The physician and the sickness certification

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In memory of my mum, Sigbritt Starzmann

For all the science you taught me at the dinner table

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ABSTRACT

Background and aims: Sickness insurance is a hallmark of most welfare states. The rising costs of sickness insurance in Sweden have been attributed to varying sickness certification practices among physicians. Other factors, such as the gender and socioeconomic status of the patient, or the experience of the physician, may affect the rate of sickness certification. The importance of these factors alone and in relation to each other has been the focus of the two first studies in this thesis. In 2006, the government introduced new reforms, the so-called "sick leave billion", to improve the quality of the sick leave process and reduce the costs of sickness insurance. It is of interest to investigate how these reforms have affected the quality of the sick leave process and the physicians' views of their working conditions. Symptom diagnoses (R diagnoses) in sickness certificates are easy to capture in national registries and have been shown to predict poor certificate quality. The potential usefulness of this marker was investigated in the third study. Primary health care physicians consider sickness certification problematic. The aim of the fourth study was to investigate whether the views of physicians changed after the introduction of the reforms.

Methods: Study I and II: Retrospective study of computerised medical records from 24 Primary Health Care Centres (PHCCs), 589 physicians and 88,780 patients in 2005. Study I: Comparison of sickness certification rates and duration between physicians of different gender and experience. Study II: Multilevel logistic regression analysis of variations in sickness certification at three levels: patients (n = 64,354: gender, age, socioeconomic status, workplace factors and diagnoses); physicians (n = 574: gender and experience), and PHCCs (n = 24). Study III: Retrospective study of computerised medical records and texts from sickness certificates from PHCCs, 2013-2014. Patients with a symptom diagnosis (SD) in the certificate, n = 222, and controls with disease-specific diagnoses, n=222, matched for sex and age, were compared concerning health care consumption, quality of the text in the certificates, duration of sick leave and time to contact for rehabilitation. Study IV: Qualitative design, six focus group interviews were carried out in PHCCs in Västra Götaland in 2015, including GPs, interns, GP trainees and locums (n = 28). Qualitative content analysis was used to explore the views of physicians on the sickness certification process after the introduction of the reforms.

Conclusions: Physicians of different gender handle sickness certification in a similar way. GPs issued certificates of longer duration. In the multilevel model, the most important factors for the variation in sickness certification were patient-related (diagnosis and socioeconomic status) and the physician's contribution was small. Symptom diagnoses in the certificate were associated with higher health care consumption and poorer quality of the sick leave process. The focus group interviews showed that the physicians perceived the sickness certification process as emotive and a challenge to master, with different demands and expectations from the management and the patients.

Keywords: Sick Leave, Primary Health Care, Multilevel Analysis, Gender, Physicians, Socioeconomic factors, Guideline Adherence, Survival Analyses, Qualitative study, Focus groups

SAMMANFATTNING PÅ SVENSKA

Den höga sjukfrånvaron i Sverige har under många år varit debatterad och det har gjorts flera regeländringar för att få sjukskrivningarna på en låg och stabil nivå. Olika förklaringsmodeller till varför Sverige har höga sjuktal har presenterats såsom dålig arbetsmiljö, överutnyttjande och bristande rehabilitering och varierande sjukskrivningspraxis bland läkare. Men vilka faktorer som spelar störst roll för sjukskrivning är inte klarlagt. Det har framkommit att kvalitén på sjukintyg är ett problem för bedömningen av rätten till sjukpenning. Läkarna själva tycker att sjukskrivningsuppdraget är betungande, framförallt bedömningen av patientens arbetsförmåga. Regeringen har sedan 2006 tillfört en miljard kronor per år för att förbättra sjukskrivningsprocessen med bl.a stöd (beslutsstöd, utbildning i funktionsbedömning och intygsskrivning) riktade till läkare.

Avhandlingens syfte var att studera sjukskrivningar med fokus på läkarens sjukskrivningspraxis, faktorer av betydelse för sjukskrivning, kvalitetsmarkörer för läkarintyg och sjukskrivningsprocess samt läkarnas syn på sjukskrivning efter stödinsatserna.

Med data från primärvården i Skaraborg från 2005 studerades skillnader mellan olika läkares sjukskrivningar i avseende på genus och erfarenhet i relation till diagnos (Arbete 1). Ingen skillnad fanns mellan manliga och kvinnliga läkares sjukskrivningar, men distriktsläkare sjukskrev patienterna längst tid jämfört med andra läkare. Detta kunde förklaras av att sjukskrivningar av patienter med längre och mer komplicerade sjukskrivningar i större utsträckning sköttes av distriktsläkare.

Med hjälp av flernivåanalys studerades betydelsen av olika faktorer för sjukskrivning; diagnos och socioekonomi hos patienten, kön och erfarenhet hos läkaren samt vårdcentralsfaktorer (Arbete 2). I modellen med samtliga nivåer inkluderade förklarades variationen i sjukskrivning bäst av patientrelaterade faktorer, i synnerhet diagnoser. Socioekonomiska faktorer som innebar lägre position i samhället, såsom att vara kvinna, utlandsfödd, låg utbildning och att familjen uppbar socialbidrag föll också ut som förklaringsvariabler.

I det tredje arbetet studerades kvalitén på läkarintyg och tid till rehabilitering av patienter med symtomdiagnos jämfört med sjukdomsspecifik diagnos på läkarintyget. Läkarintygen saknade i stor utsträckning väsentlig information i båda grupperna, men mer uttalat på intyg med symtomdiagnos. Patienter med symtomdiagnos sjukskrevs mer per telefon och hade större vårdkonsumtion än de med sjukdomsspecifik diagnos. Kvinnliga patienter med symtomdiagnos saknade oftare väsentlig information på läkarintyget jämfört med manliga patienter. Denna skillnad sågs inte mellan kvinnor och män med sjukdomsspecifika diagnoser.

I det fjärde arbetet studerades primärvårdsläkares upplevelse av att sjukskriva patienter i Västra Götalandsregionen med fokusgruppsintervjuer analyserade med kvalitativ innehållsanalys. Alla kategorier av läkare som arbetar i primärvården deltog (distriktsläkare, ST-läkare, AT-läkare och stafettläkare). Det framkom att sjukskrivningsprocessen upplevdes som känsloladdad och en utmaning att behärska med olika krav och förväntningar från ledning och patienter. Trots stödinsatser som rehabiliteringskoordinatorer och beslutsstöd upplevdes uppdraget som tungt. Flera läkare planerade att lämna specialiteten på grund av sjukskrivningsuppdraget. Socialstyrelsens försäkringsmedicinska beslutsstöd upplevdes som positivt, medan utbildningen i funktions och aktivitetsbedömning (beskrivning av arbetsförmåga) upplevdes positivt i mindre grad. En lösning som föreslogs var att specialiserade team skulle ta över de längre sjukskrivningsfallen.

LIST OF PAPERS

This thesis is based on the following studies, referred to in the text by their Roman numerals.

I. Starzmann K, Hjerpe P, Dalemo S, Björkelund C, Bengtsson Boström K. No physician gender difference in prescription of sick-leave certification: A retrospective study of the Skaraborg Primary Care Database. Scand J Prim Health Care. 2012; 30: 48-54.

II. Starzmann K, Hjerpe P, Dalemo S, Ohlsson H, Björkelund C, Bengtsson Boström K. Diagnoses have the greatest impact on variation in sick-leave certification rate among primary-care patients in Sweden: A multilevel analysis including patient, physician and primary health-care centre levels. Scand J Public Health. 2015; 43: 704-712.

III. Starzmann K, Hjerpe P, Bengtsson Boström K. Symptom diagnoses in the sickness certificate predict lower quality of the sick leave process. A retrospective study of medical records in Sweden. In manuscript.

IV. Bengtsson Boström K, Starzmann K, Östberg AL. “If only we could be spared.” Primary care physicians’ voices on sickness certification. Focus group interviews in Sweden. Submitted.

CONTENT

ABBREVIATIONS

ACG	Adjusted Clinical Groups Method
AFU	Work capacity assessment (Aktivitetsförmågeutredning)
€	Euro (9.83 SEK)
FMLA	Family and Medical Leave (US)
GDP	Gross Domestic Product (BMP)
GP	General Practitioner
ICD	International Classification of Diseases
ICF	International Classification of Function
CBT	Cognitive Behavioural Therapy
LOV	Swedish Act on Freedom of Choice (of health care provider) (Lagen om valfrihetssystem)
LUH (2300)	Doctor's assessment of medical status
MeSH	Medical Subject Headings
MMR	Multimodal Rehabilitation
MUPS	Medically unexplained physical symptoms
OR	Odds Ratio
Pat	Patient
PHCC	Primary Health Care Centres
RTW	Return to Work
RCT	Randomised Controlled Trial
R&D	Research and Development
SD	Symptom Diagnosis
SIO	Social Insurance Officer
SKL	Swedish Association of Local Authorities and Regions - SALAR
UK	United Kingdom
WHO	World Health Organization

DEFINITIONS IN SHORT

Activity compensation	Limited disability pensions for people below 30 years of age.
Basic Amount	Prisbasbelopp (2017 = 44,800 SEK)
Net days	Part-time sick leave converted into full sick days ½ + ½ = 1 ¼ + ¼ + ¼ + ¼ = 1.
R-diagnoses	Diagnoses from ICD-10, chapter XVIII; for instance, dizziness, pain, palpitation.
Sick leave process	Referrals, investigations and meetings during the sick leave period.
Social Insurance Agency	Försäkringskassan
Swedish Public Employment Service	Arbetsförmedlingen
Qualifying period	Karensdagar

1 INTRODUCTION

Sweden is a welfare state with long life expectancy but with high and fluctuating rates of sickness absenteeism (1). Today, absenteeism due to sickness in Sweden is slightly higher than the European average; 2.8 vs. 2.6% (2). The rising costs of sick leave have been considered a societal problem for many years and the Swedish Parliament decided in 2005 that efforts should be made to reduce sick leave rates to half the 2002 rate by 2008 (3). Sweden achieved the target successfully in 2009, but sick leave rates are now rising again. For physicians, especially in primary care, the sickness certification task has become an ever-increasing burden (4-9). This is a result of new regulations and requirements introduced by the Swedish Social Insurance agency (10, 11), in an attempt to control sickness absenteeism.

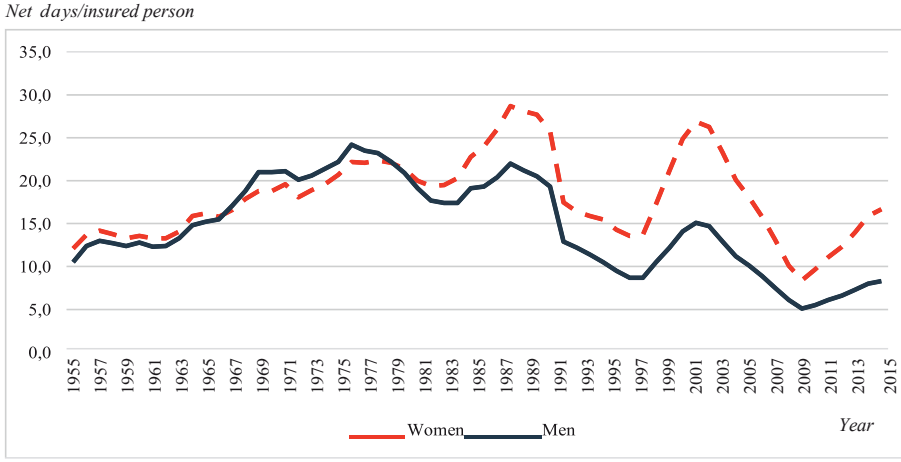


*Figure 1. Number of paid net days for sick leave in Sweden from 1955 to 2015. *Definition until 1997: Number of paid sick days per insured person. From 1998: Number of paid sick days per insured person, except those with disability pension or activity compensation.*

1.1 HISTORICAL ASPECTS OF SOCIAL INSURANCE

Throughout history, people have had to rely on others in case of illness and/or inability to support themselves. From about the 12th century in Europe, craftsmen began to organise themselves in guilds, for the benefit of their businesses but also to ensure economic support for burials, during sickness, to widows of guild members, or when needed (12). During the industrial revolution, starting in Great Britain in the late 18th and early 19th century, people moved to the cities and became wage earners. At the beginning of this era, many were poverty-stricken and had to rely on whatever system of poverty relief that was offered by society if they fell ill (13). Different kinds of insurance schemes were introduced in various countries in Europe in order to ease some of the suffering. Some of these were funded both by the employees and the employers and others only by the employers. In Germany, the industrial revolution took off around 1850 and a new working class emerged and grew. This growing working class was seen at the time as a threat to established society. This was during the time when Karl Marx and Friedrich Engels developed their theories of socialism. To curb this development, the Chancellor of Prussia, Otto von Bismarck, introduced antisocialism laws and advocated greater responsibility on the part of society to prevent rioting and revolution by the workers. A sickness insurance scheme was introduced in 1883 and, one year later, a work accident insurance scheme, financed in part by society, was introduced (14). These insurance schemes were the precursors of the public insurance system that we have today. Only blue-collar workers were included and the compensation was low but income-related.

1.1.1 HISTORICAL ASPECTS OF SICKNESS BENEFIT IN SWEDEN

Before the 19th century, Sweden was an agricultural society where the master was obliged to take care of the servants according to the oldest laws of Sweden, the provincial laws (15). In the 19th century, Sweden lagged far behind Europe, especially Germany and the UK, in terms of adopting a general social welfare system. The Swedish parliament discussed the reforms of von Bismarck in 1882 and 1884, and in 1891, the already existing voluntary sickness insurance schemes in Sweden were granted limited support from the state (14). In the beginning, only healthy employed individuals could apply to be included in an insurance scheme.

The voluntary sickness insurance schemes that competed with each other ran into economic problems when they tried to recruit new members by lowering their premiums. This led to low compensation payments and healthy people did not see the need for insurance. People with a high risk of illness were overrepresented in the voluntary insurance schemes and this development resulted in a negative financial balance (16). To mitigate this effect, the government granted the sickness insurance societies monopoly for one district each in Sweden. At the beginning of the 20th century, the Swedish Parliament made a serious effort to establish a common social security insurance system for all citizens in Sweden (14).

1.1.2 DEVELOPMENT OF TODAY'S SICKNESS BENEFIT SYSTEM IN SWEDEN

When the Social Democratic party won the general election in 1932 and formed a government, this was the starting point for the Swedish welfare system (16). Gustav Möller, an influential politician from the Social Democratic party, was Minister for Social Affairs and Chairman of the Social Welfare Committee. He argued for a flat rate insurance scheme, along the lines of that described by William Beverage, a liberal economist in the UK, in his 1942 report (17). The Public Sickness Insurance Act was adopted by parliament in 1947 but was not implemented. At that time, Gustav Möller was replaced by Gunnar Sträng as Minister for Social Affairs and the flat rate insurance was changed into an income-related sickness insurance scheme. The parliament adopted a new social insurance act in 1953, which came into force in 1955 (18). This was late, compared with the development of social welfare arrangements in other European countries (19).

Sweden experienced remarkable economic development during the post-war period that allowed many welfare reforms; see Table 1. On average, the GDP increased by 3.5% in the 1950s and by 5% during the 1960s (20). This led to generous reimbursements from the social security insurance schemes; until 1991 it was possible to grant disability pensions and then not only taking medical disabilities into account but also unemployment. During the 1990s, Sweden went through an economic recession and the costs of sickness benefits increased. This led to many changes to the social security systems, with the qualifying period being modified several times (between 0-3 days). Furthermore, the employers' share of the sickness benefit payments was altered several times, from 0 to 4 weeks. The sickness certificate in the 1990s was written on an A5 sheet of paper, whereas nowadays it consists of two A4-sized pages (Appendix 1).

Table 1. Overview of changes to the legislation on Swedish public sickness benefits, 1955-2016.

1955	Public insurance for sick leave. Sickness benefit: 60% of the average pay of a blue-collar worker. Time limit for sickness benefit was 2 years. Qualifying period of 3 days.
1963	Self-employed included in the insurance scheme. Sickness benefit time limit was removed.
1974	Sickness benefit increased to 90%, up to the 7.5 x the basic amount.
1987	Qualifying period removed.
1991	Sickness benefit lowered to 65% for the first 3 days and to 80% from the 4th to the 90th day.
1993	Qualifying period 1 day.
1996	Sickness benefit reduced to 75%. Employer pays the first two weeks of sickness benefits.
1997-1998	Employer pays the first four weeks of sickness benefits.
1998	Sickness benefit increased to 80%. Employer pays sickness benefits for two weeks.
2003	Employer pays sickness benefits for three weeks.
2005	Employer pays sickness benefits for two weeks.
2005	Twenty-two regional social security offices merged into one. The DFA chain was introduced in the sickness certificate.
2007	Medical decision support was introduced by the National Board of Health and Welfare.
2008	Rehabilitation chain.
2009	Time limit for sickness benefit was 915 days.
2016	Time limit for sickness benefit removed.

