPs are considered to be in one of the best positions to guide patients regarding life style problems because of their ongoing continuous relationship with their patients (8-10). Guides for GPs and other health care providers in smoking cessation do lack a practical approach which fits with the way GPs work (11;12).

In the Tromsø studies up to 53% of women and 82 % of men aged 60 years and above had been daily smokers previously, but in 2001 the frequency of smoking was 23% in both sexes. I became curious when acknowledging the striking drop in the frequency of smoking. What had happened? How did they stop, and which decisions did they do on their way to a potential stop? In paper 3 we wanted to explore the smokers` stories to identify clues which could improve GPs to help smokers to be more successful in smoking cessation.

All three authors of all the papers in this thesis are GPs. We wanted our findings to be of practical use for GPs.

BACKGROUND

Chronic obstructive pulmonary disease

What is COPD?

Chronic obstructive pulmonary disease (COPD) is a preventable and treatable disease characterized by chronic airflow limitation that is not fully reversible. This airflow limitation does not change markedly over several months and is usually progressive in the long term. It is associated with an abnormal inflammatory response of the lungs to noxious stimuli, predominantly smoking (1). Other factors, particularly occupational exposures, may also contribute to the development of COPD. Exacerbations often occur, where there is a rapid and sustained worsening of symptoms beyond normal day-to-day variations (5).
In the western world over 90% of causation of COPD is due to cigarette smoking (1;9;13-15). In developing countries, cooking on open fire with subsequent exposure to excessive smoke in close environments, and mining-related pollution can cause COPD too (16).

Morphological changes

Exposure to noxious particles, such as cigarette smoke and air pollution over a period can lead to lung inflammation with an associated increased number of neutrophils in the airway lumen and macrophages in the respiratory epithelium and parenchyma. (Figure 1) After years of exposure to noxious particles the lumen becomes narrower. The function of the cilia is impaired and the elasticity in the smooth muscle cell is reduced, and fibrosis occurs.
Physiological changes of COPD are characterized by mucous hypersecretion, airflow limitation and air trapping. The mucus hypersecretion will lead to chronic productive cough, a feature of chronic bronchitis, not necessarily associated with airflow limitation.
The pathological changes are seen in the proximal airways, peripheral airways, lung parenchyma- and the pulmonary vasculature.

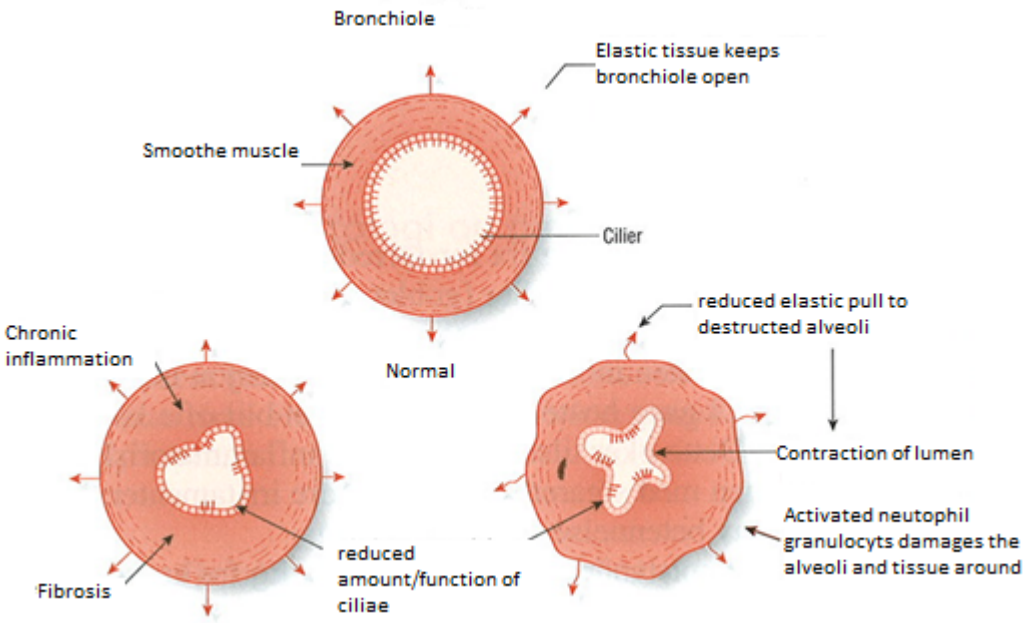


Figure 1. Illustration of a normal and two steps of damaged bronchioles (17).

The small airways will become fibrotic, and lose their elastic recoil. The alveoli will be distorted in structure in COPD. (Figure 2)

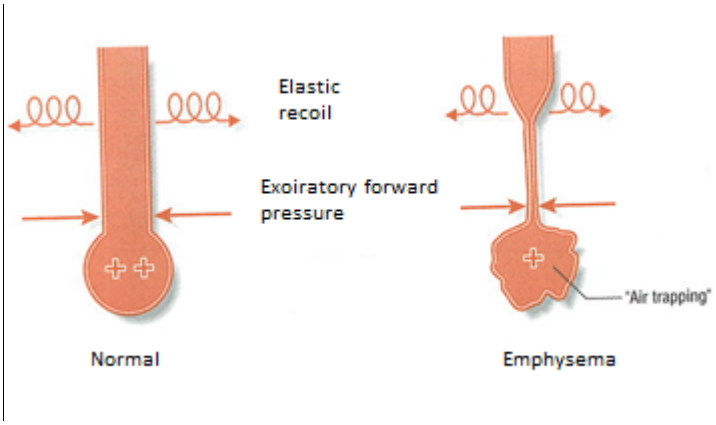
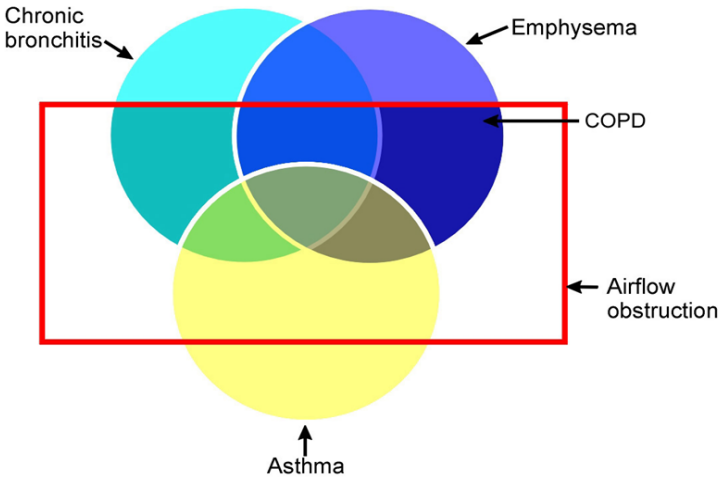


Figure 2. Normal alveolus with elastic recoil and alveolus damaged by emphysema (17).

COPD is now the preferred term for the conditions in patients with airflow obstruction who were previously diagnosed as having chronic bronchitis or emphysema, and this develop in patients with asthma as well.

Figure 3. The different components of COPD.



Emphysema (17) occurs when the elastic tissue of the small airways (including alveoli) is damaged, causing hyperinflation and impaired gas-exchange. Emphysema is one of the diseases included in the term COPD. The lung tissue is damaged and the small airways can collapse, during expiration, making it difficult for the lungs to empty. This leads to air becoming trapped in the alveoli and subsequent chest hyperinflation. The blood pressure may increase in the pulmonary artery, and cor pulmonale may develop.
Chronic bronchitis is a progressive, recurring inflammation of the bronchi and the bronchioles. The hallmark of chronic bronchitis is a persistent wet cough, caused by mucus hypersecretion, and dyspnoea. It progressively worsens over time. It is mainly caused by toxic particles in cigarette smoke or other pollutants. It is called *chronic* when the coughing and sputum production have lasted for at least three months in two consecutive years. Due to inflammation and thickening of the bronchial walls, patients with chronic bronchitis may develop chronic bronchial obstruction and, hence COPD.

Asthma is a common chronic inflammatory disease caused by an eosinophil inflammation in the peripheral airways. Asthma is characterized by variable and recurring symptoms, including cough, wheeze and dyspnea and bronchospasm. The airway obstruction in asthma

however is reversible. Asthma is clinically classified according to the frequency of symptoms, forced expiratory volume in 1 second (FEV_1), and peak expiratory flow rate. It usually starts in childhood. A smoker with asthma has increased possibility of develop COPD compared to a smoker without asthma (18).

Diagnosis of COPD

The GP should perform a detailed medical history including exposure to risk factors (such as smoking, environmental or occupational exposures), presence of pulmonary symptoms, a family history of COPD (including alpha1-antitrypsine deficiency), exacerbations and physical activity, when suspecting COPD. The physical examination includes inspection (cyanosis, chest wall, breathing pattern, oedema), palpation, percussion and auscultation (1). The diagnosis is hard to make without spirometry. Physical signs of airflow limitation are usually not present until significant impairment of lung function has occurred (1). Spirometry should be undertaken in all patients who may have developed COPD (1).

Diagnostic criteria: Spirometry, reversibility tests and reference values

Spirometry is recommended in the diagnosis and evaluation of COPD (1;5;6;19). The Global Initiative for Obstructive Lung Disease (GOLD, a partner organization in a World Health Organization program on COPD), has defined COPD to be present when the FEV_1/FVC ratio is always below 70% (1;5;6).

Spirometry is a mechanical way to measure the lung capacity. A spirometer is the device used for this purpose. In Norway, most of the GPs have a spirometer at their office (20). The standardized way of doing a spirometry is sitting, using a nose-clip.

The patient is asked to inspire before fully exhaling as fast as possible at least for six seconds. The test is repeated at least three times, the FEV_1 or FVC values in these three curves should vary by no more than 5% or 150ml, whichever is greater (21) (Figure 4).

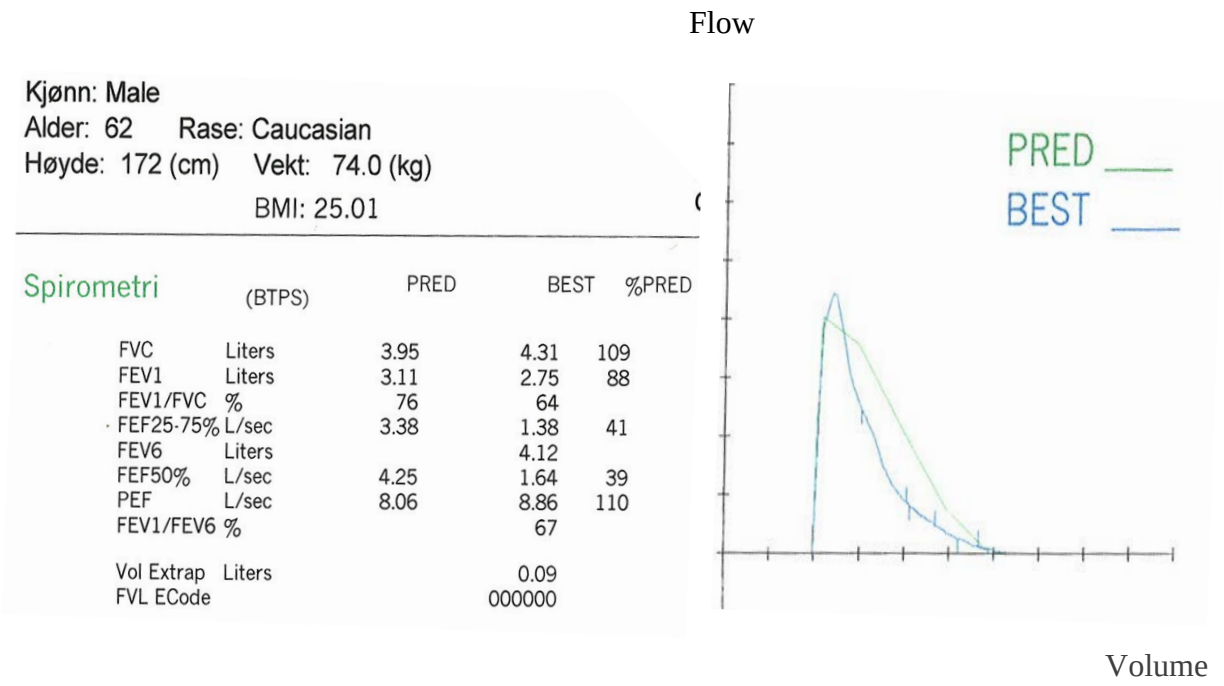


Figure 4. Example of a COPD-spirometry from Tromsø 5.

The experience of the instructor is vital for the result. The device should be calibrated regularly. The device may calculate the results based on reference values chosen in the program.

The most common measurements used are (13):

- FEV_1 (FEV6) - Forced Expiratory Volume in one (six) second: The amount of air you can blow out within one (six) second. In normal lungs one can blow out most of the air from the lungs within one second.
- FVC - Forced Vital Capacity. The total amount of air that you blow out in one breath.
- FEV_1/FVC (or FEV_1%). The proportion of exhaled air expelled in one second after full inspiration.
- PEF – peak exploratory flow - Measures the patient's maximum speed of expiration

A spirometry reading usually shows one of four main patterns:

- Normal
- An obstructive pattern (e.g. FEV_1 is decreased and FEV_1/FVC under 70%:COPD)
- A restrictive pattern (e.g. Total Lung Capacity is reduced: Mb. Bechtrew)

- A combined obstructive / restrictive pattern (e.g. both FEV_1 and FVC are lower than predicted).

