

Physicians in illness and health

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**An epidemiological study on health- and illness behaviour
among 19th and 20th century Norwegian physicians**

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(Kolofonside)

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Abstract

Background

The theme of this thesis is the health and illness of physicians past and present, and especially how physicians behave when they become ill. The origin of the study was the assumption that working as a physician can imply health risks, and that physicians who become ill might not cope with their illness in a rational way.

There are few studies on health and illness of 19th century physicians, except for studies on causes of death. Throughout the 20th century until today, there has been an increasing interest in physicians' health, and in their health- and illness behaviour. Physicians seem to have problems in accepting and handling their own illness. They have fewer sick leaves than other people, indicating that they tend to work whilst ill. They also have easy access to drugs, which may lead them to practise self-treatment instead of seeking help.

Information on physicians' health- and illness behaviour is to a large extent based on studies of selected groups of physicians. In 1992, The Norwegian Medical Association initiated a research programme to study the Norwegian physicians' health, illness, and working- and living conditions. The programme comprised a range of studies. Due to the long tradition of publishing biographical data of all Norwegian physicians, it was possible also to include a study on the health risks faced by physicians in the second half of the 19th century. At the core of the research programme, however, was a comprehensive survey of a nation-wide representative sample of Norwegian physicians – The Norwegian Medical Association's Survey (the NMA-survey, "Legekårsundersøkelsen").

Research questions

The research questions were as follows: What kind of diseases did the physicians and their families contract in the second half of the 19th century, and were the diseases caused by the physicians' work? How do the physicians in the 20th century behave when they become ill, and do they follow the recommendations in order to detect own diseases at an early stage?

Materials

The study has a cross-sectional design. It is based on two samples of physicians along with two comparison groups from the Norwegian general population.

Diseases among 19th century physicians were studied in a sample of 398 male Norwegian physicians, born between 1835 and 1854, and their families. Data were collected from the biographic work "Norges Læger i det nittende Aarhundrede (1800-1886)" ("Norwegian Physicians in the 19th century (1800-1886)") by F. C. Kiær, published in 1888 and 1890.

Data on 20th century physicians were collected in 1993, as a part of the NMA-survey. A total of 16 different questionnaires were sent to a nation-wide representative sample of 9266

physicians, aged 24-70, of which 72% responded. The analyses in the present study are based on data from two questionnaires, which were sent to two groups of 1476 physicians. The response rates were 70% (1031) and 73% (1077), and the percentages of females 28% and 31%, respectively.

The 20th century physicians were compared with two groups from the Norwegian general population derived from two large, representative health surveys. In all, 738 women from The Norwegian Women and Cancer Study (NOWAC) and 2022 women and men from The Nord-Trøndelag Health Survey (NTHS) were included. Only persons in the same age and educational group, i.e. with higher university education, were selected. Physicians were excluded from the comparison groups.

Methods

The biographies in "Norges læger" included both demographic data and information about diseases experienced by the physicians and their family members. The information was collected by the editor, Dr. Kiær, by means of a request in a medical journal. In the present study, the data were analysed by means of descriptive methods, with focus on diagnoses, sources of infections, and causes of death.

The NMA-survey collected data by means of overlapping questionnaires. Each physician received one primary questionnaire (A), which collected background information, and three randomly selected secondary ones out of 15 different questionnaires (labelled B to Q, minus O), which collected information on different aspects of the physicians' health and working conditions.

The present study is based on data collected in Questionnaires E and P, in addition to A. Questionnaire E explored quality of life and living conditions, including a question on use of minor tranquilizers (hypnotics and anxiolytics) to be used in our study. Questionnaire P explored the health- and illness behaviour of the physicians by questions on participation in health controls and use of specific health services during the last three years, present use and self-medication of a number of drugs, and experiences with self-treatment, along with questions on illness behaviour attitudes. The questionnaires were tested in a pilot study, and the collection of data was conducted by means of an anonymous postal survey in spring 1993. The data were analysed by using bivariate and multivariate techniques.

The data in NOWAC were collected by means of a postal survey in 1992, whilst the NTHS-data were collected as a part of a health screening survey in 1984-86.

Results

In all, 278 cases of disease were registered among the 19th century physicians. Forty-seven physicians were dead by the year 1890. Infections accounted for 85% of the diseases and 59% of the deaths. The physicians also reported 41 accidents that had occurred on their journeys

to visit the patients. Forty-two wives and 214 children died before 1890. Thirteen wives died of diseases in connection with childbirth, whilst air-borne infections were a common cause of death among the children. More than half of the diseases reported by the physicians were attributed to infections or traumas associated with the physicians' work. Also some of the wives' and children's diseases were attributed to the physicians' work.

Self-treatment was common among the 20th century physicians, as 75% reported to have treated themselves during the last three years. Young physicians and clinicians outside hospital were most likely to do this. Thirteen percent of the physicians had negative experiences with self-treatment. Treatment from other physicians was often obtained by consulting a colleague at work, a friend, or by referring oneself to a hospital. Females were more likely than males to consult other physicians.

During one year, 80% of the physicians had worked whilst having a disease for which they would have sick-listed their patients. More than half of the physicians in the study had worked whilst having an infectious disease – most often influenza or respiratory tract infections.

Clinicians outside hospital were more likely than other physicians to use drugs, especially antacids. Seventy-three percent of the physicians who used prescription medicine, were self-prescribing it. In all, 13% of the males and 11% of the females had used minor tranquilizers during the previous month, 31% of these on a daily or weekly basis. High age, high mental distress, and working outside hospital were identified as risk factors for use of minor tranquilizers. When compared with the general population, more male physicians than other males used minor tranquilizers, also when controlled for subjective well-being.

Thirty-seven percent had been to a health control during the last three years. Females, old physicians, and hospital physicians were most likely to have had a health control. Only 31% of the female physicians performed breast self-examination (BSE) at least once a month, and 55% had a Pap smear test at least once every third year. Physicians were more likely than other university-educated women to practise BSE monthly or more often, and less likely than other women to have Pap smear tests every third year at least. BSE was never practised among 19% of the female physicians, and 16% stated that they never had Pap smear tests. The reasons given for this behaviour were that they forgot to do it, or that they were in a low risk group or without symptoms. In addition, some claimed to have problems in finding a physician to visit for Pap smear tests or problems in finding time for it. Lack of time, forgetfulness, and low risk were also listed as the main reasons for not attending other forms of screenings among both male and female physicians.

More than half of the physicians stated that they would prefer to consult a physician to whom they had no personal ties, if they needed a somatic examination. More females than males would prefer a physician of same gender. Half of the physicians would seek help for mental problems elsewhere than in the mental health care located where they lived.

Conclusion

Both the 19th and the 20th century physicians reported in various ways that their profession could have a bad influence on their health. In the 19th century, both the physician and his family were at risk of contracting diseases which could be attributed to the physician's work. These were mainly epidemic diseases, but the physicians were also at risk of contracting diseases during operations and on journeys to visit the patients.

In the 20th century, a major health hazard of the profession seems to be the way the physicians manage their own health and illness. This study of a large, representative sample of Norwegian physicians show that most physicians practise self-treatment when they are ill, and that they tend to self-prescribe drugs, including minor tranquilizers. This self-treatment might lead to delayed diagnosis and worsening of their illness, as experienced by some of the physicians in the study. Easy access to drugs can partly explain why more male physicians than males in the general population use minor tranquilizers.

A large number of the physicians are working whilst having infections or other diseases. This can be due to problems in getting locums, but it may also reflect a problem in accepting their own illness. The behaviour of working whilst ill can be harmful not only to the physicians themselves, but also to their patients and staff members.

Many Norwegian female physicians do not follow the recommendations of BSE and Pap smear testing. Compared to other women with university education, female physicians comply more with BSE and less with Pap smear test recommendations. The reasons given for not complying include factors that can be related to a heavy workload, such as forgetfulness and problems in finding time for it. However, physicians also claim that they have a problem in finding a physician to visit for Pap smear testing, and that they drop examinations because they regard themselves to be in a low risk group. This indicates neglect of own health care.

Although physicians state that they prefer to be treated by a physician whom they do not have personal ties to, many contact friends and colleagues when they are in need of medical help. Treatment by a friend or colleague might result in a problematic physician-patient relationship; The physician who is ill might be afraid of showing his weakness to the other physician, and the treating physician might find it difficult to perform all the necessary examinations.

The study shows that there is a need for physicians to focus on their own health- and illness behaviour, and that efforts should be made to lower the threshold for physicians to seek help in the health care system.

List of papers

1. E. O. Rosvold. A day in the life of a country doctor – Occupational hazards in general practice in the Nineteenth century. In Ø. Larsen, editor, *The shaping of a profession. Physicians in Norway, past and present*. Science History Publications, USA, pages 189-202, 1996.
2. E. O. Rosvold and E. Bjertness. Illness behaviour among Norwegian physicians. *Scandinavian Journal of Public Health*. In press.
3. E. O. Rosvold and E. Bjertness. Physicians who do not take sick leave: hazardous heroes? *Scandinavian Journal of Public Health*, **29**:71-75, 2001.
4. E. O. Rosvold, A. Hjartåker, E. Bjertness, and E. Lund. Breast self-examination and cervical cancer testing among Norwegian female physicians. A nation-wide comparative study. *Social Science & Medicine*, **52**:249-258, 2001.
5. E. O. Rosvold, P. Vaglum, and T. Moum. Use of minor tranquilizers among Norwegian physicians. A nation-wide comparative study. *Social Science & Medicine*, **46**:581-590, 1998.

Definitions and abbreviations

Definitions

Health behaviour is in this thesis defined according to Kasl and Cobb as "any activity undertaken by a person believing himself to be healthy, for the purpose of preventing disease or detecting it in an asymptomatic stage" [1].

Illness behaviour is defined according to Mechanic [2] as "the ways persons respond to bodily indications and the conditions under which they come to view them as abnormal. Illness behaviour thus involves the manner in which persons monitor their bodies, define and interpret their symptoms, take remedial action, and utilise various sources of help as well as the more formal health care system. It is also concerned with how people monitor and respond to symptoms and symptom change over the course of an illness, and how this affects behaviour, remedial actions taken, and response to treatment". It should be noticed that this definition is broader than the illness behaviour definition of Kasl and Cobb, who distinguishes between "illness behaviour" (activities undertaken by a person who feel ill to define the state of his health and discover a suitable remedy) and "sick role behaviour" (activities undertaken by those who consider themselves ill for the purpose of getting well) [1].

Illness and disease. According to Kleinman *et al.* the concept "illness" refers to "experiences of disvalued changes in states of being and in social function", while "disease" can be defined as "abnormalities in the structure and function of body organs and systems" [3]. In a simple way it can be said that patients suffer illnesses, whereas physicians treat diseases. These concepts do not have correlates in Norwegian. In the questionnaires used in this study, the word "sykdom" is used. The translation into "illness" or "disease" will depend upon the context where the word is used. Since the patients in this thesis also are physicians, it is in some cases, however, difficult to distinguish between their own experience of illness and physicians' definitions of disease.

Abbreviations

BSE	: breast self-examination
GHQ	: The General Health Questionnaire
GP	: general practitioner
JSS	: The Job Satisfaction Scale
NMA	: The Norwegian Medical Association
NMA-survey	: The Norwegian Medical Association's Survey
NOWAC	: The Norwegian Women and Cancer Study
NTHS	: The Nord-Trøndelag Health Survey
UHI	: The Ursin Health Inventory

1 Introduction

1.1 A physician and his illness

"I'm afraid of being examined by my fellow physicians. Unexpectedly, they may find a prolonged expirium or a dull... I think it's my throat and not my lungs which is the cause for it" [4].

The above quotation is from a letter the writer and physician Anton P. Chekhov (1860-1904) wrote to his publisher in 1886. He had just had his second experience with haemoptysis – a symptom of the tuberculosis he died of almost twenty years later [4]. In the years to come, Chekhov continued to neglect his symptoms and avoided seeking help from other physicians. This is documented in his letters, and also by his friends and family [4, 5]. Chekhov's letters show that he experienced many of the problems a physician can have when he becomes ill. He practised self-treatment instead of seeking help, and he was afraid of entering the patient role:

"Medical treatment and concern over my physical existence fill me with something akin to revulsion. I shan't look for medical treatment. I'll take the waters and quinine, but I shan't let them sound my chest" [5].

He was afraid of a serious diagnosis, and denied that he had symptoms of tuberculosis:

"Neither tuberculosis nor any other serious lung disease is to be diagnosed solely on the basis of haemoptyses, but solely on the basis of a combination of symptoms I do not have" [4].

He was not examined by a physician until he had a serious haemoptysis in a restaurant and was admitted to hospital in 1897 [4–6]. He then accepted the diagnosis, but continued to minimise his symptoms and tried to hide his illness for his family. According to his wife, Chekhov himself asked for a physician for the first time in his life only a few hours before he died. When the physician came, Chekhov refused to have oxygen, and the only medicine given was a glass of champagne.

1.2 The medical profession past and present

The present study is directed towards the health and illness of physicians past and present. The origin of the study was the assumption that working as a physician can imply health risks, and that physicians who become ill might not cope with their illness in a rational way.

Two samples of Norwegian physicians were chosen in order to study these issues: The first comprised of physicians who practised in the second half of the 19th century, at a time when the health care system of Norway was under development towards the system we have today [7]. The number of practising physicians in Norway in the 19th century is somewhat uncertain, but according to Kobro the number of physicians was 315 in 1854 and 910 in 1894 [8]. Most of them worked as general practitioners, either as district physicians appointed by the government,

or as private physicians [9]. The district physician system was established in 1836 [8]. In addition to working as clinicians, the district physicians were appointed to work with public health [10]. As the number of hospitals increased towards the end of the century, a number of physicians were also employed full-time or part-time in hospitals [7]. Other positions held were as military physicians, publicly appointed physicians for the poor, physicians for railway workers etc. [9]. These positions were often held in addition to work as a private practising physician. The physicians were mostly men, as the first female physician graduated in 1893.

There are no surveys on physicians' working conditions in the 19th century. However, the district physicians were to submit an annual report on the health conditions in their district (in Norwegian: "Medicinalberetning"). These reports give insights into the various aspects of the physicians' work, including their struggle with epidemic diseases and their efforts to improve the hygienic conditions in their districts [11–13]. The districts were often large, which resulted in long journeys to visit the patients. One example is the district of Sandnes, which in 1866 included 1956 square kilometres and 12996 inhabitants [14]. It was initially served by one district physician, and some years later by an additional private practising physician.

The second sample of Norwegian physicians included in this study, practised in the second half of the 20th century. During the years 1960–2000, the number of physicians increased from 3844 to 15180 [15]. The percentage of female physicians increased from 12% in 1970 to 31% in 2000. Whilst the physicians 100 years earlier mostly worked in general practice, more than half of the 20th century physicians worked in hospitals [16]. Approximately 25% were general practitioners, and the rest worked in positions such as private specialist practice, occupational health, research, and administration. In 1984 the district physician system was replaced by a system where the municipalities got the responsibility for the primary health care services [17]. Some general practitioners were then employed by the municipality and had a fixed salary, while others worked in a fee-for-service practice partly reimbursed by the national insurance system. This was the situation when this study was conducted. The introduction of a regular general practitioner scheme in 2001 implies that most general practitioners now work in a fee-for-service practice with a subsidy dependent on the number of patients on their list [18]. Hospital physicians still have a fixed salary.

From the beginning of the 1980's there was a growing concern about the Norwegian physicians' health and working conditions [19–25]. As a result of this concern, The Norwegian Medical Association (NMA) initiated a pilot project in two counties in 1990/91 where physicians could consult physicians who were specially trained to treat physicians – a "physician for physicians"-service [26,27]. In addition, NMA initiated in 1992 an extensive survey to examine the health, working- and living conditions of Norwegian physicians (the NMA-survey) [28].

Studies in the NMA-survey focusing on working conditions show that Norwegian physicians' workload exceeds that of the average occupationally active population by 40%, and that 20% of physicians report to be highly stressed in their work [29, 30]. Physicians also experience less control over their own work than other employees and professionals in Norway [31].