DFA, diagnosis, function (impairment), activity limitation; GP, general practitioner; Rehabilitation chain, period in which work capacity is evaluated in relation to regular work (0-90 days), other work tasks of the employer (91-180 days), and in relation to the whole labour market; w: weeks.

1.2 SICKNESS INSURANCE IN SWEDEN TODAY

People working in Sweden with an annual income of at least € 1,190 are included in the sickness insurance scheme. The reimbursement depends on the individual salary. The highest reimbursement is currently (2018) € 27,770 per year (21, 22). During the period 2009 to 2016, there was a time limit for sickness insurance eligibility (Table 1). After 915 days, the insured individual was transferred to the Swedish Public Employment Service for attempts at work-related rehabilitation. If this was not successful after three months, the individual could apply for sickness benefit again.Since 2016, there is no upper time limit in the sickness insurance system. The Social Security Act (2010:110) regulates sickness benefits in Sweden (23). The insured individual must have her/his working capacity reduced by at least 25% due to illness to be entitled to sickness benefits. During the first tow weeks (except the qualifying day), the employer pays the sickness benefit. The payments are then assumed by the sickness insurance scheme from day 15. The amount of sickness benefit is based onthe individual's income and the level of sick leave; i.e., 100%, 75%, 50% or 25% of the individual's working hours. The only valid sick leave reasons are medical causes, excluding occupational, economic or social conditions. From the 8th day of sick leave, the insured individual needs a certificate issued by a physician.

1.2.1 THE SICK LEAVE PERIOD

Sick leave is intended to give the patient the possibility to receive treatment for the illness, undergo rehabilitation and have time for recovery. There have been large variations in sickness certification in different parts of Sweden, both concerning the level of disability and the duration of the sick leave (24). To minimise this difference in sick leave length, a decision support was introduced by The National Board of Health and Welfare in 2007 (25, 26).

1.2.2 THE SICKNESS CERTIFICATE

Since the introduction of the public sickness insurance system in 1955, a certificate issued by a physician has been mandatory from the 8th day of sick leave. A seven-day sick leave period without a certificate is very generous compared with other countries (Table 3). Currently, in 2018, the employer pays the first two weeks of sickness benefits.

The sickness certificate entitles the patient to sickness benefits and can inform the employer and the Social Insurance Agency about how to optimise the RTW process (27-29).The length and content of the certificate have increased over time and the physician is now required to provide a large number of details. There are 13 boxes in the certificate that must be completed with text and a large number of tick boxes.

All registered physicians and interns in Sweden are entitled to issue a sickness certificate for a patient but they have problems to estimate possible negative consequences of sick leave for the patient (30, 31). Since 2005, the text in the certificate has to follow the so-called "DFA chain" (diagnosis, function (impairment) and activity limitation) to be logically coherent. Most physicians fill in the certificate on the computer and submit it electronically to the Social Insurance Agency. The most important parts of the certificate are the diagnosis (section 2), medical history (section 3), functional impairments (section 4), activity limitations (section 5), work/unemployment/parental leave (section 8a), and length of sick leave (section 8b). Appendix 1.

1.2.3 ICF, INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH

The International Classification of Functioning, Disability and Health, more commonly known as the ICF, is an international classification developed by the WHO (32). The development of the ICF started more than 30 years ago and is based on fundamental human rights. The ICF was developed to provide a consistent terminology to describe disability and the ability to participate in society. The ICF is a tool that can be used, for instance, when issuing sickness certificates. It includes eight chapters that cover all mental and bodily functions, and codes that are prefaced by a "b". Another nine chapters cover activities from reading to recreation and leisure activities with codes prefaced by a "d". Using the ICF facilitates the writing of sickness certificates and the description of obstacles to the patient's RTW. It can be used by health care professionals, educators, researchers, policymakers, relatives of patients, and by the patients themselves. In the studies included in this thesis, the Children & Youth Version (ICF-CY) of the ICF has been used for a complete classification (33). The adult ICF classification lacks some of the topics that are common in sick-listing situations, like "Dispositions and intrapersonal functions" (b125).

1.3 GOVERNMENT GRANTS – THE "SICK LEAVE BILLION"

Between 2006 and 2016, the Swedish government and the Swedish Association of Local Authorities and Regions (SKL) entered into annual or biannual agreements—the so-called "sick leave billion"—allocating up to SEK one billion per year to the county councils (34). The money was intended to improve sickness certification and rehabilitation locally. Some of the proposed activities were education for physicians related to sickness certification, for instance, by the use of decision support. Furthermore, the rehabilitation chain and rehabilitation guarantee were introduced, as were management systems for sick leave and rehabilitation. The measures included the introduction of rehabilitation coordinators to enhance early collaboration between health care providers and the social insurance office, and systems for electronic information exchange between the parties (34-36). To improve the quality of assessments, a new standardised evaluation (AFU) should be made around 180 days into the sick leave period. The Social Insurance Agency decides whether there is a need to make this assessment (37).

1.3.1 MEDICAL DECISION SUPPORT FROM THE NATIONAL BOARD OF HEALTH AND WELFARE

A decision support was introduced in 2007 by The National Board of Health and Welfare (38, 39) to minimise the disparity in sick leave length between different parts of Sweden. The Swedish decision support system was developed in cooperation between experts in different medical areas and staff from the National Board of Health and Welfare (39). New revised versions are published regularly and some have been abandoned, for instance, those including symptom diagnoses, which were removed in 2016. During Study III, the decision support for symptom diagnoses was divided into two parts, one for pain, R52 (Appendix 2), and the other for all other symptom diagnoses (Appendix 3). Sick leave because of symptoms was considered harmful (Appendix 3), and early investigation of the patient's social situation was suggested in such situations.

1.3.2 THE REHABILITATION CHAIN

In 2008, the rehabilitation chain was introduced to achieve a more effective sick leave process. The rehabilitation chain stipulates that the employee is on sick leave with a sickness certificate from his/her regular work during the first 90 days of sick leave. From day 91 to day 180, the sickness certification requires an assessment in relation to all work tasks at the employer's business. From day 181, sickness certification requires an assessment in relation to all available work tasks in the labour market (40).

1.3.3 THE REHABILITATION GUARANTEE

The rehabilitation guarantee was introduced in 2008 and was an investment in cognitive behavioural therapy (CBT) for people with mild to moderate psychiatric illnesses, and in teams for multimodal rehabilitation (MMR) for people with non-specific neck and back problems. The purpose was to reduce the frequency and duration of sick leave for patients with these diagnoses. However, an evaluation showed the opposite, namely, that the sick leave duration increased (41), except for those who were enrolled in CBT before their sick leave period started (41).

1.3.4 THE REHABILITATION COORDINATOR

Coordination of the care of patients has been found to be successful in situations where many caregivers are involved and the care processes are complex, such as in organ transplantations and in the treatment and rehabilitation after stroke (42, 43). In general, coordination of treatment and rehabilitation for patients on sick leave seems to increase the collaboration between stakeholders, facilitate problem solution and increase RTW (44). In order to facilitate the collaboration between the rehabilitation coordinator and the physicians, the SIO and employer share of the "sick leave billion" was assigned to this project in 2006. Other Western countries also have coordination functions to improve RTW, such as Case Managers in the UK and the United States of America. Swedish patients who are unemployed have contacts with the Swedish Public Employment Service and the Social Services in their municipalities. The rehabilitation coordinator may have different levels of active involvement, from booking appointments with the stakeholders to acting as a bridge between SIOs and the health care system, or (45) act as a team leader, organiser, patient coach, a partner to the SIOs, advisor to physicians and educator of staff in primary care. It has been problematic to introduce this new function in the health care system, and these new

duties have been assigned to nurses or vocational therapists already employed at clinics or PHCCs (44). In 2017, almost all PHCCs and some hospitals in Region Västra Götaland had a rehabilitation coordinator. Still, 11 years after their introduction, the coordinators are highly subsidised by earmarked funding from the Swedish Association of Local Authorities and Regions.

1.4 GRADUATE AND POSTGRADUATE EDUCATION IN INSURANCE MEDICINE

Medical students at Swedish universities receive one to two days of education in insurance medicine before graduation. After graduation, education in insurance medicine is the responsibility of the employers in the health care organisation, which took over the education assignment from the Social Insurance Agency in 2012. During their clinical practice, interns (AT-läkare) receive an additional two to three days of insurance medicine education. From 2015, all doctors undergoing specialist training (ST-läkare) take a course of one to two days in social insurance medicine. These courses focus on practical issues and hands-on demonstrations, using patient cases, of how to write the certificate. However, there is no specific training in evaluating the patient's working capacity (7). A one-day course in ICF terminology has been offered since 2011 in Skaraborg in the northwestern part of Region Västra Götaland. The course includes workshops where the physicians are taught to write a sickness certificate, using the nomenclature and wording in the ICF. SIOs also participate in the course. To be certified to making working capacity assessments (AFU), physicians have to take a two-day course (46). In addition, Gothenburg University and Karolinska Institutet in Stockholm offer specific insurance medicine courses (22.5 academic credits).

1.5 SICKNESS BENEFIT IN OTHER COUNTRIES

There are great disparities in sickness benefits between different countries. Korpi and Palme identified four ideal-typical models of insurance institutions (47), see Table 2. Income-related benefits reduce poverty and inequalities more than flat-rate benefits, which has been labelled “the paradox of redistribution” (47).

Table 2. Sickness insurance models in Western countries.

Model	Base of Entitlement	Benefit Level Principle	Example of countries
Targeted	Proven need	Minimum	Australia, New Zealand
Corporatist	Membership, contribution	Flat rate or Earnings- related	Netherlands, Austria, Belgium, France, Germany, Italy, Japan
Basic security	Citizenship or contributions	Flat rate	Ireland, UK, Canada
Encompassing	Citizenship and labour force participation	Flat rate and Earnings- related	Sweden, Finland, Norway

From Korpi W, Palme J. American sociological review 1998 (47).

The Swedish model with generalised compensation for loss of income and with no time limit is very rare, even in Europe. Besides Sweden, only Slovenia has no time limit for sickness benefits. In many countries, patients must apply for a disability pension when the benefit period ends. In the United States of America, there are no legal requirements for paid sick leave, but there is a Family and Medical Leave Act (FMLA) that provides for 12 weeks of unpaid leave in medical situations, involving either an employee or members of the employee's immediate family. There are often agreements between the employer and the employee on substituting sickness benefit for unpaid FMLA leave (48).

Table 3. Organisation of sick leave process, regulation and benefits in different countries.

Country (reference)	GP	Specialist	Meeting with physician from the Social Insurance Agency	Certificate required from (day)	Time limit (weeks)	Qualifying period	Sick pay[a] (days)
Austria	Yes	Yes	Yes	4	52	3	52-84[b]
Belgium (49, 50)	Yes	Yes	Yes	2	52	0	7-30
Bulgaria	Yes	Yes	Yes	1	52-	0	3
Croatia	Yes	No	Yes	3	78	0	42
Cyprus (51)	Yes	Yes	Yes	4	44	3	0
Czech Republic (52)	Yes	Yes	Yes		54	3	11
Denmark	Yes	Yes	No	On demand	22-52	0	30
Finland	Yes	Yes	No	9	50	0	9
France	Yes	Yes	Yes	2	52-144	3	Differs
Germany	Yes	Yes	No	1	78	0	42
Hungary	Yes	Yes		1	52	0	15
Iceland (53)	Yes	Yes	No	On demand	52	0	14-360
Ireland	Yes	Yes	No	3	52-104	6	Differs
Italy	Yes			2	26	3	180
Latvia	Yes	No		1	26	2	10
The Netherlands	No	No	Yes	1	104	2	104 weeks
Norway	Yes	Some-times		4-10	52	0	16
Poland	Yes	Yes	Yes	1	26	0	14-33
Romania	Yes	No	Yes	4	26	0	7
Slovenia	Yes	No	Yes	4	∞	0	30
Spain	Yes	Some-times	Yes	4		3	4-15
Sweden	Yes	Yes	No	8	52-∞	1	14
Switzerland	Yes	Yes			102	2	21
UK	Yes	Yes	Sometimes	8	28	7	4-196

From: European Commission: Employment, Social Affairs & Inclusion, 2017 [Available from: http://www.missoc.org/MISSOC/INFORMATIONBASE/COMPARATIVETABLES/MISSOCDATABASE/comparativeTableSearch.jsp (54)

[a] Sick pay, paid by employer, calendar days. GP: general practitioner; on demand: when certificate is required by employer; w: weeks.
[b] Depends on length of employment

Examples of different sickness benefit arrangements, their organisation and benefits in different European countries are listed in Table 3. In Denmark, for instance, the employer pays for the first 30 days of sick leave, after which the municipality is responsible for the sickness benefits (55). The employer has a mandatory formal meeting with the employee within four weeks of the start of the sick leave period to discuss return to work (56).

1.6 HEALTH CARE ORGANISATION IN SWEDEN

Sweden is a welfare state with tax-funded health care. The cost for the patient of a visit to a primary health care centre is € 10, and € 30 for a visit to a specialist at a hospital. The law stipulates that good and equal health care should be provided to all citizens. Health care should be provided with respect for equality and with dignity. Health care should be provided on the basis of individual need and those with the most serious illnesses should be given priority (57).

The resources allocated to primary care in Sweden are sparse (17% of the total health care costs) compared with other European countries (58). The costs of specialised somatic care and specialised psychiatric care amount to 54% and 9%, respectively (59). Primary health care centres (PHCCs) have problems with low staffing levels and it is difficult to recruit physicians (60). Reimbursements to the PHCCs in Region Västra Götaland are based on the patients' diagnoses, which are combined into an individual ACG (Adjusted Clinical Groups Method) score (61). Severe and chronic diseases give the PHCC greater economic compensation. This has increased the number of diagnoses in case records, after the introduction of this method in 2009 (62, 63).

Some of the obstacles to good sickness certification practice have been found to be the health care organisation, the physicians' working situation, the lack of knowledge among physicians of working capacity assessments and of the sickness insurance system, and the roles of other actors in this system (4, 64, 65). It is very important that the management of the primary health care organisation addresses these problems in order to avoid negative consequences for the well-being of both patients and physicians (65).

1.7 DEBATE ON SICK LEAVE IN SWEDEN

The rising costs of sickness benefits in Sweden have been publicly debated since the 1990s. The theories and defined problems have changed over time. Overuse and excessively generous benefits have been suggested as explanations, as well as the physicians' sickness certification practices, which have been described as being of varying quality (16). In the debate, the different stakeholders have formulated their views according to their own interests (16). The trade unions have focused on the work environment as the

reason for the long sick leave periods, the employees on the costs and overuse of the insurance, and the Swedish Medical Association on the lack of resources and the failure of the health care organisation to manage sickness certification (16). It is not always the patient who asks for a sickness certificate from the physician, but sickness certificates can also be requested by actors in society, for instance, the Swedish Public Employment Service or the Social Services in the municipalities or both (66).

1.8 GENDER IN SOCIETY AND ASPECTS ON SICK LEAVE AND SICKNESS CERTIFICATION

Gender can be seen as symbols, as a social construct, or as an individual characteristic. Gender attributes typically ascribed to women are kindness, compassion and care for the family, whereas male attributes include not expressing feelings, making a career and taking risks (67-69). The expectations according to gender influence how an individual will act in certain situations. It is also possible to attribute different characteristics to gender where there is no difference. The position of the Swedish Parliament is that there should be no gender differences in Sweden (70). Eighty per cent of Swedish women are active in the labour market and, like the other Nordic countries, Sweden applies a dual breadwinner model (71, 72). Many of the social reforms in Sweden aim at reducing gender differences. Day care for children and elderly care are tax-funded and the fees are low (73). At childbirth, parents get one year of paid parental leave, with some months reserved for the father. Despite these efforts, Swedish women still take most of the parental leave. Marriage and childbirth have not been shown to increase sick leave among women, but single women living under economic pressure have increased sick leave rates (74). Furthermore, Sweden has a segregated labour market. Women more often work in the health care and education sectors while men commonly work in the construction sector. Concealment of emotions, emotional demands, and effort-payment imbalance were found to be important factors explaining the difference in sick leave between men and women (75). In workplaces with equal numbers of women and men there may be horizontal segregation, whereby men are promoted to higher positions and, consequently, better paid (76). This gender career gap between men and woman increases for women of childbearing age and the women never catch up. To be married or have children does not lead to lower taxes. Instead, a child allowance is paid monthly until the child is 15 years old (77). Women still assume most of the responsibilities

for domestic work. Long-term sick leave is associated with living in unequal family relationships, childbirth before the age of 28 and having more than two children. Women with heavy domestic responsibilities and/or work pressure have been shown to have more physical and mental symptoms (78). Men use health care to a lesser extent than women, and using health care is seen as non-masculine behaviour (79, 80).

