Physician's sickness certification practices: A systematic literature review

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Report

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Foreword

This report is a, somewhat shortened, English version of a report published in Swedish in 2010, for the research council of the Swedish Ministry of Health and Social Affairs, the so called Social Council. Many have asked for an English version of the report, hence this publication.
The Sweish title is:

Läkares sjukskrivningspraxis. En systematisk litteraturöversikt.
Socialdepartementet, Sociala rådet. Stockholm 2010
SOU 2010:107 (SOU = Sveriges Offentliga Utredningar)

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https://www.regeringen.se/49b6a3/contentassets/5bb20923b0654edc90887e8c138e8b19/lakares-sjukskrivningspraxis---en-systematisk-litteraturoversikt-sou-2010107)

The report was conducted by Elsy Söderberg, Christina Lindholm, Jenny Kärrholm, and Kristina Alexanderson.

I hope this report can be of use for others conducting studies and systematic reviews regarding physicians' work with sickness certification of patients.

Stockholm, June 2019,

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Abstract

Physicians are essential in the sickness absence process, however, little is known about their sick-listing practices.

The aim was to establish the current knowledge base regarding physicians' sickness certification practices through a systematic review of published studies.

Method

Studies including empirical data on physicians' sickness certification practices published in scientific journals in English in 2002 to August 2009, were searched for in literature databases and reference lists. Identified publications were assessed for relevance and scientific quality. When grading scientific evidence, also the 15 corresponding studies from a previous review, covering the years before 2002, were included.

Results

Of the 61 identified relevant studies, 28 had sufficient quality to be included. The studies varied much regarding design, sample size, factors studied, and outcome measures. Most studies were cross sectional and included only GPs. Limited scientific evidence could be established for that physicians' experience sickness certification as problematic. At more detailed levels, there was limited evidence for experiencing the five following aspects as problematic: handling the two roles as treating physician and medical expert, handling situations when the physician and patient disagree on the need for sickness absence, assessing work capacity, lacking knowledge in insurance medicine, and cooperating with others in these cases.

Conclusion

There were surprisingly few studies. The aspects we found evidence for, that is, aspects physicians find problematic, all relate to professional competence in insurance medicine. There is an obvious need to strengthen physicians' possibilities to develop, maintain, and use such competences, in the organizational context they work.

Content

Background

How physicians handle patient's sickness certification can have extensive consequences for the individual patient, her or his family, workplaces, as well as society. Knowledge about how physician's work with this is warranted as bases for measures to provide optimal practices [1-6] especially as some studies have showed substantial variation between physicians regarding the duration of sick leave they recommend for patients with similar medical problems [7]. In 2004, a systematic review of physicians sickness certification practices, by the Swedish Council on Technology Assessment in Health Care (SBU) [7]; could establish limited scientific evidence for that physicians find sickness certification problematic and that issued sickness certificates were often of insufficient quality. That is, the results were on a very general level and could hardly be used as a basis for interventions. As physicians have an essential role in sickness absence processes, an update of that review was wanted.

Consultations where sickness certification might be an option involves several tasks for the physician, including the following [4]:

- determine if the patient has a disease or injury, that is, establish diagnoses
- determine if and how the disease or injury impairs the patient's function to the extent that work capacity is also impaired - in relation to the demands of the patient's work
- together with the patient consider the advantages and the disadvantages of being sickness absent
- determine the grade (full-time or part-time) and duration of sick leave, and what actions that need to be taken during the sick-leave period in terms of investigations, treatments, rehabilitation, life style, etcetera
- determine and establish the need for contact or collaboration with others within and outside of the health care system, e.g., a physiotherapist or employer
- issue a certificate that provides sufficient information to those who decide whether the patient is entitled to sickness benefits
- document relevant decisions, measures, and strategies planned

Moreover, in sickness certification cases, the physician has to handle two different professional roles; as the treating physician of the patient and as the medical expert who issues certificates to be used by stakeholders such as the social insurance office and the patient's employer. Sometimes also as the "gatekeeper role" is relevant, that is, to make decisions about how to use the restricted resources available within the health care organisation, e.g., tests, medication, and surgery.

The aim was to establish the current knowledge base of physicians' sickness certification practices through a systematic review of published studies.

Methods

The review was conducted according to the criteria used by, among others, the Cochrane Collaboration and SBU [7-9], in the following six steps.

1. Studies were searched for in scientific literature databases (MEDLINE, PsychINFO, SOCA/SOCI, NHS EED, HTA and DARE) and in reference lists of identified studies. The following *inclusion criteria* were used: studies that had been published in a peer-reviewed scientific journal from January 2002 until August 2009, that included empirical data of physicians' sickness certification practices, and was not included in the SBU review [7].

The *search terms* used were: sickness certification, sick leave, sick-leave, sickness absence, sickness certificate, medical certificate, return to work, return-to-work, work capacity, work incapacity, work ability, and work inability. For physician, the terms used were: physician, doctor, specialist, general practitioner, psychiatrist, orthopaedic, family physician, cardiologist, and gynaecologist. Moreover, no limitations were set regarding inclusion of human subjects or the age of study participants, due to previous experience of that studies can be missed if such search restrictions are applied.

2. All identified studies were subjected to *assessment of relevance* according to the above mentioned inclusion criteria. Titles and abstracts were read independently by at least two authors, who had not authored or co-authored the article themselves. In case of uncertainty or disagreement, the full article was read and, if needed, discussed in the project group until consensus was reached.

3. *Data was extracted* from the relevant studies independently by two authors, using a slightly modified version of the extraction protocol used in the previous SBU review [7, page 259-261]. Essential study data from the templates was compiled in a comprehensive table. The correctness of those data was checked by at least one other author.

4. *Assessment of the scientific quality* of the relevant studies was conducted according to the criteria used in the SBU review [7, 10, page 261]. The following five aspects of each study were assessed, in relation to the aim of the review: design, dropout rate, bias, analytical method, and accuracy. A score of 0 to 3 points was used for all aspects except design, which could receive from 0 to 5 points, because it was considered to have a marked impact on the quality of a study. For the studies that had used quantitative analytical methods, the maximum score was 17, with the following cut-offs: 0-6, 7-12, 13-15, and 16-17 points for insufficient, low, moderate, and high quality, respectively. When judging the studies that had employed qualitative analytical methods, it was not relevant to evaluate bias and accuracy, and hence a maximum score of 11 was applied, using these cut-offs: 0-4, 5-6, 7-9, and 10-11 points for insufficient, low, moderate, and high quality, respectively. Two authors independently evaluated the quality of each of the studies. In case of disagreement, the other authors also evaluated that study and discussed until consensus was reached. If a group member had authored or co-authored a study, only the other group members took part in the quality evaluation of that study. When data for the same population had been used in more than one study, only data from one study was used in the evidence grading, usually the study with most participants.