Hospital physicians report less autonomy than other physicians do, and females report having less autonomy than males. Less than 50% of Norwegian physicians report that they are able to take time off on a short notice, and only 26% have good possibilities to organise their own working plan. Physicians working in occupational health services or in research seem to have less workload and higher job autonomy than other physicians [31, 32].

2 Background

2.1 Early studies on physicians' health and illness

Before describing the current knowledge on physicians' health- and illness behaviour, it is pertinent to briefly sum up the main findings on the health problems faced by physicians.

In his classic work from 1700 on diseases of workers, Bernardino Ramazzini (1633-1714) claimed that physicians were attacked by fewer diseases than other people, and that they often went free during serious epidemics [33]. He ascribed this to "their taking a good deal of exercise and to their cheerful frame of mind when they go home with their pockets full of fees". Still, he meant they had a risk of hernia after climbing many stairs, and a risk of dysentery because of sitting too long at the bedside when handling dysentery patients.

At the time of the debut of Chekhov's illness a Norwegian physician became interested in the subject of diseases among physicians. Frantz Casper Kiær (1835-1893) was the editor of the first two editions of the biographic work "Norges Læger" ("Norwegian Physicians") [34–36]. When he collected the demographic data for the second edition in 1886, he also included questions on the physicians' health and illness [37]. Unfortunately, he died before he had the possibility to analyse the data. Some of his data were included in a study on the causes of death among Norwegian physicians born 1791-1860 [38]. It was found that infectious diseases were the most important cause of death among physicians born 1791-1820, while cancer and circulatory diseases dominated in the later groups. Infectious diseases and circulatory diseases were also the major causes of death in a material of 92 Swedish physicians who died between 1840 and 1879 [39]. A study of 3865 British physicians who died within the ten years 1873–1882, showed that they had a higher overall mortality than men in the general population, and that physicians had an especially high mortality of circulatory diseases, liver diseases, and infectious diseases [40]. In contrast to the observations of Ramazzini [33], it was found that physicians had a much smaller mortality rate of hernia than the general population.

Except for these studies, there seems to be little knowledge about the health and illness of physicians who lived before the 20th century. However, some reports on physicians' illness experiences are found in diaries and autobiographies. One early example is Dr. Otto Sperling's (1602-1681) description of his experience with exanthemic typhus in 1637 [41]. Sperling was born in Germany, but practised as a physician in Norway and Denmark. Another example is the Danish physician Thomas Christopher Mangor (1775-1800) who often commented on his own health in his diary when he was ship's surgeon on a voyage to the West Indies [42].

A collection of case histories was published in 1929 in the book "Ärzte als Patienten" by the German physician Grotjahn [43]. The book included reports on physicians' illness experiences from the 16th century until the 20th. In addition to collect case histories from autobiographies and medical journals, Grotjahn invited 200 physicians to write down their illness experiences. Not all responded, but 37 such reports are presented in the book. Grotjahn's intention was not so much to learn about physicians' response to illness, as to use their experiences to learn

more about patients' psychological reactions to illness. Thus, he used the physician patients as "qualified" patients whose description he expected to be more accurate. However, Grotjahn also meant that only a physician who had been ill himself would be able to fully understand the patients' illness experience. The intention of using physicians as qualified patients seems also to have formed the basis for an American book in 1952 [44], and a British book in 1971 [45].

2.2 Health and illness of physicians of today

During the 20th century until today there has been a growing interest in physicians' health and illness, although a large amount of the research has focused on mental problems [46–48]. Many studies have been based on patient populations of physicians [49–52], or on special groups of physicians such as general practitioners [53, 54]. Physicians seem to have a higher prevalence of depression and to report more mental problems than other people do [54–57], although general practitioners are also found to report lower mental problems than comparable groups [58]. Some studies have found that physicians are especially vulnerable to impairment due to drug or alcohol abuse [46, 47, 49, 51]. However, Brewster found in a review in 1986 that the studies on the subject were inadequate, and thus one could not conclude that the prevalence of drug and alcohol problems were higher among physicians than in the general population [59]. In a review some years later, Flaherty and Richman found no evidence for a marked increase in drug addiction as compared to the general population [60]. Physicians are, however, found to have higher suicide rates than the general population [61–63]. Norwegian physicians have a higher suicide rate than other Norwegians, and they twice as often than others use poisoning as the suicide method [64].

Physicians seems to be vulnerable for mental illness especially in the first years after graduation [55, 65]. Although many have pointed out that medical students and physicians might be a selected group of individuals with a family history, life experiences, and personality traits than can make them vulnerable for mental illnesses [46, 66–68], there is growing evidence that stressors associated with being a physician interact with the individual factors in the development of mental illness [53, 65, 69–71]. The occupational stressors includes exhaustion, work overload, time pressure, low autonomy, sleep deprivation, night calls, bad management, dealing with patients' suffering, and lack of social support.

The somatic health of physicians has been studied to a lesser degree than mental health problems [47, 48]. In a study of UK physicians, 34% reported a chronic disease or a disease resulting in one week of sick leave during a period of three years [72], whilst 78% among Swiss physicians report at least one illness during one year [73]. Young UK physicians are found to report an average of 13.8 episodes of minor illnesses during one year, primarily respiratory infections [74]. The self-perceived health status of Norwegian physicians are found to be as good or better than that of the general population [75]. However, 48% female and 36% male Norwegian physicians report having had illnesses leading to at least two weeks of sick leave

since the age of 18, and more females than males report health complaints, such as muscular pain and headache [76, 77]. In a study of Israeli general practitioners, 30% reported a chronic disease [78]. Finnish physicians are found to report many common diseases, such as back complaints, chronic excema, and mental disorders, more often than other employees [57]. Among US physicians, 22% had experienced back pain during the last six months [79], and 20% of Swedish physicians reported that they frequently experienced back pain [80]. Studies focusing on occupational health risks have found a high incidence of needle accidents among physicians, although the infection rate is low [81–84].

Studies from the Nordic countries show that the cancer incidence is lower among male physicians than among males in the general population [85]. Male physicians have an especially low risk of cancers of the lung, the lip, and the gallbladder. However, they show an increased risk of colon, skin, bladder, and brain cancers. Female physicians, on the other hand, have a higher cancer incidence than other women. This is mainly due to an excess risk of breast cancer in addition to cancers of the skin and the corpus uteri. However, the female physicians have a low risk of cervical cancer. The low cancer incidence among male physicians has been attributed to a healthy lifestyle and a low proportion of smokers [86]. The high incidence of breast cancer among female physician has been attributed to a high age at first child birth, while the excess of skin cancers may indicate high sunlight exposure in both genders [85].

Although early studies showed that physicians had high mortality rates [40, 87], the physicians' overall mortality rate declined during the 20th century and are now found to be lower than that of the general population [47, 61, 88–90]. In the first half of the century, death from heart disease was more common among doctors than among control populations [47]. This changed during the second half of the century [47, 88, 90, 91]. Physicians also have a low mortality rate of cancer, especially lung cancer [88–91]. However, female physicians are found to have the same mortality rate of breast cancer as the general population [90], and as mentioned above, both male and female physicians are found to have a higher rate of suicide [47, 61, 64, 90, 91].

2.3 Studies on physicians' health- and illness behaviour

The descriptions of physicians' health- and illness behaviour have often been based on case histories, personal experiences, or observations [92–101]. They reveal a pattern of self-treatment, self-prescription of drugs, and problems with seeking and receiving help from others. Physicians seem to find it difficult to enter the patient role. They might be afraid of showing their weakness to colleagues, thinking that their own illness is a sign of not managing the job as a physician. When seeking help, they might find it difficult to let the other physician in charge of the treatment. Although most physicians are dealing with patients' health and illness on a daily basis, they can be upset by the annoyances of being a patient, such as delay in obtaining appointments and unpleasantness with medical tests, when facing it themselves [102]. These features of physicians' behaviour is also pointed out in qualitative studies [103–107]. Based

on analyses of autobiographic case histories of 13 physicians, Hahn found that the physicians initially tended to see the damage as someone else's, that they minimised and intellectualised the symptoms, and that they strenuously avoided passivity and lack of control [107].

When the present study was planned in 1991/92 there were only a few quantitative surveys on health- and illness behaviour based on large and representative samples of physicians. They were covering different parts of the issues of this survey, such as self-treatment and health controls [72, 108, 109], help-seeking [72], use of minor tranquilizers [80, 110], and working whilst ill [80]. Some studies had been performed on selected groups, such as general practitioners [111, 112] and/or small groups below 300 persons [79, 113–115].

During the 1990's, an increasing number of studies on physicians' health- and illness behaviour was published. The following sections will include articles on physician health- and illness behaviour published until December 2001.

2.3.1 Health behaviour

Physicians are found to have a lower number of smokers than the general population [116–118]. Repeated studies of Norwegian physicians in the period 1952-93 showed that they changed their smoking habits to a greater degree than did the general population [118, 119]. The dietary habits among Norwegian physicians seem not to be different from the habits of the general population [120]. Male Norwegian physicians are found to use alcohol as often as men of same socio-economic group, while female physicians aged 45 or above are found to have a slightly more frequent alcohol use than comparable women [121]. The frequency of hazardous drinking is found to be lower among young physicians than among comparable groups. However, Norwegian medical students do not differ from other students in hazardous drinking [122]. A study from the US show that the number of heavy drinkers tend to increase with age among physicians, whilst it is declining in the general population [123].

Studies of the physicians' use of health controls have focused on the frequency of different tests, such as blood pressure checks, urine checks, chest x-rays, ECG, blood tests such as PSA (prostate specific antigen) and serum cholesterol, general physical examinations, and vaccinations [72, 113, 115, 117, 124–129].

Although some studies find yearly physical examination rates up to 86% among physicians [117], other studies find that physicians are less likely than others to visit a physician for a health control [114, 125]. Physicians without a regular physician are especially likely to drop out of screenings [127]. Physicians are also found to self-initiate different tests and to follow up the results themselves [124]. However, it seems that they are equal or more likely than other people to perform procedures that are considered to constitute essential health maintenance care, such as testicular self-examination and tetanus vaccination [114, 125, 130].

Although the physicians might be better than the general population to maintain some essential health care, they do not always comply with the recommendations regarding frequency of tests. Chambers *et al.* found that only 16% of general practitioners in UK practised breast

self-examination (BSE) or testicular self-examination [130], whilst Frank found that 21% of female US physicians practised BSE at least monthly [131]. Among German physicians, however, 86% report to practise BSE regularly [109]. The proportion of female physicians who have a Pap smear test every third year varies from 50 to 73% [129, 132], although up to 89% report a Pap smear during the last three years [126].

2.3.2 Illness behaviour

Physicians tend to treat themselves, and when they seek help they often engages in informal consultations with colleagues or friends [72, 74, 78, 104, 133]. Thus, they report a lower amount of physician consultations than lay people do [57, 126, 133].

The number of physicians who is registered with a regular physician – usually a general practitioner – varies according to group of physicians and country they come from. In the US, 35% to 66% report not having a primary care physician [126–128], and university employed physicians are found to be less likely than other university employees to have a personal physician [114]. In the UK, where all population are supposed have a personal physician, up to 99% are registered [72, 112, 124, 133, 134]. However, many of the physicians are registered with a personal friend or a practice partner [72, 124, 135], which might influence the physician-patient relationship. Even if the physicians are registered, they seem to be reluctant to consult their general practitioner [134].

Although drug use and the risk of abuse have been a major topic in the study of the health and illness of physicians, there are not so many studies that compare the drug use of physicians with that of the general population. When following a group of male physicians and matched controls for 20 years, Vaillant *et al.* found a higher proportion of hypnotics users in the physician group [136]. A higher use of minor tranquilizers (hypnotics and anxiolytics) among physicians as compared to the general population is also found in other studies [110, 137–139]. On the other hand, Chambers and Belcher found no significant difference in use of minor tranquilizers between general practitioners and teachers [58].

The higher percentage of drug users among physicians has been attributed to the fact that self-treatment with drugs is wide-spread. Up to 80% of physicians report to have self-prescribed drugs of different types – from antibiotics to tranquilizers [58, 112, 134]. Antibiotics, anti-inflammatories, asthma and allergy medications, and contraceptives are often self-prescribed [129, 140]. Self-treatment can lead to delayed diagnosis and treatment. In the material of Allibone [72], 42% of those who had had serious diseases during the last three years reported to have practised self-treatment, and 46% had delayed seeking help.

Physicians have less sick leaves than other employees, such as other hospital staff members, teachers, and graduate employees [57, 58, 141, 142]. However, physicians are found to be more likely than others to have long spells of sick leave [141, 142]. A large number of physicians also report to have been working whilst ill [74, 142, 143]. McKevitt *et al.* found that physicians related their problems in taking sick leave to their feeling of responsibility towards their patients

and colleagues and to their work ethics, as well as to the organisation of the work, such as difficulty in getting a locum [142]. Some studies have asked about illness behaviour, including working whilst ill, in relation to specific or hypothetical diseases, but not registered the actual diseases physicians bring to work [74, 134, 142].

In sum, the literature on physicians' health- and illness behaviour reveals that physicians do not always use their medical expertise when ill themselves. Still, the knowledge about the physicians' behaviour is to a large extent based on small and/or selected groups of physicians. Although some large surveys have been published during the 1990's, they do not cover all the same issues as the NMA-survey [57, 131, 134, 142].

3 Objectives

The project was planned with specific research questions in mind: What kind of diseases did the physicians and their families contract in the second half of the 19th century, and were the diseases caused by the physicians' work? How do the physicians in the 20th century behave when they become ill, and do they follow the recommendations in order to detect own diseases at an early stage?

The following objectives were identified in order to give answers to the research questions:

1. To describe the diseases and the self-reported causes of the diseases experienced by Norwegian physicians and their families in the second half of the 19th century (Paper 1).
2. To study whether Norwegian physicians of today attend selected types of health controls and follow the recommended frequency of these health controls (Papers 2 and 4).
3. To study the self-treatment and help-seeking behaviour of Norwegian physicians in relation to gender, age, and place of work, and to describe the physicians' self-reported consequences of self-treatment (Papers 2 and 5).
4. To study whether Norwegian physicians tend to work whilst ill; which diseases they bring to work; and to analyse factors associated with this behaviour (Paper 3).
5. To compare the frequency of breast self-examination (BSE) and Pap smear testing among Norwegian female physicians with that of a representative group of Norwegian women at the same educational level (Paper 4).
6. To compare the prevalence of use of minor tranquilizers among Norwegian physicians with that of a representative group of Norwegian males and females at the same educational level, and to identify factors associated with use of minor tranquilizers among physicians (Paper 5).

4 Material

The present study uses a cross-sectional design. It is based on two populations of Norwegian physicians: one practised in the second half of the 19th century and the other in the second half of the 20th century. The latter group of physicians is compared with two groups from the Norwegian general population derived from two large, representative health surveys; The Norwegian Women and Cancer Study [144] and The Nord-Trøndelag Health Survey [145]. The materials used in the different papers are shown in Table 1.

Table 1: *The materials in the different papers. N refers to the number of respondents included in the analyses.*

Population	N		Paper Number				
			1	2	3	4	5
19th century physicians	398	physicians	x				
	354	wives	x				
	1133	children	x				
20th century physicians, The Norwegian Medical Association's Survey	1015	both genders		x	x		
	284	females				x	
	1024	both genders					x
	1077	both genders					x
Comparison groups	738	females				x	
	2022	both genders					x

4.1 19th century physicians

The information on the 19th century physicians was collected from the biographies in the book "Norges Læger i det nittende Aarhundrede (1800-1886), Volume I and II" ("Norwegian Physicians in the 19th century") which includes data on 1276 physicians who practised in Norway in the period 1800–1886 [35, 36]. All physicians born between 1835 and 1854 were selected for the study. The study population thus comprises of 398 physicians, all males. In addition, the physicians' families, in all 354 wives and 1133 children, were included.

4.2 20th century physicians: The Norwegian Medical Association's Survey

The data on the 20th century physicians were collected in 1993 as a part of The Norwegian Medical Association's (NMA) population based survey of 9266 physicians' health, illness, working- and living conditions [77, 146]. In Norwegian the survey was named "Legekårsundersøkelsen". All participants were members of the NMA, and in the age group 24-70 years.