In 2015, there were 34,135 working physicians (51% women) in the labour market in Sweden. Female physicians were younger than male physicians. There was wide variation in the frequency of women in different specialities; 13% in orthopaedics, 21% in surgery, 37% in internal medicine, 46% in family medicine, and 65% in obstetrics and gynaecology. Female physicians spend fewer hours at work than male physicians (81, 82). Furthermore, female physicians communicate differently from male physicians. They discuss lifestyle factors, emotional and psychosocial concerns more often (83), and it has been described that they display more empathy in the encounters with patients (84, 85). The gender of the physician and patient have been shown to have an impact on physician-patient interaction and its outcome (85).

There is a gradient of power between physicians and patients (86), with the physician being the stronger party. There has been a gradual transfer of power from the physician to the patient through legislation and organisational changes. The patients' autonomy and right to decide about their own situation have increased (87). A new act was adopted in Sweden in 2015, laying down the rights of patients to participate in decisions regarding their treatment and to have a permanent health care contact of their own choice (87). Patients can change their PHCC without restrictions and visit another physician if they are not satisfied. This has been found to increase the cost of sick leave in Stockholm county council but not in the rest of Sweden (88).

1.9 DEFINITIONS OF ILLNESS, SICKNESS AND DISEASE

There is a distinction between illness, sickness and disease. Illness is a personal feeling of a lack of wellness. Sickness is a social construction describing a person on sick leave, or it may be a sick role (89). The disease is the diagnosis emanating from medical science. A Swedish survey from 1988-2001 showed that approximately 70% of the employed population aged 16-65 years had some complaints about illness, and that illness, disease and sickness absence had a comparatively low degree of overlap.

To be entitled to sickness benefit, it is mandatory to have a disease that reduces the working capacity by at least 25%. According to an amendment to the legislation in 1991, other factors such as socioeconomic and labour market aspects should not be taken into account. A problem is that the definition of disease is vague, in part, in the social security legislation. The text from the 1944 preparatory work preceding the Social Security Act offers the following definition: "The definition should be based on what is considered to be a disease, according to common language usage and current medical opinion. This means that any abnormal physical or mental condition that is not associated with the normal life process can be termed a disease." This definition differs from the definition in the Medical Subject Headings (MeSH): "Disease is a definite pathological process with a characteristic set of signs and symptoms. It may affect the whole body or any of its parts, and its etiology, pathology, and prognosis may be known or unknown." In clinical work, the physician evaluates the patient's symptoms and signs according to the current guidelines and textbooks and the diagnosis is selected from the ICD-10 (90). The validity of diagnosis registration has been discussed, especially when the registration frequencies increased in a region when the new primary health care reimbursement system was introduced (62, 91).

The most common condition leading to sick leave today is mental ill health ("psykisk ohälsa"). The term 'mental ill health' started to appear in Swedish literature in the 1960s, relating the concept to religion, in novels and fiction (92, 93). The first scientific publication from 1982 using the term dealt with living conditions in Sweden (94). Nowadays, mental ill health is used almost as a synonym of psychiatric disease in general in Sweden (95, 96) and is a much broader concept than psychiatric disorders.

1.10 SYMPTOM DIAGNOSES

In this thesis, symptom diagnoses (SD) are defined as diagnoses from chapter XVIII (R00.0-R99.9) in the ICD 10 (90). If the patient presents with symptoms that cannot be assigned to a particular disease, the physician may choose a symptom diagnosis for the sickness certification. If the medical investigation reveals a disease-specific diagnosis, the code is changed during the sick leave period, more often in somatic diseases and less often for psychiatric diagnoses (97, 98).

1.11 THE DRAMA OF THE ILLNESS STORY-TELLING OF THE PATIENT

A central concept in the sick leave process is that physicians can understand and interpret the patient's illness in a sickness certification context. This can be seen as the drama of illness (99). Aristotle's description of the different parts of a drama fits the drama of illness very well (100). The scenery at the PHCC and the definition and roles of the participants are very clear. Health care personnel are taught during their training to play their roles. On the agenda of the patient who needs a sickness certificate is to get an appointment with a physician. This discussion usually starts with a call to the nurse on call. Arthur W. Frank has thoroughly described this drama and has made his theories understandable to medical researchers (101). Stories about illness can be divided into restitution, quest and chaos narratives. Health care personnel understand the restitution narrative best; there is a disease with a beginning, a journey towards recovery and the patient regains health. The patients learn these stories from how health care providers describe the recovery process and these are stories about the triumph of medicine. The chaos narrative is more difficult to listen to and pose a threat to the listener (102). Persons living in chaos lack the ability to regard themselves from a distance and, thus, have difficulty reflecting on their situation. Consequently, storytelling is impossible (102). The most common narratives are the quest narratives. "The quest is defined by the ill person's belief that something is to be gained through the experience (103). It is only the quest narrative that lets the ill person express her/his own voice about the illness. Storytelling is a way to regain self-confidence. The role played by the health care professional and how they perceive the patient's storytelling is important for rehabilitation and return to work (RTW). For instance, moving to a different job may be difficult if the patient is caught up in a restitution narrative, even if the person would benefit more from changing the work place instead of staying in the present position (104).

1.12 THE PATIENT'S SICK ROLE

Almost all physicians have learned about the patient's sick role, originally described by the American sociologist Talcott Parsons. The patient may take on the sick role, a social construction that relieves the patient of his/her normal obligations, such as going to work, social commitments and family responsibilities. As the sick role makes the patient perceive him/herself as sick, it also interferes with the rehabilitation process. It is important that physicians are aware of this, to prevent the patient from adopting the sick role and thereby enjoying secondary gains from the illness (105).

1.13 CURRENT RESEARCH ON SICK LEAVE, SICKNESS CERTIFICATION AND REHABILITATION

Research in insurance medicine and sick leave is a steadily increasing field covering different disciplines, such as medical science, sociology, psychology, jurisprudence, history, politics, philosophy, and economy.

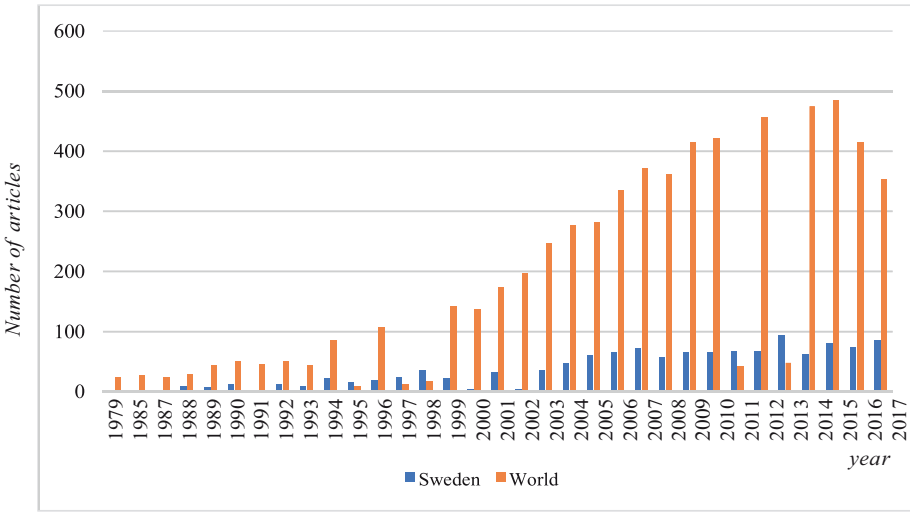


Figure 2. Number of articles published each year according to the US National Library of Medicine (PubMed). The search criteria were "Sick leave" and "Sweden". Cited 2017-11-25.

In 2003, a systematic review of the scientific literature on sickness certification was published by the Swedish Council on Technology Assessment in Health Care (106). The result showed that despite the great impact of sick leave on patients and society, few studies have been carried out and the quality of the studies was generally poor. Publications using the extensive public recording of sick leave data have shown an association between age, female gender, low socioeconomic status, certain places of residence and sick leave. How much each factor contributes to sick leave has been much less studied. One problem that was described was to disentangle the causes of disease from the causes of sick leave. A study using multilevel analysis has addressed the combination of factors influencing sickness certification (107). Furthermore, the knowledge of the sickness certification practice of physicians was very limited. For this reason, additional national funding was allocated to this research area and the number of published articles has increased, albeit not as much in Sweden as internationally; see Figure 2.

Gender differences, sick leave and sickness certification

The gender of both the physician and the patient matters in relation to different aspects of health care, and andronormativity; i.e., male gender as the norm and female gender the deviation, has a strong foundation in the medical culture (108). Gender differences in sick leave rates have been described, and there is a well-known general association between female gender and increased sick leave (109). The fact that women have a higher frequency of sick leave than men (110) can be explained, in part, by biological factors, such as pregnancy, problems during menstruation and breast cancer during working age (109, 111). Women are also exposed to domestic violence more frequently than men, which increases sick leave rates for women (112). Furthermore, work-related and psychosocial factors contribute significantly to the excess risk of sick leave among women (75), as well as women assuming the main responsibility for domestic work (113). It has been shown that responsibility for domestic work and job strain are associated with sick leave (113, 114).

On the other hand, the results of studies on the gender interaction between physicians and patients are inconsistent (115, 116). One study showed that there was an association between male patients and male GPs and increased intermediate sick leave duration compared with certificates issued in encounters between their female counterparts (115). Female patients meeting a male physician requesting a sickness certificate felt ignored, disregarded and rejected by the physicians (117). They worked out strategies to keep the

physicians' attention in their search for a credible diagnosis (117). A Swedish study using vignettes with fictive patients visiting the physician for a sickness certificate showed that female physicians were more likely to issue sickness certificates (118). The study included different specialties with different proportions of women. In contrast, another study using video vignettes found no gender differences in sickness certification (116). Studying sickness certification practices in an unbiased way is thus important, as it has been shown that there is a difference between the physician's intentions and performance in real life (119).

Rehabilitation and interventions to reduce sick leave

According to a review, there was moderate evidence that workplace interventions help workers with musculoskeletal disorders return to work (RTW) and reduce the duration of sick leave, but there is little evidence of such interventions in mental health problems and cancer (120). Another review addressing interventions to increase RTW in depressed patients, by adding a work-directed intervention to a clinical intervention, showed moderate evidence of a reduction in the number of days on sick leave compared with the clinical intervention alone (121). In addition, structured telephone or online cognitive behavioural therapy reduced sick leave compared with regular care (121). On the other hand, a recent review of the effects of coordination programmes for increased RTW showed moderate to low evidence of no such effects from using these programmes, compared with standard care (122). It has even been shown that early multidisciplinary assessment was associated with longer periods on sick leave (123).

Quality of sickness certificates and rehabilitation

Poor quality of sickness certificates has been shown on repeated occasions (27). The county councils have been encouraged by financial incentives to arrange education for physicians in issuing sickness certificates that would give a better basis for the SIO assessment of entitlement to sickness benefit. Despite significant educational efforts, one third of the certificates still failed to provide sufficient information (124).

Poor quality of sickness certificates has been shown in earlier studies, and descriptions of activity limitations, in particular, were lacking (27, 124). However, new guidelines for sick leave have improved the quality of the certificates (125). In contrast, a comprehensive review of publications with different designs; qualitative, cross-sectional as well as cohort studies, randomised controlled studies, and reviews, showed that the use of guidelines

was problematic and had no effect on the duration of sick leave. This review included many studies from the Nordic countries, especially Sweden and Norway, but also from the UK and the Netherlands. The review addressed difficulties of assessing the need for sick leave, especially in patients with complaints lacking objective findings, such as pain and fatigue. There was very limited use of tools like the ICF and other tools for functional assessment, and it was considered important to make an evaluation of these tools before educating the GPs (126). Studies have described several barriers to good sickness certification practice due to the physicians' dual roles (127-129). Assessing patients' working capacity is a major problem for physicians (9, 28, 30, 130). In a study from Switzerland there were disagreements in working capacity assessments between medical experts in multidisciplinary assessment centres, the patients' physicians, and the patient. The medical experts assessed the patients as having significantly higher working capacity compared with the patient's physician and the patient. The patients' physicians rated the patients' working capacity somewhat higher than the patient (131). Furthermore, obstacles to good practice in sickness certification have been found to be, *i.a.* the health care organisation, the physicians' working situation, the physicians' lack of knowledge of working capacity assessments, the lack of knowledge of the sickness insurance system and the roles of other actors in this system (30, 65). It has been found to be very important that the management of the primary health care organisation addresses these problems, in order to avoid negative consequences for the well-being of both patients and physicians (65). There are also differences in sickness certification between countries. When physicians from Norway, Sweden, Denmark, France and the Netherlands evaluated video vignettes, the physicians from Sweden and the Netherlands granted entitlement to sickness benefit less often, compared with physicians from the other countries. This could be a result of both Sweden and the Netherlands having guidelines for sickness certification (132).

Training in the use of the International Classification of function (ICF) was provided in Norway (133) and increased the use of part-time sick leave (134). The conclusion of the review (126) was that tailored strategies and well-validated tools for functional assessments and cooperation with occupational practitioners are needed for general practitioners.

Qualitative studies and surveys of sickness certification, physicians and patient views

A great deal of research has been published, both from Sweden and other Western countries, exploring the views of physicians on sick leave and sickness certification. A phenomenographic study including 19 primary health care physicians in 2007 reported large qualitative differences in GP views on the request for sickness certification, either from society or from the patient. Some GPs expressed feelings of strong conflict between the two, while others, at least in part, manage to solve the conflict between the two loyalties (66). A large survey performed in 2008 showed that a majority of GPs found sickness certification problematic, specifically the assessment of working capacity and the handling of conflicts with the patients (129). A UK review of qualitative studies and questionnaires addressed the feelings of GPs about sickness certification (135). The proposed solution was that other health professionals could play a role in the certification process. The studies in the review were mainly from Scandinavia and the UK and three themes common to the included studies were identified: conflicts with patients, role responsibility and barriers to good practice. Suggestions for solutions to these problems were clarification of the roles of stakeholders and improving access to specialist occupational health and rehabilitation services.

The complexity of the process has been described in an audit including physicians in Sweden, analysed with qualitative methods (136). The physicians experienced a complex variety of challenges in patient interaction, working capacity assessments and contacts with the social insurance administration, the patient's workplace and the labour market. The conclusion was that in order to improve the sickness certification process, the physicians' competence to interact with the stakeholder should be addressed. In Ireland, GPs also encountered complex issues related to sickness certification and were dissatisfied with their role in the sick leave process, specifically the lack of communication with other health care providers (137). A study from the UK (138) also describes this complexity, using interviews with physicians and patients with chronic pain. Distinguishing patients able to work from those not able to work was far more complex than could be imagined. Factors influencing the negotiation between the physician and the patient were social, economic, and psychological factors, and there was a call for training of physicians in rhetorical and persuasive skills to augment RTW. It was found in a Swedish survey that sickness certification was a psychosocial work problem, as ten per cent of primary care physicians felt threatened by patients and worried about being reported to the disciplinary board. It seems that GPs

have more problems than other specialists with the sickness certification task, and that this constitutes a work environment problem among physicians (7, 128, 139, 140). A focus group study with Swedish general practitioners reported that physicians found sickness certification burdensome but cooperation with other professionals was perceived positively (6). In a survey in Sweden from 2009, spontaneous (free) comments were analysed with qualitative methods. One finding was that physicians wanted to see sickness certification transferred to specialist physicians and multi-professional teams (4). This is in line with a study from the UK with semi-structured telephone interviews with GPs, which showed that occupational health training helped GPs with sickness certification (141).

The patient perspective has been much less investigated. One qualitative study describes the consultation experiences of female patients and strategies used by female patients with undefined musculoskeletal complaints to get attention (117). The patients described an atmosphere of distrust during the consultation. These findings indicate the importance of awareness of the context behind frustration in doctor-patient interactions. The doctor-patient relationship in sickness certification in chronic pain was studied from both perspectives using interviews (138). The conclusion from the physicians' perspective was a need for knowledge about how to change the patients' conceptualisation of their illness in the negotiation about sickness certification. A study from the UK interviewed patients who had recently received a sickness certificate from a GP s (142). They rarely attended the doctor only to get a certificate, they wanted to discuss their social situation and get advice about their illness. They valued continuity of care and felt that questions about RTW did not threaten the doctor-patient relationship. A qualitative study from Denmark showed that even if patients were dissatisfied with their physician, it was too difficult to change so they stayed with their physician (143).