Studies that had at least low quality were judged as of sufficient quality to be included in the review.

5. *Categories of type of results* from the included studies were searched for, initially testing the same ten categories of results identified in the SBU review [7]. Also, new categories and subcategories were searched for.

6. Finally, *grading of scientific evidence* of different results was conducted. In this step, also results from the 15 studies included in the SBU review [7, 10] that met the above mentioned inclusion criteria were included (that is, those not published in English were not included). The following evidence grades were applied:
Grade 1 – Strong scientific evidence. Results in the same direction from at least two high-quality studies or one good systematic review.

Grade 2 – Moderate scientific evidence. Results in the same direction from one high-quality study and at least two medium-quality studies.

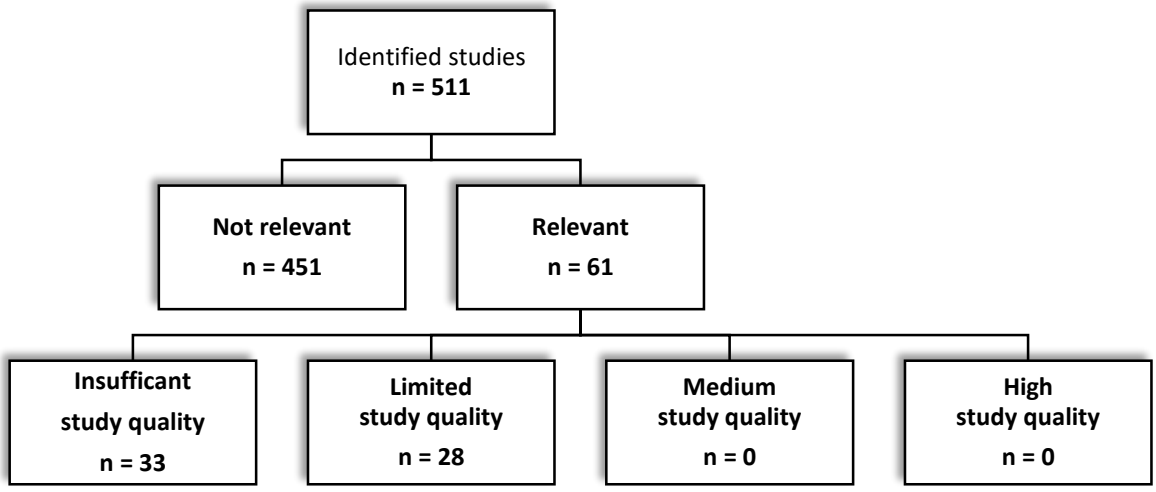
Grade 3 – Limited scientific evidence. Results in the same direction from at least two medium-quality studies or at least five low-quality studies.

Insufficient scientific evidence. Studies with lower quality than above, or that the results went in different directions.

Results

Through the searches, 511 different publications were identified of which 61 were relevant studies, applying the above criteria. Of these 61 studies, 33 studies [11-43] were of insufficient scientific quality, according to the purpose of the review (figure 1). Twenty-eight studies [44-71] were of sufficient quality, and thus included in the review.

Figure 1. Number of identified studies and results of assessment of relevance and of scientific quality



The study design was cross-sectional in the majority of the studies (79%), three were cohort studies [52, 62, 63], while another three were controlled intervention studies [48, 57, 71] (figure 2). About half (54%) of the included studies were published in the two years 2006-2007 (figure 3). Twenty one of them were produced in Great Britain [45, 51, 64-66], Norway [49, 50, 63, 71], and Sweden [44, 47, 53-56, 59, 60, 67-70] (figure 4). Most, 22, were based on statistical analyses while qualitative analysis were used in five [47, 51, 53, 67, 69]; in one both approaches was used [70].