Bronchodilator reversibility test should be performed at least once to diagnose bronchial hyper-reactivity and to establish the best lung function for the individual patient. The patient is then tested before and after inhaling a beta-2 adrenergic agonist or anticholinergic spray.

Reference values

The interpretation of the lung function test should be based on comparison with reference values derived from a healthy population, usually from cross-sectional studies of non-smokers. Sex, age, height and ethnic origin are important parameters in the calculation of a reference value (22).

Guidelines do not demand a specific reference value for each country or age group tested. The choice of reference values may vary with the software in the spirometer.

Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria

GOLD is a global consensus-group of scientists from the US National Heart, Lung, and Blood Institute and the World Health Organisation (WHO). The goals of GOLD were to increase awareness and decrease morbidity and mortality of COPD. GOLD has developed its own spirometric definition on COPD. The diagnosis of COPD is based on post-bronchodilator spirometry. Norwegian doctors diagnose COPD according to GOLD criteria.

The diagnostic criteria according to GOLD (1) are the following:

Stage 1. Mild:	FEV_1/FVC <0.7 $FEV_1 \geq 80\%$ predicted With or without symptoms
Stage 2. Moderate:	FEV_1/FVC <0.7 $50\% \leq FEV_1$ <80% predicted With or without symptoms.
Stage 3. Severe:	FEV_1/FVC <0.7 $30\% \leq FEV_1$ <50% predicted With or without symptoms.
Stage 4. Very Severe:	FEV_1/FVC <0.7 FEV_1< 30% predicted or FEV_1 <50% predicted plus chronic respiratory failure.

GOLD 0

In the former editions of GOLD criteria the did include a stage 0 – at risk of getting COPD

Stage 0: At risk	• Normal spiromety, • Chronic symptoms (coughing and sputum production)

This stage 0 has been withdrawn in the latest edition of GOLD because there is ”incomplete evidence that the individuals who meet the definition “*At risk*” necessarily progress to stage 1” (1).

British Thoracic Society (BTS) and Nathional Institute for Clinical Health and Exellence (NICE) criteria

British doctors use definitions developed by BTS and NICE. In addition to using the FEV_1/FVC ratio <70%, mild COPD occurs when FEV_1 is ≥ 80% predicted, and in the presence of respiratory symptoms, e.g. breathlessness or cough (5).

AmericanThoracic Society (ATS) and European Respiratory Society (ERS) criteriae

ATS and ERS criteria are the same as GOLD, but they have a stage "at risk" which is similar to GOLDs former stage 0: FEV_1/FVC >70%, FEV_1 % predicted ≥ 80% in patients who smoke, had exposure to pollutants or have a history of cough, sputum or dyspnoea, or have a family history of respiratory disease (6).

Under-diagnosis

Under diagnosis of COPD is a big problem (1;7;15;23;24) and may be caused by:

- **Patient delay**

One reason for under-diagnosis is due to the delay between symptoms develop and first consultation. Many of the symptoms of COPD are associated as beeing normal for a smoker, such as morning cough and sputum production. People may blame themselves for these symptoms and do not seek a doctor until they feel ill. Smokers rarely seek medical advice specifically for cough (25). Stratelis et al (26) reported in 2004 that smokers were aware that smoking can cause lung cancer, but only 39% of their participants knew that smoking was the main cause of COPD. Probably more people know of the connexion between smoking and COPD today, and agree to undergo spirometry if they are offered to do so.

- **Doctor`s delay**

The COPD diagnosis is based on spirometry. The majority of GPs in the western world do have access to a spirometer (20;27), and GPs are considered to be important in early detection of COPD (28). COPD is under-diagnosed because many COPD patients have not got their diagnosis verified by their doctor (2;4;19;29;30), and many patients with symptoms or with a

smoking history have not undergone a spirometry (31). Johannessen and co-workers (7) found that only 43% of subjects with COPD had been diagnosed by a doctor, and Hvidsten et al (24) found that two out of three COPD patients in Norway were undiagnosed. Hill et al (31) had 1003 patients tested by spirometry (adults aged 40 years or more with a smoking history of at least 20 pack-years), and found COPD in 20.7%. Only 32.7% of those knew of their diagnosis before the testing.

The use of GOLD criteria will underestimate the number of patients with COPD in persons 50 years and younger (4). Data from National health and Nutrition Examination Survey **(**NHANES3) and Health survey of England (HSE) confirm that using $FEV_1/FVC<70\%$ to define obstruction will cause 14% under-classification in those 50 years and younger (23). Screening of smokers (31) or casefinding (28) seems demanding. Despite the knowledge of the importance of early detection, GPs are reluctant to do spirometry even when they have access to spirometers (28).

Screening or case finding of smokers

There seems to be a consensus to offer smokers 40 -50 years of age spirometry, but whether screening or case-finding is the best way forward is still under discussion (28).

The arguments for screening: Canals-Borrajo G et al (32) says: "Forced spirometry data from smokers attending general practice doctors can be used to identify a significant number of previously undiagnosed COPD cases." Screening of smokers probably does no harm, and will make smokers more aware, and increase their reflection in stopping (33).

Ohar et al (34) suggest to screen older smokers since COPD is under-diagnosed, and Kotz et al (35) supports screening, and say:"… for every continued year of smoking, middle-aged smokers lose on average about three months of life expectancy." Parkes et al (36) found that telling smokers their lung age (the age of a healthy never-smoker with the same spirometric result) significantly improves the likelihood of them quitting. Stratelis et al (37) found that smokers diagnosed with COPD stopped smoking significantly more often than those with normal lung function. Toljamo et al (38) found that significant numbers of "healthy "smokers who experienced symptoms, had COPD, and they conclude:"Motivation is the most significant factor in determining the chance of stopping smoking".

The arguments against screening: Smith-Sivertsen et al (16) say:" The argument for screening is that people will be more easily motivated to stop smoking if they know their lung function results. There is, however, no documentation that this is the case." They argue: People will probably continue smoking if their spirometry is normal, adding that "Patients with *smoking-related symptoms* should be offered spirometry. Quanjer and Enright (39) discuss screening of smokers with normal lung function saying: "They may subconsciously use that information as an excuse to continue smoking."
Kotz et al (33) did not find any effect of confronting smokers with their airflow limitation.

Over-diagnosis

In order to simplify the diagnosis of COPD GOLD recommends a FEV_1/FVC threshold of 70% regardless of age(1). The FEV_1/FVC ratio falls with age (3;19;40). The use of a fixed cut-off point for defining COPD becomes more inaccurate with increasing age (4). Over-diagnosing may occur in the elderly using the GOLD diagnostic criteria (2;4;16;19;29;30).

Symptoms of COPD

The main symptoms of COPD are *chronic cough*, *sputum production* (phlegm/ expectoration), and *dyspnoea* (breathlessness) during exercise or at rest (1). Wheezing may also occur, but is not considered as a pure COPD-sign. *Dyspnoea* is known as the hallmark symptom of COPD, and is often the reason for seeking medical advice (1;41), whereas *chronic cough* may be the first symptom in the development of COPD (1). Cough and sputum production is recognized as normal in smokers (42-44), and will normally not initiate a visit to the general practitioner (45). Dyspnoea on exercise is often not recognized as a disease, but considered to be due to reduced condition or normal ageing (46), and is also normally not a reason for seeking a doctor. Symptoms are often under-reported by patients and not recognized by physicians, especially in the early stages of COPD (45;47). Assessments of symptoms are subjective, and can be evaluated in different ways. A weak correlation between reduced FEV_1 and patients' symptoms has been demonstrated in evaluation of pulmonary rehabilitation (48;49). Improvements in dyspnoea after such rehabilitation could not be detected by spirometric tests (45). The patient's self-reported or subjective assessment is

therefore important when evaluating the intensity of dyspnoea and its impact on health related quality of life (45).

A clinical diagnosis of COPD should be considered, according to GOLD, in any patient who has dyspnoea, chronic cough or sputum production (1).

Almost 50% of smokers develop chronic respiratory symptoms as chronic cough and sputum production without airway obstruction. About 30% smokers do not show chronic symptoms or abnormal lung function, but subtle changes in lung morphology, lung inflammation and lung function can be shown in this group (44). Ohar et al (34) (Report of symptoms, smoking history, and spirometric data were collected from smokers screened for a work-related medical evaluation (N = 3,955) using GOLD criteria) found that 44% of smokers in their US sample had airway obstruction (AO), and 36% of them had a diagnosis of COPD. Symptoms were frequent in subjects with AO, and increased the risk for COPD, but added little beyond age and smoking history in terms of predicting spirometry values.

Epidemiology of COPD

The prevalence of COPD is hard to estimate due to differences in definitions, and is highly dependent on the population studied, age groups included, smoking status of the study sample, and also how and where they were recruited. When based on samples from clinical settings, over-diagnosis and under-diagnosis are important (1;50). The prevalence increases with age and smoking status (1;4;51;52). According to World Health Organization (WHO) estimates, currently 210 million people have COPD and 3 million people died of COPD in 2005 (53).

COPD prevalence in the USA, Europe and Asia

Data from the NHANES III (National Health and Nutrition Examination Survey), a large national survey conducted in the USA between 1988 and 1994 were considered to give the best available prevalence in the USA (54) (The data were collected from patients in contact with doctors and health care centers). The numbers are based on ATS/ERS criterion. For those aged between 25–75 years, the estimated prevalence of mild COPD (defined as FEV_1/FVC <70% and FEV_1 ≥80% predicted) was 6.9% and of moderate to severe COPD (defined as FEV_1/FVC <70% and

FEV_1 ≤80% predicted) was 6.6%. The prevalence increased steeply with age. In the NHANES III study, COPD (presence of airflow limitation) was estimated to be present in 14.2% of current white male smokers, 6.9% of ex-smokers and 3.3% of never-smokers. Among white females, the prevalence of airflow limitation was 13.6% in smokers, 6.8% in ex-smokers and 3.1% in never-smokers (55).

Buist et al (56) have reported the worldwide prevalence of COPD in adults 40 years and older by using GOLD criteria. (9425 people, 40 years and older from 12 counties and different smoking status). GOLD stage 2-4 was found in 8.5-22.2% men (mean 11.8%) and 3.7- 16.7% women (mean 8.5%).

Swanney et al (57) analysed FEV_1/FVC from 40 646 adults (including 13 136 asymptomatic never smokers) aged over 17 years old from American, English and Dutch population based surveys. The prevalence of airway obstruction in healthy never smokers aged over 60 varied between 17-45% in men and 7-26% in women according to GOLD criteria. Brazzale et al (23) (1109 subjects) found the mean predicted FVC from NHANES3 and Health survey of England (HSE) to be 270 ml higher than from ECSC equation. They concluded: "Changing to either NHANES or HSE predicted values will significantly increase the rate of 'restrictive' interpretation, and alter the rate of obstructive findings. The NHANES and HSE data confirm that using FEV_1/FVC < 70% to define obstruction will cause 28% overclassification in persons 65 years and older".

In Korea Yoo et al (58) (A nationwide survey of a Korean population, with stratified random sampling, 6,840 subjects aged 19 years or older underwent spirometry) found COPD (FEV_1/FVC<0.7) in 13.4% of persons 40 year and older (19.4% in males and 7.9% in females).

Nathelle et al (59) (tested 3887 Swedish smokers 40-60 years of age who were on sick leave for more than two weeks and smoked more than 8 cigarettes a day. Recruited by questionnair) found that the COPD prevalence in Swedish smokers varied from 10,2% when NICE- guidelines were used to 14.0% (GOLD) and 21.7% when ERS- guidelines were used.

In Sweden Lundback et al (60) found the prevalence of COPD for people 45 years and older to be 8% according to the British Thoracic Society (BTS) guidelines, and 14% according to GOLD criteria. (They invited a random sample of 1500 subjects 46-77 years of age who were responders of a questionnaire.1237 completed an acceptable lung function test). They also found that approximately 50% of elderly smokers fulfilled the diagnosis of COPD, a somewhat higher frequency using GOLD criteria than when BTS criteria were applied.

COPD prevalence in Norway

The prevalence of COPD in a general population in Norway (Based on a random population sample in Hordaland, 2235 subjects (77%) aged 26-82 years performed spirometric tests before and 15 minutes after inhaling 0.3 mg salbutamol) is estimated to about 7% of those who are between 26-82 years of age; i.e more than 200.000 Norwegians suffer from COPD (61). COPD was more frequent in ever smokers than in never smokers, and increased in a dose-response manner with pack years. Furthermore, the prevalence was higher in subjects with lower education and in those who had been occupationally exposed to dust or gas. The prevalence of COPD was roughly equal in rural and urban residential areas (61). Hvidsten et al (24) (An age and gender stratified random sample of all adults aged 47-48 and 71-73 years in Bergen, Norway, were invited. The 3506 participants filled in questionnaires) found 9 % were classified as having GOLD COPD. In the international comparison by Buist et al (56)(Participants from 12 sites (n=9425) aged 40 years and older, completed postbronchodilator spirometry testing plus questionnaires about respiratory symptoms, health status, and exposure to COPD risk factors.) the frequency of COPD stage 2 or higher was reported to be 11 % in Norwegian males and 5.9 % in women. For persons under 50 years of age this corresponded to 4.5 % males and 1.3 % women, and for those aged 70 years and over 20.5 % and 15.1 % respectively.