In summary, reported gender differences in sickness certification are inconsistent. The use of case vignettes may affect the results, as they might show the physicians' intention rather than how they actually perform. Studies of unbiased data from practice could help resolve this issue. Furthermore, studies of factors associated with the risk of sickness certification often use single factors such as the gender or socioeconomic status of the patients and the experience of the physicians. However, the importance of these factors in relation to each other has only been described in one earlier study. Data available from primary care can be used to replicate these findings. Symptom diagnoses (R-diagnoses, ICD 10, chapter XVIII (90)) are common in primary care and easy to capture in national registries. R-diagnoses have been shown

to predict incomplete sickness certificates. The potential usefulness of this marker needs to be investigated further in order to confirm earlier results. The attitudes of physicians to sickness certification have revealed that more education on sickness certification was requested. Several reforms have been introduced through the "sick leave billion" in order to educate physicians, among other things, on how to manage the sick leave process. It is therefore of interest to investigate how these reforms have affected the physicians' attitudes.

2 AIM

2.1 GENERAL AIMS

The general aim was to study how primary health care physicians in Sweden manage sickness certification and the sick leave process.

2.2 SPECIFIC AIMS

Study I

The primary aim of the study was to investigate the effects of gender and professional experience of the physicians on the rate and duration of sickness certification. The secondary aim was to study the physicians' gender and professional experience in relation to the diagnoses in the certificates.

Study II

The aim was to evaluate simultaneously the importance of factors known to influence sickness certification, such as diagnoses, the patients' socioeconomic status, and characteristics of the physicians.

Study III

The aim was to investigate whether symptom diagnoses in the sickness certificates are associated with the quality of the information in the sickness certificate and the quality of the sick leave process, compared with certificates with disease-specific diagnoses.

Study IV

The aim of the study was to explore the views of primary care physicians of all categories on sickness certification after a period of changes in the regulations.

3 SUBJECTS AND METHODS

An overview of the subjects, design, analyses and outcomes of the four studies included in the thesis in shown in Table 4.

Table 4. Overview of the studies included in the thesis

	Study I	Study II	Study III	Study IV
Subjects	Patients (n = 88,780) Certificates (n = 33,486) Physicians (n = 589) PHCC (n = 24) Skaraborg	Patients with employment (n = 64,354) Certificates (n = 11,411) Physicians (n = 574) PHCC (n = 24) Skaraborg	Patients with symptom diagnoses (n = 222) Patients with disease-specific diagnoses (n = 222) Skaraborg	Physicians (PHC) (n = 28) in six focus groups Region Västra Götaland
Year	2005	2005	2013-2014	2015-2016
Design	Retrospective cross-sectional data from PHCC	Retrospective, cross-sectional data from PHCC	Retrospective, matched pair data from PHCC	Qualitative; focus groups
Analysis	Quantitative; descriptive, logistic regression, ANOVA	Quantitative; descriptive, multi-level	Quantitative; descriptive, Chi2, t-test, Wilcoxon, Kaplan Meier	Qualitative content analysis
Main outcome	Frequencies and duration of certificates	Interrelated importance of the patient, physician and PHCC level in sick leave	Frequencies and time to different events in the sick leave process	Views of primary health care physicians on sickness certification in their work situation after changes to the regulations
Conclusions	No physician gender difference in prescription of sickness certification	Patient level has the greatest impact on sickness certification	Symptom diagnosis predicts quality defects in the certificates	Physicians perceived the sickness certification process as emotive and a challenge to master with differing demands and expectations from management and patients

PHCC, Primary Health Care Centres.

Skaraborg, a rural area and a part of Region Västra Götaland with 264,000 inhabitants in 2016 (144). Region Västra Götaland had 1.6 million inhabitants in 2016 and is located in the southwest of Sweden with Gothenburg as the regional capital (144).

3.1 DATA COLLECTION STUDY I AND II

Study I and II were conducted using data from 24 PHCCs in Skaraborg. Data were automatically extracted from the electronic patient records, Profdoc Journal III (PDIII, Profdoc AB, Uppsala), Figure 3. All sickness certifications and all contacts between patients and physicians from January 1, 2005, to December 31, 2005, were extracted, including information about diagnoses (according to the International Classification of Diseases (ICD-10) (145)), duration, and degree of sick leave (25%, 50%, 75%, or full time). The certifying physician's gender, age, and title; intern (AT-läkare), GP speciality trainee (ST-läkare), locum (vikarie, physicians not specialised in general practice), and GP (distriktsläkare), were retrieved by the PHCC's secretary locally. In Study II, the medical records were merged with socioeconomic data from the Swedish national database, the 'Integrated database for the labour market' (146). Only patients defined as employed (i.e., working more than one hour during one defined week in November 2005), according to Statistics Sweden, were included in the analyses.

3.2 VALIDATION STUDY I

A random sample of 20 sickness certificates from each PHCC (n = 480) was selected. To evaluate the computerised medical records without seeing the patient's name and Swedish Personal ID number, a data extraction programme has been developed and used in earlier studies (147). The text from the computerised medical records was transferred to a spreadsheet (Microsoft Excel) and a macro was used to highlight relevant words or text fragments (e.g., sick leave, certificate).

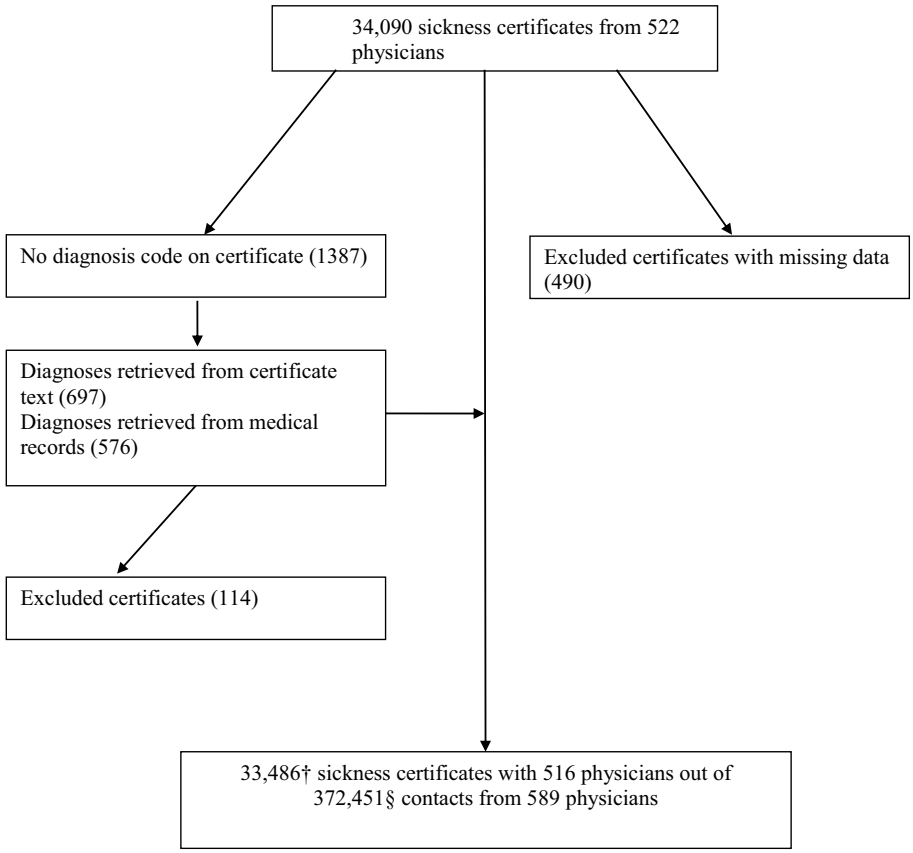


Figure 3. Flow chart of sickness certificates for patients aged 18-64 years in Skaraborg primary care, 2005.

Notes: The discrepancy between the number of physicians at top and bottom of the flow-chart was due to 67 physicians having prescribed no certificates and/or had missing data on sex, age, or title (n = 28) and were thus excluded from those analyses, but contributed to contacts in other analyses. Eight physicians were from other specialities (gynaecology, internal medicine, dermatology, paediatrics) and did not contribute with sickness certificates but contributed to contacts (n = 1639). Six physicians ' sickness certificates were excluded because of missing diagnosis or because of errors in contact registration. The frequency of sickness certification was calculated using the number of sickness certificates (†) by the number of registered contacts (§).

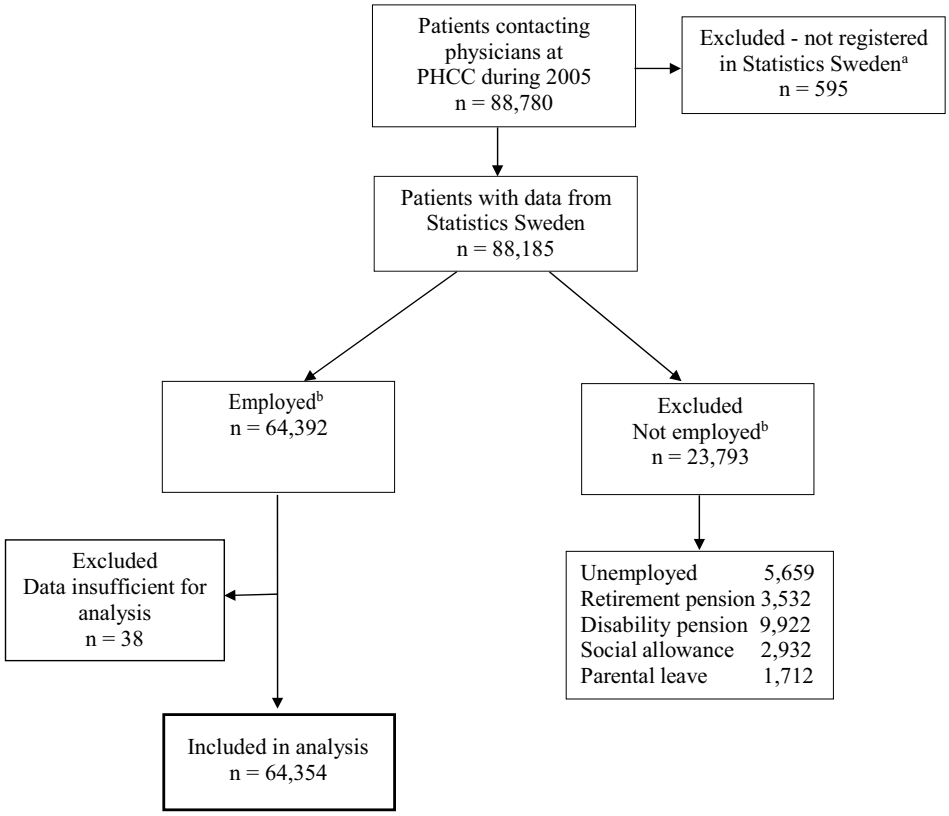


Figure 4. Flow chart of patients 18-64 years of age, visiting primary health care centres in Skaraborg in 2005.

[a] *Dead or not residing in Sweden during part of 2005*

[b] *Definition of employment was work more than one hour during one defined week in November 2005*

PHCC, primary health care centre

3.3 VALIDATION STUDY II

The data set was validated as described in Study I (148). Furthermore, two computer-generated random samples of patients with psychiatric diagnoses were retrieved, as these diagnoses had the highest odds ratios for sickness certification; one sample with patients without sick leave (n = 80) and one with patients with sickness certificates in 2005 (n = 135). The different psychiatric diagnoses in the certificates were evaluated. Patients with depression (F32 or F33) were also evaluated and the diagnosis criteria for depression in DSM-IV (Swedish version, Table 5) were compared with the text in the medical records.

Data on sickness certification were also compared with data on reimbursement (after the first two weeks on sick leave) from the Swedish Social Insurance Agency, delivered by Statistics Sweden.

Table 5. Diagnostic criteria for depressive disorders according to DSM IV.

Depressed mood (1) and/or loss of interest or pleasure in life activities (2) for at least two weeks are mandatory and, in addition, at least five of the following symptoms:

1. Depressed mood most of the day

2. Diminished interest or pleasure in all or most activities

3. Significant unintentional weight loss or gain

4. Insomnia or sleeping too much

5. Agitation or psychomotor retardation noticed by others

6. Fatigue or loss of energy

7. Feelings of worthlessness or excessive guilt

8. Diminished ability to think or concentrate, or indecisiveness

9. Recurrent thoughts of death

3.4 MULTILEVEL MODELS

In Study II, multilevel logistic regression analysis (MLRA) was used as the data were hierarchically ordered. MLRA is useful when the data has a nested structure, i.e., patients nested within physicians nested within PHCCs (149, 150). The analysis gives the opportunity to refer the variability to the appropriate level. Using single-level models and ignoring a multilevel data structure may lead to overestimated or underestimated results.

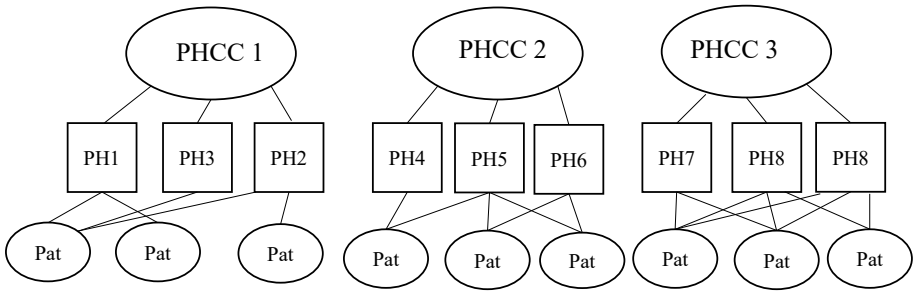
The outcome variable in the analysis was sickness certificate, yes/no. The degree of association of the level-specific variables (i.e., fixed effects) was expressed as odds ratios (ORs) with 95% confidence intervals. In the random effects part of the MLRA, the variance at the physician and PHCC levels was obtained. The variance was expressed at different levels using intraclass correlation (ICC). Statistically, the ICC is the correlation between two observations within the same unit of a hierarchical level. In a model with a dichotomous outcome, the first level variance is measured on a different scale than the higher level variances. Several solutions exist to overcome this problem and we used the latent variable method that converts the individual level variance from the probability to the logistic scale. The unobserved individual variable follows a logistic distribution with the individual level variance equal to $\pi^2/3$; that is, 3.29 (150). The ICC is a function of the area level variances and does not depend directly on the prevalence of the outcome. The ICCs for the different levels were calculated as follows:

$$ICC_{physician} : (Variance_{physician}) / (3.29 + Variance_{physician} + Variance_{PHCC})$$

$$ICC_{PHCC}: (Variance_{PHCC}) / (3.29 + Variance_{physician} + Variance_{PHCC})$$

To account for the possibility that one patient might visit several physicians, we used a multiple membership model (151), where the number of contacts with a certain physician during the study period was used for weighting of the data. Patients who attended more than one PHCC were assigned to the PHCC having the largest number of contacts with the patient. The parameters were estimated using the Markov chain Monte Carlo MCMC (Monte Carlo Markov chain) methods in the MLwiN 2.24 software (151). The MCMC is an iterative process calculating random effects and fixed effects for the included parameters. In the MCMC procedure, the goodness-of-fit is obtained as the Deviance Information Criterion (DIC), where a lower value indicates a better model fit. The DIC takes the number of parameters included in the model into account and the different models can be compared (151-153).

A three-level model with the patient, physician and PHCC on the different levels was constructed, as illustrated in Figure 5. Five models were used in the analysis; one empty model and four models with level-specific variables included as fixed effects at the patient and physician level, step by step.



PHCC, Primary Health Care Centre; PH, physician; Pat, patient

Figure 5. The multilevel structure in Study II. The patients are nested within physicians and the physicians within the PHCC. As a patient may see different physicians, a multiple membership model was used.

Table 6. An example of three level multi-level logistic regression analysis with one empty model (A) and four models (B, C, D, E) including level specific variable as fixed effects.