The survey collected data by means of an overlapping questionnaire method. Each physician received one primary questionnaire (A), which collected background information, and three randomly selected secondary ones out of 15 different questionnaires (labelled B to Q, minus O), which collected information on different aspects of the physicians' health and working conditions. The response rate for the total survey was 71.8% (females 80.4%, males 68.7%). Table 2 gives a description of the 16 questionnaires in the survey.

Table 2: *The sixteen questionnaires in The Norwegian Medical Association's Survey [77].**

Questionnaire, Sample size	Responders (Response rate)	Questionnaire title	Instruments included	Description
A 9266	6652 (71.8)	Background information and basic measures of health, well-being, and job satisfaction	GHQ (General Health Questionnaire) JSS (Job Satisfaction Scale) UHI (Ursin Health Inventory)	Age, gender, marital status, place of living, education, job career, physical and mental health, and well-being
B 3608	2454 (68.0)	Work hours and conditions of employment		Work hours, duty obligations, women physicians, medical and administrative leadership, organisational issues
C 3608	2628 (72.8)	Organisation of work, work environment		Job autonomy, challenges, relations to patients, colleagues and co-workers, relations to media
D 3608	2510 (69.6)	Health, work, family	JSQ (Job Stress Questionnaire)	Commitment, affiliations, stress and coping, absenteeism, work and family, work and spouse
E 1476	1077 (73.0)	Quality of life and living conditions		Questions from relevant Norwegian general population studies about quality of life, level of living etc.
F 1230	821 (66.8)	Personality profile	TCI (Temperament and Character Inventory)	Personal experience of challenge, pain, reward
G 1230	896 (72.9)	Personality, attitudes	BCI (Basic Character Inventory) DAS (Dysfunctional Attitudes Scale)	
H 1476	1030 (69.8)	Coping strategies	WCCL (Ways of Coping Checklist) PRU (Physicians Reaction to Uncertainty)	
I 1230	862 (70.1)	Social relations	IIP (Inventory of Interpersonal Problems)	
J 1476	1083 (73.3)	Stress and burnout	MBI (Maslach Burnout Inventory) SCL-25 (Hopkins Symptoms Checklist, 25 items)	
K 1476	1042 (70.6)	Educational and cultural activities, religious affiliation		Questions from The Norwegian Survey on Cultural Activities
L 1476	1056 (71.6)	Lifestyle	AUDIT (Alcohol Use Disorders Identification Test)	Questions from previous Norwegian surveys on physicians' smoking and drinking
M 1476	1063 (72.0)	Social network	SAS (Social Adjustment Scale) PBI (Parental Bonding Inventory)	
N 1476	1014 (68.7)	Nutritional habits		Questionnaire developed by Dept. of Nutrition, Univ. of Oslo
P 1476	1031 (69.9)	Health- and illness behaviour		Questions developed for the purpose of this study
Q 1476	990 (67.1)	Health politics, priorities, and ethical issues		Questions on Norwegian health-political reforms, priorities, eutanasia, sexual relations with patients, impaired physicians, and communication with cancer patients

* References to the instruments included are given in Reference 77.

The respondents of Questionnaire P constitute the sample in Papers 2 to 5. The questionnaire collected data on the physicians' health- and illness behaviour. It was sent to 1476 physicians.¹ The response rate was 69.9%, 739 males and 290 females (gender was missing on two persons).

Eight of the 1031 respondents had not answered the questions on illness behaviour, and were excluded from the analyses in Papers 2 and 3. Eight physicians who had not been working during the last year were also excluded, giving a total of 1015 physicians in this sample. The physicians' mean age was 42.3 years (range 24-69), 27.9% were females.

Six female physicians who had not answered the questions on female health behaviour, were excluded from the analyses in Paper 4, giving a sample of 284 female physicians with mean age 38.7 years (range 24-67). In the comparison with NOWAC, the sample of physicians was restricted to the age group 35-49 years (n=135).

Seven respondents had not answered the questions on self-prescription of drugs. They were excluded from the analyses in Paper 5, giving a sample of 1024 physicians with mean age 42.4 years (range 24-69). 27.9% were females.

The respondents of Questionnaire E were included in the analyses of drug use in Paper 5. The questionnaire was sent to 1476 physicians, of which 1077 (73,0%) responded. The mean age in this group was 42.5 years (range 25-69), 30.6% were females.

Due to the data collection method we do not have the response rates for subgroups in the Questionnaires E and P. However, in the total NMA-survey it was found that in addition to the higher response rate among females than males, young physicians under the age of 40 had a higher response rate than older physicians (74% versus 70%, $p < 0.001$). Private practising specialists were found to have an especially low response rate (50%) [146]. They comprised of 5% of the total sample of 9266, which were reduced to 3% among the respondents of Questionnaire P.

4.3 Comparison group from The Norwegian Women and Cancer Study

The Norwegian Women and Cancer Study (NOWAC, in Norwegian: "Kvinner, livsstil og helse" / "Kvinner og kreft") is a population based longitudinal study carried out at the Institute of Community Medicine at the University of Tromsø [144]. More than 100,000 women born 1927-65 have been included in the study in the time period 1991-97. In 1992, a random, nation-wide sample of 15,000 women in the age group 35-49 years was drawn from the Central National Person Register and invited to answer a questionnaire exploring, among other issues, breast self-examination and Pap smear testing. Altogether 9237 (61.6%) responded. Women with four or more years of education at the university level (n=775) were included in the present study. The physicians in NOWAC (n=37) were excluded, giving a total of 738 women in the comparison group.

¹*Erratum:* The total sample of Questionnaires E and P was given as 1467 instead of 1476 in Paper 5. Insignificantly higher response rates were thus given in the paper (73.4% for Questionnaire E and 70.3% for P).

4.4 Comparison group from The Nord-Trøndelag Health Survey

The Nord-Trøndelag Health Survey (NTHS, in Norwegian: "Helseundersøkelsen i Nord-Trøndelag" [HUNT]) is a health survey of the entire population over 20 years of age in a county of Norway [145]. During the years 1984-86 all the inhabitants (n=87,285) were invited to participate in a health screening.² Of these, 2185 persons were removed from the files because they were dead before the study started, or they were under 20 years of age or living in another county. Of the remaining 85,100 inhabitants, 74,977 (88.1%) participated in the screening, and 64,543 (75.8%) also answered a questionnaire which included questions on drug use. The screening participation rates were highest among those who were married, and among middle-aged people. The latter resulted in a participation rate of 91% in the age group 25-69 years (88.4% among males and 93.2% among females), which our comparisons were drawn from.

A sub-sample, which corresponded to the physicians according to age (25-69 years) and education (four or more years at university level), was drawn from NTHS. Health professionals with the right to prescribe medicines (physicians, veterinarians, and dentists) or with easy access to drugs (pharmacists) were excluded along with retired persons. The final comparison group consisted of 2022 persons. 34.5% of these were females.

²*Erratum:* In Paper 5, this figure was claimed to be 87,282. The correct figure is 87,285 as given here.

5 Methods

5.1 19th century physicians

The editor Dr. F. C. Kiær (1835-1893) collected the data for "Norges Læger i det nittende Aarhundrede (1800-1886)" [35,36]. He sent an appeal to all Norwegian physicians through the journal "Norsk magazin for Lægevidenskaben" ("The Norwegian Magazine for Medical Sciences") in 1886, asking for both demographic data and information about diseases experienced by the physicians and their families [37]. He presented a list of 14 issues he wanted information on. Kiær specified that he was particularly interested in epidemic diseases such as exanthemic typhus, typhoid fever, smallpox, scarlet fever, diphtheria, Asiatic cholera, and dysentery, as well as infections caught when carrying out operations and post-mortems. He asked the physicians to particularly point out if they or their families had *not* suffered from any epidemic diseases. He also mentioned that he had a hypothesis that the incidence of puerperal fever was high among the wives of physicians, and therefore he especially wanted information on this disease. In addition, he requested information about accidents while travelling on duty.

We do not know the exact number of physicians in Norway at the time of Kiær's data collection, but according to Kobro the number of practising physicians increased from 610 to 910 during the period 1884-94 [8]. Kiær received answers from 647 of these physicians [36]. Biographies of 629 other physicians who had practised in Norway since the year 1800, were also presented in the book.

The date of the information letters from the physicians to the editor was given in most of the biographies. Of the 398 physicians in the study group, 307 were marked with dates between 1886-89, which probably means that they had given the information as a response to Dr. Kiær's request. Two physicians were marked with dates from 1885. Twenty-five were marked with dates from 1871-73, which probably means that they had given the information to the first edition of "Norges Læger" [34]. Twelve of these physicians had died before 1890, and one had emigrated to USA. For 60 physicians no date of information was given. Twenty-six of these had died, and six had emigrated. The only information about diseases given in these biographies, is the cause of death. Some of this information is probably given by a group of informants, mostly physicians, whom the editor acknowledges in the preface [36]. In his request, Kiær invited all the physicians to also give information about colleagues [37]. In addition, he collected information from medical journals and public registers.

"Norges Læger i det nittende Aarhundrede (1800-1886)" was published in two volumes; physicians with family names beginning with Aa-K in 1888 [35] and L-Ø in 1890 [36]. The last volume also included an appendix with updated information of some of the physicians in volume I. Thus, the study includes data on the physicians up to the end of 1889 and not only until 1886 as the title of the book indicates.

A form was constructed by the author to systematise the information in the books. For each physician date of death (year and month), cause of death, place, post held, and age at the time

of death were registered. The same information was collected for each episode of disease or accident experienced by the physician himself or his family members. An outline of the data collection is given in Appendix I. The diagnoses given by the physicians were coded by using a disease classification form used in Norway in 1896-1910 [147]. When presented in Paper 1, the diseases were categorised according to a study by Nilsson, where contagious diseases were categorised by mode of infection [148]. The diagnosis "typhus" was categorised as "exanthemic typhus". This might have led to some misclassifications, because the term "typhus" for a long time also was used for "typhoid fever". It was not until 1870 the district physicians' reports began to distinguish between the two diseases [149].

The physicians' comments on source of infection were registered for each episode of disease. In addition, the form included information on year of marriage, year of birth for the wives, number and gender of children, and number and type of positions the physicians had held from graduation until 1889. Forty-one physicians married twice, and two married three times. In all, 397 wives were registered, but only the 354 who married before 1890 were included in the study. Data on life length and cause of death of the physicians who were alive in 1889, were collected from subsequent editions of "Norges læger" from 1915 and 1944 [150, 151].

The forms were filled in by the author, and later registered in a data file in the Statistical Package for the Social Sciences Programme (SPSS) [152]. The design of the study was descriptive with focus on diseases, sources of infections, and causes of death (Table 3).

5.2 20th century physicians: The Norwegian Medical Association's Survey

5.2.1 The Norwegian Research Programme on Physician Health and Welfare

In 1992 The Norwegian Medical Association initiated a research programme to study the Norwegian physicians' health, illness, and working- and living conditions [28, 146]. The programme included different kinds of studies: a register-data study on mortality where physicians were compared with other groups [64]; qualitative studies on illness experiences and conditions for learning among physicians [103, 106, 153, 154]; studies on retired physicians [155, 156]; historical studies [157–161]; and longitudinal studies on medical students and a group of 2000 physicians [65, 75, 162–164]. In addition to these studies, a comprehensive postal questionnaire survey was initiated – the NMA-survey. The research programme was conducted by the Research Institute of the NMA.

5.2.2 The design of The Norwegian Medical Association's Survey

The NMA-survey had a cross-sectional design. Data were collected by means of overlapping questionnaires (Table 2): Out of 16 different questionnaires, each physician received one primary questionnaire (Questionnaire A) and three randomly selected secondary ones (B to Q, minus O). The three secondary questionnaires were distributed randomly according to the following principle: each physician received at least one of Questionnaires B, C, or D, which all

dealt with working conditions, and not more than one of F, G, or I. The latter questionnaires included personality inventories, which in the pilot study had proved to be quite provocative and therefore could prevent a high response rate [77]. This distribution of questionnaires had the consequence that among the 1031 physicians who answered Questionnaire P, random groups of approximately 350 also answered Questionnaires B, C, or D, and random groups of approximately 90 also answered Questionnaires E to Q. This technique was developed to reduce the workload for the respondents, and at the same time increase the number of estimable cross-relations by making it possible to use imputed values in multivariate analyses. The technique of imputing values has been used in other studies in the NMA-survey where it is described in more detail [77, 165]. In the present study, however, this possibility of the overlapping questionnaire design was not used, as the analyses are based on variables from one questionnaire at a time (P or E), and the background data were selected from Questionnaire A, which all physicians answered.

5.2.3 Questionnaires

Questionnaire A collected background data, such as age, gender, marital status, place of living, education, and job career. In addition, it included instruments to investigate physical and mental health and job satisfaction, i.e. The Ursin Health Inventory (UHI) [166], The General Health Questionnaire (GHQ) [167], and The Job Satisfaction Scale (JSS) [168]. It also included questions on the major illnesses the physicians had suffered from since the age of 18, and some questions to female physicians about pregnancies. Questionnaire A was developed by the Research Institute of the NMA. The complete questionnaire is given in Appendix III. The questions used in the present study are described in more detail in Section 5.2.7.

Questionnaire P was developed by the author, in co-operation with her supervisors and the Research Institute of the NMA, for the purpose of studying the health- and illness behaviour of the physicians. It included questions on participation in health controls and use of specific health services during the last three years, present use and self-prescription of a number of drugs, and experiences with self-treatment. The physicians were also asked questions about illness behaviour attitudes. The questions in Questionnaire P were to a large extent developed for the survey, and they are described in more detail in Section 5.2.6. In some of the questions the physicians were given pre-categorised answering alternatives. These were constructed partly based on the available literature on physicians' health- and illness behaviour, and partly on assumptions made by the researchers. All these questions also included an open category. Questionnaire P also investigated the physicians' treatment of their own families, colleagues, and friends. These questions were based on questions used in an US-survey by La Puma *et al.* [169]. See Appendix IV for the complete questionnaire.

Questionnaire E was developed by another group of researchers in the NMA-survey to study quality of life and living conditions. It included a question on drug use that had been used in the Nord-Trøndelag Health Survey (NTHS) [145], and therefore this questionnaire was used in

Paper 5. See Appendix V for an extract from Questionnaire E.

The questionnaires are given in Norwegian in the appendices. However, the questions used in this study are translated to English in the papers and in the description of the dependent and independent variables below.

5.2.4 Pilot study

All questions in the survey were discussed and approved by the research group of the NMA-survey, which included physicians from different specialities in addition to researchers from other subjects. However, specific studies on validity and reliability of the questions developed for the survey were not performed. The questionnaires were tested in a pilot study which included 101 physicians. The pilot was conducted in the autumn 1992, and some corrections were made according to the comments. The respondents also recorded the time needed to complete four questionnaires, and the average time was 90 minutes [77].

5.2.5 Data collection

In March/April 1993 the questionnaires and a covering letter (Appendix II) were distributed by mail to 9266 of the 11367 active members of The Norwegian Medical Association. The excluded physicians were the participants in the pilot study (101) and the random sample of 2000 who were invited to take part in the longitudinal study and in the qualitative study on illness experiences. Passive members of the NMA (students and retired) were also excluded from the survey. Both these groups were, however, included in separate surveys [65, 155, 156]. Prior to the data collection there were several short articles in the Journal of The Norwegian Medical Association in order to promote the survey [170–182].

The answers were anonymous. In order to stimulate the response, a thank you-letter was sent to all recipients after one month, along with a name-card to be returned by all respondents. After two months a reminder with a copy of the questionnaires was sent to those who had not submitted the name-card. On the name-card the physicians had the possibility to report if they did not want to participate in the survey, and also to give the reason why. In all, 405 physicians (322 males and 83 females) responded to this [146]. The main reasons for not participating were that they felt a lack of anonymity (31%), that they had no time (16%), or that the respondent was dead, ill, or disabled (7%). Other reasons contributed of 19%. Twenty-seven percent did not give any reason.