Figure 2. Design applied on the included studies 2002-2008

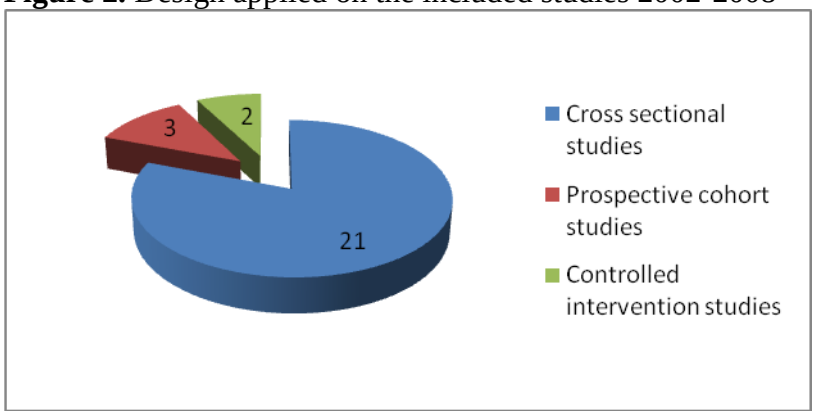


Figure 3. Year when the different studies were published

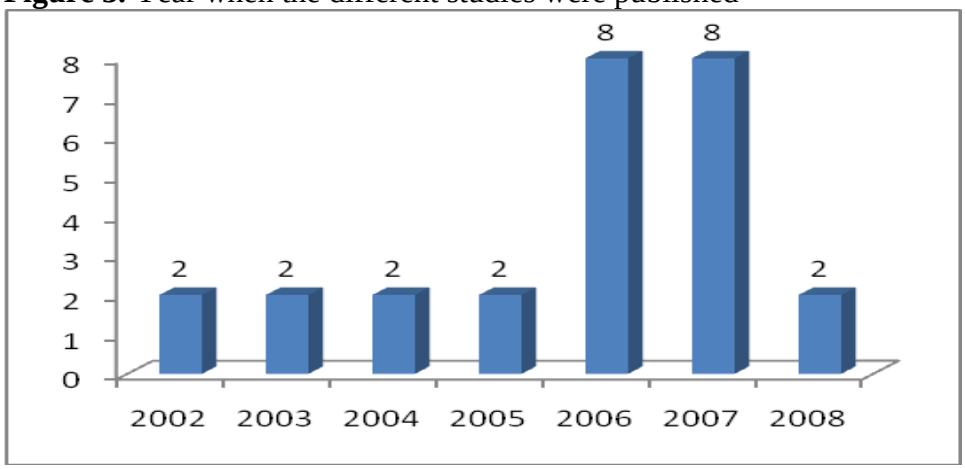
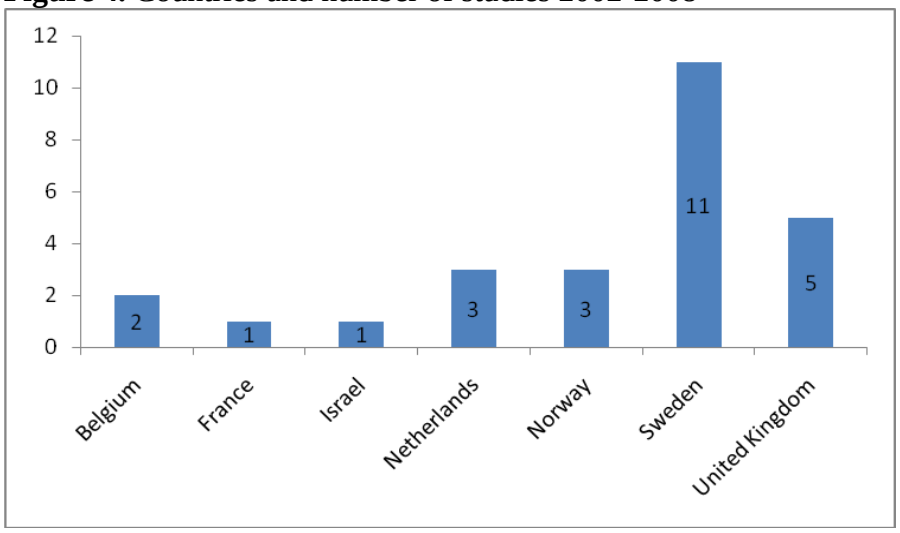


Figure 4. Countries and number of studies 2002-2008



A total of 7961 physicians were enrolled in the studies, counting each physician only once, even if data regarding the same physicians was used in more than one study (table 1). The number of participants varied much between the studies, from 2 [56] to 5455 [55] physicians, with a mean number of 518 (standard deviation (SD) 1305) and the median 65. When excluding studies using data from the largest project [44, 55, 68], the corresponding figures decrease to mean: 56 (SD 121) and median: 200; that is, most studies were small.

Table 1. Total number of physicians who participated in the included studies, by type of specialty/clinic. If data from the same physicians was used in more than one study, that physician has been included only once in the figures.

Type of specialty/clinic[1]	Number of physicians[1] in the studies	Number of studies within different specialties[2]	Lowest and highest no. of participants in the studies within each specialty
Primary health care (GPs)	3210	16 (4)	2 – 978
Psychiatry	442	2	1 – 441
Internal medicine	472	3	2 – 396
Gynaecology	354	2	39 – 315
Surgery	323	2	5 – 318
Orthopaedic	219	3 (2)	2 – 200
Occupational health service	216	5 (1)	2 – 124
Oncology	108	1	108
Rehabilitation	75	1	75
Insurance medicine	15	1 (1)	15
Type of speciality not specified	2527	2 (1)	1 - 2500
Total	**7961**	**20 (4)**	**1 - 5455**

[1]Data from the following three studies was not included, as information of number of physicians was not given:
- Two studies that were based on data from medical certificates, where the number of physicians who wrote them was not clear. One of them was the study of Fleten et al [49] based on 999 sickness certificates. The other was the study by Söderberg et al [70] based on 2249 medical certificates (of which 1208 were written by GPs, 465 by hospital physicians, 301 by occupational health physicians, and 668 by others).
- One study, in with the research question was how soon sick-listed employees were called by their occupational physician, the number of physicians was not given [52].

[2] The figures in parentheses = number of studies in which data regarding the participants has been used several times, but with different study aims. E.g., for the 20 studies including GPs, four used survey data that had been used in at least one other study.

Data regarding aim, design, participants, type of data and outcome, and results from each of the included studies is presented in table 2 (page 26).
Six different categories of results presented in the studies could be identified (table 3). No other categories than those identified in the SBU review [7] were found, however, subcategories could be identified for three of the categories, namely; patient-related factors, physician-related factors, and type of experienced problems. In the last column of table 2, the categories that each study has results about, is given, using the numbers of categories from table 3.

Table 3. The identified six categories of type of results presented in the included studies, as well as subcategories. Number of studies that presents results within each category is given. The numbers in parentheses are the studies included from the previous SBU review [7].

The six categories of studied areas, with subcategories	**Number of studies 2002-2009 (number in the 2003 review** [7]**)**
1. What patient-related factors influence physicians´ sickness certification practice?	8 (1)
- Age	3 (0)
- Sex	5 (0)
- Level of education, type of employment	3 (0)
- Disease and symptoms	7 (0)
- Patient requesting sickness certification	1 (1)
- Patient's assessment of her/his work incapacity	2 (0)
2. What physician-related factors influence physicians´ sickness certification practice?	14 (5)
- Age or years worked as a physician	4 (2)
- Sex	7 (2)
- Perceptions, emotions, etcetera	5(2)
- Specialty, level of education	2 (2)
3. What problems do physicians report regarding sickness certification?	13 (3)
- Handling the two roles as the treating physician and as a medical expert	7 (1)
- Problematic to handle situations when physician and patient have different opinions about the need for sick leave	6 (2)
- Assess the patient's functioning, work capacity, or the need for sick leave	7 (2)
- Problems to deal with prolongation of sick-leave spells initiated by another physician	1 (1)
- Lack of knowledge	4 (1)
- Collaboration with other professional groups or other stakeholders	8 (1)
- Lack of managerial support in handling sickness certification	3 (0)
4. Do sickness certificates have sufficient quality for their intended use?	2 (2)
5. Do patients and physicians agree on the need for sick leave?	1 (1)
6. Intervention studies; can physicians' sickness certification practises be influenced?	3 (4)

Below, the results for each of the six categories are summarized as well as the grading of scientific evidence for those results, including the results from the 15 studies from the SBU review.

None of the included studies had moderate or high scientific quality, i.e., all were of low scientific quality.