	Model A Empty	**Model B**	**Model C**	**Model D**	**Model E**
Included variables		Patient gender		Patient gender	Patient gender
			Diagnoses	Diagnoses	Diagnoses
					Physician's gender
Random effects	**Variance (95% CI)**	**Variance (95% CI)**	**Variance (95% CI)**	**Variance (95% CI)**	PHCC
Patient	x.x	x.x	x.x	x.x	x.x
ICC patient	xx.x%	xx.x%	xx.x%	xx.x%	xx.x%
Physician	x.x (x.x-x.x)	x.x (x.x-x.x)	x.x (x.x-x.x)	x.x (x.x-x.x)	x.x (x.x-x.x)
ICC physician	xx.x%	xx.x%	xx.x%	xx.x%	xx.x%
PHCC	x.x (x.x-x.x)	x.x (x.x-x.x)	x.x (x.x-x.x)	x.x (x.x-x.x)	x.x (x.x-x.x)
ICC PHCC	xx.x%	xx.x%	xx.x%	xx.x%	xx.x%
Deviance	DIC	DIC	DIC	DIC	DIC
Fixed effects	**Odds ratio**	**Odds ratio**	**Odds ratio**	**Odds ratio**	**Odds ratio**
Patient					
Sex					
Women		REF		REF	REF
Men		x.x (x.x-x.x)		x.x (x.x-x.x)	x.x (x.x-x.x)
Diagnoses					
Psychiatric disorders			x.x (x.x-x.x)	x.x (x.x-x.x)	x.x (x.x-x.x)
Musculoskeletal diseases			x.x (x.x-x.x)	x.x (x.x-x.x)	x.x (x.x-x.x)
Respiratory tract diseases			x.x (x.x-x.x)	x.x (x.x-x.x)	x.x (x.x-x.x)
Symptom diagnoses			x.x (x.x-x.x)	x.x (x.x-x.x)	x.x (x.x-x.x)
Physician					
Women					REF
Men					x.x (x.x-x.x)

The random effects are expressed as intraclass correlation (ICC) and the fixed effects as odds ratios with 95% confidence intervals (CI). The deviance shows the goodness-of-fit expressed as the deviance information criterion (DIC).

3.5 STUDY III

The study was conducted in Skaraborg, a rural area in the Västra Götaland Region with approximately 258,500 inhabitants (2013). The 20 publicly run primary health care centres (PHCC) in the area care for approximately 75% of the inhabitants. All sickness certificates recorded in these 20 PHCCs during 2013-2014 were collected from the electronic medical records (ProfDoc, Journal III). Patients with sickness certificates recorded in 2012 were excluded in order to include only new onset sick leave periods. All patients with symptom diagnoses (SD), defined in ICD-10 in R00.0-R99.9, registered in the sickness certificate on day 28 were included in the SD group. For each patient with an SD, one matched control with a disease-specific diagnosis and new onset sick leave of a minimum of 28 days was selected. The controls were matched by sex and date of birth by picking the first consecutive patient without an SD after a patient with an SD on a list sorted by sex and date of birth.

The patients were included in the study on the day they first visited the physician who certified sick leave for a period of 28 days or longer. If the patient had visited the physician a few days before the certificate was issued they were included from the date of that visit. The sick leave period was defined as the date of the first certificate to the last date of the last registered certificate. The patients left the study if they were referred to other clinics or if their sick leave was prolonged beyond the introduction of a new electronic medical record system in 2015, prohibiting retrieval of data.

Data from the medical records and sickness certificates were gathered manually using a predefined protocol. Information was gathered on diagnoses, investigations and referrals, patients' employment and occupation, impairment of functioning, contacts with SIOs and rehabilitation activities.

Table 7. Example of the coding process of text in the sickness certificate into the ICF-CY

Text in certificate	Text in ICF-CY	ICF-CY code exact	ICF-CY second level	Assessment
Palpatory **pain** across the back	Pain in back	b28013	b280	Objective
The patient feels **anxiety** and **dizziness**	Anxiety Dizziness	b1522 b2401	b152 b240	Subjective
The patient has **sleeping** problems, wakes up several times a night and is **tired**	Sleeping Lethargy and inaction	b1343 b1252	b134 b125	Subjective
The patient has **diminished facial expressions**	Diminished mimics	d3350	b335	Objective

Descriptions of impairment of functioning and activity limitation were translated and coded into the WHO ICF-CY classification, Swedish version (33). All descriptions of impairment of functioning and activity limitation were indexed and classified using the ICF-CY on the second level (ex. pain = b280, walking = d450). The descriptions were assessed on the basis of the physicians' statements; i.e., observations of the patient's impairment of functioning or activity limitation (objective), or as a description by the patient (subjective), for examples see Table 7. Descriptions of diagnosis, impairment of functioning and subsequent activity limitation (DFA chain) were classified as: coherent and complete, no impairment of functioning, no activity limitation, or no description of the DFA chain. All text in the sickness certificate was evaluated, including activity limitations noted in the wrong section of the certificate. Impairment of functioning or activity limitation was classified as missing if the sickness certificate lacked information corresponding to functioning or activity. The frequency of referrals and the time to contact with other stakeholders (SIO, Swedish employment service and rehabilitation coordinators) were calculated.

3.6 STATISTICS

Descriptive statistics were calculated for means and standard deviations. Differences in discrete variables were calculated with the Chi2 test, for continuous variables with the T-test and for small samples with the Wilcoxon test (154). Differences in sick leave length were calculated with survival analysis (Kaplan-Meier) in order to deal with the censored patients in the study (155). One important aspect of survival analyses is that the observed time can be used without knowing the exact end point. If the beginning of the sick leave period was known but not the end point, the sick leave period was defined as censored in the survival analysis. If patients were referred to a hospital or occupational physician they were defined as censored. The survival analysis was performed using the SAS LIFETEST procedure (156). All analyses were performed in SAS (9.3, Inc., Cary, NC, USA). The level of significance was defined as < 0.05.

3.7 STUDY IV

Study IV had a qualitative design to acquire new knowledge about the physicians' views on sickness certification in their work situation. Focus group interviews were used in order to take advantage of the interaction between the participants, reflecting different views when topics of interest were discussed during the interview. The study was carried out during 2015 in primary health care centres in Västra Götaland, a region with 1.6 million inhabitants (one sixth of the population in Sweden), including both urban and rural areas, and in areas with low and high levels of sickness certification. Primary health care physicians were recruited by purposive sampling to achieve a representation of different professional experiences; general practitioners (GP), locum physicians, GP speciality trainees, interns from both urban and rural areas, from private and public PHCCs, and with education in Sweden or abroad. Managers of primary health care centres of different sizes, public and private, urban and rural, and with a mix of physicians with different lengths of professional experience were contacted. If an opportunity for an interview was found, usually at lunchtime, the physicians were informed about the study by the manager. The physicians willing to participate were further informed by the researcher and gave their signed informed consent at the beginning of the interview.

3.8 DATA COLLECTION

All interviews but one were performed in the PHCCs in connection with scheduled meetings. Thus, colleagues from the same PHCC made up the groups, except one with GP specialty trainees who were interviewed at the local R&D centre. In all, six focus group meetings with 2-8 participants were held. One of the authors (KBB), a clinically active GP and researcher, acted as moderator in all focus groups. ALÖ, a dentist and researcher experienced in qualitative methods, was the supervisor of the team and participated in the first interview with support and evaluation. KS, a GP and PhD student, was not taking part in the interviews as she participated in the regional education programme on sick leave and sickness certification at the time of the project. An observer (two different R&D secretaries experienced in focus group interviews) supported the moderator technically and observed and took notes of the non-verbal communication between the informants. The interviews lasted from 50 to 90 minutes. The participants were served a light meal after the interview.

An interview guide was used to ensure that areas of interest would be discussed. The opening question was, “Sickness certification of patients: what does that mean to you?” The main areas to be covered in the discussions were the roles of the physician, the beneficiary; that is, the patient, and of stakeholders. Desired areas to be discussed were the influence of authorities, the health care organisation and new regulations pertaining to the process of sickness certification and rehabilitation. At the end of the interview the participants were given the opportunity to add subjects that they felt had not been covered. The observer could also add comments or put questions to the group. After the interview, when the participants had left, the moderator and the observer reflected on the discussion. If new subjects had emerged during the interview, these were included in the guide for future interviews.

The interviews were recorded and transcribed verbatim by the observers. Unclear parts of the interviews were reviewed and discussed by the moderator and observers. The names of the participants were coded numerically and text that could identify the participants was removed or replaced by neutral text.

3.9 DATA ANALYSIS

The interviews were analysed using qualitative content analysis (157, 158). This method searches for content at different levels. Firstly, the manifest content in the data is sought; that is, the outspoken and visible content in the transcripts, and then the deeper and underlying meaning of the data; that is, the latent content.

In a first step, the transcripts were read several times by all the authors separately to get an overview of the whole material. In a second step, units carrying meaning were identified; formulations that illuminate topics and phenomena of interest throughout the transcripts. The meaning-bearing units were condensed, a process to shorten the text while still retaining the central meaning. The third step was the sorting of the meaning-bearing units into codes, subcategories and finally into categories in which the content should not overlap. The transcripts were read over and over again and discussed (triangulation) during several meetings between the authors. The process was documented in notes after the meetings. Finally, a comprehensive theme (latent content) describing the main and comprehensive meaning of the data was formulated in agreement between all authors.

Table 8. Results of qualitative content analysis of the category "strategies of handling" resulting in codes, sub-categories and categories. Focus group interviews on sick leave with primary health care physicians.

Main Category	Strategies for handling			
Category	Passive		Active	
Sub-category	Shielding oneself: Not bothering	Shielding oneself: Giving up	Seeking informal support	Seeking formal support
Codes	*Not guilty* *Not too ambitious*	*Not putting effort*	*Discuss with colleagues* *Joking*	*Meetings are outstanding* *Consensus*
Condensed meaning bearing units	*Not guilty, to do what I can* *Not too ambitious in getting a person back to work*	*Not putting effort to motivate the patient to go back to work*	*Discuss sick leave with colleagues at meetings* *Joking about sick leave*	*Rehabilitation meetings are outstanding* *To get consensus*

3.9 ETHICAL CONSIDERATIONS

All research in this thesis was conducted in compliance with the ethical declaration adopted in Helsinki in 1964 (159). Ethical approval was obtained from the Regional Ethical Review Board, Gothenburg, for Studies I-II, reg. no. 357-08, and for Study III, reg. no. 719-15. In addition, approval to retrieve data was given by the directors at the PHCCs for all three studies. For the focus groups interviews (Study IV), an application for ethical vetting was sent to the Regional Ethical Review Board. The board found that the project was not subject to the Swedish Ethical Review Act; however, also stated that the board had no objections (reg. no. 570-14).

In Studies I-III we used the same evaluated extraction processes that have been used before in other studies (62, 91, 147, 160, 161). In the extraction process, it was possible to code the patient, the physician and the PHCC. Thanks to a code key that was extracted at the same time, it was possible to add socioeconomic data from Statistics Sweden. Also, during the validation against the medical records it was possible to extract and read coded data (Study I, II). The extraction from the medical records in Study III was performed manually and the protocols were directly coded.

There is a possibility that patients and physicians may feel discomfort about the retrieval of data from their care and treatment. Data identifying PHCCs or individual physicians were not retrieved. Furthermore, to avoid recognition of individuals, all data were presented at group level. All participants in Study IV provided written consent to participate and had the possibility to withdraw at any time. To avoid revealing the identity of the participants, their names and workplaces were coded in the transcripts. It is possible that the younger physicians felt uncomfortable about being interviewed together with older and more experienced physicians.

4 RESULTS

4.1 STUDY I

The primary aim of the study was to investigate the effects of gender and professional experience of the physicians on the rate and duration of sickness certification. The secondary aim was to study the physicians' gender and professional experience in relation to the diagnoses in the certificates.

Out of 372,451 contacts between physicians and patients, a total of 33,486 sickness certificates were issued in 9.0% of the contacts. The most common certificates were issued for musculoskeletal diseases (3.0%), psychiatric disorders (2.3%), and respiratory diseases (1.1%).

There was no difference in the frequency or duration of sickness certifications between female and male physicians. On the other hand, the duration (days or net days) of the sick leave was significantly different between the different levels of professional experience of the physicians (GPs, 37 days; GP trainees, 26 days; interns, 20 days, and locums 19 days, $p < 0.001$). GPs had a higher proportion (78%) of patients with on-going sick leave from the previous year (2014). The locum physicians constituted 41.4% of the physicians and they contributed 13% of the certificates. They usually worked during short periods and sometimes during recurrent periods. Most of the patients with sickness certification were women (61%).

Validation

In a random sample of 20 sickness certificates from each PHCC (n = 480), the complete medical records were investigated. Nine certificates were duplicates; thus, the sample contained 471 patients. All certificates from 2005 for each patient during the period (ranging from one to twelve certificates, mean 2.2), were investigated (n = 1047). The diagnosis code in the certificate was compared with the diagnosis codes or diagnoses mentioned in the text of the medical records and only ten instances of incongruity (0.1%) were recorded.

4.2 STUDY II

The aim was to evaluate simultaneously the importance of factors known to influence sickness certification, such as diagnoses, the patients' socioeconomic status, and characteristics of the physicians.

Out of 64,354 patients with employment visiting a PHCC, 18% received at least one sickness certificate during 2005. Women had a higher rate of sick leave than men (20.4% vs. 14.8%, respectively, $p < 0.001$). The diagnoses most commonly leading to a sickness certificate were psychiatric diagnoses; 64% of patients with these diagnoses received sickness certificates. Patients with sickness certificates for psychiatric diagnoses hade a higher frequency of acute stress disorders (46% vs. 15%, $p < 0.001$) and depression (39% vs. 30%, $p < 0.001$), compared with patients with a corresponding psychiatric diagnosis but no sickness certificate.

The multilevel model

Random effects:

Table 9 presents the result of the random effects part of the multilevel analysis. The analysis showed that the model including socioeconomic factors and the diagnosis (model D) had a better model fit then the model just including the diagnosis (model C). There was no difference between the models when physician characteristics were added (model E), Table 9. Model A shows that only a small part of the total variation in certified sick leave could be attributed to the higher levels; physician ($ICC_{physician} = 2.2\%$) and PHCC ($ICC_{PHCC} = 0.9\%$). The inclusion of patient and physician characteristics (model E) increased the ICC at the higher levels, but only to a minor extent ($ICC_{physician} = 3.5\%$ and $ICC_{PHCC} = 1.2\%$).

Table 9. Random effects, intraclass correlation and deviance from the multilevel logistic regression analysis of sickness certificates; patients in Skaraborg primary care in 2005.

	Model A[a]	Model B[b]	Model C[c]	Model D[d]	Model E[e]
Random effects					
Patient	3.29	3.29	3.29	3.29	3.29
Physician	0.075 (0.055-0.1)	0.08 (0.05-0.1)	0.12 (0.09-0.15)	0.12 (0.082-0.15)	0.12 (0.08-0.15)
PHCC[f]	0.03 (0.01-0.06)	0.02 (0.01-0.05)	0.05 (0.02-0.1)	0.04 (0.02-0.09)	0.04 (0.02-0.09)
Intraclass correlation					
Patient	96.9%	97.1%	95.1%	95.4%	95.4%
$Physician_{ICC}$	2.2%	2.4%	3.5%	3.5%	3.5%
$PHCC_{ICC}$	0.9%	0.6%	1.4%	1.2%	1.2%
Deviance	59,984	58,352	47,194	46,645	46,646

[a] Empty model
[b] Includes patients' age, sex, socioeconomic status and work-related factors
[c] Includes patients' diagnoses
[d] Includes patients' age sex, socioeconomic status, work-related factors and diagnoses
[e] Includes patients' age, sex, socioeconomic status, work-related factors, diagnoses, and characteristics of the physicians

Fixed effects:

Results from the best-fit model (models D and E) are shown in Table 10. If socioeconomic status and diagnoses were included, it could be shown that patients with psychiatric diagnoses had a 16-fold increased OR for sick leave, followed by a six-fold increase for patients with musculoskeletal diseases, and a 4.5-fold increase for patients with respiratory tract diseases. Patients with symptom diagnoses had a comparatively low OR (1.8) for sick leave. The 25-44-year group had the highest OR for sickness certification (OR = 1.5), whereas it was lower for the oldest age group (55–64 years) (OR = 1.2).

Table 10. Results from the fixed effects part of the multilevel logistic regression analysis of sickness certificates in Skaraborg primary care in 2005.