5.2.6 Dependent variables

The dependent variables used in the different papers are shown in Table 3.

Table 3: *Dependent variables used in the different papers.*

Domain	Examined	Paper Number				
		1	2	3	4	5
Diseases	Cause of death	x				
	Diseases	x	x	x		
	Source of infection	x				
Drug use	Use of different types of drugs		x			x
	Self-prescription		x			x
Health controls	Health controls during the last three years		x			
	Breast self-examination (BSE)				x	
	Pap smear testing				x	
Physician contacts	Treatment during the last three years		x			
	Self-treatment		x			
Working whilst ill	Working whilst ill during the last year			x		
Attitudes	Attitudes to physicians' illness behaviour		x			

Diseases

The physicians were asked to give the disease or symptoms they had suffered from on the occasions when they had treated themselves and regretted it, and when they had worked whilst ill (P6, P10).³ The diseases/symptoms were classified by the research group according to The International Classification of Primary Care (ICPC) [183]. Some physicians gave more than one disease when answering the question about working whilst ill. Since the question asked for the disease related to the last event, only the first mentioned disease was registered, presuming that the first recollected event was the newest experienced.

Drug use

The questions on drug use (P12-P18) in Questionnaire P were constructed according to a Danish questionnaire on physicians' health and working conditions [184]: "Do you at present use any of the following drugs: antacids, non-prescription analgesics, prescription analgesics, antihypertensives, hypnotics, anxiolytics, or other psychotropics?" No specific time period was given, but the physicians were asked to record if they used the drugs 1 "Never", 2 "Less than weekly", 3 "Weekly, but not daily", or 4 "Daily". These categories were chosen because we wanted to have the possibility to analyse frequency of use. They differ from the Danish study, where the following categories were used: "Yes, often", "Yes, sometimes", and "No, never/almost never".

When analysing drug use in Paper 2, the variables were dichotomised, "No use" (option 1)

³The numbers following the letters A, E, and P refer to the question number in the questionnaires.

or "Use" (options 2-4). Initially, a number of physicians were registered as missing as they had not answered some of the drug questions. When the questionnaires were checked, we found that most of the missing physicians had reported use of one or more of the drugs listed, indicating that they had just paid attention to the drugs they were using. A few had not answered any of the drug use questions, but they had answered the questions before and after the list of drugs. This indicates that they were missing because they were not using any of the drugs at the time. Thus, after checking the questionnaires, we decided to register the missing as "No use".

In Questionnaire E, use of minor tranquilizers was explored with the same question as in The Nord-Trøndelag Health Survey [145]: "How often have you used sedatives/anxiolytics or hypnotics in the past month?" (E4). The response alternatives were as in Questionnaire P, except for writing "Not past month" instead of "Never". The opportunity to include a comparison group from NTHS occurred after the data were collected, and thus we decided to include the data from Questionnaire E in the analysis in Paper 5.

Self-prescription of drugs

The physicians' self-prescription of drugs was measured in Questionnaire P: "Have you treated yourself with prescription drugs?" (P11), with the response alternatives "No, (I) have not needed any", "No, (I) have received it from another physician", "Yes, a couple of times", "Yes, sometimes", and "Yes, often". In connection with the question on present drug use, the following question was added: "If you are using any of these drugs now, are you self-prescribing them?" The physicians were to mark "Yes" or "No" on each drug they were using at present (P19-P25).

Health controls

Attendance to health controls was explored by the questions: "Have you been to a health control during the last three years?" (P1), and "If yes, what kind of health control?" (P2). The following options were given: "Invited to the occupational health officer", "Invited to cardiologic screening", "Invited to screening for another disease", "Invited to control for own disease", "Initiated a health control myself", and "Other".

Furthermore, the physicians were asked: "Have you refused to attend a screening you were invited to?" (P3), and "If yes, what was the main reason?" (P4). They were given one open and eight pre-categorised options: "I knew the status of my own health", "I am in a low risk group", "I did not want to be examined by a local physician", "I did not want to be examined by the physician in question", "I had no time", "Usually such examination are of no use", "I forgot about it", "I was afraid of finding something wrong".

Breast self-examination

The frequency of breast self-examination (BSE) was recorded according to six options: "How often do you examine your breasts for structural changes?" (P166). "Never, or less than once a

year", "Approximately 1-3 times a year", "Approximately every third month", "Approximately every month", "Several times a month", and "Several times a week".

In the analysis where the physicians' BSE frequency was compared with that of the university-educated women, the physicians' answers were divided into categories resembling those used in NOWAC ("Never", "Irregularly", and "Regularly (about every month)"). See Paper 4 for details. In all other analyses, BSE frequency was dichotomised into "Compliance with the recommendation" or "Non-compliance". The recommended frequency of BSE is once every month as given in the guidelines of The Norwegian Cancer Society [185]. However, the physicians who reported a higher frequency of BSE were also included in the compliance group, because NOWAC did not distinguish between compliers and over-users.

Physicians who did not practise BSE were asked to give the reason why: "If you are not practising breast self-examination, what is the main reason?" (P167). They were given one open and four pre-categorised options: "It is unnecessary as long as I have no symptoms", "I am in a low risk group", "I forget", and "I am afraid of finding something wrong".

Pap smear tests

The frequency of routine Pap smear tests (Papanicolaou-stained vaginal smears) was recorded according to six options: "How often do you have a routine gynaecological examination with a Pap smear test?" (P164). "Never, if I do not have any gynaecological symptoms", "Less than every fifth year", "Every fourth to fifth year", "Every third year", "Every second year", and "Every year".

In the analysis where the physicians' Pap smear frequency was compared with that of the university-educated women, the physicians' answers were divided into categories resembling those used in NOWAC ("Never", "Less than every third year", and "Every third year or more often"). See Paper 4 for details. In all other analyses, the variable was dichotomised into "Compliance with the recommendation" or "Non-compliance". The Norwegian Governmental recommendation of tests every third year was used [186]. However, physicians who reported a higher examination frequency were also included in the compliance group, because NOWAC did not distinguish between compliers and over-users.

Physicians who did not take routine Pap smears were asked to give the reason why: "If you never have a routine Pap smear, what is the main reason?" (P165). They were given one open and seven pre-categorised options: "It is unnecessary as long as I do not have any gynaecological symptom", "I am in a low risk group", "I do not wish to be examined by a local physician", "I have a problem in finding a physician to visit", "I have no time", "I forget", and "I am afraid of finding something wrong".

Physician contacts

Medical treatment during the last three years was measured by asking: "What physician contacts have you used when experiencing illness during the last three years?" Nine options were given (P34-P42): "Self-treatment", "A regular general practitioner", "Spouse or co-habitant", "Friends", "A colleague at work", "An occupational health officer", "Chosen a physician by chance when in need", "Self-referral to hospital", and "A physician for physicians". The physicians were asked to mark if they had used these contacts "Never", "One to three times", or "Four times or more" during the last three years. In the analyses in Paper 2 the variables were dichotomised into having had contact or not.

As in the drug use questions, we found that some physicians had paid attention only to the contacts they had used. After checking the questionnaires, these physicians were registered as "No contacts" instead of missing.

Self-treatment

In addition to the questions on self-treatment during the last three years and present self-prescription of drugs, the physicians were asked if they had negative experiences with self-treatment: "Have you ever performed self-treatment for an illness for which you retrospectively would have consulted another physician?" (P5). They were asked to give the diagnosis for the event (as described above), and if the self-treatment had lead to any of six given consequences (P7): "No serious consequences", "It took a long time before I got a diagnosis", "Worsening of the illness", "It took a long time before I started to take the right medicines", "It took a long time before I got examined", and "Delayed hospitalisation". In addition, an open category was given.

Working whilst ill

Working whilst ill was explored by the question "Have you ever gone to work although you had an illness you would have sick-listed a patient for (provided that the patient's working conditions were comparable with yours)?" (P8). The physicians were also asked: "How often did this happen during the last year?" (P9). The options were "Once", "2-3 times", and "More times". In addition, they were asked "Which disease or symptoms did you have the last time this happened?" (P10), as described above.

Attitudes

Based on assumptions on physicians' illness behaviour found in the literature, 12 statements were developed for the purpose of investigating the illness behaviour attitudes among the physicians (P152-P163). The statements are shown in Paper 2. The answer options 1 "Not true",

2 "True to a slight degree", 3 "Partly true", 4 "Fairly true", and 5 "True", were in the analyses dichotomised into "Low" (options 1-3) and "High" (options 4 and 5) agreement with the statements.

5.2.7 Independent variables

The independent variables used in the different papers are shown in Table 4. Most of the variables were collected in Questionnaire A.

Table 4: *Independent variables used in the different papers. In Paper 1 only descriptive statistics were performed, whilst in Papers 2–5 the variables were used in bivariate and multivariate analyses.*

Domain	Examined	Paper Number				
		1	2	3	4	5
Demographics	Age	x	x	x	x	x
	Gender		x	x		x
	Place of work		x	x	x	x
	Speciality				x	x
	Marital status	x			x	
	Children	x			x	
Health status	General Health Questionnaire (GHQ)				x	x
	Subjective well-being				x	x
	Subjective health complaints (UHI)				x	x
	Oral contraceptives				x	
	Mammography examination				x	
	Breast self-examination (BSE)*				x	
	Pap smear testing*				x	
	Medical treatment during the last three years			x		
Job satisfaction	Job Satisfaction Scale (JSS)			x	x	x

*) BSE was used as an independent variable in the analyses of Pap smear testing, and *vice versa*.

Age

In Papers 2, 3, and 5, age was divided into 10-year groups (A1). In the logistic regression analyses in Paper 5, it was used as a continuous variable. Due to a small material of female physicians, age was divided according to the tertiles in Paper 4.

Place of work

The place of work variable has been operationalised differently in the papers. The physicians were asked to give their present place of work in an open question (A8), and this resulted in a variable where the physicians were distributed on more than 60 different job categories. In Paper 5, which was published first, the variable was dichotomised into "Hospital physicians" and "Others". When analysing the female physicians' health behaviour in Paper 4, we wanted to compare the general practitioners in our study with those in the study by Krohg and Malterud [132]. Thus, the variable was divided in three, in order to separate the general practitioners from hospital physicians and others. In papers 2 and 3, which were the last analyses to be conducted, the private practising specialists were combined with the general practitioners in the category "Clinicians outside hospital". These papers focused on illness behaviour, help-seeking behaviour, and the physicians' tendency to working whilst ill. General practitioners and private practising specialists have comparable working conditions that may affect their behaviour on this issues: They often work alone or in small practices, they have responsibility towards a daily patient list, and they might have problems in getting a locum on a short notice.

Speciality

The physicians were asked to give the specialities they had achieved (A7), and a variable was made on these registrations. Only those who had finished their post graduate speciality training were categorised in the different specialities. Thus, a large group of young doctors still in their training were categorised as non-specialists. We do not have information on which speciality these young physicians were actually working in.

Marital status and children

Questionnaire A also included questions on marital status and number of children (A3, A4). Based on information about year of birth and if the child was adopted, female physicians who had self-born children under the age of 12 were identified (Paper 4).

The General Health Questionnaire

The 28-item version of The General Health Questionnaire (GHQ) [167] was used to measure emotional distress among the physicians. It comprises 28 items relating to symptoms of depression and anxiety occurring over the last two weeks. Scoring is done on a four point Likert scale: 1 "More than usual", 2 "As usual", 3 "Less than usual", and 4 "Much less than usual". In the present study the responses to the items were dichotomised according to the GHQ-scoring to be used for case identification [167]; 1 and 2 were scored as 0, and 3 and 4 were scored as 1. The resulting sum score ranged from 0 (low mental distress) to 28 (high mental distress). Persons with a score of six or more were classified as GHQ-cases. Cronbach's alpha was 0.91 in the

samples used in Papers 4 and 5. In Questionnaire A, both GHQ-28 and GHQ-30 were included. GHQ-28 comprises of A22, A24-A26, A31, A32, A36-A47, A51, A54-A61, A63.

Subjective well-being

Mental health was also measured by a single question on subjective well-being which has been found to be a simple and valid item for measuring overall quality of life [187]: "When you think of the way your life is going at the present, would you say that you are by and large satisfied with life, or are you mostly dissatisfied?" (A74). In Questionnaire A the question was scored from 1 "extremely satisfied" to 7 "extremely dissatisfied". When used in Papers 4 and 5 the scoring was inverted, i.e. a low score thus mean low subjective well-being. The item has a reliability of 0.75 (estimate based on Heise's formula for the reliability of single items measured at three points in time [188]) and correlates 0.60 with the Hopkins Symptom Checklist (SCL-25) [189]. The item was also used in NTHS [145], and it was used as a measure of mental distress in the comparison between physicians and the NTHS comparison group in Paper 5.

Subjective health complaints

Subjective health complaints was measured by The Ursin Health Inventory (UHI) [166], an instrument measuring the subjective experience of health. The instrument consists of questions on occurrence, intensity, and duration of pain in the neck, back, feet, arms and shoulders, in addition to pain in the chest, migraine and headache, digestive problems, and vertigo over the last 30 days (A11-A21). The items are scored on a 4-point rating scale ranging from 0 (no complaints) to 3 (serious complaints). A person who scores 2 or 3 on intensity on at least one item is classified as an UHI-case [77].

Oral contraceptives

Present use of oral contraceptives was taken from the following question: "If you use oral contraceptives now, are you complying with the recommended health controls?" (P171). All who had answered this question (yes or no), were considered as present users, with one exception – a physician who at a previous question had responded that she did not need any contraceptives.

Mammography examination

Mammography examination was explored by the question "Are you attending routine mammography?" (P168). Five options were given: 1 "Never", 2 "Less than every third year", 3 "Approximately every third year", 4 "Approximately every second year", and 5 "Approximately every year". In the analyses the variable was dichotomised in attending mammography "No" (1) or "Yes" (2-5). Two physicians who reported mammography due to cancer treatment follow-up, were included in the yes-group.

Medical treatment during the last three years

Medical treatment was defined as having consulted other physicians or performed self-treatment during the last three years. The variable was based on the nine questions on physician contacts in Questionnaire P, described above (P34-P42).

Job satisfaction

Job satisfaction was measured by The Job Satisfaction Scale (JSS) [168], a 10-item instrument which measures satisfaction with various aspects of working conditions: responsibility, variation, collaborators, pay, working hours etc. (A64-A73). All items were scored on a scale from 1 'Extremely satisfied' to 7 'Extremely dissatisfied', and combined in a sumscore ranging from 10 (high satisfaction) to 70 (high dissatisfaction). Cronbach's alpha was 0.85 in the sample used in Paper 3, 0.84 in Paper 4, and 0.86 in Paper 5. The JSS was translated to Norwegian by one group of translators, and then back into English by another group to reassure the validity [77].

5.3 The Norwegian Women and Cancer Study

The main focus of the The Norwegian Women and Cancer Study (NOWAC) is to examine factors related to cancer, in particular breast cancer, and cause-specific mortality in a prospective manner [144]. The study consists of different cohorts of women included during the time period 1991-97. In 1991-92 a random sample of 100,000 Norwegian women aged 34-49 received a mailed questionnaire. The questionnaire was made in different versions of two to six pages, with some basic questions given to all. Included in this sample were 15,000 women who received a four-paged questionnaire. 61.6% responded. Based on demographic information in the questionnaire, i.e. years of education and present occupation, women with university education of four years or more were identified. The questionnaire was anonymous and self-instructive. The sampling and mailing procedure was done by The Division for Sample Surveys in Statistics Norway.

Among the respondents of NOWAC there were 37 physicians who were excluded from the comparison group. However, their Pap smear and BSE behaviour were analysed separately.

Dependent variables

The frequency of BSE was requested by: "How often do you practise breast self-examination?", with the fixed options "Never", "Irregularly", and "Regularly (about every month)". Frequency of Pap smear tests was requested by: "Have you regularly taken cervix cancer tests?", with the fixed options "Never", "Less than every third year", and "Every third year or more often". In the multivariate analyses, the dependent variables were dichotomised in complying with the recommendations (BSE regularly (about every month) / Pap smear test every third year or more often) or not.