1. *What patient-related factors are associated with physicians´ sickness certification practice?* Eight studies [45, 52, 56, 60, 61, 63-65] had results about this. Six sub-categories were identified and results for them are also summarized in table 4. The sub-categories are the patient's; age [60, 63, 64], sex [52, 56, 60, 63, 64], educational level/type of job [52, 56, 60], diagnosis [45, 52, 56, 60, 61, 63, 65], requesting a sick note [45], and the patient's assessment of his/her work capacity [60, 72]. Only one study from the SBU review concerned this category - regarding the sub category 'requesting a sick note' [73].

Regarding all the six sub-categories of patient's aspects the results went in different directions and/or held too few studies. Regarding the seven studies [45, 52, 56, 60, 61, 63, 65] about associations between type of diagnosis and physicians' sickness certification practices, the variation in design and outcome measures across studies was so substantial that it was not meaningful to use them for considerations about potential associations. Hence, there was no scientific evidence regarding association between any type of patient-related factors and physicians' sickness certification practice, due to conflicting results and/or too few studies.

2. *What physician-related factors influence physicians' sickness certification practice?* Fifteen studies [44, 46, 50, 54-56, 59, 62, 64-66, 68-70] present such findings. The following four subcategories were identified: physician's age/years worked [59, 63, 66, 68], sex [50, 54, 59, 63, 64, 68], beliefs (including feelings and attitudes) [46, 50, 56, 66, 69], and type of specialty/training [55, 70]. From the SBU review [7], the following studies were appropriate; physician's age [73, 74], sex [73, 74], beliefs [75, 76], and specialty [73, 77]. Results for this category are presented in table 5.

As in the previous category, in grading level of evidence for results of each subcategory, they go in different directions and/or the number of studies are too few – that is, less than five. Hence, there was no scientific evidence regarding association between any type of physician-related factors and physicians' sickness certification practice.

3. *What problems do physicians experience in their sickness certification tasks?* We found 13 studies [44, 47, 50, 51, 53-55, 58, 61, 67-69, 71] for this category. The different problems could be classified into seven different subcategories, namely; seven studies deal with managing the two roles as the treating physician and medical expert [50, 51, 53-55, 67, 69], one study was about prolongation of sick-leave spells initiated by another physician [55], seven involved assessing patients' functioning, work capacity, and need of the sick leave [44, 51, 53-55, 67, 71], six about handling when the physician and patient have different opinions about the need of sick leave [51, 53-55, 67, 69], four involved problems with lacking knowledge [47, 51, 61, 71], eight reported problems in cooperation with other professional groups or stakeholders [44, 47, 51, 53, 54, 58, 61, 67], and three studies highlighted organizational factors e.g., leadership, management or support regarding physicians ´sickness certification practices [44, 53, 68]. Results from these, as well as the three relevant from the SBU review [75, 78, 79], are summarized in table 6.

Based on these 16 studies, we found scientific evidence (evidence grade 3, that is, the lowest level) for five of the seven subcategories. Hence, evidence was found for that physicians experience the following five aspects of sickness certification as problematic; managing the two roles as the treating physician and medical expert; when the physician and patient have different opinions about the need for sick leave; assessing patients' functioning, work capacity, or the need for sick leave; lacking relevant knowledge; and collaboration with other professional groups or stakeholders.

Regarding the other two subcategories, the results went in the same directions but the studies were too few to form bases for evidence.

4. *Do sickness certificates have sufficient quality for their intended use*? Only two studies [49, 70] had results about this. Combined with the two from the SBU review [80, 81], these four are too few to give scientific evidence.

5. *Do patients and physicians agree on the need of sick leave?* In this category, we found only one study [60 28979] which was consistent with the one [72] from the SBU review in showing that patients and physicians usually agree on this. Obviously, the number of studies are too few to provide scientific support.

6. *Intervention studies; can physicians' sickness certification practices be influenced?* This subcategory includes three studies [48, 57, 71] plus four from the SBU review [82-85]. The seven intervention studies varied greatly in design and outcome measures; e.g., to improve communication between different types of physicians [48, 57], to improve GPs' knowledge and confidence in functional assessments, based on an instrument developed to assess work capacity [71 29913], effect of changes in rules [83-85], and an intervention study finding that feedback and guidelines helped improve the quality in sickness certificates [82 7029]. The interventions are so diverse that most are not suitable for comparison with each other. Thus, there was no scientific evidence regarding effects of interventions on physicians' sickness certification practice, due to too few comparable studies.

Summary of scientific evidence

There was limited scientific evidence supporting that physicians perceive sickness certification as problematic (Evidence Grade 3).
On a more detailed level, we found limited scientific evidence for that physicians experience the following five problems:
- to manage the two roles as the treating physician and the medical expert,
- to assess function, work capacity, or need for sick leave,
- to handle situations when the physician and patient have different opinions about the need for sick leave,
- that their own knowledge in insurance medicine is insufficient, e.g., regarding the labour market or social security system, and
- to collaborate with other professionals and stakeholders.

We did not find scientific evidence for any other aspects.

Discussion

In this systematic review of studies on physicians' sickness certification practices, we identified 61 relevant studies published in the seven-year period. Twenty-eight studies had sufficient quality to be included; however, they all were of low quality. In general, there were large differences between studies regarding study designs, aims, outcome measures, type of methods for data analyses, as well as in number participants. Most studies included only GPs, were cross sectional, and had low numbers of participants. Nevertheless, there has been a clear increase in number of studies in the last decade.

Methodological considerations

This review used the systematic methods established and used by organisations such as Cochrane [8] and SBU [9]. Studies have been searched for, assessed for their relevance and quality, and the evidence for their results has been graded. We have used the same criteria in assessing relevance and quality and in grading evidence as in the previous equivalent SBU review [7].

Identification of studies

As always in literature database searches, the number of studies found, of those published, depends on how well established the relevant field of research is. In a less well established field, such as this one, the risk of missing studies is higher. In an attempt to counterbalance this, we used a broad spectrum of search terms and also searched in the reference lists of relevant articles. Another reason for studies not being identified can be that they are published in journals which are not included in the literature databases used. Therefore, we searched several different literature databases.

A third reason is *publication delay*, i.e., that it sometimes takes long time before an accepted study is published, in some cases up to two years. In addition, there is sometimes a time delay before a published study is registered in a literature database. In order to overcome these problems we searched for relevant studies published during all of 2002, despite the fact that the SBU review [7] included studies published before November 2002.

A fourth reason is *publication bias*; researchers are less likely to submit studies if they have not come up with any new findings. In addition, scientific publications are less likely to accept studies for publication if there are not any statistical differences in their findings [86]. It is unlikely, however, that this form of publication bias was a large problem in this area of research, due to the present limited number of studies. However, there still is a possibility of publication bias.