	Model D	Model E
Patient characteristics		
Sex		
Men versus women	0.8 (0.8-0.9)	0.8 (0.8-0.9)
Age (years)		
18-24	1 (ref)	1 (ref)
25-44	1.5 (1.4-1.6)	1.5 (1.4-1.7)
45-54	1.4 (1.2-1.5)	1.4 (1.2-1.6)
55-64	1.2 (1.1-1.4)	1.2 (1.1-1.4)
Diagnoses		
Psychiatric disorders (F01-F99)[a]	16.0 (15-17.2)	16.1 (14.8-17.4)
Musculoskeletal diseases (M06-P-M96)[a]	6.1 (5.8-6.5)	6.2 (5.8-6.5)
Respiratory tract diseases (J01-J98)[a]	4.5 (4.3-4.7)	4.5 (4.3-4.7)
Symptom diagnoses (R00-R99)[a]	1.7 (1.6-1.9)	1.8 (1.7-1.9)
Education (years in school)		
Missing data	0.9 (0.5-1.6)	0.9 (0.5-1.7)
≤ 9	1.7 (1.6-1.8)	1.7 (1.6-1.8)
10-11	1.4 (1.3-1.6)	1.4 (1.4-1.6)
12	1.4 (1.3-1.5)	1.4 (1.3-1.5)
>12	1 (ref)	1 (ref)
Country of birth		
Born outside Sweden	1.2 (1.1-1.4)	1.2 (1.1-1.4)
Born in Sweden, both parents born outside Sweden	1.3 (1.1-1.6)	1.3 (1.1-1.6)
Born in Sweden, one parent born outside Sweden	1.0 (0.9-1.1)	1.0 (0.90-1.1)
Born in Sweden, both parents born in Sweden	1 (ref)	1 (ref)
Social allowance		
Any time during 2005	1.4 (1.2-1.7)	1.4 (1.2-1.7)
Disposable family income		
Low	1.1 (1.0-1.1)	1.0 (1.0-1.1)
Middle	1.2 (1.1-1.2)	1.2 (1.1-1.2)
High	1 (ref)	1 (ref)
Unemployment[b]		
Yes versus No	1.0 (0.9-1.0)	1.0 (0.9-1.0)
Work place characteristics		
Public administration	1 (ref)	1 (ref)
Agriculture	0.6 (0.5-0.7)	0.6 (0.5-0.7)
Manufacture	1.5 (1.4-1.6)	1.5 (1.3-1.7)
Energy, water and waste management	1.1 (0.8-1.4)	1.1 (0.8-1.5)
Construction business	1.1 (1.0-1.3)	1.1 (1.0-1.3)
Trade and communication	1.0 (0.9-1.2)	1.1 (0.9-1.2)
Financial and business services	1.0 (0.9-1.1)	1.0 (0.9-1.1)
Education and research	1.1 (1.0-1.2)	1.1 (1.0-1.2)
Health and social care	1.4 (1.3-1.6)	1.4 (1.2-1.6)
Social culture service	0.9 (0.8-1.1)	0.9 (0.8-1.0)
Unspecified	0.9 (0.6-1.1)	0.9 (0.7-1.1)
Physician characteristics		
Vocational status		
GP[c]		1 (ref)
GP[c] specialty trainee		0.9 (0.8-1.1)
Interns		0.9 (0.8-1.1)
Locums		1.0 (0.9-1.2)
Sex		
Men versus women physician		1 (0.9-1.1)

4.3 STUDY III

The aim was to investigate whether symptom diagnoses in the sickness certificates are associated with the quality of the information in the sickness certificate and the quality of the sick leave process, compared with certificates with disease-specific diagnoses.

Two hundred and twenty-two patients in each group were included in the study, Figure 6.

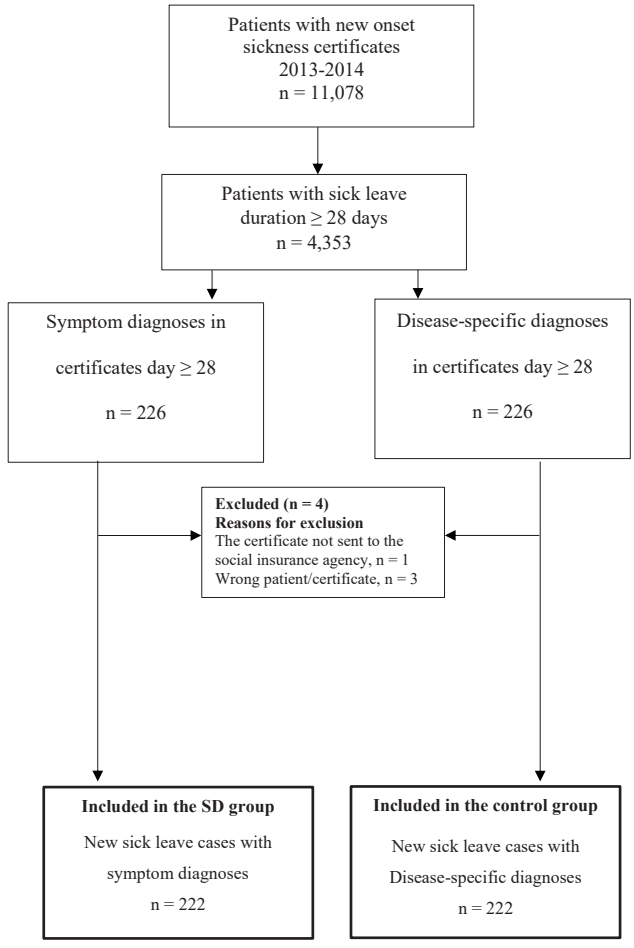


Figure 6. Flow chart of inclusion in the study. [a] SD: Symptom diagnosis, ICD-10, chapter XVIII, (R). [b] Control group: ICD-10, all other chapters.

There were more women (n = 162) than men (n = 60) and the women were younger than the men (41 ± 13 vs. 44 ± 13 years, p = 0.04). The duration of sick leave among patients with symptom diagnoses (SD) was shorter than among controls (116 ± 138 vs. 151 ± 171, p = 0.012). This difference is also illustrated in Figure 7, using a Kaplan-Meier curve where the end point is the end of the sick leave period. Patients with an SD had more visits to the physician at the PHCC the year before the sickness certification compared with the controls (82% vs. 68%, p < 0.001), but fewer visits due to mental ill health (6% vs. 14%, p = 0.005). However, visits to registered nurses and physiotherapists showed no differences. Furthermore, patients with SDs had visited emergency clinics and other health care providers more frequently than the control group the year before the study (22% vs. 13%, p = 0.009), and had more referrals and other contacts with the health care service, (56% vs. 43%, p = 0.008). They also had more X-ray or ultrasound examinations than the controls (32% vs. 18%, p<0.001). There was no difference in the prescription of analgesic drugs, opioids, proton pump inhibitors or benzodiazepines between the groups. On the other hand, there were fewer patients treated with antidepressants in the SD group compared with the controls (22% vs. 44% p<0.001). There were no differences in occupation between the groups, Table 10.

Some patients were censored, as they could not be followed throughout the entire sick leave period, given that the end of the sick leave period was unknown. They were patients referred to hospital or transferred to the new computerised medical journal system in 2015, in all 43 in the SD group and 50 of the controls.

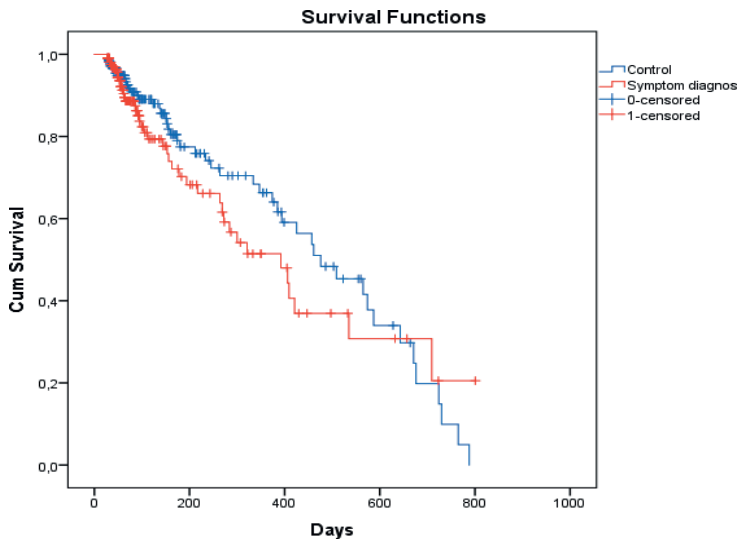


Figure 7. Cumulative survival curve of sick leave duration. SD: Symptom diagnosis, ICD-10, chapter XVIII, (R). Control group: ICD-10, all other chapters. KM p = 0.012.

Table 11. Occupation stated in the sickness certificate on day 28.

	Symptom diagnosis	Control
Agriculture	6	3
Manufacture	22	21
Construction business	13	13
Trade and communication	24	23
Financial and business services	10	11
Education and research	14	12
Health and social care	54	59
Social culture services	7	6
Public administration	12	10
Parental leave	1	1
Student	15	6
Unemployed	42	52
Missing	2	5
Total	222	222

Chi-2 test for the table not significant

4.3.1 QUALITY OF SICKNESS CERTIFICATES

For the group with an SD, the most common diagnosis in the sickness certificate on the 28th day of sick leave was "Pain, not otherwise classified" (23%), followed by "Dizziness and giddiness" (14%), "Malaise and fatigue" (14%), and "Abdominal and pelvic pain" (14%). Among the disease-specific diagnoses, psychiatric diagnoses were the most common (52%), followed by musculoskeletal (26%). In the psychiatric group, depression (18%) and stress disorders (18%) were equally common, followed by anxiety (13%).

It was less common that the first sickness certificate in the sick leave period was longer than 28 days in a patient with a SD than in the control group (33% vs. 52%, $p < 0.035$). The physicians described fewer objective findings with regard to medical status and objective impairment of functioning in the SD group compared with the controls (24% vs. 45%, $p < 0.001$). The coherence in the DFA chain between the diagnosis, description of impairment of functioning and activity limitation was missing to a greater extent in the SD group compared with the control group (56% vs. 44%, $p = 0.008$), Table 13. In the SD group, this lack

of coherence was more frequent for women than for men (60% vs. 47%, p = 0.042). This gender difference in the lack of coherence was not seen in the control group. (48%, 37%, ns). There were no associations between incoherence in the DFA chain between groups or gender and certification by telephone. Planned rehabilitation was described at a low frequency in the certificates in both groups.

4.3.2 COLLABORATION WITH OTHER STAKEHOLDERS

In this study, it was rare that the SIO contacted the PHCC, regardless of the diagnosis (10% vs. 8%, ns). There was great variation in the time to the first contact between the SIO and the PHCC in both groups (range 43-381 days vs. 35-790 days, ns) and few rehabilitation meetings (7% vs. 10%, ns). The meetings with the Swedish employment service were even less frequent (2% vs. 1%). The rehabilitation coordinator contacted very few patients (10% vs. 19%, ns) with a wide variation in time (13-770 days vs. 9-460 days, ns) and there was no difference between the SD group and the controls.

Table 12. Characteristics of patients with symptom diagnoses and controls with disease-specific diagnoses. Frequencies and duration of different events in the sick leave process.

	Symptom diagnoses n = 222, w/m 162/60	Control group n = 222 w/m 162/60	*p*
Age, women (years)	41 ± 13	41 ± 13	0.04
Age, men (years)	44 ± 13	44 ± 13	0.04
Length of sick leave, all individuals (days)	116 ± 138	151 ± 171	0.018[a]
Length of sick leave, women(days)	107 ± 125[b]	154 ± 172	0.012[a]
Length of sick leave, men (days)	134 ± 91 [b]	150 ± 105	ns [a]
Contact with coordinator before sick leave, n (%)	7 (3)	8 (4)	-
Contact with coordinator during sick leave, n (%)	10(4)	19(9)	ns
Contact with physiotherapist, n (%)	59 (27)	63 (28)	ns
Planned rehabilitation, n (%)	5 (2)	12(5)	ns
SIO contacted the PHCC (%)	22 (10)	17(8)	ns
Sick leave rejected, n (%)	0	1 (0.5)	-
Certified by telephone, n (%)	50 (23)	33 (15)	0.038
X-ray or ultrasound examination, n (%)	71 (32)	40 (18)	p < 0.001
Visit to physicians at PHCC preceding year	183(82)	151(68)	p < 0.001
Visit to emergency clinics and other healthcare providers, n (%)	49 (22)	28 (13)	p < 0.009
Antidepressants drugs, n (%)	49 (22)	97 (44)	< 0.001
AUDIT or tests for alcohol, n (%)	17 (8)	16 (7)	ns
Planned follow-up by physician, n (%)	35 (16)	58 (26)	0.008

Data are means ± standard deviations or numbers and frequencies.

w, women; m, men; ns, non-significant; SIO, Social insurance officer.

[a] Differences calculated with Kaplan-Meier.

[b] No difference in length of sick leave between women and men with symptom diagnoses.

Table 13. Analysis of the text in the predefined subheading in the sickness certificate encompassing the 28th day of sick leave.

	Symptom diagnoses n = 222, w/m 162/60	Controls n = 222, w/m 162/60	*P*
No coherent DFA chain, all[a]	125 (56%)	97 (44%)	0.008
No coherent DFA chain, women[a]	97 (60%)	74 (46%)	0.002
No coherent DFA chain, men[a]	28 (47%)	23 (38%)	ns
Activity limitations missing, all	87 (47%)	82 (40%)	ns
Activity limitations missing, women	68 (42%)	63 (39%)	ns
Activity limitations missing, men	19 (32%)	19 (32%)	ns
Impairment of body functions missing	7 (3%)	2 (1%)	-
Objective evaluation of impairment of functioning, all	53 (24%)	100 (45%)	< 0.001
Objective evaluation of impairment of functioning, women	40 (25%)	66 (41%)	0.003
Objective evaluation of impairment of functioning, men	13 (22%)	34 (57%)	< 0.001
Presence of explanation for sick leave duration exceeding decision support	8 (4%)	4 (2%)	
Number of described impairments of body function[b]	4.4 ± 2.6 (0-14)	4.5 ± 2.5 (0-12)	0.86
Number of described activity limitations[b]	1.7 ± 1.7 (0-9)	1.9 ± 1.9 (0-10)	0.28

[a]DFA; Diagnosis, impairment of body **F**unctions, **A**ctivity limitations. DFA chain coherent

Association of D, F and A on the certificate according to a predefined evaluation form.

[b] Classified in ICF-CY on second level (b###) in four-piece code. Each code could only occur once for each patient.

w, women; m, men; ns, non-significant

Table 14. Impairment of functioning on certificate day 28. A patient is only coded once for each code.

	Impairment of functioning	SD number of patients	Controls number of patients
Mental functions	b125 (fatigue)	47	48
	b126	11	38
	b130	10	21
	b134	20	44
	b135	1	0
	b138	1	0
	b140 (concentration)	36	45
	b144	4	15
	b147	1	5
	b152 (anxiety)	15	64
	b160	1	10
	b164	2	5
	b167	1	1
Sensory functions and pain	b210	3	1
	b215	0	1
	b230	1	1
	b235	2	0
	b240 (dizziness)	15	4
	b265	2	5
	b270	4	3
	b280 (pain)	62	37
Voice and speech	b310	1	1
	b320	0	1
	b330	2	1
	b350	0	1
Functions of the cardiovascular, haematological, immunological and respiratory system	b410	3	7
	b415	1	1
	b420	5	1
	b430	2	2
	b435	1	1
	b440	1	3
	b450	4	0
	b455 Exercise tolerance functions (ex fatigability)	10	5
	b460	1	1
Digestive system	b510	1	1
	b515	2	3
	b525	4	1
	b530	2	4
	b535	14	6
	b540	3	2
	b550	2	0
Genitourinary and reproductive	b610	1	0
	b625	1	0
	b660 (pregnancy)	9	7
Neuromusculoskeletal and movementrelated functions	b710	13	21
	b715	0	1
	b720	1	0
	b730 (muscle power)	6	8
	b735	2	0
	b740	1	0
	b750	0	1
	b760	1	0
	b765	1	4
	b770	1	5
Skin	b820	0	1
	b830	1	3

Table 15. Activity limitations on certificate day 28. A patient is only coded once for each code.

	Activity limitation	SD number of patients	Controls number of patients
Learning and applying knowledge	d134	1	0
	d137	0	1
	d140	2	0
	d155	0	1
	d160	9	19
	d161	0	1
	d163	0	1
	d166	1	4
	d175	1	2
	d177	3	4
	d179	1	0
General tasks and demands	d210	7	13
	d220	9	6
	d230	2	6
	d240	5	17
Communication	d310	0	3
	d315	0	2
	d325	1	1
	d330	2	1
	d335	0	7
	d345	0	1
	d350	0	1
	d355	0	1
	d360	2	3
	d385	0	1
Mobility	d410	14	17
	d415 (Changing basic body position)	23	28
	d420	1	.
	d430 (lifting carrying)	36	32
	d431	1	0
	d440	7	2
	d445	1	0
	d450 (walking)	24	21
	d455	1	8
	d460	4	2
	d470	3	0
	d475 (driving)	12	11

	Activity limitation	SD number of patients	Controls number of patients
Self-care	d510	0	1
	d540	2	2
	d550	1	2
	d570	1	1
	d599	0	1
Domestic life	d620	2	2
	d630	3	1
	d640	8	6
	d660	4	4
Interpersonal interactions	d710	3	11
	d720	1	4
	d740	5	8
	d750	0	1
	d760	0	1
Major life areas	d820	5	3
	d850 (Remunerative employment)	41	30
	d860	0	1
Social and civic life	d910	0	2

4.4 STUDY IV

The aim of the study was to explore the views of primary care physicians of all categories on sickness certification after a period of changes in the regulations.