Independent variables

The independent variables employed in the analyses of the physicians and the general population were age (tertiles), marital status, self-born children younger than 12 years of age, mammography examination, and use of oral contraceptives. Mammography examination was requested by: "Do you regularly attend mammography examination?" The answering alternatives "No", "Yes, every second year or more often", and "Yes, more seldom than every second year" were dichotomised in attending mammography (yes, no). Present use of oral contraceptives was requested by: "Are you using oral contraceptives now?" (yes, no).

5.4 The Nord-Trøndelag Health Survey

The Nord-Trøndelag Health Survey (NTHS) was conducted by The Norwegian National Health Screening Service (Statens Helseundersøkelser), The National Institute of Public Health (Statens institutt for folkehelse), and The Quality of Life Research Group at the Institute of Applied Social Research and the Institute for Social Sciences (Gruppe for livskvalitetsforskning ved Institutt for anvendt samfunnsforskning og Institutt for samfunnsforskning).

All residents in the county of Nord-Trøndelag aged 20 years or more by 31 December 1983 were invited to participate in the health screening [145]. A questionnaire was enclosed with the invitation letter (Questionnaire 1). When attending the screening they received Questionnaire 2, which they were to fill in at home and mail back to the researchers. The questions on drug use and subjective well-being used in Paper 5 were part of Questionnaire 2.

Dependent variable

Use of minor tranquilizers was explored by the following question "How often have you used sedatives/anxiolytics or hypnotics in the past month?" Four answering options were given: "Daily", "Weekly, but not daily", "Less than weekly", and "Never".

Independent variables

The independent variables employed in the comparison with the physicians were age (continuous), gender, and subjective well-being (described above).

5.5 Statistical methods

5.5.1 19th century physicians

Data registration and analyses of the 19th century physicians were carried out by using the Statistical Package for the Social Sciences Programme (SPSS) [152]. Only descriptive analyses (percentages and mean values) were performed.

5.5.2 20th century physicians

Data registration and organisation of the NMA-survey were carried out by using the Norwegian statistical package File Orientated Statistical System (FOSS) [190]. The data files for the present study were imported to SPSS [152]. In Paper 5 also Epi Info 6 was used [191].

Statistical approaches applied descriptive statistics (percentages and mean values) and bivariate and multivariate techniques. Chi-square tests and Fisher's exact tests were used when comparing proportions, and T-tests were used when comparing means. Level of significance was set to $p \leq 0.05$. The 95% confidence intervals for differences between proportions in Paper 3 were calculated manually based on Altman [192].

Multivariate analyses were done using logistic regression analyses. Level of significance was set to $p \leq 0.05$, 95% confidence interval. The statistically significant variables in the bivariate analyses were included in the multivariate analyses, in addition to variables which were non-significant, but considered scientific relevant. In Paper 3, variables with a p-value < 0.25 in the bivariate analyses were selected for the multivariate analysis in accordance with Hosmer and Lemeshow [193]. Only adjusted Odds Ratios were presented in the tables along with the confidence intervals and p-values. Interactions were checked between relevant variables in Papers 4 and 5 applying methods according to Hosmer and Lemeshow [193].

5.6 Ethics

The NMA-study was approved by the Data Inspectorate (Datatilsynet). All data were anonymous.

5.7 Sponsorship

The project has been supported by The Norwegian Medical Association, The Norwegian Research Council, and Christensen's Legacy (administered by UNIFOR – The management foundation for funds and legacies).

Data for The Nord-Trøndelag Health Survey were collected under the auspices of The Norwegian National Health Screening Service. The Norwegian Women and Cancer Study was funded by The Norwegian Cancer Society.

6 Synopsis of Papers 1–5

6.1 Paper 1

E. O. Rosvold.

A day in the life of a country doctor

– Occupational hazards in general practice in the Nineteenth century.

In Ø. Larsen, editor, *The shaping of a profession. Physicians in Norway, past and present.* Science History Publications, USA, pages 189-202, 1996.

Background. Data on physicians' health and illness in the 19th century are scarce. Due to the tradition of publishing biographical data of all Norwegian physicians, we have the possibility to study some aspects of the life and health of physicians in the second half of the 19th century.

Objectives. To describe the diseases experienced by Norwegian physicians and their families in the second half of the 19th century, and to report the causes of the diseases as given by the physicians.

Material. 398 male Norwegian physicians born in the period 1835-54. The material also includes the physicians' wives (n=354) and children (n=1133).

Methods. Data were collected from biographies in the book "Norges Læger i det nittende Aarhundrede (1800-1886)" by F. C. Kiær. Information about diseases, causes of death, and possible sources of infection was registered for the physicians and their family members.

Results.

- In all, 278 cases of disease were registered among the physicians; 47 of these resulted in death before the year 1890.
- Infections accounted for 85% of the diseases and 59% of the deaths. Typhoid fever (45 cases), diphtheria (41), lymphangitis (27), and exanthemic typhus (23) were the most frequent registered diseases.
- 56% of the diseases reported by the physicians were attributed to their work.
- Eight physicians had caught diphtheria while carrying out tracheotomies.
- The physicians reported 41 accidents that had occurred on their journeys to visit the patients. The accidents included 14 capsizes and 19 accidents with horse and carriage.
- Exhaustion, resulting from long journeys to the patients as well as a heavy workload, was given as reason for ten cases of disease and one death.
- 40 cases of diseases of childbirth, mainly puerperal fever, were reported among the wives. 13 wives died of such diseases. Air-borne infections, such as diphtheria, scarlet fever, and tuberculosis were also reported among the wives.

- 42 wives died before 1890.
- 214 (19%) of the 1133 children in the material died before 1890. Infectious diseases were a common cause of death.
- Whooping cough, measles, and scarlet fever accounted for 76% of the reported cases of disease among the children.
- Some of the diseases among the wives and children could be attributed to the physicians' work.

Conclusion. Both the physician and his family were at risk of contracting diseases that could be attributed to the work as a physician.

6.2 Paper 2

E. O. Rosvold and E. Bjertness.

Illness behaviour among Norwegian physicians.

Scandinavian Journal of Public Health. In press.

Background. Although physicians have illness and health as their profession, many seem to have a problem in accepting and handling their own illness. Information on physicians' illness behaviour is to a large extent based on studies of selected groups of physicians.

Objectives. To study help-seeking behaviour and self-treatment in a nation-wide representative sample of physicians in relation to gender, age, and place of work, and to describe the physicians' self-reported consequences of self-treatment.

Material. 1015 Norwegian physicians, aged 24-69, 28% females.

Methods. 70% of a random sample of 1476 physicians answered a mailed, anonymous questionnaire. Sixteen were excluded due to insufficient data or because they were not working. The questionnaire explored participation in health controls, physician contacts, use and self-prescription of a number of drugs, and experiences with self-treatment. It also included 12 statements concerning illness behaviour attitudes among physicians. Data were analysed by means of bivariate and multivariate techniques.

Results.

- 75% of the physicians had performed self-treatment during the last three years, and young physicians and clinicians outside hospital were most likely to do this.
- 68% had received treatment from other physicians. Most often this treatment was obtained by consulting a colleague at work, a friend, or by referring oneself to a hospital.
- Females were more likely than males to have consulted other physicians and to use non-prescription analgesics. More males than females were using antacids. There were no gender differences in use of prescription analgesics, anxiolytics, and hypnotics.
- Clinicians outside hospital were more likely than other physicians to use drugs, especially antacids.
- Although 66% of the physicians were using one or more of the drugs listed, only a few used drugs daily or weekly.
- 73% of those who used prescription medicine, were self-prescribing it.
- 13% of the physicians had negative experiences with self-treatment.

- 37% had been to a health control during the last three years. Females, old physicians, and hospital physicians were most likely to have had a health control.
- 14% had ever refused to attend a screening programme. The reasons given for this behaviour were lack of time, forgetfulness, and a feeling of low risk.
- 56% stated that, if they needed a somatic examination, they would prefer to consult a physician to whom they had no personal ties. More females than males would prefer a physician of same gender.
- 50% would seek help for mental problems elsewhere than in the mental health care located where they lived.

Conclusion. Most physicians practise self-treatment when they are ill. Although they would prefer to be treated by a physician they do not have personal ties to, many contact friends and colleagues when they need help from another physician.

6.3 Paper 3

E. O. Rosvold and E. Bjertness.

Physicians who do not take sick leave: hazardous heroes?

Scandinavian Journal of Public Health, **29**:71-75, 2001.

Background. Physicians have less sick leave than other employees, which is reflected in a high proportion of physicians going to work whilst ill. The diseases physicians bring to work have previously only been studied by asking about illness behaviour related to specific or hypothetical illness episodes.

Objectives. To present the whole range of diseases a nation-wide representative sample of physicians report to bring to work, and to analyse factors associated with working whilst ill.

Material. 1015 Norwegian physicians, aged 24-69, 28% females.

Methods. A random sample of 1476 physicians received a mailed, anonymous questionnaire. The response rate was 70% (1031). Sixteen respondents were excluded due to insufficient data or because they were not working. The physicians were asked about their own experiences with working whilst ill, and which disease or symptoms they had the last time this happened. Data were analysed by means of bivariate and multivariate techniques. The independent variables were gender, age, place of work, job satisfaction, and medical treatment during the last three years.

Results.

- Most of the physicians (86%) had at some time worked during an illness for which they would have sick-listed their patients.
- During the previous year 80% had worked whilst ill, and 48% had done this twice or more.
- More than half of the physicians in the study had been working whilst having an infectious disease – most often influenza or respiratory tract infections.
- Being in the age group 30-39 years, working as a clinician outside hospital, having received medical treatment during the last three years, and having low job satisfaction were independently associated with the behaviour of working whilst ill.

Conclusion. A large number of physicians work whilst having infections and other diseases. This behaviour might be harmful to the physicians themselves as well as to their patients and staff members.

6.4 Paper 4

E. O. Rosvold, A. Hjartåker, E. Bjertness, and E. Lund.

Breast self-examination and cervical cancer testing among Norwegian female physicians. A nation-wide comparative study.

Social Science & Medicine, 52:249-258, 2001.

Background. All women are encouraged to practise breast self-examination (BSE) on a monthly basis in order to detect breast cancer. Pap smear testing for cervical cancer is recommended to be performed every third year.

Objectives. To study the Norwegian female physicians' compliance with the recommendations of BSE and Pap smear testing, and to compare the physicians' behaviour with that of other university-educated women.

Material. A nation-wide representative sample of 284 female physicians, aged 24-67, from The Norwegian Medical Association's Survey, and a nation-wide representative sample of 738 females with university education, aged 35-49, from The Norwegian Women and Cancer Study (NOWAC).

Methods. The analyses were based on the combination of two data sets that both were collected by means of anonymous postal questionnaires in 1992-93. The response rate was 80% among the physicians and 62% in NOWAC. Data were analysed using bivariate and multivariate techniques. When comparing physicians and university-educated women, the sample of female physicians was restricted to the 135 who were in the age group 35-49 years. The independent variables were age, marital status, having self-born children younger than 12 years of age, attending mammography examination, and present use of oral contraceptives. In addition, speciality, place of work, job satisfaction, mental health, and subjective health complaints were included in the separate analyses of the physicians.

Results.

- 31% of female physicians performed BSE at least once a month, and 55% had a Pap smear test once every third year at least.
- BSE was never practised among 19% of the physicians. These women claimed that they forgot it, or they stated that they were in a low risk group or had no symptoms of disease.
- 16% of the physicians reported that they never had routine Pap smears. Their reasons for this behaviour were that they were in a low risk group or had no symptoms of disease, they had a problem in finding a physician to attend, they forgot to take the test, or they found no time for it.

- Among physicians, the factors independently associated with having Pap smear tests at least every third year included young age, being married/cohabitant, having children under 12 years of age, and using oral contraceptives.
- Physicians were significantly more likely than other university-educated women to practise BSE monthly or more often.
- Physicians were significantly less likely than other university-educated women to have Pap smear tests every third year or more frequently.

Conclusion. A large number of Norwegian female physicians do not comply with the recommendations of BSE and Pap smear testing. Compared with other university-educated women, female physicians comply more with the BSE recommendation and less with the Pap smear test recommendation.

6.5 Paper 5

E. O. Rosvold, P. Vaglum, and T. Moum.

Use of minor tranquilizers among Norwegian physicians.

A nation-wide comparative study.

Social Science & Medicine, 46:581-590, 1998.

Background. Physicians have the possibility of prescribing drugs for themselves without consulting another physician. This may lead to a high use and even abuse of drugs, and neglect of seeking professional help when needed. It is therefore of interest to assess the magnitude of drug use and self-prescription among physicians, and to identify possible risk groups.

Objectives. To study use and self-prescription of minor tranquilizers (hypnotics and anxiolytics) in a nation-wide representative sample of Norwegian physicians, and to compare the physicians' drug use with that of a representative sample of the general population.

Material. Drug use was analysed in a sample of 1077 Norwegian physicians (Sample 1), aged 25-69. 31% were females. Self-prescription was analysed in a sample of 1024 physicians (Sample 2), aged 24-69, 28% females. Both samples were parts of The Norwegian Medical Association's Survey. The comparison group was drawn from the Nord-Trøndelag Health Survey, and constituted 2022 persons with higher university education, aged 25-69. 35% were females.

Methods. The data of the physicians were collected by means of an anonymous postal questionnaire. The response rates were 73% and 70% in Samples 1 and 2, respectively. The participants in the Nord-Trøndelag Health Survey received a questionnaire when they attended a health screening. 76% responded. Data were analysed using bivariate and multivariate techniques. The independent variables were gender, age, speciality, place of work, job satisfaction, subjective well-being, mental distress, and subjective health complaints.

Results.

- A total of 12% of the physicians (13% males and 11% females) had used minor tranquilizers during the previous month, 31% of these on a daily or weekly basis.
- High age, high mental distress, and working outside hospitals were identified as risk factors for drug use.
- 73% of the physician users of minor tranquilizers had self-prescribed the drugs.
- When including all kinds of legal drugs, eight out of ten physicians stated that they sometimes had prescribed drugs for their own use.
- In the general population, 7% had used minor tranquilizers, significantly more women (10%) than men (6%). 43% of these had used the drugs daily or weekly.

- When compared with university-educated men, more male physicians used minor tranquilizers, also when controlled for subjective well-being. However, the physicians used the drugs less frequently.
- There was no significant difference in drug use between female physicians and university-educated women.

Conclusion. Norwegian male physicians have a higher proportion of users of minor tranquilizers as compared to other university-educated men. No significant difference is found between female physicians and university-educated women. In addition to mental distress and high age, working outside hospitals is associated with use of minor tranquilizers among physicians.

7 General discussion

7.1 Methodological considerations

In epidemiological studies one has to consider methodological problems which may influence the results. Systematic errors affect the validity of the inferences drawn. The internal validity, i.e. the validity of the inferences about the target population from which one has sampled, is attributable to the selection of subjects, the quality of information obtained, and confounding variables [194, 195]. The external validity concerns inferences to an external population, i.e. the generalisation of the study results. Random errors affect the precision (reliability) of the study, and is attributable to the sampling variation, e.g. to study size and study design.

All materials used in this study are based on a cross-sectional study design where data are mainly collected by means of postal questionnaires. The advantage of this design is the possibility to collect a wide range of data from a large number of people. However, the design is vulnerable to selection problems and low response rates [192]. In addition, the results only gives a measure of associations between the dependent and independent variables because all data are collected at the same time.

7.1.1 Internal validity

Selection of subjects

"Norges Læger" aimed at presenting biographical data of all physicians who had practised in Norway in the period 1800-86, and it is thus reasonable to assume that the total cohort of physicians born between 1835 and 1854 is presented in the book. From the preface, one can see that Dr. Kiær made a thorough research for the book; in addition to the dated response letters from each physician, he also received information about many physicians from a group of informants whom he especially acknowledged [36]. Due to this, also dead or emigrated physicians are registered in the book. However, we can not rule out that some might be missing. Later editions of "Norges Læger" includes a few more physicians born in the same age period as our study group. These physicians had not yet graduated by 1890, and they are therefore not included in the study. In all, we can assume that the material of the 19th century physicians does not have any important selection problems.