Another issue is if any bias exists in the identification of studies or in our assessment of the relevance and quality of studies. Of the 33 excluded studies, six were conducted in Sweden (18%). Of the included studies, 43% were Swedish. It is possible that we have better knowledge of research carried out in Sweden. However, the same can be said about studies from, for example, Norway, Great Britain, Belgium, and the Netherlands, which are countries with which we have had close collaboration with researchers within this area and where we know the sickness insurance systems well. On the subject of bias in the identification of studies, we were

co-authors of three of the relevant but excluded studies [23, 26, 40]. We have not assessed the studies which we ourselves were involved in; this was made possible since we were four researchers in the project group.

One way of assessing the existence of this type of bias is to make a comparison with the studies included in other systematic literature reviews in this area during the same period of time. We only found one such review, by Wynne-Jones et al [87]. In that review the number of studies from Sweden is actually higher (50%) compared to 43% in our review, which also could indicate that we have not been biased regarding inclusion or assessment of studies. So far, more studies originate from Sweden.

Another shortcoming of this, as of every review, is that studies published after our deadline have not been included.

Quality assessment

SBU's reviews usually include only randomised controlled trials (RCT). In this research area, due to the, so far, limited number of studies, we had to be wider regarding type of studies to include. The level of sufficient study quality was set low, considering that the research area is relatively theoretically, methodologically, and conceptually undeveloped [7]. Nevertheless, the quality differs widely within the span of 'low quality' in the included studies.

Grading of evidence

Usually, in the assessment of scientific evidence, results of studies of limited quality are not included at all. In the SBU review [10] it was considered acceptable, as a basis for scientific evidence on the lowest level, to include results of studies of limited quality if there were at least five studies showing similar results and no studies showing divergent results. SBU assumed [10] that it cannot be considered being due to chance, if the results of at least five studies arrive at the same results at a five per cent level of significance and no other studies found no such results. We have followed this principle, while remaining aware of the problems involved and that future studies, of higher quality, may alter what is today supported by scientific evidence.

Discussion of results

The most striking result of this review is the low number of studies conducted. Sixty-one relevant studies were published in the seven-year period that this review covers; all together 76 when including studies from also previous periods. This could be compared to the large number of studies on most medical diagnoses. The area of research is characterised not only by the low number of studies, but also by many small-scale, cross-sectional, and exploratory studies – the latter is typical in a relatively new area of research. There is large variation between studies regarding used outcomes and, when having the same type of outcome, in how they were measured. With only a few exceptions [47, 53, 67], studies included in both this and the SBU review [7] presented their empirical results without reporting any specific theoretical perspective.

When comparing our results to the other recent literature review, by Wynne-Jones et al [87] one must bear in mind that their aim was to was to gain knowledge about GPs' attitudes towards sickness certification. That is, their aim was narrower, including only studies of GPs. On the

other hand, for such studies their inclusion criteria were wider, including all identified studies, even reports, and not using any criteria for quality assessment of the identified studies. Moreover, they used qualitative methodology as method for analyses. In doing so, they identified three themes: conflicts, role responsibility, and hindrances to good practice. These themes are in well agreement with our findings regarding types of problems physicians experience in sickness certification cases.

That we did not find any evidence for that *patient- or physician-related factors* influence sickness certification practices is encouraging! It is the disease and the work incapacity that the disease leads to that should be basis for sickness certification, not the sex, age, beliefs, or educational level of the patient or the physician. However, the lack of evidence was mainly due to diverging results and/or too few studies for respective factor. Notable is that in a number of studies, sex was used as a variable in the analysis, but no analysis was made from a gender perspective [88, 89]. Another important methodological aspect of the studies based on sickness certificates or on number of sick-listed patients [64, 65] is that information on those of the physician's patients that were not sickness certified was not included. Therefore, conclusions cannot be drawn regarding impact of e.g., sex or age on sickness certification in general, only regarding those of the patients that actually were sick-listed.

Sickness certificates are an important means for communication between the health sector and other stakeholders, such as employers, unemployment offices, and insurance offices [4]. Only a few studies on *the quality of sickness certificates* were included, although several interventions have taken place to increase the quality of certificates, in Sweden and other countries. With the background of the immense importance of the quality of such certificates, for the life situation of patients, for the staff using them as bases for decisions, and for society, the low number of studies is notable.

Problems experienced by physicians regarding sickness certification tasks

In 2003, SBU [7] established that there was limited scientific evidence supporting that physicians experience sickness certification as problematic. The additional studies from our review on this aspect made it possible to examine this issue in more detail regarding different types of problems (table 6). All the identified problems are related to professionalism and highlights the prerequisites for physicians to acquire, maintain, and apply competence in insurance medicine. Below, some of the problems are commented on.

To manage different professional roles is something physicians are well trained to do, and have much experience of. Nevertheless, regarding sickness-certification cases, managing the two roles as treating physician versus that as medical expert, writing adequate information in certificates to other stakeholders, was experienced as problematic [50, 51, 53-55, 67, 69, 78]. This might be due to the lack of scientific knowledge both regarding sickness absence and for the two main sick-leave diagnoses, namely muskuloskeletal and mental, for which also the scientific knowledgebase is less than, e.g., for cancer or cardiovascular disease.

According to eight studies [44, 51, 53-55, 67, 71, 78], *physicians find it problematic to assess patients' functioning, work capacity, or need for sick leave.* That assessing work capacity is problematic is not surprising, since there is a general lack of instruments and guidelines for this and the need for

their development has been discussed in many different studies [1, 3]. There is a strong need for this and the study of Østerås [71] showed one way to develop such. Another reason behind the problem of assessing work capacity can be that different organisations make different interpretations of the two key concepts functioning and work capacity [78, 90, 91]. Clear definitions of these concepts would help the communication regarding sick-leave cases between involved stakeholders.

Problems in collaboration with other professional groups and other actors are reported in the nine studies [44, 47, 51, 53, 54, 58, 61, 67, 78]. The problems concern both content and consequences, related to contact with representatives from various organisations such as the Social Insurance Office, patient employers, other physicians, and other occupational groups or agencies within the health care sector. In this context, inter-organisational cooperation is of great importance to enable the use of available knowledge in the handling of sickness absentees.