In all, 28 participants in six different focus groups were interviewed. Most of them were educated in Sweden and 15 were specialists in general practice, five were GP specialty trainees, four were interns and four registered physicians. Their age ranged from 30 to 60 years and 43% were women. Their experience of primary health care ranged from a few months to 26 years. It was uncommon that the moderator had to interrupt with questions from the guide. Mostly, the groups discussed the topics in the guide spontaneously and went on to the next area without any comments by the moderator.

The latent content of the interviews was formulated in a comprehensive theme. "The participants considered sickness certification an emotive task, a challenge to master with differing demands and expectations from management and patients".

Three main order categories of the manifest content were identified. (Figure 8): (i) the physicians' thoughts and reflections on factors influencing sick leave, (ii) the physicians' strategies for handling sick leave, and (iii) the physicians' suggestions for future situations. Subcategories to these categories were sought and labelled. Table 8 shows an example of the analytical process from meaning-bearing units to codes and categories.

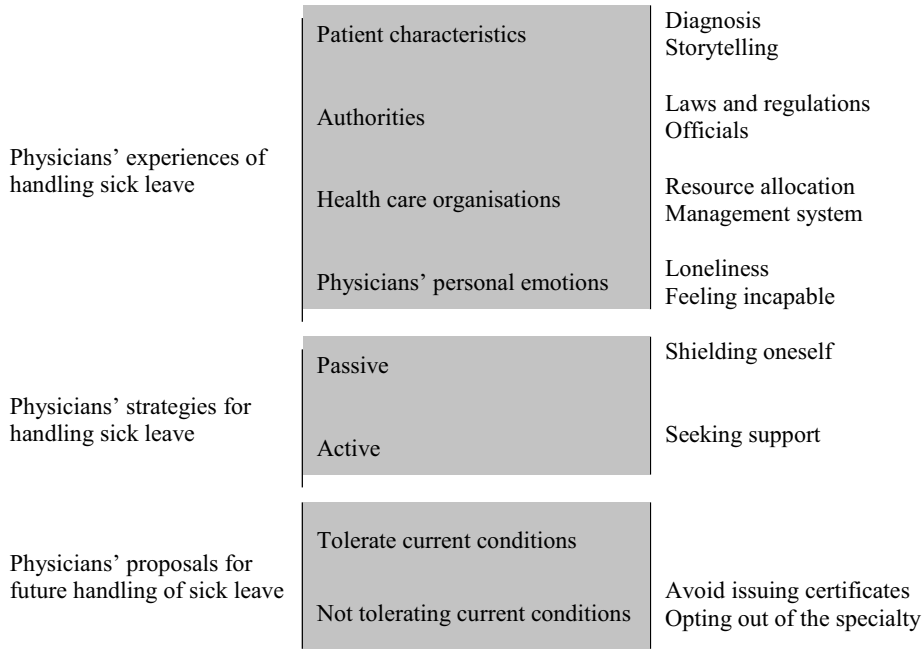


Figure 8. The physicians' views of the sick leave process.

The first main category, "Physicians' experiences of handling sick leave", contained four subcategories, two of which were the parties to the consulting situation: the patient and the physician. The patient's medical status was the basis for the sick leave; however, completed with his/her communication with the doctor. Own experiences and emotions were recognised. The physicians expressed feelings of sometimes being incapable of responding to the demands placed on them. The other two subcategories concerned superior authorities and the health care organisation and these issues were thoroughly discussed. The management of the primary health care service was raised in all groups and discussed extensively, specifically economic issues and the guarantee of care within a certain time limit. This increased the pressure on the physicians, according to the participants.

*The second main category, "*Physicians' strategies for handling sick leave", contained two principal approaches: passive and active handling strategies. Both strategies could be adopted by the same physician, depending of the situation. Sometimes a passive approach could be a strategy of shielding oneself and avoiding disappointment from the patient.

One active approach was seeking support in formal documents and scheduled me etings and the other was support from colleagues, often sought “en passant”. Both forms of support were highly valued by the participants.

The third main category dealt with the physicians’ views of how the future would be, after all the changes to the system. Two main ways could be distinguished: one was to tolerate the prevailing circumstances and make the most of the situation. Sometimes, when succeeding at helping a patient, the physician’s own professional self-esteem could be boosted. The other way of action was avoiding issuing certificates and a wish was expressed for specialised doctors or teams to whom patients could be referred. One approach that was discussed was leaving the specialty due to the heavy task of sickness certification. Also, young doctors might not be attracted to choose the GP specialty for this reason.

5 DISCUSSION

This thesis has explored sickness certification from different perspectives using both quantitative and qualitative methods with the focus on the physician. The studies were carried out during a period with great changes to the social insurance legislation and many new reforms. The studies can be seen as an evaluation of the effects of the reforms. The studies have been conducted in a Swedish context but some results should be applicable outside Sweden.

5.1 MAIN FINDINGS OF THE THESIS IN RELATION TO EARLIER STUDIES

Study I investigate sickness certification by physicians of different gender and vocational experience. Earlier studies addressing this issue have shown conflicting results (115, 116, 118). The studies were generally small and often used case vignettes for evaluation. Our study was based on a large sample of sickness certificates from computerised medical records. These data have high validity, as the certificates were automatically registered in the medical records when the physicians issued them. Also, the extraction procedure has been shown to have high validity and has been used in earlier studies from the same primary health care area (62, 91, 162). The finding that GPs issued sickness certificates with the longest duration might indicate that patients with more complicated diseases more often saw physicians with long vocational experience. Another explanation could be that GPs have a greater work load and thus certify for longer periods in order to postpone subsequent visits.

Several factors, apart from the patient's illness or disease, play a role in sickness certification, such as gender, socioeconomic and workplace factors and varying sickness certification practices at the physician's place of work and the geographical location of the PHCC. Usually, such factors have been studied separately (124, 163-165). In Study II we studied several of these factors simultaneously using multilevel analysis of sickness certification in 2005. Compared with factors at the patient level, factors on the physician level contributed only to a small extent to the variation in the frequency and duration of sickness certifications. It is noteworthy that the variation between physicians was greater than between PHCCs. The gender of the physician did not seem to be of importance. These results are in line with the results from a study by the Norwegian Primary Health Care organisation, using analyses similar to those in our study (107).

Study III, with data from 2013-2014, evaluated the effects of educational efforts, financed through the "sick leave billion", on sickness certification quality and other aspects of the sick leave process. It is still unclear to what extent the "sick leave billion" has had the intended effects, since the whole of Sweden was included in all interventions at the same time (117). The evaluation showed that almost half of the sickness certificates lacked information crucial for the assessment of entitlement to sickness benefit, and it was more pronounced in sickness certificates for patients with an SD compared with certificates for patients with disease-specific diagnoses. This strengthens the findings in an earlier study using certificates with an SD as a marker of poor quality of certificates (166). We also found, somewhat surprisingly, that the entire sick leave period in the SD group was shorter, even though the sickness certificates were more often renewed by telephone and the follow-up was less extensive. The recommendation from the National Board of Health and Welfare is that sickness certificates should not be renewed by telephone (167), but we found no rationale for this recommendation in our study. The study also showed that physicians were very much on their own in the sickness certification process. The rehabilitation coordinator was rarely involved in the process, irrespective of the diagnosis in the certificate. Furthermore, the time to rehabilitation was long. An SD was not recommended in certificates exceeding four weeks, according to the decision support tool used at the time of the study. This particular decision support tool has now been removed from the web site, which seems to be an adequate action. On the other hand, patients with an SD differed from patients with disease specific diagnoses. They had attended health care more often before the sick leave period and had more diagnostic procedures. Finding these patients and offering them extra medical attention would therefore be valuable. Presumably, patients with medically unexplained symptoms can be found in this group. Finding them early and taking care of them, whether they need sickness certification or not, might facilitate the management of these patients. More attention is given to these patients in other countries. In addition, guidelines in these countries are used for the management of patients with medically unexplained physical symptoms (MUPS), which most probably constitute a substantial part of patients with SDs (168).

Finally, Study IV showed that physicians considered sickness certification an emotive task, a challenge to master with differing demands and expectations from management and patients, despite the introduction of new regulations. The physicians also expressed feelings of being on their own in the process of handling sick leave and rehabilitation. All types of physicians working in primary health care, with different experience and background, participated in this study, using qualitative methods.

The results of this thesis partly contradict and are partly in line with earlier studies. For instance, in Study I, there was no difference in the sick leave prescription rates between male and female physicians. A previous study investigating this by using vignettes showed that female physicians issued more certificates (118). In another study, male physicians were more likely to issue sickness certificates of medium-long duration to male patients (115). However, there are also studies where no differences are seen between female and male physicians (116, 169). The strength of the current study was that certificate data were extracted without bias and independently of self-reporting. However, all diagnoses in medical records involve subjective, personal views on what diagnosis is the most appropriate and could thus differ between physicians. We tried to reduce this difference by using higher level diagnoses, like psychiatric disorders or musculoskeletal disease. The results of Study II are partly in line with earlier studies (163, 170, 171), as socioeconomic factors influence the frequency of sick leave. On the other hand, if other patient-related factors are also included in the same analysis, the patients' diagnoses dominated, especially psychiatric diagnoses. The fourth study also confirms, in part, the results from other studies using interviews. The setting was slightly different from that of the other studies, as only GPs were interviewed in those (30, 66), while in the current study, all types of physicians working in primary health care were interviewed. In Study I, the contacts managed by GPs amounted to 66%, and the rest were managed by interns, physicians in education and locums. A recently published study (6), using focus group interviews, found that the participants had a positive view of rehabilitation teams. The current study found that the informants were more reluctant to this form of cooperation and some expressed the view that it could even delay return to work. This is in line with a new study that shows that rehabilitation teams increase the sick leave length (172). Several studies have shown results that strengthen the findings in Study IV. The physicians feel stuck with the problem of sickness certification and evaluation of working capacity (4, 173-175). A finding not previously described was that the physicians regarded the sickness insurance time limit as an aid in rehabilitation, making all parties more focused on RTW. The physicians used the decision support not only to decide about the length of the sickness certification but also used the wording in the support protocol. It was also used as an aid to relieve the physician of the burden of deciding about sick leave in contacts where the patient opposed the physician's decision.

5.2 THE PHYSICIAN

Michael Balint worked as a physician and psychoanalyst. He analysed the stories of patients from his own practice (176) and introduced groups for physicians to facilitate discussions about problems in the doctor-patient relationship and to help physicians understand their patients. In the last study, we saw that physicians still attend Balint groups, 50-60 years after his seminal work, in order better to cope with their problems. There is a conflict between satisfying the patient as a consumer of health care and guarding against overuse of the sickness insurance system. The physicians expressed that during the period with time limits in the sickness insurance, these restrictions helped them in the rehabilitation of the patient. This is in line with another Swedish study, which showed that time limits increase RTW (177), but in contrast to another study using interviews, where the time limits made the actors more passive in the rehabilitation process (178).

We have shown that the variations in characteristics between physicians in primary health care are minor, except that GPs issued sickness certificates of longer duration. As GPs usually have a permanent position, they presumably look after patients on prolonged sick leave over long periods of time. The other categories of physicians work for shorter periods in the primary care system.

Physicians expressed that they did not feel competent to assess working capacity. It was shown in Study III and Study IV that the assessments, especially in patients with symptom diagnoses, had quality deficiencies. In Study IV, participants suggested that primary care physicians should be relieved of the task of sickness certification, as this was perceived to be a heavy burden. Earlier studies have argued that physicians need to be more skilled (179-181). Consequently, courses in insurance medicine have been given at different stages of the medical education programme. For older physicians, there was no compulsory education, as is the case nowadays, and the education in insurance medicine is still very limited; about 5-7 days in total during a ten-year period. It can also be assumed that changes to the rules are introduced over time and knowledge and skills have to be updated. This means that physicians have to rely on their own initiative to acquire these skills. This is in line with earlier studies where physicians acquired their sickness certification competence through their daily clinical practice or contacts with colleagues (179, 180). Different education programmes for physicians have been suggested as a solution (136, 180, 181). The lack of properly completed certificates (Study III) may reflect the difficulty of finding signs of a specific disease but may also reflect incomplete knowledge about what to assess; for instance, regarding the patient's function and ability to work. In Study IV, the physicians expressed that they did not feel competent to assess working capacity. Having duties and not feeling competent or educated enough to

perform them led to frustration and even thoughts of leaving the specialty. One suggestion for the future was to transfer the sickness certification and rehabilitation tasks to specialised rehabilitation physicians or teams.

Some studies of the management of health care point out that health care managers have a weak and ambiguous role in relation to the physicians and that their support in the sickness certification task needs to be strengthened (182, 183). This is in line with our findings, where physicians feel that they are on their own in the sickness certification task. They are left alone with the problem without help and the physicians in the interviews did not know that they could get support from the managers. The only time that managers were mentioned in the interviews was when the manager demanded that the physician take more patients for prolonged sickness certification from physicians who had left their position at the PHCC.

5.3 THE PATIENT

All sickness certification starts with a person who feels ill and contacts the PHCC for an examination, for treatment and perhaps for a sickness certificate. However, many different factors are involved in the assessment before the patient can get a sickness certificate. The gender of the physician does not seem to play a role, as shown in Study I. In Study II, the multilevel model showed that the diagnosis of the patient and socioeconomic factors explained 95% of the variation in sickness certification. The most common diagnoses leading to sick leave were psychiatric and musculoskeletal diagnoses. The patient's socioeconomic status also has to be taken into account: factors at the patient level that were associated with a higher risk of sickness certification were female gender, low educational level, being born outside Sweden, receiving help from social security; all factors related to a low social position. A low social position has been shown in several studies to generate more sick leave (163, 170, 184). Women have unequal working and employment conditions compared with men and do not have the same career opportunities (185). It is also more common for women to live under domestic pressure, in unequal family relations and with domestic violence (78, 114, 186-188). Domestic violence is well known to be associated with prolonged sick leave (112). The problems with social gradients and inequality have to be addressed by other authorities outside of the health care system.

Study III describes how patients with symptom diagnoses utilise health care more frequently, with more emergency and PHCC contacts the year before the sick leave period. In Study IV, the physicians described how patients appeal to their feelings. They highlighted the conflict of the physician's dual roles, as the gatekeeper in the social system and the provider of medical care, especially in cases of prolonged sick leave. The patients tell their stories (189) and express their needs to the physician (190), and it is important for the physician to understand the different kinds of stories, like the chaos, quest and restitution narrative, and to feel capable of understanding and coping with these stories.

5.4 SWEDISH SICKNESS INSURANCE IN COMPARISON WITH OTHERS COUNTRIES

The Swedish government has a target for Swedish sickness payments of nine days per person per year, with little variation between different geographical areas in Sweden. Sweden differs from other countries in that all physicians are entitled to certify sick leave, also prolonged sick leave periods. There is no insurance physician who actually meets the patient. The time period during which the patient can be on sick leave without a certificate from a physician is also longer (seven days) than in other countries. Only the UK (seven days) and Finland (nine days) have the same length or a longer period.

Sweden is a welfare state with large tax-funded financial transfers that include all citizens. To give credibility to the system it must be ensured that the sick leave and rehabilitation processes are as equitable and effective as possible and that the assessments for sickness benefit are of high quality. As a low social position is associated with more sick leave periods, this has to be addressed by the rest of society, outside the health care system. Specialised rehabilitation teams might contribute to minimising inequalities between caregivers and the management of sickness certification and the rehabilitation process.

5.5 STRENGTHS AND WEAKNESSES OF THE THESIS

The studies in this thesis cover a decade, thereby providing the opportunity to reflect on changes to the social insurance system and the impact of these changes on different stakeholders in the process. On the other hand, some studies used data that are fairly old, which may compromise their relevance to today's situation.

Study I and II

The strength of Study I and II is that they are largely based on automatically recorded data and thereby unbiased, since the recording is independent of active registration. The sickness certificates were automatically registered in the computerised medical case record. Having a large sample with many physicians and sickness certifications increased the power of the studies. One problem was assigning the sickness certification to the physicians if there were sickness certificates from different physicians.

When designing the study, measures were taken to take the statistical problems into account. We used repeated measurements to control for this and to avoid the risk of findings that are of little or no clinical significance. Furthermore, the quality and completeness of data may vary between physicians and PHCCs and with time, due to altered regulation and organisation of the health care system. One example of this is the impact of the free choice of care provider introduced in 2009. The reimbursement to the PHCCs was based, among other things, on the registration of diagnoses, which may jeopardise the validity of studies relying on long-term data spanning 2009. The registration of diagnoses improved from a low and varying degree in the public PHCCs between 2005 and 2009 (62), as this was the recommendation from the management but not yet the basis for reimbursement. The diagnoses used in Study I were based on the diagnosis in the sickness certificate. In Study II, diagnoses in the medical records could have been affected by the varying and low registration of diagnoses for patients who were not put on sick leave, while the diagnoses of patients on sick leave most certainly had a correct diagnosis in the certificate. A validation was therefore performed as a quality assessment to preclude that severe illnesses (diagnoses) causing sickness certification were missed in the study. It was found in the validation that psychiatric diagnoses, such as sleeping problems and depression and anxiety on longstanding medication, were found in the group of patients without a sickness certificate.