Reducing the burden of COPD

Effects of smoking cessation on lung function and symptoms of COPD

Smoking cessation is the single most effective, and cost-effective way to reduce exposure to COPD risk factors and disease progression (1). The risk of myocardial infarction is also reduced after smoking cessation, and after 15 years the risk equals that of a never-smoker. The risk of lung cancer is halved after 10 years of cessation (14).

There is a decline in lung function with increasing age for everybody. A faster decline is observed in smokers. After smoking cessation, the decline curve will be parallel to the curve of a never smoker (figure 5.)

Figue 5. Lung function and smoking cessation. (62)

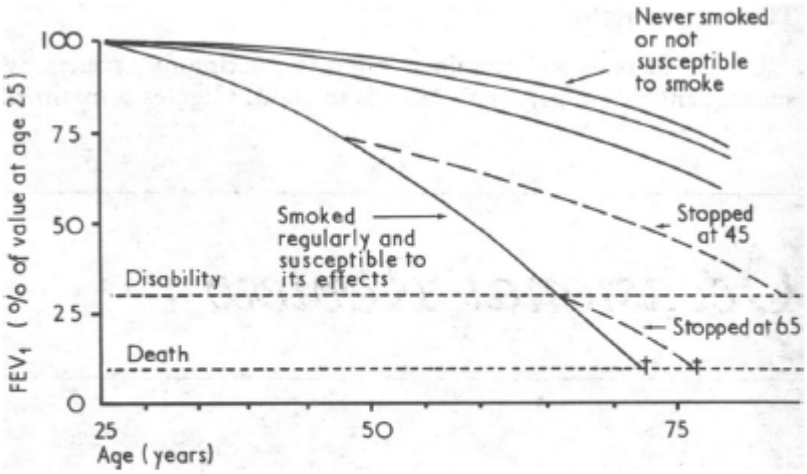


FIG 1—Risks for various men if they smoke: differences between these lines illustrate effects that smoking, and stopping smoking, can have on FEV_1 of man who is liable to develop chronic obstructive lung disease if he smokes. †=Death, the underlying cause of which is irreversible chronic obstructive lung disease, whether the immediate cause of death is respiratory failure, pneumonia, cor pulmonale, or aggravation of other heart disease by respiratory insufficiency. Although this shows rate of loss of FEV_1 for one particular susceptible smoker, other susceptible smokers will have different rates of loss, thus reaching "disability" at different ages.

Willemse et al (44) found in their review paper that smoking cessation clearly improves respiratory symptoms and bronchial hyper secretion, and prevents excessive decline in lung function in all types of smokers. Ten studies reviewed by Godtfredsen et al (63) show significant reduction in decline of FEV_1 after smoking cessation. They conclude: "In smokers aged >35 years with mild-to moderate COPD, smoking cessation initially increases FEV_1, and subsequently, the rate of FEV_1 decline in sustained quitters reverts to the age-related decline seen in never-smokers in background population". Two studies (Denmark and Sweden) showed a reduced risk of hospitalization due to COPD after smoking cessation, highly dependent upon duration of smoking cessation (63). Short-term changes after smoking cessation affect the symptoms of cough, expectoration, breathlessness and wheezing. Etter (42) found a significant decrease in all four symptoms 30 days after smoking cessation.
GPs are considered essential in reducing the burden of COPD due to their continuous contact with many patients (1;9;64;65). The GP should undertake a detailed medical history including

exposure to risk factors as smoking, environmental or occupational exposures, ask for pulmonary symptoms, a family history of COPD (including alpha1-antitrypsine deficiency), for exacerbations and physical activity, when suspecting that the patient may have developed COPD.

The diagnosis is hard to predict without doing spirometry, and such examination should be undertaken in all patients who may have developed COPD (1;5;6;65).

Physical signs of airflow limitation are not usually present until significant impairment of lung function has occurred (1). The physical examination includes inspection (cyanosis, chest wall, breathing pattern, oedema), palpation and percussion and auscultation (1).

Doubts of the effect of smoking cessation

Willemse et al (44) argue that the information on the effect of smoking cessation is scarce. The fibrosis and loss of alveolar attachment following years of smoking is probably irreversible (44). Bronchial biopsy studies have shown persistent airway inflammation in ex-smoking COPD patients, which probably will affect the course of the disease (63). Earlier studies demonstrated an increase in mortality due to COPD up to 10 years after smoking cessation, but decreased thereafter, which the authors could not explain (63). Recent studies have demonstrate that mortality rates due to all causes of COPD decline progressively after smoking cessation, but it is still elevated compared to never smokers even after many years as non-smokers (63). Ussher et al (43) say cough and common cold symptoms may increase after smoking cessation. Among tobacco-and nicotine withdrawal symptoms International Classification of diseases (ICD-10) lists increased cough (44;63).

Smoking and smoking cessation

Smoking is considered to be the leading global cause of preventable death (9;66). Besides COPD it causes cardio vascular and lung diseases as well as cancers and other diseases. Smoking imposes burdens upon the smokers and their families through disease and premature deaths, also to the society through hospitalization, medical costs and lost productivity (9;67). More than 650,000 Europeans die every year because they smoke, which equates to one in

seven deaths across the EU (14;68). Approximately 6700 Norwegians will die each year because of smoking, and in addition 3-500 will die because of passive smoking (14).
A reduction in smoking will affect the public`s health considerably. About half of all smokers will die too early from their habit, and will lose on average 14-20 years of their life-span (14;69).

Passive smoking occurs when inhaling cigarette fumes indirectly from nearby smokers (exhaled main-stream smoke) and their burning cigarettes (side-stream smoke). Massive passive smoking will be equal to smoking two cigarettes a day (7).

People have been smoking different forms of dried leaves for ages all over the world. The reason *why* people *start* smoking is sparsely described in the medical literature (70) but people usually start at the age of 13-15, and are more likely to smoke if there is a family member and a friend who smokes (71).
Smoking and smoking behaviour seems to bear a meaning. People achieve group membership and status, and develop their own identity when smoking (70). By smoking a youth may signal to be an adult, taking own decisions. Smoking makes the person more visible, the smoker is seen and smelled by the cigarette, hence communicating non-verbal to other people. Smoking will also be incorporated in the body-mind, and influence the body-image, and the image the person has of her or himself (72).
After smoking for some time many people get addicted to the habit of smoking or to the components in the cigarettes. People deal with stress, relax and come together via their habit of smoking (70). The attitude towards smoking has changed during the last 50 years. Smoking in the sixties and seventies was very common and “in”, but the prevalence has been decreasing the last three decades for men, and the last decade for women due to the information on health damages caused by smoking (73;74).
Smoking nowadays may signal an identity of independence, ie. not getting controlled by the society`s legislations (“hard core”). Others may be stigmatized as weak, not managing to stop smoking (70).

Tobacco addiction

Tobacco dependence is a chronic condition, and about 85% of smokers are estimated to be physically addicted to nicotine (9).

Nicotine is an alkaloid. It is found in the leaves of the tobacco plant. The nicotine molecule in the cigarette has low pH, and do not pass the cell membrane before reaching the alveoli (14). About 90% of the nicotine is broken down in the liver, and 10% is secreted unchanged in the kidneys. It takes less than 10 seconds from inhalation till the nicotine molecules passes through the blood-brain barrier and affects the body. The nicotine affects the peripheral autonomic nerve system and the brain. Acetylcholine and dopamine are released in the brain, which makes the smoker feel refreshed and relaxed at the same time (14). The pulse and the blood pressure both rises, which raises the heart's own oxygen requirement. The small vessels in the skin also contract (14). Nicotine influences the peripheral nerve system mainly in the gut. Appetite is slightly reduced and the metabolism slightly increased.

Whilst smoking the serum concentration of nicotine reaches a level which the addicted smoker tries to maintain during the day. The halv-time of nicotine in serum is approximately 2 hours, and therefore in order to sustain this level, the smoker has to continue to smoke during the day (46). Usually about 1 mg of nicotine is absorbed per cigarette, but the smoker can influence the absorption by e.g. deeper inhalation. Hence by deep inhalation technique, the smoker can facilitate a reduction in the number of cigarettes smoked whilst the amount of absorbed nicotine stays unchanged (75). When the pH in the tobacco increases (by adding ammoniac) from 6 to 8, the uptake of free (unionised) nicotine in the body increases from 1% to 50% (14). Modern cigarettes contain different additives in order to be more "acceptable". Adding acetaldehyde led to more nicotine addiction in rats, and probably in humans too (14). About 80% of those trying to stop smoking will have some sort of withdrawal symptom as irritability, restlessness, sleep disorder, headache, concentration difficulties, constipation or depression (46). The psychological abstinence when change of habits occurs is hard to deal with as well. A more gradual reduction in smoking yields fewer withdrawal symptoms (46).

Research linking smoking to different diseases (73).

1950: *USA* The link between smoking and lung cancer was confirmed. A landmark article "Tobacco smoking as a possible etiologic factor in bronchogenic carcinoma" by E. L. Wynder and Evarts Graham was published in The *Journal of the American Medical Association.*

1960: *USA* Framingham Heart Study found cigarette smoking increased the risk of heart disease.

1981: *Japan* Professor Takeshi Hirayama (1923–1995) published the first report linking passive smoking and lung cancer in the non-smoking wives of men who smoked.

1988: Framingham Heart Study found cigarette smoking increased the risk of stroke.

1988: Studies confirmed the harmfulness of smoking fewer than 10 cigarettes a day.

Smoking prevalence internationally

Tobacco is smoked all over the world, particularly in the developing world. Smoking kills nearly 6 million people and causes hundreds of billions of dollars of economic damage worldwide each year (66).

Male smoking prevalence is 70% in Russia, 60% in China, with no signs of decrease. In almost all African countries male smoking is ten times higher than female smoking. Among women 4 % in China and 15% in Russia are smokers (73;76). In China more than 37 percent of the world's cigarettes are consumed (73).

The smoking prevalence differs in Europe. Smoking among men in Western Europe has decreased over the last 25 years. The women have followed the trend, but later, and more slowly, which has evened out much of the difference between the sexes (77).

Sweden has the lowest prevalence for men with 19.8%, and is the only country where more women (22%) than men smoke. The prevalence for male smoking is between 31-38% in most West-European countries and 16-29% for women, while male smoking is between 45-62% in East Europe and female smoking is 20-32% (66).

The situation in Norway

Prevalence

In 1973 52% of men and 30% of women between 16 and 74 years were daily smokers.

Since then the prevalence has halved in men, and in 2006 the prevalence of smoking for both women and men was about 24% (74). In 2004-2006 49% were never-smokers, 18% former regular smokers and 8% were irregular smokers (14).

In 2009 about 21% (more than 800.000 people) of the population 16-74 years of age were daily smokers, and 19% in 2010 (both sexes). There has been an annual reduction in the number of daily smokers among men from 1973 until 2010. About 30% of the women were daily smokers from 1973-2002, and then a yearly reduction thereafter. In 2008 15% of youths (16-24 years of age) were daily smokers, 17% in 2009 and 12% in 2010 (14% girls and 10% boys), but the use of snuff increased especially among young men (14).

The average number of cigarettes smoked a day was approximately 14.3 for men and 11.6 for women in Norway in 2006. 29% men and 14% women smoked more than 20 cigarettes per day (74).

Smoking occurs more frequently in lower social classes. In 2006 about 35 % of people with education from primary school, 29% with high school, and about 13% with university education were daily smokers (74).

People in Troms smoke slightly more than the average in Norway, 28% women and 30% men in 2002-2006 (74). In our 2001 population based survey from Tromsø, of around 61.000 inhabitants, about 82% of the men and 53% of the women 60 years and older had once been daily smokers, and 23 % were still daily smokers. Of the ever-smokers 71% and 56% had stopped respectively (52). In 2008 the proportion of daily smokers was 16% among those older than 60 years in Tromsø (personal information Lisa Joensen, a research fellow at ISM).

Smoking cessation

Eight out of ten Norwegian smokers have once tried to stop smoking, and 27% did try to stop smoking in 2004-2006. About 45% of Norwegian daily smokers said they planned to stop within 6 months (74).

In 1990-2006 about half of those who quitted smoking in Norway stopped without using nicotine replacement therapy (NRT), snuff, Varenicline or used smoking aid ("Røyketelefonen"). 1 % of the quitters did use smoking aids, 3% used Varenicline, 14% used NRT and 17% used snuff (74). In 2006 health care providers did talk about smoking to 59% of the daily smokers, but only 31% had received guided counseling (74).