Only two studies [53, 55] present results showing that lack of management in the *organisation of the health care system* regarding strategies of competence development, cooperation, and quality assurance of how these tasks are performed by physicians. The awareness of the importance of leadership and managerial responsibility with regard to the sickness certification tasks has increased in Sweden in recent years [92-95]. There is a great need for organisational support for these aspects.

Intervention studies

Again, only a few intervention studies were identified. Although several large- and small-scale interventions to influence physicians' sickness certification practices have been carried out in many countries in the last decades, the results of these have not been published internationally. We need to consider why. Is this due to lack of interest from researchers, lack of funding, that scientific journals do not accept such manuscripts? So far, nearly all studies are cross sectional, more intervention studies are needed. There are several challenges in this area of research; nevertheless, scientific knowledge is warranted, by physicians, patients, labour unions, employers, insurance organisations, and politicians.

Future research

The competence in the handling of sickness certification cases can be described in terms of the knowledge, skills, and attitudes required for optimal handling of these cases [96]. This, in addition to medical knowledge, includes knowledge of how society and working life is organised, demands on the patient in his or her working life, the laws and regulations of the social insurance system, the roles and competence of other stakeholders, options and responsibilities they as well as the physician have. In addition to medical skills, skills regarding communication, conflict management, cooperation, decision making, writing certificates, and finding new information is needed. Attitudes regarding ethics, the different professional roles, and scientific approach are involved.

Overall, a clearer understanding of the research area is warranted, in all its complexity [97, 98]. This concerns, for example, what the professionalization process involves, in particular concerning insurance medicine, within the context it occurs, and the need of competence and

conditions allowing this to be included in medical training at all levels: undergraduate, post graduate, and in clinical practice. Research on physicians' sickness certification practices has developed somewhat in recent years; however, the number of studies is still very low. Studies that more in detail investigate the significance of the organisational factors in the management of sickness certification cases are needed [53, 95]. There is a general shortage of comparable studies, both nationally and internationally. The complexity of the area demands controlled, randomised studies, a theoretical and concept-based development integrated with empirical studies. Larger and more detailed studies are needed, as are studies investigating how a professional approach in insurance medicine can be applied, maintained, and developed.

Conclusions

There are surprisingly few studies in this area, considering the importance of how physicians handle sickness certification of patients and the numerous interventions that have taken place in many countries in the recent decades. There is limited scientific evidence supporting that physicians experience sickness certification and management of such cases as problematic (evidence level 3).

The similarity of results from different countries was striking. This indicates that we can learn from studies conducted in other countries when designing interventions to improve physicians' sickness certification practices and the prerequisites for them to establish such professionalism. The prerequisites for physicians to acquire, maintain, and apply competence in insurance medicine are not optimal. Measures to increase them are warranted.

We do not only need more but also better studies!

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Table 2. Summary of each of the 28 included studies.
The following abbreviations are used: general practitioner (GP), return to work (RTW), odds ratios (OR), United Kingdom (UK)

Author, Publi-cation year [Ref] Country	**Aim**	**Study design Year of data collec-tion**	**Object of study**	**No. in study population No. of participants (response rate) (%♀)**	**Type of data**	**Outcome measures**	**Results**	**Cate-gory of results** (see table 3, page 11)
Arrelöv 2007 [44] Sweden	To explore perceived problems and coping strategies related to sickness certification among GPs and orthopaedic surgeons (OSs)	Cross-sectional 2004	All GPs and OSs <65 years of age in two Swedish counties	Study population: 7700. Participants: the total response rate was 71%. Of these 673 were GP (52% ♀), 149 were OS (15% ♀)	Data from a questionnaire sent to all physicians in the two counties	Differences between GP and OS in problems and strategies for how to handle problems regarding sickness certification issues. Calculated as Odds Ratios (OR) where OS were used as reference group	97% of both GPs and OSs had consultations involving sickness certification at least once a week and a majority experienced problems with this issue weekly. Most GPs and OSs experienced problems with patients who wanted to be on sick leave for other reasons than disease/injury. A higher rate of GPs experienced problems. The ORs were statistically significant for GPs compared to OS to report problems with: assessing if patients' functional incapacity limits the work capacity; (OR 7.1), assessing of work incapacity (4.0), assessing the optimum duration and degree of sick leave (4.2), handling the physicians' two roles (2.9), and conflicts with the patients about sick leave (3.5).	2, 3

Campbell 2006 [45] UK	To explore what factors influence physician's decision of issuing sick notes with focus on the impact of type of problem (mental vs. somatic), adverse family circumstances (present vs. absent), and patient demand (asks for note vs. does not ask)	Cross-sectional Year: not given	All GPs in the counties of East and West Sussex	Study population: 829 GPs Participants: 489 (59%) (31% ♀)	Questionnaire data, including eight versions of case vignettes on a male patient. Information in the versions varied with regard to the factors mentioned in the aim	One of the eight versions was randomly given to each GP, who rated their agreements on two main areas; believing the patient and whether to issue a sick note or not	The decision to issue a sick note was not influenced by that the patient demanded this or had adverse family circumstances. GPs were more likely to issue a sick note to patients with mental disorders because he/she deserved or needed one, and to a patient with somatic disease in order to maintain a good relationship with him/her. Patients with somatic disease were less likely to be sick listed and more likely to be labelled as work-shy	1
Coudeyre 2006 [46] France	To examine GPs' fear-avoidance beliefs about low back pain (LBP), the impact of these beliefs on following guidelines for bed rest, physical activities, and sick leave for acute and chronic LBP, and factors associated with GPs' fear-avoidance beliefs	Cross-sectional, Sept. 2003-Feb. 2004	Randomly selected GPs, stratified by geographical area in France	Study population: 1800 GPs Participants; 864 (48%), (20%♀)	Questionnaire, including 2 subscales of Fear Avoidance Beliefs Questionnaire (FABQ)	Fear-avoidance beliefs about LBP, recommendation for bed rest, physical activities & duration of sick leave	16% of GPs had high FABQ rating (>14), suggesting fear avoidance beliefs. GPs with high such ratings prescribed longer sick leaves and bed rest at acute LBP.	2

Edlund 2002 [47] Sweden	To describe and analyse physicians' experiences of sickness certification, their perceptions of their co-actors and the interaction they participate in	Cross-sectional 1996	Physicians in northern Sweden who had practiced for at least 8 years; GPs (public & private), Orthopaedic physicians (OP), Internal Medicine specialists (IM), Company doctors (CD), psychiatrist.	No information on selection strategies or drop out. Participants: 14 physicians; (29% ♀) (6 public & 2 private GPs, 2 OP, 2 CD, 2 IM, 1 psychiatrist)	Information from transcribed individual interviews with thematic questions	Physician's attitudes, behaviour and practices based on physician's role, collaboration, prevention of sickness absence, sick leave and vocational rehabilitation	The physicians experienced having less control, more - and more sick patients, and less time with patients; leading to longer sick-leave spells. They experienced problems in collaboration with other actors. Insufficient knowledge of work demands, rules etc, was also an obstacle in the certification practice.	3