The validity of diagnoses can also be questioned from another angle. There is always a risk that the physician issuing the sickness certificate uses a diagnosis that improves the chances that the SIO will approve the certificate. Furthermore, the diagnosis in the certificate may change over time. To minimise these errors, the certificates were evaluated against the text in the medical records.

In Study II, we used a multilevel design to evaluate the importance of the different levels. A regression model with one level would possibly also have yielded the result that the diagnoses were the most important, but the variations in context and relation to the physician and the PHCC would not have been clarified to the same extent as in a multilevel model. Being able to use validated data, linked by Swedish personal ID numbers, from Statistics Sweden improved the quality of the study, as these data have passed a validation process. A strength of our study was the possibility of validating sick leave data and data from the Swedish Insurance Agency via data from Statistics Sweden. In Study II, only patients with employment, as classified by Statistics Sweden, were included. The fact that patients without employment are not required to present sickness certificates as urgently as patients with employment has to be taken into account (191).

Study I and II were observational; thus, only associations can be found. It is not possible to evaluate the causality between factors involved in the process and the outcome. To study causality, clinical trials such as randomised controlled trials would be necessary.

Study III

The strength of study III was the age and sex matching of controls with disease-specific diagnoses to the patients with an SD in their sickness certificates. Furthermore, only new onset sick leave was included in both groups. The data in the certificates were retrieved automatically and, in addition, data to further characterise the patients were collected manually from the computerised medical records. The evaluation of the sickness certificates in both groups was performed at the same time in the sick leave process, on day 28, to minimise the time-dependent variability. The characterisation of the patients in the two groups was performed through examination of their medical records up to one year before the sick leave period started. This broadened the perspective of the study and gave new insights into the background of patients with SDs and the complexity of problems of patients with SDs, influencing the care of these patients.

One limitation of the study was that the sickness certificate only includes one ICD-10 code. Patients with SDs might have other diagnoses and also disease-specific diagnoses stated in the text of the certificate or in the medical record. This

information was not included in the analysis in this study but could influence the decision of the physician about the duration of sick leave and the SIO's assessment to exceed the time limit of two weeks for SDs, as stated in the decision support; see Appendix 3. This limits the use of SDs as a marker of the quality of the certificates and the sick leave process.

Study IV

The strength of the study was that all types of physicians working at PHCCs were included in the study, such as locums, interns (AT) and GP specialty trainees. A substantial part of the care of patients in primary health care is performed by physicians other than GPs and they also handle sickness certification. Furthermore, PHCCs in both rural and urban areas were included. A limitation could be that all physicians at the PHCCs participated in the same focus group. There might be a risk that physicians with more experience dominate the interviews. The moderator was aware of this and took action during the conversation so that all participants were given the possibility to speak. At the end of all focus group sessions the participants were encouraged to raise topics they felt had not been addressed. An interview guide was composed for the sessions, in order to cover all topics of interest. This guide was carefully compiled; however, most questions were raised by the participants themselves, with one exception: questions about the ICF had to be introduced by the moderator.

The reliability of the results was evaluated in terms of credibility, dependability and transferability (157). Credibility is the ability to answer the research question. In the current study, the research question or aim was to acquire new knowledge about the experience and feelings among primary health care physicians about sickness certification. By choosing participants with various backgrounds we wanted to shed light on these questions from different angles. Focus group interviews were chosen to increase the amount of data and take advantage of the interaction between the participants. After the interviews, the guide was evaluated and minor changes were made based on the information gleaned during the interviews. Very few changes had to be made. In the analysis, spontaneously raised topics addressed in most groups and with interaction between participants were considered the most important. The authors had several meetings to discuss coding and classification. All meetings were documented in written summaries and pictures.

Dependability is a means to describe changes in phenomena and study design over time, or other factors that interfere with the result. The interviews were performed during a limited period of time to avoid time-dependent variability. The interview

guide was used to check that all topics were covered. The majority of topics were mentioned spontaneously, but the views on the ICF manual and the accompanying education had to be asked for in most groups. The author with considerable experience of qualitative research and qualitative content analysis participated in the first interview and provided constructive criticism regarding the performance of the moderator and assistant. After later interviews, further feedback was given based on the transcribed interviews.

The transferability of the findings to other settings and groups depends on the choice and description of the context and the presentation of the results. We put much effort into choosing participants from different settings in the primary health care service and to present both the most commonly expressed and alternative experiences and feelings. Thus, the qualitative information gained in the study can be seen as relevant to similar contexts.

6 CONCLUSION

- Physicians of different gender handle sickness certification (frequency and duration) in a similar way. GPs certified longer sick leave periods compared with other categories of physicians in primary health care. This was also true for the different groups of diagnoses.
- The most important factors for sickness certification were patient-related, such as diagnoses and socioeconomic status. Physician-related factors only contributed to a minor extent to the variation when analysed in a model including patient-related factors.
- Symptom diagnoses in the certificate covering the 28th day of sick leave were associated with the completeness of the certificate. Patients with symptom diagnoses had higher health care consumption compared with patients with disease-specific diagnoses.
- Primary health care physicians perceived the sickness certification process as emotive and a challenge to master with differing demands and expectations from management and patients. The reforms introduced to increase the quality of sickness certification process seem to have had little impact on PHC physicians' views of their working situation.

7 FUTURE PERSPECTIVES

This thesis is about sick leave and social security in Sweden, which has a system with income-related sickness benefits. Even if Sweden has a feminist government, as declared by the Prime Minister (2017), women are discriminated against compared with men in the social security system (192). On the other hand, the social security system in Sweden is regarded as liberal and it would be interesting to study how it performs in comparison with other countries. In future studies, I would like to address the question to what extent women with a lower social position are entitled to benefits from the social security system in countries with different systems. This would increase our knowledge about how the design of different systems influences social equality and participation in the labour market.

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Appendix 1

Försäkringskassan

0771-524 524
www.forsakringskassan.se

Läkarintyg 1 (2)
enligt 27 kap. 25 § socialförsäkringsbalken

Patientens namn Personnummer

Skickas till
Försäkringskassans inläsningscentral

839 88 Östersund

Om patienten inte är känd ska han eller hon styrka sin identitet genom legitimation med foto (SOSFS 2005:29)

1
☐ Avstängning enligt smittskyddslagen på grund av smitta
(fortsätt till fält 8 b)

2 Diagnos/diagnoser för sjukdom som orsakar nedsatt arbetsförmåga

Diagnoskod enligt ICD-10
(Huvuddiagnos)
Minst tre positioner

3 Aktuellt sjukdomsförlopp

4 Funktionsnedsättning - observationer, undersökningsfynd och utredningsresultat

Intyget baseras på — Datum
☐ min undersökning av patienten
☐ min telefonkontakt med patienten
☐ journaluppgifter
☐ annat (ange vad i fält 13)

5 Aktivitetsbegränsning relaterat till diagnos (fält 2) och funktionsnedsättning (fält 4)

6 a Rekommendationer
☐ kontakt med Arbetsförmedlingen
☐ kontakt med företagshälsovården
☐ övrigt (ange vad)_____

6 b Planerad eller pågående behandling eller åtgärd
☐ inom sjukvården (ange vilken) _____
☐ annan åtgärd (ange vilken) _____

72631104

FK 7263 (010 F 003) Fastställd av Försäkringskassan i samråd med Socialstyrelsen 2010-04-13

Läkarintyg	Doctor's certificate
Patientens namn	Patient's name
Personnummer	Swedish Personal ID number
Om patienten inte…	If the patient is not previously known, he/she is to verify his/her identity with an identity card containting a photograph

Section 1 Suspended in accordance with the Infectious Disease Act due to infection (continue to section 8b)

Section 2 Diagnosis/diagnoses for the illness causing reduced working capacity
Diagnosis code according to ICD-10 (principal diagnosis)

Section 3 Course of illness

Section 4 Functional disabilities: observations, examination findings and results of investigations

The certificate is based on
1. My examination of the patient
2. My telephone contact with the patient
3. Medical records
4. Other information

Section 5 Activity limitations related to diagnosis (section 2) and functional disability (section 4)

Section 6a Recommendations
1. Contact with the Swedish Public Employment Service
2. Contact with occupational health service
3. Other (specify what)

Section 6b Planned or on-going treatment or measures
1. Within health care (specify what)
2. Other (specify what)

Personnummer 2 (2)

7 Är arbetslivsinriktad rehabilitering aktuell?

☐ Ja ☐ Nej ☐ Går inte att bedöma

8 a Patientens arbetsförmåga bedöms i förhållande till

☐ nuvarande arbete - ange aktuella arbetsuppgifter _____

_____

☐ arbetslöshet - att utföra sådant arbete som är normalt förekommande på arbetsmarknaden

☐ föräldraledighet med föräldrapenning - att vårda sitt barn

8 b Jag bedömer att patientens arbetsförmåga är

	från och med (år, månad, dag)	längst till och med (år, månad, dag)
☐ nedsatt med 1/4		
☐ nedsatt med hälften		
☐ nedsatt med 3/4		
☐ helt nedsatt		

9 Patientens arbetsförmåga bedöms nedsatt längre tid än den som det försäkringsmedicinska beslutsstödet anger, därför att:

10 Prognos - kommer patienten att få tillbaka sin arbetsförmåga i nuvarande arbete? (Gäller inte arbetslösa)

☐ Ja ☐ Ja, delvis ☐ Nej ☐ Går inte att bedöma (Förtydliga i fält 13)

11 Kan resor till och från arbetet med annat färdsätt än normalt göra det möjligt för patienten att återgå i arbete? ☐ Ja ☐ Nej

72631204

12 Kontakt önskas med Försäkringskassan ☐ Ja

13 Övriga upplysningar och förtydliganden

Ovanstående uppgifter och bedömningar bekräftas

14 Datum	**16** Läkarens namnteckning
15 Namnförtydligande, mottagningens adress och telefon	**17** Förskrivarkod och arbetsplatskod

FK 7263 (010 F 003) Fastställd av Försäkringskassan i samråd med Socialstyrelsen 2010-04-13

Section 7 Is occupational rehabilitation relevant in this case?

1. Yes
2. No
3. Cannot be assessed

Section 8a The patient's working capacity is assessed in relation to:

1. Current work – specify current tasks
2. Unemployment – ability to carry out a job normally found in the job market
3. Parental leave with parental benefit – ability to take care of a child

Section 8b I assess the patient's working capacity to be impaired by:

- 25%, from YYYYMMDD up to an including YYYYMMDD
- 50%
- 75%
- 100%

Section 9 The patient's working capacity is estimated to be reduced for a longer period than that indicated by the insurance medicine decision support, for the following reasons:

Section 10 Prognosis – will the patient regain his/her working capacity in their current work (does not apply to unemployed patient)

- Yes
- Yes, in part
- No
- Cannot be assessed (specify why in section 13)

Section 11 Would using a different means of transport for travel to and from work enable the patient to return to work?

Section 12 Is contact with the Social Insurance Agency wanted?
Section 13 Additional information and clarifications
Section 14 Date
Section 15 Printed name
Section 16 Physician's signature
Section 17 Prescriber code and workplace code

Appendix 2

Långvarig smärta i rörelseorganen inkl. fibromyalgi – M79, R52

Försäkringsmedicinsk information

Rekommendationen gäller för långvarig smärta som i det aktuella läget inte är direkt kopplad till väldefinierad diagnos (t.ex. artros el. inflammatorisk ledsjukdom).

Sjukskrivning bör alltid vara kopplad till aktiva åtgärder i form av funktionsutredning, funktionshöjande åtgärder, regelbundna arbetsplatsbesök, arbetsanpassning, arbetsträning och utbildning. De patienter med svårast smärta bör bedömas och behandlas i specialiserad multiprofessionell smärtvård.

Vissa patienter tenderar att återkommande överansträngа sig under episoder med mindre smärta och får i efterförloppet episoder med svår smärta och uttalad oförmåga. Smärtlindring eller fullt återvunnen funktion kan inte alltid påräknas, men väl en aktivitetsnivå som kan möjliggöra lämpligt arbete.

Passiv sjukskrivning och ogenomtänkta förnyade utredningar är skadliga. Samtidigt kan ett otillräckligt förberett plötsligt avbrytande av sjukskrivning och påtvingade arbetsuppgifter som individen inte anser sig ha kapacitet att klara medföra ökade symtom och funktionsnedsättningar och försvåra fortsatta insatser.

Symptom, prognos, behandling

Symtomen fluktuerar i intensitet, men kvarstår i stort över tid. Ofta finns oro, stresskänslighet och kognitiv påverkan med i bilden. Traditionell medicinsk utredning har i princip avslutats och farmakologiska/kirurgiska och fysioterapeutiska behandlingsmetoder har bedömts inte kunna medföra ytterligare förbättringar. Behandlingen inriktas mot smärtanalys, smärtbehandling och smärthantering. Läkningsperioden är i princip överstånden och det handlar snarare om tid för smärtbehandling och smärthantering. Resttillstånd kan kvarstå under lång tid men ger sällan av biomekaniska skäl anledning till försiktighet. Smärtlindring eller fullt återvunnen funktion kan inte alltid påräknas, men väl en aktivitetsnivå som kan möjliggöra lämpligt arbete.

Funktionsnedsättning

Nedsatt muskelstyrka/koordination, uthållighet, kognitiv förmåga och emotionell stabilitet. Rädsla för att ansträngning leder till försämring och otillräcklig acceptans för sänkt prestationsförmåga leder till undvikande av aktiviteter som befaras öka smärtan. Sömnstörningar.

Rehabiliteringsåtgärder

Samverkan med företagshälsovård, arbetsgivare och Försäkringskassan för diskussion om successiv arbetsåtergång, alternativa arbetsuppgifter etc.

Vägledning om sjukskrivning vid olika situationer

- Trots kvarstående besvär kan en betydande del av patienterna efter hand återgå i lämpligt arbete på hel- eller deltid. Tiden för detta varierar mellan några månader upp till två år bl.a. beroende på smärttillståndets svårighetsgrad och grad av komplikationer t.ex. i form av sömnstörningar och sekundär depression.

Appendix 3

Text från Socialstyrelsens försäkringsmedicinska beslutstöd för symtomdiagnoser exklusive R52.

Giltig 2007-2016

Det finns en spännvidd för hur en given sjukdom påverkar olika individers arbetsförmåga och förmåga att utföra olika aktiviteter. Därför måste bedömningen av arbetsförmågan ske individuellt utifrån individens unika förutsättningar och sysselsättning. En ny bedömning ska ske innan sjukskrivningen förlängs.

Sjukskrivning enbart utifrån symtom ska undvikas. Innan diagnos är ställd kan inte arbetsförmågan och inte heller tiden för eventuell nedsättning bedömas. En ställd diagnos är dock i sig inte grund för sjukskrivning utan bedömningen ska alltid baseras på konsekvens för funktionstillstånd och arbetsförmåga.

Vid betydande funktionsnedsättning kan sjukskrivning helt eller partiellt under begränsad tid vara adekvat. En sådan sjukskrivning bör i normalfallet inte överstiga 2 veckor. Viktigt är att bedömningen görs som en integrerad del i en strategi för utredning och behandling. Sjukskrivning i avvaktan på, och under utredning, bör om möjligt undvikas. Det är dock viktigt att en utredning inte forceras fram för att ställa diagnos så att sjukskrivning kan motiveras.

Korrekt diagnostik i ett tidigt skede är avgörande för bedömning av behandling och arbetsförmåga. Yrsel, trötthet, ospecificerad huvudvärk och andra typer av symtom kan ha en rad olika bakomliggande orsaker. Då diagnos fastställts (t.ex. Ménières sjukdom H81.0, migrän G43 eller huvudvärk av spänningstyp G44.2) används rekommendationen för respektive diagnos. Innan diagnos är ställd kan inte prognos, behandling och naturligt förlopp anges. Utan en diagnos är det inte möjligt att ange en prognos för återvunnen funktion och normal läkning. Symtomen i sig kan påverka funktionstillståndet i form av bl.a. oro, sömstörningar och smärta av bl.a. kognitiv natur.

Risken för skadlig påverkan vid sjukskrivning enbart utifrån symtom är stor. Tidig kartläggning av patientens livssituation och arbetssituation, gärna av ett tvärprofessionellt team på vårdcentralen, kan vara en förutsättning för bra behandling. Passiv vila motverkar ofta ett tillfrisknande.