From 2002-2007 smokers with university education did intend to quit more frequently (>60%) than smokers with lower education (about 43%) (74). Both smokers and non-smokers support “the smoking law” of June 1st 2004 in increasing numbers year by year (74).
In 2004 all GPs in Norway received a guideline from the Social-and health department (9) with information on how to handle smoking cessation in general practice. Every GP is encouraged to implement minimal smoker intervention in all suitable consultations by asking three simple questions: 1. Do you smoke? 2. What do you think of it? 3. I will encourage you to stop smoking, and I can help you (1;8;9). The book was supposed to be a proper instrument for counselling in GP.

Strategies for reducing the harm of smoking

Norway has a 45 year history of tobacco control, and has been considered to be a beacon for many other countries in the start of the period. In 1973 tobacco advertising was banned, and an age limit – first 16, later 18 years - for buying tobacco was introduced. In the 90`s smoking in public places was limited, and in 2004 it was prohibited in all restaurants and bars too (called “The smoking law”) (69).
At the request of the Ministry of Health (MoH) in Norway a group of national and international and World Health Organization (WHO) health experts have assessed Norway`s tobacco control effort in April 2010 (78). They conclude that despite a decrease of the proportion of adults that smoke, tobacco use continues to be a major health problem in Norway.
Norway still has a big potential for improvements. Smoking causes 16% (6700 persons) of all deaths in Norway. Almost 130.000 children in Norway (2004) are still exposed to secondhand tobacco smoke. Young males have increased dramatically the use of snuff. The lower the income-and education in the population the higher smoking prevalence, thereby creating social and health inequalities (14).

WHO’s five key recommendations are:

1. Stronger leadership for tobacco control with more human and financial resources.
2. At least two national campaigns each year.

3. Ensure universal and equal protection for all workers and public form exposure to second hand tobacco smoke.
4. Educate adults by mass media campaigns on how to protect children from second hand tobacco smoke at home.
5. Smoking cessation needs to be a true priority in 2011-15, delivered with economic resources.

The price of tobacco in Norway is among the highest in the world, and might influence the smoking prevalence (79). The government estimate that information on the negative sides of smoking, the legislations, and the negative signals of smoking nowadays is attributed to the falling smoking prevalence (74). The main reason seems to be that less young people start smoking today (14).

In recent years resources directed to tobacco control have been inadequate, and there have been a lack of cooperation among national, county and municipal players, preventing MoH from exerting leadership. There are no uniform restrictions to smoking rooms at workplaces. The mass media campaign in 2003, resulted in a drop in smoking prevalence of 3%. This was Norway`s last campaign until 2012.

Children in private places (e.g. homes and cars) remain relatively unprotected from second hand smoke. Cessation services (in budgets and action) are almost nonexistent (78).

The role of the GPs in smoking cessation

On the individual level more than 70% of the smokers want to quit, but only 2-3% do stop permanently each year (8;9;69;77).

The general practitioner is considered important in smoking prevention, and is expected to offer smoking cessation counselling to all smokers, regardless of their lung function (1;8;16). According to the research literature GPs advice only a minority of the smokers who consult them to stop smoking, but in the patients who have smoking-related diseases the advice rate increases (80). Huang et al (81) found that of the current smokers, 13.4% (37 731 of 282 433 participants) were given prescriptions (NRT, bupropion or varenicline) for smoking cessation treatment during 2008 in the UK.

The governments in Europe and USA expect the general practitioners (GPs) to provide health information (1;8;9;77) for instance by minimal intervention called the five As: *ask, advise, assess, assist* and *arrange* for every smoker at every visit to map out smoking. The five As invite patients to a 2-5 minute person-to-person conversation on smoking (8). Such a talk is expected to strengthen the smoking patients` motivation and experience of control, in turn promoting a change of behaviour (82). After minimal intervention by health providers approximately 2-3% of smokers will stop (69;83). Nicotine replacement therapy (NRT) is recommended in smoking cessation (1;77;84) and will enhance the cessation rate by an odds ratio of 1,77 (77).

The Transtheoretical Model of Change (TTM) and Motivational Interviewing (MI)

TTM, described by Prochaska et al (85) is a theoretic model for how motivation may develop, and estimate where in the changing process the patient is situated. The latter is thought to decide the patient`s readiness to abandon a risk behaviour, and hence to give a basis for developing effective interventions to promote change. The TTM contains five phases – *pre-contemplation, contemplation, preparation, action and maintenance* (85;86). The effectiveness of the TTM has been discussed. Armitage (86) conclude that this model offers promise in developing an effective health behaviour. It has much in common with MI, but the two are not parts of the same package (87;88).

Miller and Rollnick define motivation as a state of readiness or eagerness to change, which may fluctuate from one time or situation to another (89).

As a method of conversation MI offers a way to prepare patients for lifestyle changes (90). It is a directive, client-centered counseling style that may help patients to explore and resolve ambivalence. It is also an empathic therapeutic style trying to elicit arguments for change from the patients themselves, rather than trying to convince them to change (88;91). MI takes in average less than 10 minutes for each patient (88). A recent meta-analysis showed MI to result in smoking cessation at a slightly higher rate than “brief advice” and “usual care” (87). When applied in a brief version aimed at opportunistic intervention, MI was judged applicable in usual practice by GPs (88) even though, being a “brief” intervention it made the consultations longer (88).

Emmons and Rollnick (90) say that training GPs in conversational strategies as MI is important, but also that for GPs to adopt new strategies may present a challenge equal to that of the wished change of their patients. It should be remembered that GPs do have conversations with their patients all day long, and if conversation about smoking cessation was regarded as a normal everyday conversation on a normal issue rather than a certain consulting strategy more GPs would probably take it on.

Critique of standardized programs

The usefulness of standardised and structural programs as MI and TTM has been questioned. Ritchie et al (92), Aveyard et al (93) and Riemsma et al (94) found that such programs were insufficient for many smokers. In addition only a minority of GPs seem to advise their smoking patients about stopping (80). One reason for their reluctance to intervene was given in a study by Guassora et al (11). Here the interviewed GPs said that more problems were produced than solved by discussing smoking cessation in "every" GP consultation. If the GP gives advice not consonant with what the patient expects, trust can be strained (12).
A conversation demands engagement from both patient and doctor to succeed. The setting, in where the discussion on lifestyle changes occurs, is important. Guassora et al (12) say: "The outcome depends on whether the advice conforms to what both patients and GPs expect from the interaction in general practice consultations". Even when motivated by the clinical situation doctors often think it is difficult to map out smoking because patients signal resistance and ambivalence to change (1;88). There are also practical obstacles: it takes time to assess motivation, and doctors feel they lack the training (88;95)
Ege Møller has discussed motivation as preconceived in the TTM from a mainly critical angle (96). According to Møller: "motivation takes on different meanings and functions depending on the perspective; thus the general agreement on the importance of motivation in health promotion does not correspond to a mutual understanding of what motivation actually is: motivation works variously as technology, a statistically created collective informed consent, and a moral imperative." Regarding the interest of society and health authorities in searching for motivation in each individual Ege Møller maintains that" It is not an interest in the patient perspective in itself. Instead it is an interest in motivation as an instrument for change…"

Based both on experience and information people will have differing motivations for change. Beneath the motivation are complicated psychological processes – often very individual- which can be difficult to explore and explain. There is no exhausting theoretical understanding of motivation which can explain all incentives for behavior (97).
In this text and context I therefore stay with the simplistic definition of *motivation* as the willingness to change, being well aware of the complex reality behind the concept.

AIMS OF THE THESIS

- Provide enough background information on COPD and smoking to understand the disease and the importance of smoking cessation advices.
- To contribute to the discussion about the criteria for diagnosing COPD, by describing lung function and pulmonary symptoms in a population aged 60 years or more, and in particular the changes in the mean and 5% percentile of the FEV_1/FVC ratio by increasing age.
- To evaluate the diagnostic value of respiratory symptoms in the diagnosis of airflow limitation in the elderly.
- To gain insights that may help general practitioners understand why people smoke, why smokers stop and remain abstinent and, from this, to find fruitful approaches to the dialogue about smoking cessation.

SUBJECTS AND METHODS

Table 6. Paper 1-3: Research questions, study population, study design and analysis.

Paper number	Research question	Study population	Study design	Analysis
1	*Can we use $FEV_1/FVC<70\%$ as a criterion of COPD in all ages?*	Tromsø 5. 4102 persons, 60 years and older	Cross sectional population study	Application of linear regression models, Comparison of subgroups by indep.sample T-tests and Chi-square tests, calculating 5% percentiles (LLN), Kappa-statistics
2	*What role may symptoms play in the diagnosis of airflow limitation?*	Tromsø 5. 3954 persons, 60 years and older	Cross sectional population study	Binary logistic regression, Chi-square tests, calculating positive predictive values, ROC curves
3	*What makes people start smoking, and a smoker to quit and maintain quitted?*	18 smokers and ex-smokers, 58 years and older	Semistructured in-depth interviews	Narrative-and content analysis

Subjects and questionnaires paper 1 and 2.

Tromsø is university-city and regional capital in the northern part of Norway. In 2001 it had about 61 000 inhabitants, with 7842 inhabitants aged 60 years old or more. In the 19-20 th century trading (with Russians) and fishing were the main source of income, but nowadays the biggest workplaces are the University, the hospital and the municipal sectors. There is little occupational or environmental pollution in Tromsø.

The Tromsø study is a single-centre population based prospective study with repeated health surveys of inhabitants in the municipality of Tromsø, which started in 1979. In the first survey only men 20-49 years of age were invited. During the years the survey did include more than 40.000 people in Tromsø, and more than 15.000 persons have participated three times or more. In the fifth Tromsø study, about 7000 persons were invited because of their participation in Tromsø 4 (1994-1995). Tromsø 5 started in March 2001 and ended in February 2002. It was conducted by The University of Tromsø in cooperation with the National Health Screening Service (98).

In the fourth study in 1994, all citizens aged 25 years or more (37 558 persons) were invited to fill in a questionnaire and to have a brief examination done. Those aged between 55–74 years, and a random sample of 5–10% of the others between 25–84 years, were also asked to take part in a second, more detailed medical examination (phase 2); 7965 persons (77%) attended. All the phase 2 participants from the fourth survey, who still lived in Tromsø, were eligible to participate in the two phases of the fifth study, and attended twice with a few weeks gap between visits. In addition all inhabitants aged 60 and 75 years were invited. In subjects aged 60 years and above, a total of 5328 subjects were eligible and 4713 (88.5%) attended phase one, and 4519 (85%) attended also phase two. In both phases participants filled in a questionnaire (appendix).

Spirometry was included for the first time in "Tromsø 5". It was performed in 4102 subjects (54.6% women), 90% of the attendees and 77% of the eligible for participation. Absence of staff and technical problems were the reasons for spirometry not being performed in 10% of the attendees. Papers 1 and 2 were written on basis of information from the two questionnaires, and spirometry results in "Tromsø 5".

Subjects in Paper 3:

A written invitation to participate in the interview study was sent consecutively to 57 smokers/ex-smokers 58 years and older from the 6th Tromsø-study. Women and current smokers responded less than ex-smoking men did, giving in the end a sample of 2 smoking and 3 ex-smoking women, and 3 smoking and 10 ex-smoking men.

Methods paper 1 and 2

The methods used are described in paper 1-2 and in Table 7.1.

Methods paper 3

We interviewed 18 elderly smokers and ex-smokers about their smoking and decisions to smoke or quit, and analysed the interviews with qualitative content analysis across narratives.

The narrative method

Narrative research is a branch within the broad field of qualitative research. According to Polkinghorne (99) "Narrative inquiry refers to a subset of qualitative research designs in which stories are used to describe human action." He distinguishes between a *narrative*, which is thematically organized by plots that cumulate in a movement, and a *story*, which is more unreliable. Meanwhile Riessman (100) says that sociologists reserve the term *narrative* for a general class, and *story* for a specific prototypic form with some elements of disturbance in the normal course of events. Polkinghorne (99) states that stories are suited to the linguistic form in which human experience as lived can be expressed. A *plot* is the narrative structure through which people understand and describe the relationship among the events and choices of their lives (99). Some stories deal with a turning point or a *plot*, e.g. when they stopped smoking, and the story is built up around this plot (101;102). Frank say stories are part of all people's lives, from birth to death. People are born into their story, adapt to their stories, and may be thrown into new stories (101). Stories do things *for* people: Subjectify and connect, and they do things *to* people: Stories are media through which people position themselves in the world; explore who they are in relation to events and other people. People adapt to their stories and live their lives according to the stories to which they adapt. A story is more than retelling, it gives people a sense of belonging and greater understanding of life (101). Stories are recipient designed, and part of a communicative setting where two or more people try to find a meaning together (101). Stories can be used to deepen an understanding of a phenomenon, e.g. smoking and smoking behaviour. Stories function socially to create possibilities for group belonging and action (100).

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Narratives may be analysed structurally as described by Labov and Waletzky forty years ago. They say a complete narrative contains six elements: 1. Abstract, 2. Orientation, 3. Complicating action, 4. Evaluation, 5. Resolution/result and 6. Coda. The structural analysis can generate insight that can be missed when interpretation concentrates narrowly on "what" is said, ignoring how content is organized by the speaker (100), but may be too strict losing some narrative elements.

Some authors mix the terms *narrative* and *story*. In this text narratives and stories are used about the same phenomena.