Faber 2005 [48] Netherlands	To determine effectiveness of training to increase collaboration between GPs and occupational health physicians (OHP) in the treatment of patients with Low Back Pain (LBP).	Intervention; collaboration training program and protocol for collaboration. Control-led study. Year: not given	GP, OHP, and their LBP patients.	Study population: All 100 GP & 35 OHP in intervention region, 115 GP & 40 OHP in the control region. Participants: 21 GP (21%) & 20 OHP (57%) in the intervention region, 28 GP (24%) & 27 OHP (68%) in the control region. No. patients meeting the inclusion criteria: 56 in each region. 29% ♀ in intervention & 21% ♀ in control region.	Questionnaires to patients at inclusion, 3, & 6 months. No. visits healthcare. Data on sick leave from occupational health service, data on collaboration from physicians' checklists.	Frequency of collaboration between GP & OHP after training intervention. The effects of intervention on duration of sick leave, health, functional ability, and RTW.	No positive effect of the intervention regarding collaboration between GPs and OHPs, nor on patients' pain, drug consumption, functional ability, and quality of life. RTW was significantly later among patients in the intervention group (mean sick-leave days in intervention groups: 76 vs. 45 in control group). During the 6-month follow-up, no GP contacted OHP in either region. OHP contacted GP concerning 7 patients in the intervention group and 2 patients in the control group, no statistical significant difference.	6

Fleten 2004 [49] Norway	To explore the value of medical sickness certificates related to daily work in Norwegian National Insurance Offices to identify sick-listed persons, where modified working conditions might reduce the ongoing sick leave	Cross-sectional. Oct.-Nov. 1997, Feb.-March 1998	Officers and medical consultants at two Norwegian National Insurance Offices (NIO), and a random sample of people (n=496) sick-listed >2 weeks.	1: 999 sickness certificates >2 w. with musculoskeletal or mental diagnoses. 2: 496 sickness absentees; 159 (32%) participated (?% ♀)	Two types of data: 1. Assessments of the certificates by the 4 officers, For 50% randomly selected (n=501) the assessment was only based on the certificate. For the rest (n=498) also information about previous sick leave was available. Some were also assessed by the absentees. 2. Questionnaire data from the sickness absentees	Assessment of if enough information was available to assess need for modification of working conditions is needed and if such changes could lead to faster RTW	The sickness certificates proved insufficient for detecting potential sick-leave reduction by modification of work conditions. There were poor agreements among and between groups of NIO officers and medical consultants. In 20-30% of the sick-leave cases both the NIO and the sick-listed agreed that modification of work conditions might result in shortened sick leave.	4

Gul-brandsen 2007 [50] Norway	To study the association between GPs attitudes and their sickness certification practices	Cross-sectional June 2002	GPs in Norway	Study population; a nationwide representative sample of 1605 physicians. Participated: 1168 (73%). Here only the GPs were included. Participants: 308 GPs (28% ♀)	Questionnaire data	Perceived burden, self-assessment, doubt, ways of handling sickness certification and gate keeping, associations with job satisfaction, paternalistic style, personality and frequency of issued sick notes; permissiveness, opinions on whether sickness certification is a medical task, socio-political attitude	Large differences in the attitude towards sickness certification among GPs. Three groups with distinct response patterns were found among a majority of GPs. Despite the differences in attitudes towards sickness certification, the GPs had similar practices, patient contacts, and number of issued sick notes per week. Problems were experienced regarding the two roles as treating physician and as medical expert. There were no gender differences in attitudes and sickness certification practices of GPs.	2, 3
Hussey 2004 [51] UK	To explore how GPs handle the sickness certification system, their views on the system, and suggestions for change	Cross-sectional Year: no infor-mation	Purposive sample of GPs working in three regions in Scotland	Study population; GPs in practices in Scotland. Purposive sample of GPs with a wide range of characteristics and experiences. Participants; 67 GPs (assistants, principals, and GPs in training) participated (?% ♀).	Transcripts from 11 focus group interviews were analysed qualitatively.	GPs' perception of the sickness certification system	Almost all GP experienced strong conflict between the two roles as treating physician and as medical expert to authorities. Collaboration with other professionals and stakeholders was experienced as problematic. Many made patient advocacy a priority and issued certificate on demand, undermining the gatekeeper role. GPs experienced problems to assess the patient's functioning, work capacity, need for sick leave, and to handle the situation when they and the patient had different opinions of the need to be on sick leave. GP experienced a lack of knowledge of the labour market and the insurance system.	3

Joling 2003 [52] Netherlands	To investigate whether gender differences in the risk of being granted disability pension were related to the chance of being called by the occupational physician (OP)	Pro-spective cohort study 1990	All employees who reported sick in November 1990 and whose case was reported to medical administration service (GMD) 9 months later. The employees' OP	Study population; 2622 sickness absent employees, from a population-based study (38% ♀)	Baseline questionnaire from a longitudinal survey and data on time to consultation with OP	Gender differences in the chance of being called by the OP	Women were more likely to be called by the OP and women were called earlier in the sick-leave period. The gender differences were explained by high educational level, working in industry or smaller companies (10-49 employees). Employees, with mental symptoms had 24% higher chance to be called than employees with musculoskeletal symptoms.	1
Larsson 2006 [54] Sweden	To investigate whether sick leave during pregnancy could be explained by attitudes to sickness absence held by obstetricians working in antenatal care	Cross-sectional 2000	All obstetricians in public antenatal care in seven hospitals in South Eastern Sweden	Study population; 45 obstetricians Participants; 39 (87%) (59%♀)	Questionnaire	Distribution of time between discussing normal pregnancy and issues concerning family situation, work conditions, pregnancy benefit, and sick leave. Reasons for issuing sickness certificates and the obstetricians' attitudes toward this	No gender differences in attitudes with one exception; more male than female obstetricians (73% vs. 51%) assessed that low back pain of pregnant women could be explained by the women's´ personal problems. No information whether this influenced their sickness certification of pregnant women	2, 3