The total response rate in the NMA-survey of the 20th century physicians was 71.8%, and the response rate in the two Questionnaires E and P was 73.0% and 69.9%, respectively. Although other studies of selected groups, such as general practitioners, show response rates as high as 90%-95% [124, 132], the response rate of studies of representative groups of physicians varies from 59% [131, 139] to 79% [80]. Thus, we view the response rate in our study as acceptable.

We do not have any information on the non-respondents in Questionnaires E and P, and thus we do not know if they differ from the respondents. However, a recent review of physicians'

responses to surveys revealed that there were few differences in demographic variables among early and late respondents [196]. If late respondents are used as proxies for non-respondents, this review indicates that non-response bias might be of less concern in physician surveys than in surveys of the general population. Still, the design and promotion of the NMA-survey might have introduced a risk for selection bias: The survey was initiated as a result of a growing concern about physicians' health and well-fare. Problems related to being a physician were also addressed in many of the short articles promoting the survey [176–182]. Thus, there is a risk that the response is biased in the direction of the physicians who wanted to set focus on their problems, i.e. that physicians who did not feel that they had any problems might have failed to participate. On the other hand, there is a risk that a feeling of lack of anonymity have led to low response among physicians with stigmatising problems such as drug dependency or mental illnesses. Although anonymity was reassured both in a promoting article and in the covering letter, the main reason given for not participating was lack of anonymity [146, 172].

There was a higher response rate among females than males, and among young physicians. In the descriptive analyses of the total sample, this might have led to an overestimation of the percentages on issues that especially affects these groups. The youngest females complied more with the Pap smear recommendation than did the older. The higher number of young females in the sample as compared to the NMA-members can thus have resulted in an overestimation of the Pap smear compliance in the total group of female physicians. However, this has not affected the main results, i.e. that female physicians are less likely than university-educated women to comply with the recommendations. The difference between physicians and other women might, in fact, be underestimated.

Among the different groups of physicians, private specialists had an especially low response rate. However, the number of private specialist in the total population was low. They comprised of only 5% of the NMA-members [77], and 3% of our sample. They were not analysed as a separate group in our study, but were included in the group "clinicians outside hospital" where they comprised less than 10%. A response rate of 70% among the private specialists would have increased the percentage to approximately 13% in the "clinicians outside hospital"-group. Thus, the low response rate among private specialist has probably not influenced the results.

The NMA-survey included only the active members of the NMA. Physicians who were retired due to illness were thus excluded. This indicates that the results can be influenced by the healthy worker effect, i.e. that it is the most healthy workers that remain in the work-force [197]. This might have led to an underestimation of health problems among physicians. The healthy worker effect can also affect the comparison between physicians and other occupational groups, as there can be a selection of healthy individuals into the physician group. Due to such selection problems, it is recommended to avoid using the general population as the comparison group in occupational epidemiology [197]. In our study we selected comparison groups that resembled the physicians in educational level, although we do not know if these persons have working situations that are comparable with that of the physicians. In NTHS, retired persons (n=45)

were excluded from the comparison group. This was not the case in NOWAC. However, the comparison group from NOWAC included only two retired women and three on vocational occupational rehabilitation.

The questionnaire answered by our comparison group in The Norwegian Women and Cancer Study had a response rate of 62%, making it vulnerable to selection bias. It might be that the respondents were those most interested in health issues, which in turn might have increased the proportion of Pap smear compliers in this material. However, the females in NOWAC had a low frequency of BSE performance, indicating that this is not the case. The representativeness of the NOWAC sample that included our comparison group was investigated by examining the distribution of age, length of education, and parity among the respondents and in the total sample of eligible women [198]. The proportion of nulliparous women among the respondents was 8.6% as compared to 10.4% in the eligible sample. Taking into account that having children under the age of 12 was associated with Pap smear compliance, this lower proportion of nulliparous might have resulted in an overestimation of compliers in NOWAC. However, this has probably not affected our main finding that there is less Pap smear compliance among physicians than in the general population. As a part of NOWAC, it was also studied how length and title of a questionnaire affected the response rate [199]. Five different questionnaires were used. The study revealed that although few pages and an intriguing title increased the response rate from 57% to 70%, the distribution on the different risk factors for breast cancer did not vary between the questionnaires with different response rates. This indicates that our results from NOWAC have not suffered from any significant selection bias.

As many as 88% of the inhabitants in the county of Nord-Trøndelag participated in The Nord-Trøndelag Health Survey, and 76% returned Questionnaire 2 that was used in Paper 5 [145]. Thus, the response rate can be viewed as acceptable. A study of the non-participants revealed that many did not show up because they were busy or not interested in the survey [200]. When a random sample of the non-participants were examined, the age group over 55 years showed a higher morbidity among non-participants than participants. Since our comparison group was non-retired people in the age group 25-69 years, this higher morbidity among older non-participants has probably not introduced any significant bias in our study. A study of those who returned Questionnaire 2 without answering the question on use of minor tranquilizers, revealed that missing was most likely among those who were over 60 years of age, widows/widowers, in poor health, or who had dropped out on all the questions concerning health, sleeping problems, nervous symptoms, and drug use [201]. Thus, the proportion of users in the NTHS might give a too low estimate, but this has probably not affected the conclusions in Paper 5 significantly.

Quality of information

Although "Norges læger" included biographies of presumably all Norwegian physicians born 1835-54, the information given might have been biased. When information was obtained by

others than the physicians themselves, data about illness were often missing. This means that the number of cases in the tables are to be viewed as minimum figures.

It is reasonable to believe that the diagnoses set by the physicians were correct according to the diagnostic criteria used at the time. There can, however, have occurred some misclassifications when we 100 years later systematised the findings, for example by classifying all cases of typhus as exanthemic typhus. The information about diseases given by the physicians might also have been biased: The editor listed a number of epidemic diseases and also asked about diseases attributed to the physicians' work [37]. This might have led the respondents to focus on these diseases when giving their information. Non-epidemic diseases and diseases not attributed to the physicians' work are therefore probably underrepresented in the tables.

The questionnaires in the NMA-survey consisted of different types of questions: Some were instruments, such as GHQ and JSS as shown in Table 2, which have been validated and used in different populations [167, 168, 171]. In the NMA-survey GHQ was used in a validated Norwegian translation. The NMA-research group did the two-way translation of JSS by use of bilingual psychologists and medical doctors [77].

In order to compare the physicians with other professional groups and the general population in Norway, the survey included a number of questions taken from large Norwegian population surveys [171]. The question on subjective well-being in Paper 5 were thus the same as used in NTHS [145]. The validity and reliability of the question have been found satisfactory in previous studies [188, 189]. The question on use of minor tranquilizers was also taken from NTHS. The validity has not been tested, but it is assumed that the drugs in question has been clearly defined for the general population [201]. It is reasonable to believe that this also count for the physicians in our study.

Many of the questions in Questionnaire P were constructed for the present study in order to explore physician specific issues that were not covered by validated instruments or in comparable surveys. Thus, the validity of the questions is difficult to assess. The questions were developed in co-operation with the NMA-survey research group, which mainly consisted of physicians. Since physicians also were the target population, it can be assumed that the face and content validity of the questions are good [202]. The questionnaire was also tested in a pilot study. We have, however, no information on criterion and construct validity of the questions.

The diseases reported by the physicians as a response to the questions on self-treatment and working whilst ill were probably correct. However, the result could be affected by the time that had passed since the event: e.g. it might be easier to remember serious illnesses than minor ones, resulting in an underestimation of minor illnesses. If the physicians gave only the symptoms, e.g. fever or nausea, these were coded according to the list of symptoms given in ICPC [183]. Some physicians gave more than one disease or symptom when asked about the diseases they brought to work. Since the question asked about the last event, we coded only the first mentioned disease/symptom, presuming that the latest event was remembered first. This might have resulted in some misclassifications. However, many of the symptoms or diseases

given could be classified in the same group of diseases, such as influenza and cold, which both were included in the group "infections" when we discussed the data in Paper 3.

The use of health services and health controls during the last three years is probably underestimated due to problems in remembering all contacts over such a long time period. Especially informal contacts with colleagues and friends are likely to be underreported. Physicians with serious or recent health problems might have been more likely to recall all forms of contact. However, some physicians gave comments to these questions revealing that they had used time in recalling their medical history: e.g. one physician who wrote that he had no physician contact since the year 1986.

When filling in the question about physician contacts during the last three years, some physicians requested an option about attending a specialist. Unfortunately, this option was inadvertently omitted from the final questionnaire, and thus we did not get information on this topic. Specialist contacts are probably included in some of the other categories, such as "Chosen a physician by chance" and "Self-referral to hospital", but still there is a possibility that we have an underestimation of physician contacts due to the omission of the specialist-category.

Those who were missing on the questions in which physician contacts and drugs were listed, were classified as "non-users", assuming that they had only paid attention to the physician contacts or drugs they had been using. This might have resulted in some misclassification leading to an underestimation of physician contacts and drug use.

In the questions exploring the frequency of BSE and Pap Smear testing, one of the given options was identical with the official recommendation of how often such tests should be performed. This could have led to social desirability bias [203], indicating that the compliance might have been overestimated.

In many questions the answer options given in the questionnaire were finer than those used in the analyses. Such a reduction of categories can lead to loss of information. When drawing new boundaries between the categories, we looked for meaningful boundaries which were inherent in the variable [195]. BSE and Pap smear were therefore divided into compliance with the recommendation or not. More frequent practising were included in the compliance category. Frequent Pap smear testing will not reduce the possibility of detecting cancer, and thus it is adequate to include it in the compliance category. However, frequent BSE might imply a risk of not detecting a lump, because the tissue changes are small from one examination to next. On the other hand, frequent BSE might reflect an awareness of the breast cancer risk. Thus, we decided to include physicians with high BSE frequency in the compliance group. These categories also resembled those used in NOWAC.

When dichotomising the health attitude variables in Paper 2, we chose to put the middle category into the "Low-agreement group" in order to reduce the possibility for overestimating the agreement.

The pre-categorised alternatives about why physicians had not attended health controls, were constructed partly based on the available literature on physicians' health behaviour, and

partly on assumptions made by the research group. After being tested in the pilot study, the text in some of the categories was adjusted according to the pilot panel's comments. In addition, all these questions had an open category with the possibility to mark other reasons for not attending controls. Only a few used this opportunity, indicating that the categories given were suitable.

Some respondents added comments to one or more of the questions in Questionnaire P, which may indicate a problem with the validity. Most comments were to clarify the answers, e.g. "I have worked whilst ill, but not during the last year". Some commented on the importance of focusing on the issue in question; some reported that they did not understand the question; and some wanted to express that they did not approve the survey. All comments were registered and used as guidance when registering, analysing, and interpreting the data. Although a few comments revealed that some of the questions might have been more clarified, most comments indicated that the respondents had interpreted the questions as intended by the authors.

GHQ was included in the analyses of female physicians' health behaviour, because we assumed that mental distress could have an influence on health behaviour. However, we found no significant effects. Since GHQ measures mental distress during the previous two weeks, it focuses on breaks in normal function rather than upon stable traits [167]. On reflection, GHQ should not have been included in Paper 4. However, the variable was not included in the multivariate analyses, and thus it did not have any influence on the main findings in the paper.

The data on the physicians and the comparison groups were collected in separate surveys not initially designed to be compared. Differences in questionnaire title and design, information procedures, and data collection procedures can have introduced biases that affect the results. We performed separate analyses on the physicians in NOWAC and NTHS. Although the figures were not identical with the figures in the NMA-survey, the physicians in these surveys showed the same trend as the NMA-physicians. This indicates that comparable data were collected in the surveys.

The data in NTHS were collected in 1984-86, and they were thus older than the NMA-data. However, the proportion of users of minor tranquilizers among university-educated people in Nord-Trøndelag did not change significantly from 1984-86 to 1989, indicating that the drug use could be compared to that of the physicians in 1993.

When comparing health problems among physicians and lay-people, there is a risk that the two groups are interpreting the questions differently. Physicians' better knowledge about when Pap-smears are actually taken might thus explain some of the difference in Pap smear compliance between female physicians and other females. However, this has probably not affected the main findings in the study.

Confounding

A confounder is a covariate that is associated with both the outcome variable of interest and a primary independent variable or risk factor [193]. If there is available data, a possible confounding factor can be controlled for by stratification or by using multivariate analysing tech-

niques [194, 204]. In this study we applied multiple logistic regression. The selection of variables for the multivariate analyses is discussed in the papers. There might, however, be confounders that we have not measured. For example, it would have been of interest to control for alcohol use when analysing drug use. However, due to the overlapping questionnaire design, only 82 of the physicians in our sample had answered the questions on alcohol use. In addition, alcohol use was measured differently in the NMA-survey and NTHS.

Interaction

Interaction refers to variation in the effect measure across levels of a third variable [204]. In logistic regression this can be investigated by creating a new variable that is the product of the two variables of interest [193]. A significant interaction found in Paper 5 indicated that the effect of mental health on the use of minor tranquilizers was stronger in the comparison group than among the physicians.

7.1.2 External validity

External validity concerns inferences to an external population, i.e. whether or not the findings in the study can be generalised to other groups than the studied [194].

The Norwegian material on the 19th century physicians included a whole birth cohort of physicians. The findings can therefore probably be generalised to all physicians practising in Norway in the second half of the 19th century. To what extent the findings can be generalised to physicians outside Norway, is difficult to assess, as the working situation and organising of the health care system might have been different. It is, however, reasonable to believe that physicians elsewhere faced the same danger of contracting diseases from patients as reported by the Norwegians. The medical knowledge of Norwegian physicians was probably not so different from that of other physicians. Norway's first Faculty of Medicine was established in Oslo in 1814, and it was organised in the same way as other medical faculties in Europe [205]. In order to gain new knowledge, many Norwegian physicians went on study tours abroad, and medical news were spread in reading clubs and medical journals [206, 207].

The NMA-survey is a nation-wide survey of the active members of The Norwegian Medical Association. The different questionnaires were distributed randomly among the members. More than 95% of Norwegian physicians are voluntary members of the Association [17]. The physicians who choose not to be members of the NMA might differ from the members, but unfortunately we do not have any information about them. It was initially attempted to include the non-members in the survey. However, the register held by the National Board of Health (Helsedirektoratet) was incomplete, and many of the mailings were returned with "address unknown" [28]. The high rate of NMA-members among Norwegian physicians indicates, however, that the study population is representative for physicians practising in Norway today. The nation-wide design and the inclusion of all specialities along with the high number of

participants make the survey quite comprehensive as compared to other studies of physicians.

Since the data were collected in 1993, the results could reflect an outdated situation. For example, a Pap smear screening programme was started in 1995 [208], and thus the proportion of physicians complying with the recommendation can have increased during the recent years. In addition, the "physician for physicians"-service has been made more available during the years since 1993 [71]. However, many have not registered for this service [209]. The introduction of the regular GP scheme in Norway in 2001 might affect the physicians' help seeking behaviour in the future, although experiences from other countries with regular GP schemes reveal that physicians still have a high frequency of self-treatment [104, 134]. With the exception of the changes experienced by general practitioners due to the regular GP scheme, the working conditions for Norwegian physicians have not undergone any significant changes since 1993. The findings in our study is therefore considered to be relevant for Norwegian physicians of today. A generalisation of the results to a system other than the Norwegian one, must be handled with care. The study has, however, focused on problems that might be inherent in the physician profession, indicating that the findings are relevant also for physicians in other countries.

The Norwegian Women and Cancer Study is among the largest epidemiological studies of cancer in Norway [144]. The survey included a range of questionnaires, and the participants were randomly sampled from the female Norwegian population. Our comparison group included only women with higher university education in the age group of 35-49. There might be differences in health behaviour according to length of education, and thus the findings from NOWAC in our study can probably only be generalised to the Norwegian female population with same age and educational level.