During two different courses in qualitative medical research I was introduced to narrative research. I was inspired by Arthur Frank and his way of seeing stories as part of all people`s lives throughout their lives. How we explain incidents by new stories, and how the stories changes during time and according to whom we talk. I wanted to analyse my interviews by asking his three questions to the interviews I already had performed: What does the story do *fo*r me (the researcher)? What does the story do *to* me? What does the story do *for* the informant? These questions opened up for new insight for me, but I felt I needed more structure to manage answer my research questions.

Narratives nowadays are often analysed by thematic analysis, where the content is the exclusive focus: "What is said?"(rather than "how" or "to whom" or "for what purposes?" (100).

Qualitative content analysis (QCA)

Qualitative content analysis (QCA) is a systematic mean of grasping the meanings of qualitative data such as transcripts of interviews. The aim of the analysis is to attain a condensed and broad description of a phenomenon. It allows the researcher to test theoretical issues to enhance understanding of the data, and distil words into fewer content-related categories (103). The outcome is usually concepts or categories describing the phenomenon. It may be applied either in the inductive or in the deductive direction (103). It is a flexible approach that may work within different theoretical perspectives (103).

We chose qualitative content analysis because it is intuitive and straight forward, and well suited for a novice in qualitative research, as I am.

We found that QCA, with certain attention given to the narrative elements, was well suited to explore the smoking patient`s stories in both breadth and detail (101;103-106).

Regarding how we performed the analysis in our study, see paper 3.

Project finance and ethics

The study has been mainly financed by the University of Tromsø. The General Practice Research Fund has supported the qualitative study. Ethical approval was given by the Regional Committee for Medical and Health Research Ethics in Northern Norway. In paper 3 a licence was obtained from the Norwegian Social Science Data Services. All the participants gave written informed consent. They were not paid.

MAIN RESULTS

Paper 1:

We found that decreased FEV_1% predicted and FEV_1/FVC ratio were associated with smoking, increasing age, and reported pulmonary and cardiovascular diseases. In never smokers aged 60-69 years old the frequency of FEV_1/FVC ratio < 70% was approximately 7% compared to 16-18% in those 70 years or more ($p<0.001$). FEV_1/FVC ratio < 70% among never smokers aged 60-69 years old was just as frequent as FEV_1/FVC ratio <65% in never smokers older than 70 years.

Conclusion: Adjustments of the GOLD criteria for diagnosing COPD are needed, and FEV_1/FVC ratios down to 65 % should be regarded as normal when aged 70 years and older.

Paper 2:

The prevalence of any airflow limitation was 15.5% and 20.8%, in women and men, respectively, whereas the corresponding prevalence of severe airflow limitation (FEV_1 <50% predicted) was 3.4% and 4.9%. The positive predictive value of chronic cough with phlegm

for any airflow limitation was 37.0% in women and 40.4% in men. For severe airflow limitation it was 17.3% and 14.2% respectively. Wheezing was a symptom which persisted despite of smoking cessation, whereas coughing was considerably less common in ex-smokers than in current smokers. Wheezing, dyspnoea on unhurried walking, dyspnoea on quick walking and coughing with phlegm were independent predictors of any airflow limitation, OR 1.5, 1.8, 1.4, and 1.6 respectively. (The ORs for severe airflow limitation were 2.4, 2.4, 2.4. and 1.6 respectively). The most important factor was still smoking. Compared to never smokers the ex-smokers had 2.4 times the likelihood of having COPD, and the figure for current smoker was 5.8 times. Ex-smokers reporting two symptoms had asimilar risk of airflow limitation as current smokers not reporting any symptoms. In never- and ex-smokers the chance of having airflow limitation was more than doubled when having two or more, compared to one, of the three symptoms: wheezing, dyspnoea, and coughing with phlegm. These results were not surprising, yet they did add a perspective to the diagnostic process of COPD. With increasing symptoms the likelihood of having COPD increases. The most important thing was still smoking.

Conclusion: Respiratory symptoms are valuable predictors of airflow limitation, and should be emphasized when selecting patients for spirometry.

Paper 3:

We presented a smoking narrative from debut in adolescence where friends had huge influence. Smoking then became a habit, often without obvious reflection of the negative sides of smoking. Information from doctors and public sources on the damage to health caused by smoking, reinforced by legislations on tobacco restrictions and rising prices, sometimes in combination with physical symptoms, made the informants aware of the negative sides of smoking. From the beginning this awareness was not negotiated, but a growing reflection on the consequences of smoking made them approach, however in ambivalence, the decision to stop, and then to actually carry it through. Most of the informants stopped smoking unplanned. “All the others” had a crucial role in all stages of smoking, from the start, via habituation to awareness and the approaching decision, and finally to stopping, and sometimes relapsing. Spouses had vital influence in stopping, relapses and continued smoking. Many of those who had quitted smoking had stopped by themselves

without medication, and had kept the tobacco handy for 3-6 months. Nicotine replacement therapy or Vareniclin was often not used either because of their cessation occurred in a time when these drugs were not available or because drugs were not considered necessary for success. The majority of smokers believed that keeping tobacco handy helped to maintain their cessation. Information from the community and doctors enhanced awareness of the negative effects of smoking, and may have influenced the motivation for stopping.

DISCUSSION OF THE METHODS

Methodological considerations paper 1 and 2

The goal for an epidemiologic study is accuracy in measurement, e.g. to estimate the value of the parameter with a minimum of error. Sources of error may be either random (lack of precision) or systematic (inaccuracy, bias). Precision can refer to the magnitude of differences between repeated measurements (i.e. reproducibility) as in e.g. spirometry. Precision is expressed through the confidence intervals and by inter-and intra observer variability, and the first of these depends on the study size. Validity refers to how the study results apply to the target population, separated into *internal validity;* absence of systematic errors and *external validity*; generalizability. Internal validity is a prerequisite for external validity (107). Methodological considerations are outlined before the presentation of the findings in a paper. What are the goals of the study? What are the main findings? How can we present them? There is always a long way to go to present the findings in a proper way, which is as precise as possible and understandable for the reader. Quantitative data are best presented by tables and figures..

Internal validity

Selection of participants: A selection bias may occur because the non-participants from earlier surveys were not invited. Who were the non-participants? Are they healthier or more have more comorbidity than the general population? The participants represent more than 50% of all inhabitants 60 years and older in Tromsø. The attendace rate in the extended examination was 89%. We have information on responders and non-responders to the questionnaire that was handed out at the screening in an earlier Tromsø survey (108). We assume that the non-responders in this survey do not differ much from the responders. If they differ, they usually are in a worse condition than the participants, and we could expect even lower lung function. The attendance-rate is very high, and in a survey covering 4102 persons 60 years of age and older we are able to conclude with a high level of certainty.

What is a never smoker? There is an ongoing discussion how to classify a never-smoker. Some define a never smoker as someone who has smoked less than 100 cigarettes per lifetime (109;110) others have stricter criteria. In Tromsø 5 the participants defined their smoking status by answering the following questions: “Do you smoke/have you been smoking daily?”(yes now/ yes previously/no). We put our participants into three groups: Smokers, ex-smokers and never smokers according to their answers. Some of our never smokers may have been smoking more than 100 cigarettes a lifetime, and would have been classified as smoker or ex-smoker in other studies.

Recall-bias: The amount of cigarettes consumed will differ through life. People often underestimate the consumption of potentially dangerous stuff like cigarettes (111). Recall bias around the time of starting to smoke, how many years of smoking, previous efforts to stop smoking, and the duration of the abstinencewill affect the “true” answers (112). We were not able to clarify whether participants underestimated the number of cigarettes smoked per day or number of years spent smoking, and thus had to rely upon the reported numbers. The ex-smokers may have forgotten exactly when they stopped, and the never smokers may have been smoking cigarettes for some time without consider themselves as smokers.

The risk of developing COPD is smoking dose-related. Age at embarking upon smoking, total pack-years smoked, and current smoking status are predictive of COPD mortality (1). Starting to smoke and the time of the cessation attempts are often connected to a special incident (staring to work, moving away from home, the first heart infarction event etc). The number of years spent smoking is possibly easier to estimate than the numbers of cigarettes smoked a day.

The questionnaire in paper 1 and 2:

These questions formed a small part of the questionnaire. Some people read all the questions and tried to answer all of them correctly, while others may have answered without reading the questions thoroughly. Regarding coughing we noticed that the question: "Did you have *such* a cough (with phlegm) for more than three months during the last two years?" was sometimes were misunderstood. Some participants overlooked that the question implied cough *with phlegm* for more than three months.

Quality of the spirometry:

A spirometric test is effort –dependent and needs adequate coordination between the technician, the patient and the equipment. The patients have to inhale completely before exhaling all the air, and at least for 6 seconds. People tend to get exhausted if they do it correctly. The technician has to motivate the participants to perform this as best as possible t 3-6 times consecutive in a positive and supportive manner.

The spirometric tests from Tromsø 5 were carried out with the use of one spirometer only, a "Sensormedics Vmax 20". The American Thoracic Society-criteria for spirometry testing (40) were adopted. Calibration of the instrument was performed every morning and at the machines request. Three trained technicians shared the conducting of the spirometry. The subjects were sitting, using a nose clip, and were instructed to blow as long as possible, for at least six seconds. The participants took a full inspiration before inserting the mouthpiece ("open circuit"). At least three exhalations where required. We had *one* spirometer and three trained technicians performing 4102 spirometry tests. The 74 subjects, who blew for more than three, but less than six seconds, were included in the analyses. Excluding these subjects induced only minimal and insignificant changes of the results. Many other studies consist of

smaller surveys from different parts of a country or from different countries, using different spirometers and more than three technicians. The validity of the test is strengthened in Tromsø 5 methodology.

Quality test: In two weeks in 2001 an inter- and intra observer agreement test was done with two of our three technicians (A and B, who performed the majority of the spirometris) and 80 participants. It implied repeated testing both weeks. The two technicians were blinded toeach other's results. Inter- and intra-observer agreement were evaluated by Bland-Altman plots and in 2x2 tables with FEV_1 /FVC $\geq$ 70% as threshold, using Kappa statistics. Kappa statistics are used when comparing categorical data, for instance comparing the same technician in two different weeks with the same patients, and to compare technician A to B the same day, and two weeks later. Maximum Kappa is 1.00, where there are no differences in the subjects checked. Our measures were 0.77-0.92 (mean 0.85).We are confident with the quality of the spirometry. The Kappa-values for the inter-and intra-observer agreements were close to optimal and the Bland-Altman plots were homogenous (Paper 1). We can conclude therefore that the quality of the spirometry done in Tromsø 5 is excellent.

Reversibility tests: According to GOLD guidelines the diagnosis of COPD should be based on post-bronchdilatator spirometry. Spirometry was only a small part of the survey, and reversibility tests were not done due to the work-load of the whole survey. The omission of reversibility testing is a weakness of our study and made it impossible to describe the prevalence of COPD according to GOLD guidelines. Johannessen et al (61) found that the prevalence of FEV_1/FVC below 70% decreased by approximately 18% after inhalation of a beta2-agonist for subjects 60 years oldand above. Our spirometric values would probably have been somewhat higher if they had been based on post-bronchdilatator spirometry. However, the frequency in our study of FEV_1/FVC ratio less than 70 % among subject 75-79 years was similar to the frequencies found by Lundbäck et al (60) after reversibility testing in subjects aged 76-77 years, both in smokers and never smokers. The negative effect of not doing reversibility testing may to some degree have been reduced by the fact that on-going medication, including anti-asthma medicines, had not been interrupted. In later Tromsø-studies I would encourage those who plan for the spirometry to do reversibility tests.

External validity

The study findings are generalisable if the results are applied to other populations in the same age group. There are many former smokers in our study, mainly male. Smoking in Troms is about 3% higher than the mean for Norway (74). The high participation rate in our studies strengthens the external validity. The spirometry results are comparable to other studies in Europe and the USA (4;19;59;60;113). Therefore we conclude that our results are valid also outside North Norway.

Statistical considerations

Independent samples T-tests, and Chi-square test were used to check whether differences between groups were statistically significant. T-test and Chi-square test presupposes the null hypothesis, eg: the lung function is the same in people who *do* and *do not* report lung symptoms. These models are appropriate to check differences between groups, and relevant for our work.

Lower limit of normal (LLN): Some argue for using LLN in the diagnosis of COPD. The LLN is statistically defined by the lower fifth percentile of a reference population and can be calculated by substracting 1.64 times the standard deviation from the mean, i.e. the expected value (114). When the reference population is constituted by healthy never smokers, subjects with healthy lungs may be classified as abnormal by this method. In spite of this, the risk of false positive spirometry may be lower than when using a fixed FEV_1 /FVC ratio.

In paper 1 the LLN was calculated by using the equation of Enright (19) and was compared with our 5% percentiles in different age groups. Our results for the 730 “healthy never smoking” women were comparable to Enrights results, but not for men, probably by chance due to low numbers, only 235 “healthy never smoking” men.

Odds Ratio (OR): This is used when comparing groups in multivariable logistic regression, and is the relationship between the two odds (e.g. odds of having COPD when being a smoker and being a never smoker.)

In paper 2 we evaluated the differences in prevalence by chi square statistics. Binary logistic regression was used in calculating Odds Ratios (OR). A three-symptom score was made based on the independent predictors determined to be statistically significant by logistic regression. Each symptom gave 1+ when present, and zero when absent. Positive predictive values (PPV) for airflow limitation of separate symptoms, and the three-symptom score were calculated.

Receiver Operating Characteristics (ROC)-curves: is a graphical approach to plot the sensitivity versus 1- specificity for each possible cut-off, and to join the points (115)The curve obtained is known as ROC-curves. ROC curves were used to illustrate the value of the three symptoms in the diagnosis of airflow limitation in paper 2. The ROC curves of the symptoms score for airflow limitation and severe airflow limitation produced areas under curve of 0.63 and 0.76 respectively. We conclude that symptoms have some diagnostic value when having airflow limitation, but being a smoker is the most important factor.

Methodological considerations Paper 3

Women and current smokers were more reluctant to participate than ex-smoking men. We do not see that the further inclusion of smokers and women would have altered the general structure of the narrative.

The informants may have had a special interest in talking to us about own smoking, which could make the conversation more open and trustful, and contribute to the richness of the personal stories told. Taking this into account we still consider our sample to be complex enough to state important issues about being an ex-smoker or smoker.

All the interviewees knew that the interviewer was a GP. They may have answered according to what they think the interviewer wanted to hear. However, the plenitude of clear statements of low motivation does not support this presumption.

Doing the interviews in the informant's homes strengthened the method. The informants could be expected to feel more calm, relaxed and free, and the home interview sent the message that we invited other kinds of stories than usually are presented in a GP**'s** office (116).

The data were collected in about 6 months and analysed directly after all had been collected, and inconsistency should not be a problem.

DISCUSSION OF THE RESULTS

Paper 1.

Norway has developed its own COPD-strategy (69) and Norwegian doctors are encouraged to follow the recommendations of GOLD when performing spirometry (117). They are also encouraged to implement Norwegian reference values in their computer software (65).

Age and diagnostic criteria.

The discussion of the criteria of COPD, whether to use FEV_1/FVC <70% of $FEV_1/FV6$ or LLN of FEV_1 is an ongoing discussion (19;23;57;118;119) which has lasted since GOLD published their first program in 2001 (1). There is still no conclusion on the criteria of COPD, and GOLD has not changed their definition.

Many epidemiological surveys (4;19;29;120-122) say the FEV_1/FVC ratio falls significantly after the age of 60. The reduction in lung function can to some degree be explained by the structural changes that take place in the airways with increasing age, including dilatation of the alveoli and loss of supportive tissue in the peripheral airways called “senile emphysema” (30). Another aspect of normal ageing is loss of muscular tissue generally and reduced physical endurance. Height-loss during life is normal, and actual height may differ significant from the reported height. The elderly suffer, in addition, from other diseases, co-morbidities which may influence the lung function (19). Heart failure, in particular, is known to be associated with reduced spirometric values, including the FEV_1/FVC ratio in severe cases (123).

The elderly part of the population increases year by year, and it is necessary to derive more equations adapted to the elderly. There is a lack of reference data adjusted for elderly subjects (124). The existing data are based on relatively small samples, some of them based on self-reported height (22) which may be a bias.

Vollmer et al states (119) “Use of the FEV_1/FVC <LLN criterion instead of the FEV_1/FVC <0.7 should minimise known age biases and better reflect clinically significant irreversible airflow limitation”. Our study in paper 1 also supports the use of the $FEV_1/FEV6$ as a practical substitute for the FEV_1/FVC, but we recommend to lower the threshold in the elderly.

A Pub-Med search in January 2012 (COPD AND reference equations for elderly) found 24 papers of which only two (125;126) had actually derived new equations, and none of them were derived for elderly only (the fist for 27-82 years of age, the second for 40-69 years).

Because of the normal ageing and reduction in lung function we suggest to change reference equation adjusted to elderly when performing spirometry on persons 70 years of age and older to $FEV_1/FVC<0.65$. The FEV_1/FVC ratio is a practical indicator of the lung function. It is easily measured, and can be used without the need of reference equations. The application of the 70% threshold in all ages is an oversimplification, as previously stated by Enright, Falaschetti and Hardie (4;19;29). Adjustments have to be done to make the measure clinically useful and credible.

Sweden has recently changed their guideline-recommendations in COPD. For people 65 years of age and older they recommend $FEV_1/FVC<0.65$ (127) which is partly in agreement with our recommendations in paper 1.

I suggest that more research has to be done to persons 60 years of age and older, and use the threshold $FEV_1/FVC<0.65$ to avoid over diagnosis.

Prediction equations:

Since stage 1-4 COPD are determined based on expected values of FEV_1, GOLD classification is dependent on the reference values chosen. The most widely used reference values in Europe, The European Community for Steele and Coal, (ECSC) are based on studies published in 1954- 1990. These may not represent the study population of today (128). Both equipment, measurement techniques and population have also changed in the last 20-30 years (22). Several studies indicate that the ECSC equation underestimate the FEV_1 and FVC lung parameters that can be expected (3;22;23;113;129). If we use ECSC reference values in Norwegians, we will accordingly underestimate the numbers of persons having COPD by about 10% (65;125).

The average height in a population increases in the latter decades of life. This will influence the reference values and may cause misclassification (128). The inter-subjects variability in lung function is highly age-dependent. This is certainly the case for those under 11 years of age, but also for those over 30 years of age (22).

Developing prediction equation which fits all ages has been difficult to create (3;22;29;30;113;129). Between 1995-2004 at least 53 new reference value-studies have been published (23) and between 2007-2010 at least 15 more were published (22). There are a few prediction equations for the oldest part of the population (19;113). Brandli et al (129) had the upper age limit at 60 years of age, ECSC (40) used 70 years, and Enright et al (19) used 85 years.

American Thoracic Society (ATS) recommend the use of NHANES 3 reference equation. The European Respiratory Society (ERS) do not recommend a particular reference equation, but the ECSC is the most widely used in adults in Europe. Australia, New Zealand and Asia-Pasific do not set recommendations (22)

The users of lung function equipment may not be aware of which equations are being used, and misinterpretation may occur (22). In many new spirometers it is possible to choose a preferred reference value, but the user has to think about adjusting an equation to the test-population. Still most spirometers uses old equations as standard choice (22). Each country ought to agree on one equation relevant to their own population, and use it. Software ought to state clearly which one is preferred in each country.

LLN:

LLN is calculated based on a reference value. When calculating LLN the reference value used has to be adjusted to the population tested. Brazzale et al (23) calculated LLN by using the equations of NHANES3 and Health Survey of England (HSE) and compared to empiric values of FEV_1/FVC <70% . When comparing FEV_1/FVC < 70% to FEV_1/FVC<LLN they found a large number of false positive in persons 65 years and older. Swanney et al (57) concludes: “Airway obstruction should be defined by FEV_1/FVC and FEV_1being below the LLN using appropriate reference equations.”

In paper 1 we used Langhammers (113) equation when calculating the predicted values, and GOLD guidelines. We implied the reference equation derived to elderly by Enright (19) when calculating LLN in healthy never smokers in Tromsø 5, and compared them to mean empiric values and 5% percentile empiric values of FEV_1/FVC %. We suggested to use LLN in age-related curves as a good substitution to FEV_1/FVC < 70% to improve the diagnostic precision. When using the threshold of 70% for all age groups we identified an over-classification in

people 70 years of age and older, which is in agreement with many other papers as previously mentioned (2;4;15;19;29;30).

We have suggested to keep the diagnosis of COPD simple by using the threshold FEV_1/FVC <70% for persons 70 years and younger, and FEV_1/FVC <65% for those over 70 years of age. The FEV_1/FVC ratio is a practical indicator of lung function. It is easily measured, and can be used without the need of a reference equation**.** To find a proper and "fair" way to diagnose COPD in all ages still seems difficult

Some suggest reference tables which is age-and country-based (in addition to sex, height and ethnic origin) for the future (22). I think it will be complicated to perform daily- life spirometry without implementing it automatically into software for analysis.

There are still many questions to be answered before a consensus can be reached regarding what requirements and index of severity of lung disease should fulfil. We may need to adopt an entirely different approach in the future (22).

The spirometric results: Higher FEV_1/FVC% values were found among the healthy never smoking men than expected on the basis of Enright`s material (19). One reason for this may be the less strict inclusion criterions in Enright`s study, as people who had smoked up to five pack-years also were included.

Paper 2.

The aim of paper 2 was to evaluate the diagnostic value of respiratory symptoms in the diagnosis of airflow limitation.

General practitioners meet and examine the patients in early stages of the disease, and symptoms represent the starting point of the diagnostic process.

GOLD did withdraw the stage 0, normal spirometry and chronic symptoms (breathlessness, decreased exercise capacity, cough and sputum production) because "there is only an imperfect relationship between the degree of airflow limitation and the presence of symptoms"(1). Since the withdrawal authors have discussed whether or not symptoms and normal spirometry will proceed to GOLD 1. We know from survey data that a large proportion of people with impaired lung function do not report respiratory symptoms and that a large proportion of people with respiratory symptoms have normal lung function (130).

Arguments for GOLD 0: Many authors have argued in favour of implementing GOLD stage 0 in the classification again, since persistence of symptoms without reduced spirometry seems to be of some importance in developing COPD (131-134). ATS/ERS criterion assess symptoms as important when diagnosing COPD, and "at risk" COPD when having FEV_1/FVC ratio >70%, and FEV_1 is ≥ 80% predicted in patients who smoke or have exposure to pollutants or have cough, sputum or dyspnoea, or have a family history of respiratory disease (6).

In a 3.5 years follow-up study of 4060 inhabitants (random recruitment and examination of a representative sample of participants), in Australia (131) the authors state that "Persistent GOLD-0 identified people with physical and psychological morbidity in both smokers and non-smokers. Identification of those with *persistent* respiratory symptoms is therefore important. Excess FEV_1 decline in men suggests GOLD-0 may identify a group at risk of progressing to COPD over time." Those statements are in agreement with our conclusion in paper 2: "Respiratory symptoms are valuable predictors of airflow limitation, and should be emphasized when selecting patients for spirometry. " Still the most important issue is whether the patient has stopped smoking or not.

Ekberg-Aronsson M et al (135) states: "Symptoms fulfilling the definition of chronic bronchitis were associated with an increased mortality risk among male smokers with normal pulmonary function (stage 0) and also with an increased risk of death among smoking individuals with mild to moderate COPD (stage 1 and 2)."

Ohar et al (34) conclude: "Symptoms are frequent in subjects with AO (airways obstruction) and increase their risk of COPD, but add little beyond age and smoking history to the predictive value of spirometry." They suggest screening of old smokers.

Stavem, k et al (136) (From 1972 to 1975, clinical, physiologic, and biochemical parameters including respiratory symptoms, spirometry, and physical fitness were measured in 1,999 healthy men aged 40 to 59 years in an occupational cohort, of whom 1,623 had acceptable spirometry findings) conclude: "There probably is an excess mortality among GOLD stage 0 subjects compared to symptom-free subjects; however, this should be interpreted cautiously and the results vary with the definition of the GOLD stage 0. Subjects in GOLD stage I or stage II had higher mortality than symptom-free subjects".

Arguments against GOLD 0:

Vestbo et al (137) (using data from three surveys in The Copenhagen City Heart Study, in which a sample of the general population was examined at baseline and in which, after 5 and 15 years. 14,223 attended the first examination and 10,049 attended the third examination. 7,073 subjects had participated in the initial survey and this corresponds to 70.5% of those examined at first survey and alive at the time of the third survey.) say "Gold stage 0 was not identifying subsequent airway obstruction // In the western world, smoking is still in itself the most important indicator of risk of COPD."

Enright writes in his editorial letter (138)" COPD is a major and growing challenge worldwide, with evidence of under-recognition, inaccurate diagnosis, lack of emphasis on smoking cessation treatment, and inaccessibility to pulmonary rehabilitation, its most effective treatment." Enright postulates that early diagnosis is "..unwelcome because medical services are already having difficulty providing optimal care for patients with clinically-important COPD. Very few countries have the capacity to expand COPD case-finding to include patients with borderline abnormal spirometry results for whom there is no evidence that treatment has any effect."

I think it should be possible to have two thoughts at the same time: Ask for symptoms to be more aware of the possibility of COPD. Encourage all smokers to do spirometry and stop smoking. Clinically, the presence of respiratory symptoms among people with normal lung function may provide an opportunity for interventions that will potentially improve both the quality and duration of life in our patients.

Paper 3.

Although smoking is one of the biggest health burdens known, there are rather few qualitative medical studies done on elderly in this field. As far as we know our study is unique; describing a smoking story from the start as youngsters until a cessation in the elderly, a story lasting more than 60 years.

The Transtheoretical Model of Change and Motivational Interviewing

Superficially, the smoking narrative we describe in paper 3 resembles the structure of the Trans Theoretical Model of change, although the latter was not within our theoretical perspective when analysing our material. In contrast with the TTM, the smoking narrative puts smoking in a detailed biographical context, as well as describing and interpreting what goes on before awareness occurs. Starting with contemplation gives too limited an entry into the reality of smoking cessation. In real life the stages of smoking turn into experience, drives, emotions and arguments in an ongoing process of consideration with very individual patterns and with very strong social influences; and the outcomes of this process are difficult to forecast.