In The Nord-Trøndelag Health Survey all inhabitants in the county were invited to the screening. The participation rate in the age group we studied was high, although the response rate was lower on Questionnaire 2. The findings in the non-participation study did not affect our age group to a large extent. According to the drug sales statistics, the use of minor tranquilizers in Nord-Trøndelag is somewhat below the average of the whole country [210], which indicates that the difference between the physicians and the general population might have been overestimated in Paper 5. However, due to the large difference between male physicians and the male general population, we do not think this have influenced the main results. As in NOWAC, we selected a comparison group with higher university education. The findings can thus only be generalised to active workers in the same educational group in the general Norwegian population.

In sum, we consider the samples used in this thesis representative for the populations studied. The findings in the NMA-survey can be generalised to physicians practising in Norway today, and the findings in NOWAC and NTHS can be generalised to occupationally active people with higher university education in the general Norwegian population.

7.1.3 Reliability

Whilst the validity of a question or an item can be described as how well the question measures what it set out to measure, the reliability can be described as how reproducible the data are under different conditions and over time [202, 203].

Most of the questions in the NMA-survey have not been tested on reliability. The exceptions are the scales, GHQ and JSS, and the subjective well-being question, which have been tested in different surveys [167, 168, 188]. The drug use question in Paper 5 was analysed among the physicians who were a part of NTHS (but excluded from the comparison group). The proportion of drug users among the NTHS physicians did not differ significantly from the proportion of drug users in the NMA-survey, indicating that this question was reliable.

7.1.4 Statistics

Due to the cross-sectional design, the results can only indicate associations between the dependent and independent variables. The odds ratio is a measure of association, and it indicates how much more likely or unlikely it is for the outcome to be present among exposed than among unexposed individuals in a study [193].

The power of a test is the probability that a study of a given size would detect as statistically significant a real difference of a given magnitude [192]. A wide confidence interval is an indication of low power. The width of a confidence interval associated with a sample statistic depends on its standard error, and on the chosen level of significance (alpha level) [195, 211]. The sample size affects the size of the standard error, and thus the width of the confidence interval can be reduced by increasing the sample size. In the NMA-survey 1476 physicians received Questionnaire P. The sample size was a result of the distribution method where 16 questionnaires were distributed to 9266 physicians according to the key given in Section 5.2.2. Some analyses of sub-groups where there are few persons show rather wide confidence intervals, indicating that the sample size should have been larger. Thus, there is a possibility that we in these analyses have experienced Type II errors, i.e. missed to have rejected a false null hypothesis [192]. However, this is probably not a problem in the main analyses, where the numbers of individuals are high.

Whilst the p-value only gives information about rejection or not of the null hypothesis, the confidence interval also provides an idea of the likely magnitude of the effect and the random variability of the point estimate [195]. According to Gardner and Altman both p-values and confidence intervals should be presented [211]. If one should be excluded, the confidence interval should be presented alone. We chose a significance level of $p \leq 0.05$, and computed 95% confidence intervals. As far as possible we have tried to present both confidence intervals and exact p-values, but space limitations may have led to other presentation forms.

7.2 Discussion of main results

7.2.1 Diseases among 19th century physicians

To our knowledge, the Norwegian data on physicians' health in the 19th century are unique world-wide. Information on physicians' health in other countries is scarce, with the exception of the studies of causes of death [39,40].

Although it was not possible to compute the incidence of the diseases among the physicians and compare it with data from the general population, the figures in our study provide important information about the health and lives of 19th century physicians in Norway. The tables of diseases among the physicians and their families mainly list epidemic diseases. This is partly due to the data collection method which focused on these diseases. However, it also reflects that contagious diseases were the dominant group of diseases experienced in the society at that time [11,212]. During the 19th century new knowledge was gained in many fields of medicine, including causes of infections, vaccination, and antiseptics [213]. Smallpox vaccination was compulsory in Norway from 1810 [9]. However, it took some time before the larger part of the population was vaccinated. The main knowledge in microbiology was gained at the end of the 19th century and forward. Thus, during the time period covered in our study most contagious diseases had no vaccine nor treatment.

Due to the lack of therapeutic measures, preventive measures were important in the medical thinking in the 19th century [212]. It is all reason to believe that physicians possessed better knowledge of how to protect themselves against diseases than lay people did. In his study on causes of death among British physicians in the 19th century, Ogle found that physicians had lower mortality rates of smallpox than other men, indicating that physicians were more likely to be vaccinated [40]. With regard to other contagious diseases where vaccination were not available, physicians had higher mortality rates than other men. Thus, it seems that the physicians had a risky profession, despite their knowledge about preventive measures.

In his request to the physicians, Dr. Kiær did not ask specifically about health- and illness behaviour, but the biographies reveals information about physicians working and travelling whilst ill. Two examples are Dr. Johannes Ruth (1848-1884) who went on an exhausting journey whilst having typhus, and Dr. Thorvald Egeberg (1846-1885) who went on a 30 km sea journey to help a pregnant woman whilst he himself had typhoid fever [35,36]. The cases of transmission of diphtheria during operations also show that the physicians took great risks in order to help their patients.

It is difficult to compare the occupational hazards of the physician profession with the hazards of other occupations. We know that the working conditions were poor for many occupational groups, such as miners and factory workers already long back in history [214]. In the 18th century Ramazzini assumed that physicians had less occupational hazards than other "learned men" [33]. We do not have any comparable information about the health of other academic groups such as theologians or lawyers to test this hypothesis. However, these groups had

probably less contact with sick people than did physicians.

Although the professional life of the 19th century physicians was quite different from the life of physicians of today, some of the hazards experienced are still of importance; The 19th century physicians had limited possibilities to protect themselves against infection when treating patients. Skin injuries which resulted in lymphangitis, boils, and abscesses were thus common among the physicians. Today the physicians can protect themselves by using disposable latex gloves and a number of disinfectants, but injuries due to needle accidents are still a significant occupational hazard [82–84]. The 19th century physicians had no antibiotics against their most important threats, the infectious diseases. Today the growing amount of resistant bacteria makes the physicians, as well as the population in general, vulnerable again. In addition, we have not yet developed antibiotics that are effective against a range of diseases caused by viruses. Although transportation is easier today, and there are more physicians to be on call, physicians still experiences long journeys to visit the sick in some geographical areas, and at times they have accidents on their journeys [103].

In the 19th century, the physician's wife and children were at risk of contracting infectious diseases from the physician or from patients visiting their home. It is possible that the physicians' wives were especially at risk of contracting puerperal fever. However, we do not know if this could be attributed to the physicians' work, since few physicians gave any information about cause of infection in connection with puerperal fever; Two physicians reported that they had just returned from house calls when they attended to their wives, and two reported that their wives probably had been infected by the midwife.

The risk of infections is probably not so high among physicians' family members of today. However, some other hazards associated with being part of a physician's family might be the same; Some 19th century physicians reported that their wives suffered due to poor living conditions and from the strain of their husbands being absent on long and dangerous journeys. Today the economy is usually good among physicians [215], but the physician's marriage and family life might suffer from the physician's heavy workload and his strong commitment to his work [216].

In conclusion, the study shows that working as a physician in the 19th century implied a health hazard to the physician himself as well as to his wife and children. In addition to the risk of contracting diseases when handling patients, the physicians experienced danger when they made journeys to their patients.

7.2.2 Health behaviour of physicians of today

In order to study the health behaviour of Norwegian physicians of today, we focused on the use of health controls and on two indicators related to the early detection of cancer, namely breast self-examination (BSE) and Pap smear testing. A total of 37% had been to a health control during the last three years. Older physicians, hospital physicians, and females were most likely to have done this. Since the risk of disease increases with age, an increased attendance to health

controls with age was expected. One reason for more reports of health controls among hospital physicians might be that they have better access to occupational health services. However, the use of occupational health services in the study was small, which is also found in other studies of physicians [143].

The higher number of health controls among females than males are probably partly due to maternity clinic check-ups and Pap smear testing. However, the study of female physicians' compliance with BSE and Pap smear testing, revealed that many did not follow the recommended frequency of controls. Only 36% had a Pap smear test every third year. When including those with a higher test frequency than recommended, the proportion increased to 55%. Still, this is lower than in other surveys of physicians [129, 132]. The female physicians were even less likely to comply with the BSE recommendation, as only 31% practised BSE at least monthly. A low monthly performance of BSE is also reported among female physicians in the US (21%), whilst 86% of German physicians report to practise BSE regularly [109, 131]. The US study showed that high age (50-70 years), having a family or personal history of breast cancer, and being an obstetrician/gynaecologist were associated with BSE performance. We found no association between BSE and age or speciality in our sample of female physicians.

The reasons stated by the female physicians for not complying with the BSE and Pap smear recommendations, were that they forgot to do it, or that they were in a low risk group or without symptoms. In addition, some claimed to have problems with finding a physician to visit or finding time for Pap smear tests. Lack of time, forgetfulness, and low risk were also listed as the main reasons for not attending other forms of screenings among both males and females.

Many physicians work long hours and have problems in taking time off during office time [29, 31]. Lack of time is thus often given as a reason why they do not take care of their own health [128, 135]. A heavy workload can also explain why many physicians forget about their own health care. However, lack of time and forgetfulness can also reflect a problem in facing own vulnerability, and for some this might be an expression of denial. In addition, the physicians' resistance to disclose their own unhealth to patients and colleagues might hinder their engagement in health screenings [217]. Some physicians claimed to have no need for examination or testing because they had no symptoms of disease. Since the purpose of screening is to detect diseases at an early stage, waiting until symptoms occur can be too late. Thus, our results indicate that physicians do not employ their medical knowledge on themselves, and that they may deny their own vulnerability.

Norwegian female physicians have high confidence in Pap smear screening [218]. This reflects the knowledge that organised screening programmes have had a major impact on the reduction in cervical cancer mortality [219]. Still, physicians were less likely than other women with university education to comply with the Pap smear recommendation. Some physicians reported that this was due to a problem in finding a physician to consult. Many female physicians stated that they would prefer a physician of same gender, and that they would like to visit a physician whom they have no personal ties to when having a physical examination. If this is

difficult to organise, they might drop out of health controls. Self-treatment can also result in non-compliance. Physicians who do not have a personal physician are found to be less likely to be screened for cancer than other physicians [127].

Although female physicians were less likely to comply with the recommendations regarding BSE than Pap smear testing, they had a higher proportion of BSE compliers than other university-educated women. This might be because physicians are more familiar with the BSE technique, and also because it is an examination they can do by themselves without consulting another physician. We do not know if female physicians have more confidence in BSE than lay people have. The efficiency of breast self-examination on cancer mortality is less clear than for Pap smear screening. In the years since our study was conducted, the discussion about the use of BSE has been intensified. It is found that performance of specific BSE components may reduce the risk of death from breast cancer [220]. However, a recent review article concludes that BSE has no effect, and that it can even be harmful because diffuse findings might lead to increased numbers of physician visits and high rates of benign biopsy results [221]. Others argue that a major problem is that BSE is not performed correctly, and that there is a need to focus on how to teach women BSE [222]. Since physicians have knowledge about breast cancer and clinical examination, it is reason to believe that they can gain from practising BSE.

Studies from Denmark show that female physicians do not have an increased mortality rate of breast cancer, despite an increased incidence [85, 90]. This indicates that the cancer is often detected at an early stage, which may be attributed to a higher BSE compliance among physicians than among lay people. However, since our data from Norway show that only one of three physicians perform BSE monthly, there seems to be a potential for increasing the survival rate.

Physicians' health habits do not only influence their own health; it can also affect their patients' health. It is found that physicians with good personal health habits counsel their patients significantly more about health habits than other physicians do [223, 224]. Non-smoking physicians counsel more about smoking than physicians who smoke themselves [119, 225], and physicians who wish to improve their health habits are more likely than others to counsel their patients in the same direction [224–226]. A study of US female physicians revealed that those who performed BSE regularly were more likely than others to perform clinical breast examination on their patients [224].

We did not ask the physicians about their counselling practice, so we do not know if their own frequencies of BSE and Pap smear testing are reflected in their counselling. A study of Norwegian female GPs revealed that most of them recommended Pap smear tests every third year, but that up to 29% recommended their patients to have more frequent testing [218]. We do not know if these physicians had a high frequency of Pap smears themselves, but our study revealed that 18% of female Norwegian physicians were over-users of the test. However, it is more disturbing if the physicians' low compliance is reflected in their counselling of their patients.

In conclusion, we find that many physicians do not comply with the recommended fre-

quency of the health controls studied. They are more likely than other university-educated women to practise BSE, and less likely to have Pap smear tests. The physicians' low compliance with the recommendations might be due to lack of time and forgetfulness related to a heavy workload, and to problems in finding a physician to consult. However, it might also reflect denial of own vulnerability and neglect of own health. A better attention to the problem is needed. This study was conducted before the introduction of a Pap smear screening programme. Future studies should therefore investigate whether the reminders sent by such a programme will increase the compliance among female physicians. It is also of interest to explore whether the introduction of a regular GP scheme in Norway will affect the physicians' health behaviour.

7.2.3 Illness behaviour of physicians of today

The illness behaviour of physicians of today was explored by questions on use of health services, self-treatment, use and self-prescription of drugs, and illness behaviour attitudes.

A large number of Norwegian physicians had performed self-treatment during the last three years. This is in line with other studies of physicians [57, 72, 124, 134, 135]. Two out of three physicians were at present using one or more of the drugs listed in the questionnaire, and self-prescription occurred in 73% of the physicians who used a prescription drug. A high amount of self-prescription is also found in other studies [58, 112, 129, 134].

The use of anxiolytics and hypnotics presented in Paper 5 was analysed by using Questionnaire E, which explored drug use during the previous month. Questionnaire P, on the other hand, explored present drug use. The number of users of minor tranquilizers was highest among the respondents of Questionnaire P, indicating that the question on "present use" also included physicians with a rather infrequent use. Still, they defined themselves as users of minor tranquilizers. The answers on the two questions showed the same trend, i.e. that hospital physicians were less likely than other physicians to use minor tranquilizers. When analysing present drug use, the difference seemed to be due to a high number of users among physicians in the group "other positions". However, when analysing drug use during the previous month, there was also a significantly higher use among clinicians outside hospital as compared to hospital physicians (not shown in Paper 5). These findings indicate that the difference between hospital physicians and others discussed in Paper 5, should be further investigated before a final conclusion can be drawn.

Our results confirmed, on the other hand, the findings from other studies that physicians seem to have a higher proportion of users of minor tranquilizers than the general population, at least when it come to males [110, 136, 138]. The findings were stable also when controlling for mental health, indicating that other reasons than high mental distress among physicians should be looked for when investigating use of minor tranquilizers. A possible explanation is physicians' easy access to drugs, and their tendency to practise self-treatment. However, we found no gender difference in self-prescription, and we do not know why female physicians are not showing the same increased number of users relative to the general population as males do.

Clinicians outside hospital were more likely than other physicians to report present use of one or more drugs, especially antacids. At the same time they were less likely to self-prescribe. This seems to be in contradiction with the finding that they were more likely than others to practise self-treatment. However, it might be that the clinicians outside hospital have more easy access to drug samples and drugs prescribed for practice, and that they do not view the use of these drugs as an active self-prescription. A study of Irish general practitioners revealed they often used drugs obtained from samples [135]. Physicians who run their own practice have also easy access to different clinical tests, and thus they are able to initiate clinical investigations on themselves [124]. Easy access to drugs might explain the significantly higher use of antacids among clinicians outside hospital. However, it can also reflect high job stress. General practitioners employed by the municipality are found to report higher job stress than other general practitioners and hospital physicians, although chief physicians in hospital report even higher stress [30, 227, 228].

Self-treatment and self-prescription of drugs are often referred to as the major hazards of being a physician [229, 230]. The physicians' knowledge in medicine and their easy access to drugs and clinical tests may enhance self-treatment. For minor illnesses this might not be viewed as dangerous, and many probably find it inconvenient and unnecessary to consult a colleague when having a disease that they are familiar to treat. However, self-treatment implies treatment without the objectivity and distance to the patient that is needed in a physician-patient relationship. A physician who becomes ill can have problems with the evaluation of his symptoms due to anxiety and denial [102]. Also lay people may respond to illness with anxiety and denial, and thus delay seeking help [231, 232]. However, physician patients can delay their help seeking substantially by practising self-treatment with drugs or by performing blood tests and examinations other patients need to get from a physician.

To some degree, physicians need to suppress their anxiety about own health and vulnerability in order to manage the daily work with patients' illnesses and suffering [101, 233]. This can, however, lead to a feeling that physicians are invulnerable and immune to the diseases they treat, which may result in denial, unawareness, or neglect of own symptoms [98]. This seems to be the case also among Norwegian physicians. Almost half of them admitted that they tended to minimise their symptoms, and they also stated that they had a higher threshold for taking antibiotics themselves than giving it to patients. Many reported to drop out of screenings because they found no need for it, and 13% had actually experienced that they had misjudged their symptoms and practised inappropriate self-treatment.

The medical culture may reinforce the physicians' neglect of own health by stigmatising or ignoring illness among colleagues [103, 217, 234]. In addition to lack of time and direct access to medication, Irish physicians listed embarrassment and not wishing to impose on a colleague as reasons for not consulting other physicians when ill [135]. The same reasons were often given by Norwegian physicians who had experienced serious illnesses [103]. A physician can avoid to reveal his illness to colleagues because he is afraid they will think he do not manage the

job as a physician [235]. In addition, many do not want to bother colleagues with banal diseases, as they might be afraid of revealing that they have made a wrong diagnosis or exaggerated their problems. All this can hinder physicians in seeking help, and thus enhance self-diagnosing and self-treatment. In addition to neglect of illness, medical knowledge might also lead to unnecessary anxiety of having a serious disease [102]. Especially young and female physicians in our study admitted to think of serious diagnoses when ill.

Among the physicians in our study, one out of four would try to hide their illness from their colleagues, and especially old physicians were likely to report this. On the other hand, almost half of the physicians found it easy to ask colleagues for advice when ill. More old than young physicians, and more males than females, found it easy to seek advice. If problems in seeking advice hinder the physicians to seek help when ill, this finding indicates that especially young and female physicians are vulnerable for self-treatment. Young physicians were, in fact, more likely than older to practise self-treatment, and they were also more likely to state that they preferred a physician whom they had no personal ties to. We found no significant gender difference in self-treatment. Females were, however, more likely than males to seek help by a regular GP or to chose a physician by chance. This reflects the finding that more females than males would prefer physicians whom they had no personal ties to. It is also in line with the help seeking behaviour of the general population, where females seek help in the health care system more often than males do [236].

Many physicians reported that they had been working whilst having infections or other diseases they would have sick-listed a patient for. The high tendency of working whilst ill is also shown in other studies of physicians [74, 142, 143, 217]. However, the whole range of diseases physicians bring to work have, as far as we know, never been published before.

The reasons for not taking sick leave have been related to both psychological and organisational factors, such as a high feeling of responsibility and difficulty in getting locums [142]. Some authors have claimed that compulsive traits are common among physicians, and that this can lead to an exaggerated sense of responsibility towards patients and colleagues [67, 101]. Many physicians proudly reports that they have not given in for illness [103]. Difficulty in getting locums, along with economical issues, can explain why general practitioners and private practising specialists were most likely to work whilst ill. These physicians often work alone or in small practices. In addition to care for their patients, physicians seem to have a high sense of obligation towards their practice partners [142,217]. They do not want to give them extra work.

Low job satisfaction was also associated with working whilst ill. One possible explanation is that problems in taking sick leave reflects low job autonomy, which is associated with low job satisfaction [228]. Another explanation can be that physicians with low job satisfaction have a lower threshold for reporting episodes of working whilst ill. Physicians in the age group 30-39 years were more likely than the oldest physicians to work whilst ill. Young physicians are often working in training positions where they are mutually interdependent, and thus they may have a high threshold for imposing others to cover their calls. Another reason for the difference might

be that older physicians are less restrictive than younger in taking sick leave. Such an attitude is reflected in studies that have found old physicians to be more likely than young ones both to sick-list and to give long duration of sick leaves to their patients [237, 238].

The behaviour of working whilst ill might be harmful to the physician themselves as well as to their patients and staff members. Many physicians are working whilst having possible contagious diseases, thus setting their patients and staff members at risk of getting infected. In addition, physicians who work whilst ill are at risk of performing poor practice due to being indisposed. The physician himself is at risk of getting worse because he is neglecting his illness. This can finally result in a long spell of sick leave. The findings in other studies that physicians tend to have low frequencies, but long spells of sick leaves, indicate that physicians are going on sick leave only when it is clearly necessary [141, 142]. However, taking into account that physicians are working whilst having a whole range of diseases that qualifies for sick leave, our study show that physicians' threshold for taking sick leave might be too high.

Physicians' tendency to work whilst ill can also be associated with their reluctance to seek help, as long term sick leave is to be initiated by another physician. Physicians' threshold of seeking formal help in the health care system seems to be high. Instead, they tend to seek help in an informal way, i.e. by consulting a colleague in the corridor or asking a friend for advice [100, 102]. Such consultations can be hazardous, as neither the patient nor his physician follow the rules for a normal consultation. The physician who is ill might give limited information, either because of time pressure or because he do not want to expose all sides of himself to the other [100]. Also the examination will usually be limited, because the setting is inappropriate. In addition, the consulted physician might not respond adequately, as the encounter is not viewed as a consultation [96].

Treatment obtained by contacting friends or colleagues at work was common among Norwegian physicians. We did not ask specifically about the form of these contacts, but it is reasonable to believe that many of the contacts were informal as described in other studies of physicians [100, 102]. However, also formal treatment by friends or colleagues might be difficult due to personal ties between the treating physician and the patient. If the treating physician is a spouse or a family member, the physician-patient relationship can suffer even more. Physicians often report to treat members of their own family [78, 134, 169]. Data from the NMA-survey show that 40% of Norwegian physicians treat their spouse/cohabitant (Gjengedal and Rosvold, unpublished data). In the present study, especially female physicians reported to get treatment from their spouse/cohabitant, probably because more females than males had a physician partner. Personal ties between the patient and the physician are especially problematic when it comes to stigmatising problems or intimate examinations. This is reflected in the result that three out of four female physicians state that they want a physician whom they have no ties to when they need a somatic examination.

We found that clinicians outside hospital were more likely than hospital physicians to practise self-treatment, whilst hospital physicians were more likely to consult a colleague at work.

This reflects the findings in a British study of physicians' response to hypothetical illnesses [134]. Hospital physicians have more physician colleagues than the other groups, and also more colleagues trained in different specialities, and thus they have more easy access to informal advice. They reported less self-referral to hospital than the other physicians, probably because they by contacting colleagues already were receiving hospital treatment. Up to 30% of physicians who worked outside hospital had referred themselves to hospital during the last three years, and thus chosen to seek help from another physician. We do not know how appropriate these referrals were. However, a study of British general practitioners revealed that self-referrals were more likely to be inappropriate than referrals made by another physician [124]. In addition, self-referral implies that the physician himself has the responsibility for the follow-up once discharged from hospital, which might not be easy nor recommended.

Physicians might perceive the health services available to them as irrelevant, or they do not know about them at all [74, 234]. Few seek help in the occupational health care system [143], and many have concerns about confidentiality [102, 217]. Confidentiality is especially a matter when the physician has mental problems [235]. This was also shown in our study, where half of the physicians would seek help for mental problems elsewhere than in the local mental health care facilities.

Even if the consultation is formal and in an appropriate setting, physicians can find it difficult to enter the patient role [100–104, 233, 239]. The treating physician can also find it difficult to define his role in the relationship. The physician patient can be reluctant to let the other physician be in charge of the treatment. He might have difficulty in knowing what is expected of him as a patient. His use of medical terms when describing the illness, and his interpretation of his own symptoms, can mislead the treating physician. In addition, the treating physician can feel professionally insecure when having a patient trained in medicine, which can lead him to initiate too extensive examinations. He might provide less information than he gives to ordinary patients, because he believes that the physician patient knows the medical facts of the disease and the treatment procedure. There is also a risk that he over-identifies with the physician patient, and thus faces his own anxiety of becoming ill. The latter might lead him to distancing himself from the patient, which can result in poor treatment. When in hospital, both the physician patient himself and the staff might have problems in defining their roles. Some physicians thus experience to be treated as VIP-patients, whilst others are neglected [102–104].

Professional courtesy, i.e. the provision of care to colleagues without charging them, can give a feeling of being a VIP-patient. However, it might also have a negative effect on the physician-patient relationship. A physician who is not paying can feel indebted to his treating physician, or be afraid of using too much of the physician's time [101, 233].

Physicians who treat physicians need knowledge about physicians' reaction to illness and the problems they may face in the consultations with such patients. Some authors have given advice about this [101, 102, 233, 240]. The treating physician is advised to reassure about confidentiality and clarify the physician-patient relationship as early as possible; to take thorough

examinations in optimal circumstances; to ask about self-treatment and self-diagnosis (the patient might have consulted an old textbook and jumped to conclusions); to discuss the diagnostic and treatment plan in detail; and also to be aware of own feelings. Physicians who are anxious about treating other physicians, should not accept such patients. The authors also call attention to the corridor encounter. Physicians are advised to avoid such treatment, but not to refuse helping a colleague who is ill. Instead they can use the informal consultation to encourage the colleague to seek appropriate help [96,233]. In sum, the advice intend to secure that physicians receive same treatment as other patients.

In many countries there are support services or treatment programmes for physicians who have drug problems, are mentally ill, or in crisis [51,241]. Recently, web-services where physicians who become ill can get informal advice have been established [242]. During the 1990's, The Norwegian Medical Association established support-groups in all counties for physicians who are ill or impaired [71]. These groups can be contacted by the physicians themselves, or by family members or colleagues who find that a physician need support. In 11 counties there are also psychiatrists who are specially trained to treat physicians. Furthermore, the NMA established a health resource centre in 1998, "Villa Sana", where physicians facing problems such as burnout can attend courses alone or together with their families [71,243].

In contrast to these services to impaired or "burned out" physicians, the "physicians for physicians"-service aims to provide primary health care services to all physicians. The NMA's "physician for physicians"-service was started as a pilot project in two counties in 1990/91 [26,27]. The service was available in four out of 19 counties in 1993, increasing to 16 counties in 2001 [71]. The service gives physicians a possibility to sign up with a regular physician who is specially trained to treat physicians. The treating physicians are general practitioners educated by the NMA [244]. They offer ordinary medical services. The treatment is reimbursed by the national insurance system, and the physician patients pay ordinary rates. An evaluation of the service in the county of Rogaland in 1994 revealed that the participants were very satisfied [27]. Still, many physicians do not use the service. In 1999, only 22% of the physicians in Oslo had registered [209]. Since the service was established as a pilot in two counties only when our survey was conducted, few physicians reported to have contacted a "physician for physicians". However, 38% of the physicians reported to be interested in joining such a service.

Although regular health check-ups are not recommended for the general population, it might be beneficial for physicians, since they seldom seek help. An evaluation of the "physicians for physicians"-service in the county of Akershus revealed that the participants appreciated the psychosocial aspect of the health control most of all [245]. It was thus recommended that a control covering both somatic and psychosocial problems should be performed every third to fifth year [26,245].

In 2001, a regular GP scheme was introduced in Norway, and along with the rest of the population physicians were to sign up with a personal physician [18]. The "physician for physicians"-service is to be continued within the framework of this system, as physicians have

the possibility to choose a specially trained physician as their regular GP [244]. By today, we do not know to what extent this has actually happened, neither do we know if all physicians have chosen a regular GP. In the general population, 99.5% have signed up [246]. In one county, Møre og Romsdal, the "physician for physicians"-service has been terminated as a result of the regular GP-scheme, but physicians who treat physicians are encouraged to attend courses on the subject arranged by the NMA [244].

Results from other countries with a regular GP scheme has shown that up to 99% of the physicians are registered, but that many are registered with a personal friend or a practice partner [72, 124]. We do not know if Norwegian physicians have avoided to sign up with friends or practice partners. However, the new Health Personnel Act, which became operative 1 January 2001, states that health personnel who are disqualified pursuant to the Public Administration Act §6, are not allowed to issue medical reports, medical certifications etc. [247, 248]. This implies that physicians are not allowed to sick-list or prescribe reimbursed medicines to friends, practice partners, or family members. Thus, physicians should be registered with a regular GP whom they have no ties to.

Even if they are registered with a regular GP, we do not know if Norwegian physicians will seek this physician when they become ill. Unfortunately, studies on physicians' illness behaviour in countries with a regular GP scheme reveal many of the same problems in taking care of own health as shown by Norwegian physicians in our study [104, 124, 142]. This indicates that the regular GP scheme is not a substitute for the "physician for physicians"-service. A future study should investigate whether the Norwegian physicians are changing their help seeking behaviour due to the regular GP system and the increased availability of "physicians for physicians".

In conclusion, the study of Norwegian physicians' illness behaviour show that most physicians practise self-treatment, and that they are self-prescribing drugs, including minor tranquilizers. Male physicians are more likely to use minor tranquilizers than are other university-educated men. Physicians have a high threshold for taking sick leave, and they often contact friends and colleagues when they need help from another physician. Females and young physicians find it less easy than males and older physicians to seek advice from colleagues, and the first two groups are also more likely to state that they prefer a physician whom they have no personal ties to.

The illness behaviour of physicians described in this study is in line with findings reported in personal experiences, case histories, and qualitative and quantitative studies of physicians in different countries. The citation below, written by the Australian general practitioner Tony Rogers, is thus also valid for Norwegian physicians:

The 3P (primary, preventive, patient-centred) and 3C (continuing, comprehensive, in the community) model of general practice seems to be substituted when it comes to doctors' own health with the 3D (delusion, denial, and delay) and 4S approach (self-investigation, self-diagnosis, self-treatment, and self-referral) [249].

8 Concluding remarks

The findings in this study show that being a physician implies certain health risks, and that physicians who become ill not always cope with their illness in a rational way.

In the 19th century, the physicians and their family members contracted infectious diseases that could be attributed to the physicians' work. Thus the physician's profession could be a health hazard to himself as well as to his wife and children. In addition, the physician experienced danger when going on journeys to visit his patients.

Today, when the risk of contracting infections is smaller, physicians still faces a major health hazard related to their profession: Despite their medical knowledge, it seems that physicians have problems in taking care of their own health. They do not comply with the recommendations for health examinations, they practise self-treatment when they are ill, and they have a high threshold for taking sick-leave. Although they state that they prefer to be treated by a physician whom they have no personal ties to, physicians often use informal contacts with friends or colleagues when asking for help.

The reason for this behaviour is complex. It might be due to a heavy workload and a strong feeling of responsibility towards patients and colleagues. Other reasons can be that physicians due to their daily work with illness tend to neglect or deny signs of illness among themselves, and that they are afraid of showing their weakness to their colleagues.

The study show that there is a need for physicians to focus on their own health- and illness behaviour, and that efforts should be made to lower the threshold for physicians to seek help in the health care system. The "physician for physicians"- service can contribute to improving the physicians' health care. However, all physicians, both the patients themselves and those who treats them in primary health care and hospitals, need to be aware of the problems that arise when a physician becomes a patient.

Although Chekhov was a 19th century physician, his behaviour when ill is comparable with that of the 20th century physicians. He denied his illness and was afraid of seeking help, and he also worked whilst ill. In a letter to his publisher Leikin on 10 July 1886 he wrote:

Upon returning from Moscow I discovered to my horror that I could neither sit nor walk: my haemorrhoids had struck again. ... Five days ago I went to Zvenigorod to stand in for a while for my colleague, the district doctor, I was up to my eyes in work and felt unwell [5].

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Errata

Paper 5

Page 581, Abstract, line 3: n=1476 (not 1467)

Page 582, Material, paragraph 1, line 9: 1476 (not 1467)

Page 582, Material, paragraph 1, line 12: 73.0% and 69.9% (not 73.4% and 70.3%)

Page 582, Material, paragraph 2, line 9: 25 to 69 years (not 24 to 69)

Page 583, Material, paragraph 1, line 5: n=87285 (not 87282)

Page 583, Material, paragraph 1: The response rate for the NTHS questionnaire is missing.
The response rate was 76%.

Page 584, Table 1, column 1, line 6: 25-30 years (not 24-30)