We believe that our findings may put TTM and MI within a context of concreteness and complexity that GPs would easily recognize, and which often may be necessary to embark on a fruitful dialogue, but eliciting the smoking narrative itself without putting it into categories of decision may be fruitful itself. Within the same context, however, a categorical approach such as the five As (1;8;9) would hardly turn out appropriate.

The smoking narrative in the consultation

One lesson from our study is that its method of interrogation, i.e. eliciting the life-long smoking narrative, as an ingredient of doctor-patient interaction, may induce awareness and/or motivation by itself, as well as paving the way for a fruitful dialogue. The link between the passing of time and the changes in thinking about one's own smoking has its own explorative dynamic that made up the richness of the material of our study. We believe that this dynamic would be valid also in the consulting room. The smoking narrative may be asked

for when smoking cessation is relevant; either at the patients` request, or as called for by smoking-related ill health where the patient asks for help. When doing this the patient senses the doctor`s interest, and an ensuing conversation may elicit new insight both for the patient and the GP.

Malt (97) maintains that earlier behaviour and positive expectations are the main reason for prospective behaviour, and the most motivating factor for a patient to change behaviour seems to be an empathic doctor who cares for the unique patient and do not communicate health changes in general. Guassora (12) supports this by saying: ”Smoking cessation advices has the potential both to put trust under strain and to strengthen trust. The outcome depends on whether the advice conforms to what both patients and GPs expect from the interaction in general practice consultations.”

We believe it is realistic to see motivational interviewing, even in its brief intervention version, as a second step, when smoking cessation is the agreed reason for the encounter. Depending on the GP’s workload and interest, this more extensive motivational work might well be taken over by other members of the team. The encounter between a patient and the GP are based on trust and good communication. If the patient’s own reason for the encounter is more or less exchanged for a public agenda of smoking cessation, the common ground and trust-based doctor-patient relationship crucial to patient-centred medicine will never be established (139).

The social dimension of smoking

A second important lesson from our study is that smoking is a very social activity. The fellowship in smoking and the influence of other people is well known (70;140), but it is very much absent in TTM, MI and the 5 As. Our study indicates that a smoker is influenced by his/her close relations in all stages of smoking and throughout life, not least at the start. Friends and parents/siblings are influencial at the start of smoking (70;71;140;141). The partner takes over to have an important impact on the continuation of smoking as well as a potential stop (142). Focussing on individual health without taking close relations into account is probably a too narrow an approach for many smokers.

The influence of “all the others” is not discussed in the official smoking cessation advices. From advertising we know how trendsetters influence the potential customer, and from

studies of smokers we know how they group together to smoke, borrow a lighter, bum a cigarette and to get in touch through their smoking. This sociology of smoking is not taken into consideration when developing programs for helping smokers to stop, narrowing the perspective of understanding of smoking and smokers. To bring in the relevant version of "all the others" in the smoking cessation conversation should be included into the official strategies of today. Ege Møller (96) , also discusses the effect of doing things together when striving for lifestyle changes. She finds no recognition, in the public discourse, of the role of fellowship for motivation, for instance within a group-based physical activity. She maintains that in the prevailing ideology of health prevention *motivation or lack of motivation* is treated as a purely individual phenomenon, not taking into account the influence that people exert on each other. This standpoint of Ege Møller adds importance to our main finding; namely that the influence from "all the others" should be taken into account in all steps of smoking. In the smoking cessation conversation the individual perspective has to be supplemented by a contextual one.

Caring for close relatives was also a reason for stopping. Spouses stopped smoking to care for or in companionship with their partners. Due to caring for one`s own children and grand-children, many smokers considered stopping. Although a smoker's own responsibility ultimately makes the difference between smoking and non-smoking, the impact of context is very great.

Still it is plausible that referring to "all the others" not only manifested the dependence on others and the wish to adhere to group norms, but sometimes was self-deceit to escape from responsibility.

Flexibility rather than standard strategies

Strategies for cessation should be agreed in the individual case and unorthodox solutions suggested by patients, such as keeping tobacco handy, need to be discussed. The official advice to GPs is to advice stoppers to get rid of all tobacco prior to the actual stopping (8;9). In our paper all but one said they would manage a stop by keeping tobacco close at hand for 3-6 months. This ought to be discussed separately for each patient.

We also found that NRT or Vareniclin are not always necessary for a successful stop. Many of our stoppers managed without. One explanation to this was that they stopped before NRT

was available, another that the patients did not consider it necessary to succeed. We suggest that the patient preferences should be explored in the conversation on cessation of smoking. Some smokers may stop unplanned with little obvious motivation, so that the GP's interest in the smoking narrative may sometimes be enough to encourage cessation. Cessation at low levels of motivation has also been described by West and Sohal (143) who, in addition, found that unplanned attempts to quit were more likely to succeed (OR 2.6) for at least six months than planned attempts were. They propose a model of change based on catastrophe theory where small triggers can lead to sudden changes in motivational state. Larabie (144) also found most quit attempts to be unplanned and unaided by health professionals.

CONCLUSIONS AND IMPLICATIONS FOR FURTHER RESEARCH

The last word in the discussion on how to diagnose COPD is not said. We have contributed our findings from paper 1 as mouse-steps in the right direction, but we do not expect agreement on the most "fair" or reliable diagnose COPD. The human body can to some extent be classified into mathematic stages, but it is not a machine. We must always treat each individual with caution and relate the spirometric findings to the person treated. Probably future researchers have to be more creative than researchers have been hitherto to find useful criteria. We may need to create different criteria for different people in different age-groups. It is possible that we will never can reach a worldwide agreement, and therefore have to find agreements within a country or small parts of the world.

Although symptoms are what all clinical doctors do navigate from, symptoms in COPD cannot be the only reason for doing a spirometry. The most important information for a doctor, when searching for COPD, is whether the patient smokes or not. If the patient smokes the GP or the hospital doctor ought to start a conversation on smoking, and may for instance ask for the smoking narrative, and encourage to have a spirometry taken. To help smokers to stop is the most important issue to avoid getting COPD.

More research, particularly qualitative, is needed to find out more about smoking cessation. Is *motivation* as important as we believe? What kind of processes must a smoker have gone through before she/he starts to consider smoking cessation? Why do many smokers stop unplanned and unaided? How can we best help the hardcore smokers? Lifestyle changes are difficult to handle, and much more research is needed to understand the depth of the willingness to change. To effectively fight tobacco we need a combination of strategies, both legislative, regulatory and public health. GPs ought to learn different approaches to the smoking patients. Eliciting the smoking narrative as method ought to be tested in practice, and implemented in clinical research to see if it adds more to cessation than TTM, MI or 5As.

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Paper I

Paper II

Paper III

Appendix I

T10. SYKDOM I FAMILIEN

10.1 Kryss av for de slektningene som har eller har hatt noen av sykdommene: *(Sett kryss for hver linje)*

	Mor	Far	Bror	Søster	Barn	Ingen av disse
Hjerteinfarkt (sår på hjertet)	☐	☐	☐	☐	☐	☐
Angina pectoris (hjertekrampe)	☐	☐	☐	☐	☐	☐
Høyt blodtrykk	☐	☐	☐	☐	☐	☐
Utvidet hovedpulsåre i magen	☐	☐	☐	☐	☐	☐
Mage-/tolvfingertarm-sår	☐	☐	☐	☐	☐	☐
Lårhalsbrudd	☐	☐	☐	☐	☐	☐
Psykiske plager	☐	☐	☐	☐	☐	☐
Allergi	☐	☐	☐	☐	☐	☐
Slitasjegikt (artrose)	☐	☐	☐	☐	☐	☐
Aldersdemens	☐	☐	☐	☐	☐	☐

10.2 Hvor mange søsken og barn har du?

	Brødre	Søstre	Barn
Antall	☐☐	☐☐	☐☐

10.3 Fører sykdom e.l. hos noen i nær familie til at du vanligvis utfører ekstra omsorgsarbeid?

Ja, stor sett daglig ☐ 1 — Ja, av og til ☐ 2 — Nei ☐ 3

10.4 Har du/din familie hjemmehjelp eller hjemmesykepleie? ..... JA ☐ NEI ☐

	JA	NEI	Evt. alder ved død
10.5 Lever din mor?	☐	☐	☐☐☐ år
10.6 Lever din far?	☐	☐	☐☐☐ år

T11. MOBILTELEFON

11.1 Disponerer du (eier, leier e.l.) mobiltelefon?

Ja, hele tiden ☐ 1 — Ja, av og til ☐ 2 — Nei ☐ 3

Hvis JA:
Hva bruker du mobiltelefonen til, og hvor ofte bruker du den? *(Sett ett kryss for hver linje)*

	Antall ganger per døgn				
	30 eller flere	10-29	2-9	1 eller mindre	Aldri
Samtaler	☐	☐	☐	☐	☐
Tekstmeldinger	☐	☐	☐	☐	☐
	1	2	3	4	5

T12. RESTEN BESVARES BARE AV KVINNER

12.1 Hvis du har født barn, fyll ut hvert barns fødselsår, og hvor mange måneder du ammet etter fødselen.

(Hvis du ikke ammet, skriv 0)

Barn:	*Fødselsår:*	*Antall mnd med amming:*
1. barn	☐☐☐☐	☐☐
2. barn	☐☐☐☐	☐☐
3. barn	☐☐☐☐	☐☐
4. barn	☐☐☐☐	☐☐
5. barn	☐☐☐☐	☐☐
6. barn	☐☐☐☐	☐☐

(Hvis flere barn, bruk ekstra ark)

T12. RESTEN BESVARES BARE AV KVINNER

12.2 Hvis du fremdeles har menstruasjon eller er gravid: Hvilken dato startet din siste menstruasjon?

Dag ☐☐ Måned ☐☐ År ☐☐☐☐

12.3 Hvis du ikke lenger har menstruasjon; hvorfor mistet du menstruasjonen? *(Sett ett kryss)*

Den stoppet av seg selv ☐ 1
Operasjon på livmoren ☐ 2
Opererte bort begge eggstokkene ☐ 3
Annen grunn (f.eks. stråling, cellegift-behandling) ☐ 4

12.4 Bruker du eller har du brukt reseptpliktig østrogen (tabletter eller plaster)? ..... JA ☐ NEI ☐

Hvis JA:
Hvor gammel var du da du begynte med østrogen? ..... ☐☐ år

Hvis du har sluttet å bruke østrogen,
Hvor gammel var du da du sluttet med østrogen? ..... ☐☐ år

12.5 Bruker du eller har du brukt p-piller? .. JA ☐ NEI ☐

Hvis JA:
Hvor gammel var du da du begynte med p-piller? ..... ☐☐ år

Hvor mange år har du til sammen brukt p-piller? .....*Antall år* ☐☐

Dersom du har født:
Hvor mange år brukte du p-piller før første fødsel? .....*Antall år* ☐☐

Hvis du sluttet å bruke p-piller:
Hvor gammel var du da du sluttet? ..... ☐☐ år

12.6 Når du ser bort fra svangerskap og barselsperiode, har du noen gang vært blødningsfri i minst 6 måneder? JA ☐ NEI ☐

Hvis JA:
Hvor mange ganger? ..... ☐☐ *ganger*

12.7 Hvordan er blødningsforholdene for deg nå?

Jeg har ikke hatt blødninger det siste året ☐ 1
Jeg har regelmessige blødninger ☐ 2
Jeg har uregelmessige blødninger ☐ 3

12.8 Da du var i 25-29 årsalderen, hvor mange dager var det vanligvis mellom starten på to blødninger?

Minimum ☐☐ *dager* — Maksimum ☐☐ *dager* — Vet ikke ☐

Pågikk selve blødningen omtrent like mange dager hver gang? ..... JA ☐ NEI ☐

Hvor mange dager varte en typisk menstruasjonsblødning? ..... ☐☐ *dager*

Takk for hjelpen!
Husk å postlegge skjemaet i dag!

IE 050000-1046-1 - 25.000 - Beyer Hecos 02.01

Etikett

Tilleggsspørsmål til helseundersøkelsen i Troms og Finnmark 2001-2002

Hovedformålet med Helseundersøkelsen er å skaffe ny kunnskap om hjerte-karsykdommer for å kunne forebygge dem. I tillegg skal undersøkelsen øke kunnskapen om kreftsykdommer og plager som f.eks allergier, smerter i muskulatur og nervøse lidelser. Vi ber deg derfor svare på noen spørsmål om forhold som kan ha betydning for risikoen for disse og andre sykdommer.
Skjemaet er en del av Helseundersøkelsen som er godkjent av Datatilsynet og forelagt Regional komité for medisinsk forskningsetikk. Svarene brukes bare til forskning og behandles strengt fortrolig.

T1. LOKALMILJØ OG BOLIG

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

_____

1.2 Hvilken type bolig bor du i? *(Sett bare ett kryss)*

Enebolig/villa ☐ 1
Gårdsbruk ☐ 2
Blokk/terrasseleilighet ☐ 3
Rekkehus/2-4 mannsbolig ☐ 4
Institusjon/omsorgsbolig ☐ 5
Annen bolig ☐ 6

1.3 Hvor stor er din boenhet? ☐☐☐ *kvm (brutto)*

1.4 Er du plaget av: *(Sett ett kryss for hver linje)*

	Ikke plaget	En del plaget	Sterkt plaget
Fukt, trekk eller kulde i din bolig	☐	☐	☐
Andre former for dårlig inneklima	☐	☐	☐
Trafikkstøy (biltrafikk eller fly)	☐	☐	☐
Annen støy (bedrift, byggeplass e.l.)	☐	☐	☐
Nabostøy	☐	☐	☐
Dårlig drikkevann	☐	☐	☐
Luftforurensning fra trafikk	☐	☐	☐
Luftforurensning fra ved-, oljefyring, fabrikk e.l.	☐	☐	☐

1.5 Hvilket hjemmespråk hadde dine besteforeldre? *(Kryss av for ett eller flere alternativ)*

	Norsk	Samisk	Kvensk/ finsk	Annet språk
Mormor	☐	☐	☐	☐
Morfar	☐	☐	☐	☐
Farmor	☐	☐	☐	☐
Farfar	☐	☐	☐	☐

Opplysningene kan senere bli sammenholdt med informasjon fra andre offentlige helseregistre etter de regler som Datatilsynet og Regional komité for medisinsk forskningsetikk gir.

Hvis du er i tvil om hva du skal svare, sett kryss i den ruten du synes passer best.

Det utfylte skjemaet sendes i vedlagte svarkonvolutt. Portoen er betalt. På forhånd takk for hjelpen!

Med vennlig hilsen
Institutt for samfunnsmedisin — Statens helseundersøkelser
Universitetet i Tromsø

Hvis du ikke ønsker å besvare dette spørreskjemaet, sett kryss i ruten under og returner skjemaet. Da slipper du å bli purret på!

Jeg ønsker ikke å besvare spørreskjemaet ☐

Dato for utfylling:
Dag ☐☐ Måned ☐☐ År ☐☐☐☐

T1. LOKALMILJØ OG BOLIG (forts.)

1.6 Hva regner du deg selv som? *(Kryss av for ett eller flere alternativ)*

Norsk ☐ — Samisk ☐ — Kvensk/finsk ☐ — Annet ☐

1.7 Føler du at du har nok gode venner? JA ☐ NEI ☐

1.8 Hvor ofte tar du vanligvis del i forenings-virksomhet som f.eks. syklubb, idrettslag, politiske lag eller andre foreninger? *(Sett bare ett kryss)*

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

T2. LØNNET OG ULØNNET ARBEID

2.1 Hvis du er i lønnet eller ulønnet arbeid, hvordan vil du beskrive ditt arbeid? *(Sett bare ett kryss)*

For det meste stillesittende arbeid? *(f.eks. skrivebordsarbeid, montering)* ☐ 1
Arbeid som krever at du går mye? *(f.eks. ekspeditørarb., lett industriarb., undervisning)* ☐ 2
Arbeid hvor du går og løfter mye? *(f.eks. postbud, pleier, bygningsarbeider)* ☐ 3
Tungt kroppsarbeid? *(f.eks. skogsarb., tungt jordbruksarb., tungt bygn.arb.)* ☐ 4

2.2 Kan du selv bestemme hvordan arbeidet ditt (lønnet eller ulønnet) skal legges opp? *(Sett bare ett kryss)*

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

2.3 Har du skiftarbeid, nattarbeid eller går vakter? JA ☐ NEI ☐

T3. TOBAKK

3.1 Røyker du?

Ja, daglig ☐ 1 | Ja, av og til ☐ 2 | Nei, aldri ☐ 3

Hvis "Ja, av og til",
Hva røyker du?

☐ Sigaretter ☐ Pipe ☐ Sigar/sigarillos

3.2 Har du brukt, eller bruker du snus daglig?

Ja, nå ☐ | Ja, tidligere ☐ | Aldri ☐

Hvis JA:
Hvor mange år har du til sammen brukt snus? ☐☐ år

T4. ALKOHOL

	JA	NEI
4.1 Er du totalavholdsmann/-kvinne?	☐	☐

4.2 Hvor mange ganger i måneden drikker du vanligvis alkohol? ☐☐ *Antall ganger*
(Regn ikke med lettøl.
Sett 0 hvis mindre enn 1 gang i måneden)

4.3 Hvor mange glass øl, vin eller brennevin drikker du vanligvis i løpet av 2 uker?

(Regn ikke med lettøl.
Sett 0 hvis du ikke drikker alkohol)

Øl	Vin	Brennevin
☐☐	☐☐	☐☐

4.4 I omtrent hvor mange år har ditt alkoholforbruk vært slik du har svart i spørsmålene over? ☐☐ år

4.5 Har du i en eller flere perioder de siste 5 årene drukket så mye alkohol at det har hemmet deg i yrkeslivet eller sosialt?

Ja, i yrkeslivet ☐ 1 | Ja, sosialt ☐ 2 | Ja, både i yrkeslivet og sosialt ☐ 3 | Nei, aldri ☐ 4

T5. MAT OG KOSTTILSKUDD

	JA	NEI
5.1 Spiser du vanligvis frokost hver dag?	☐	☐

5.2 Hvor mange ganger i uken spiser du varm middag? ☐ *ganger*

5.3 Hvor stor vekt legger du på å ha et sunt kosthold?

Stor ☐ 1 | Middels ☐ 2 | Liten ☐ 3 | Ingen ☐ 4

5.4 Bruker du følgende kosttilskudd?

	Ja, daglig	Iblant	Nei
Jerntabletter	☐	☐	☐
Kalk eller benmel	☐	☐	☐
Vitamin D	☐	☐	☐
Tran	☐	☐	☐

T6. VEKTEN

6.1 Gjør du for tiden noe forsøk på å endre kroppsvekten din?

Nei ☐ 1 | Ja, jeg forsøker å legge på meg ☐ 2 | Ja, jeg forsøker å slanke meg ☐ 3

6.2 Hvilken vekt vil du være tilfreds med (din "trivselsvekt")? ☐☐☐ kg

T7. SYKDOMMER OG SKADER

7.1 Har du noen gang hatt:
Sett ett kryss for hvert spørsmål. Oppgi også alderen ved hendelsen. Hvis det har skjedd flere ganger, hvor gammel var du siste gang?

	JA	NEI	Alder siste gang
Alvorlig skade som førte til sykehusinnleggelse	☐	☐	☐☐ år
Ankelbrudd	☐	☐	☐☐ år
Magesår	☐	☐	☐☐ år
Magesår-operasjon	☐	☐	☐☐ år
Operasjon på halsen	☐	☐	☐☐ år
Prostata-operasjon	☐	☐	☐☐ år

7.2 Har du, eller har du hatt?
(Sett ett kryss for hvert spørsmål)

	JA	NEI
Kreftsykdom	☐	☐
Psoriasis	☐	☐
Stoffskiftesykdom (skjoldbruskkjertel)	☐	☐
Grønn stær	☐	☐
Grå stær	☐	☐
Slitasjegikt (artrose)	☐	☐
Krokete fingre	☐	☐
Hudstramninger i håndflatene	☐	☐
Nyrestein	☐	☐
Blindtarmsoperasjon	☐	☐
Brokkoperasjon	☐	☐
Operasjon/behandling for urinlekkasje	☐	☐
Epilepsi	☐	☐
Poliomyelitt ("Polio")	☐	☐
Parkinsons sykdom	☐	☐
Migrene	☐	☐
Leggsår	☐	☐
Allergi og overfølsomhet:	JA	NEI
Atopisk eksem (f.eks. barneeksem)	☐	☐
Håndeksem	☐	☐
Matvareallergi	☐	☐
Annen overfølsomhet (ikke allergi)	☐	☐

	JA	NEI
7.3 Har du hatt forkjølelse, influensa, "ræksjuka" eller lignende siste 14 dager?	☐	☐
7.4 Har du i løpet av de siste 3 ukene vært forkjølet, hatt influensa, bronkitt, lungebetennelse, bihulebetennelse eller annen luftveisinfeksjon?	☐	☐
7.5 Har du noen gang hatt bronkitt eller lungebetennelse?	☐	☐

7.6 Har du i løpet av de siste 2 årene hatt bronkitt eller lungebetennelse? *(Sett bare ett kryss)*

Nei ☐ 1 | 1-2 ganger ☐ 2 | Mer enn 2 ganger ☐ 3

T8. SYMPTOMER

8.1 Har du de siste to ukene følt deg:
(Sett ett kryss for hvert spørsmål)

	Nei	Litt	En god del	Svært mye
Nervøs og urolig	☐	☐	☐	☐
Plaget av angst	☐	☐	☐	☐
Trygg og rolig	☐	☐	☐	☐
Irritabel	☐	☐	☐	☐
Glad og optimistisk	☐	☐	☐	☐
Nedfor/deprimert	☐	☐	☐	☐
Ensom	☐	☐	☐	☐
	1	2	3	4

	JA	NEI
8.2 Hoster du omtrent daglig i perioder av året?	☐	☐
Hvis JA: **Er hosten vanligvis ledsaget av oppspytt?**	☐	☐
Har du hatt slik hoste så lenge som i en 3 måneders periode i begge de to siste år?	☐	☐
8.3 Har du hatt episoder med piping i brystet?	☐	☐

Hvis JA:
Har dette oppstått: *(Sett ett kryss for hvert spørsmål)*

	JA	NEI
Om natten	☐	☐
Ved luftveisinfeksjon	☐	☐
Ved fysisk anstrengelse	☐	☐
Ved sterk kulde	☐	☐

	JA	NEI
8.4 Får du smerter i tykkleggen når du går	☐	☐

Hvis JA:
Hvor langt kan du gå før du får smerter? ☐☐☐ *meter*

8.5 Blir du tungpusten i følgende situasjoner?
(Sett ett kryss for hvert spørsmål)

	JA	NEI
Når du går hurtig på flatmark eller svak oppoverbakke	☐	☐
Når du spaserer i rolig tempo på flatmark	☐	☐
Når du vasker deg eller kler på deg	☐	☐
Når du er i hvile	☐	☐

	JA	NEI
8.6 Må du stoppe på grunn av tung pust når du går i eget tempo på flatmark?	☐	☐
8.7 Har du i løpet av det siste året vært plaget med smerter og/eller stivhet i muskler og ledd som har vart i minst 3 måneder sammenhengende?	☐	☐
Hvis JA: **Har plagene ført til redusert aktivitet i fritida?**	☐	☐

Hvor lenge har plagene vart totalt?

ca. ☐☐ *år og* ☐☐ *måneder*

Har plagene redusert din arbeidsevne det siste året?
(Gjelder også hjemmearbeidende og pensjonister. (Sett ett kryss)

Nei/ubetydelig ☐ 1 | I noen grad ☐ 2 | I betydelig grad ☐ 3 | Vet ikke ☐ 4

	JA	NEI	Ikke i arbeid
Har du vært sykmeldt pga. disse plagene det siste året?	☐	☐	☐

T8. SYMPTOMER (fortsettelse)

8.8 Hvor ofte er du plaget av søvnløshet?
(Sett bare ett kryss)

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

8.9 Hvis du er plaget av søvnløshet månedlig eller hyppigere, når på året er du mest plaget?

Ingen spesiell tid ☐ 1
Særlig i mørketiden ☐ 2
Særlig i midnattsoltiden ☐ 3
Særlig vår og høst ☐ 4

	JA	NEI
8.10 Har du det siste året vært plaget av søvnløshet slik at det har gått ut over arbeidsevnen?	☐	☐
8.11 Pleier du sove om dagen?	☐	☐

8.12 Hvor ofte har du ufrivillig urinlekkasje?

Aldri ☐ 1
Ikke mer enn en gang i måneden ☐ 2
To eller flere ganger i måneden ☐ 3
Ukentlig eller oftere ☐ 4

	JA	NEI
8.13 Kan du gå ned 10 trappetrinn uten å holde deg i noe (f.eks. et gelender)	☐	☐
8.14 Bruker du briller?	☐	☐
8.15 Bruker du høreapparat?	☐	☐

8.16 Hvordan er hukommelsen?
(Sett ett kryss for hvert spørsmål)

	JA	NEI
Glemmer du ting du akkurat har hørt eller lest?	☐	☐
Glemmer du hvor du har lagt ting?	☐	☐
Er det vanskeligere å huske nå enn før?	☐	☐
Skriver du huskelapper oftere nå enn før?	☐	☐
Hvis "JA" på ett av disse spørsmålene; **Er det et problem i hverdagen?**	☐	☐

T9. MEDISINER

9.1 Bruker du, eller har du brukt noen av følgende medisiner:

	Nå	Før, men ikke nå	Alder ved bruk 1. gang	Aldri brukt
Medisin mot osteoporose (benskjørhet)	☐	☐	☐☐ år	☐
Tabletter mot sukkersyke	☐	☐	☐☐ år	☐
Tabletter mot lavt stoffskifte (thyroxin)	☐	☐	☐☐ år	☐

	JA	NEI
9.2 Bruker du noen medisin som du får som sprøyte (injeksjon)?	☐	☐

Hvis JA:
Oppgi navn på medisinen (til sprøyte):
(ett navn pr. linje):

_____

_____

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