Löfgren 2007 [55] Sweden	To study physicians´ sickness certification practices with regard to the frequency of sickness certification consultations, frequency and nature of problems related to this task, in general and in different clinics/practices.	Cross-sectional 2004	All physicians in two Swedish counties	Study population; 7765 physicians <65 years in Stockholm and Östergötland county. Participants; 5455 (71%) (50% ♀)	Questionnaire	Associations of physicians' characteristics (speciality, level of education, age, sex, years in practice) and frequency of sickness certification consultations and seriousness of related problems	The frequency of sickness certification consultations and frequency and nature of problems varied substantially between clinics/practices. The frequency of problems was highest among GPs and orthopaedics and lowest in internal medicine and surgery. Of GPs, 82% rated the assessing of work capacity as fairly or very problematic, compared to 33% of the orthopaedics. A higher proportion of GPs compared to all other physicians rated the handling of disagreement with patients on the need for sick leave as problematic. Other problematic issues were lack of management, conflict between the roles as a treating physician and medical expert, and collaboration with other professionals or stakeholders. Experience of problems decreased with number of years worked.	2, 3
Löf-vander 2003 [56] Sweden	To explore factors related to two GP's joint assessments of work incapacity of immigrant sick-listed patients and whether their ratings were concordant.	Cross-sectional 1993-1997	GPs and consecutive immigrant patients at a primary health care centre in Stockholm, sick listed due to benign disorder for >6 weeks participating in a 4-weeks treatment program.	Study population: 2 GPs and 175 patients. Participants: 2 GPs (50 % ♀), 151 (86 %), patients (68% ♀)	Notes from the consultation where one GP examined the patient and the other acted as an observer and made the notes. The GPs alternated in these roles.	GPs individual assessments of patients work incapacity	A positive association between GP's assessment of work incapacity and depression and pain in men respectively self-rated work incapacity in women, were found. The OR of sickness certification were highest regarding depression (OR 12.8), pain behaviour (OR 5.6), and education <7 years (OR 5.1) in male patients, and regarding self-rated work incapacity (OR 7.0) in female patients. Two third of the patients who rated themselves as incapable of work were by the GPs assessed to have at least 50% work capacity. No association between GPs assessment of work capacity and ethnicity, occupation, age, or number of years at work. The two GPs found that their assessments probably were influenced by the patient's stories.	1, 2

Mortel-mans 2006 [57] Belgium	To assess the influence of enhanced information exchange between social insurance physicians (SIP) & occupational physicians (OP) on work resumption of patients on sick leave	Con-trolled inter-vention Oct. 2001-July 2003	SIP at the Christian Sickness Fund (CSF) & OP of the external occupational health services in three regions in Belgium. SIPs' patients on sick leave 1-12 months	Study population; SIP and OP in 3 regions and their patients. Study sample; 15 SIP at the CSF, all 40 OP of the occupational health services, the SIP's 1883 patients sick-listed 1-12 months, not pregnant, and aged 18-51 years. Participants; 1564 patients (84%), (50%♀). Of these 505 (32%) were assigned to the intervention group, 1059 (68%) to the control group.	Questionnaire to patients at inclusion. Data from the physician's communicatio n form. Data on sickness absence from CSF	Effects of the intervention on rate of sick-listed, RTW, and number of sick-leave spells during the study period	No significant differences between the intervention group and the control group for any of the outcomes; RTW, rate of employees on sick leave, and number of sick-leave spells during follow up.	6

Mortel-mans 2007 [58] Belgium	To analyse the inter-physician communication between social insurance physicians (SIP) & occupational physicians (OP) during an intervention that aimed at enhancing and structuring the information exchange practices.	Cross-sectional Oct. 2001 - July 2003	SIP at the Christian Sickness Fund (CSF) & OP of the external occupational health services in 3 regions, north Belgium.	Study population; SIP and OP in 3 regions and their patients. Study sample:15 SIP at the CSF and all 40 OP of the occupational health services in the regions. 505 (59%♀) sick-listed employees in an intervention group	Information from communication forms used by SIP and OP	Frequency and type of communication, and type of patients for whom SIP want communication with OP	Inter-physician communication was initiated for 52% of patients and focused particularly on work modification that could impact RTW. Most communication for patients with mental disorders, pain, work-related disorders, high physical work demands, or a bad prognosis for RTW	3
Norrmén 2006 [59] Sweden	To describe physician-related factors that may be associated with the sickness certification decision, when patients meet their general practitioners (GPs).	Cross-sectional 1996	GPs in 16 primary healthcare centres in a Swedish county, and their consecutive patients aged 18-64, not already on sick leave or retired.	Study population: the 93 GPs in all 37 primary healthcare centres in a Swedish county. Participation; 65 GPs (89%), (43% ♀) and their 642 patients (61% ♀)	Data from 2 questionnaires to GPs; one about GP factors & one about each consultation	Associations between physicians' characteristics and issuing a sick note or not.	GPs with long experience in family medicine and those working part time issued sick notes more often among patients with an infectious disease or a musculoskeletal disorder, than GPs with shorter experience. There were large variations in associations between physicians' characteristics and issuing a sick note. No association with GP's sex. Physicians regularly participating in continuing medical education issued fewer sick notes. GPs having regular contact with social insurance officials, issued more sick notes.	2

Norrmén 2008 [60] Sweden	To explore and compare physician and patient opinions regarding medical factors and functioning and their influence on sick listing.	Cross-sectional 1996	GPs in 16 primary healthcare centres in a Swedish county, and their consecutive patients aged 18-64, not already on sick leave or retired.	Study population: all 93 GPs in the 37 primary healthcare centres in a Swedish county. Participants; 65 GPs (89%), (43% ♀) and 642 of their patients. 521 (81%) answered a questionnaire Responses from both GP & patient available for 474 (74%) of the consultation. (66% ♀ among sick-listed/64% ♀ among not sick listed).	Questionnaire data from patients and GPs for each consultation	Issuing a sick note or not	If the patient stated work incapacity, the OR for sick listing was high (OR 7.0). Other associations for GP issuing a sick note were previous sick leave (OR 1.7), musculoskeletal disorders (OR 3.5), fatigue (OR 2.5), and when GP assessed that the disorders limited the patient's work capacity severely (OR 14.2). No association regarding patient's age, sex, education, occupation, or language and sick listing. When GP and patient agreed on reduced work capacity, the majority got a sick note.	1, 5

Pransky 2002 [61] USA	To explore the practices and perspectives of primary care physicians (PCPs) (GPs and internalists) in relation to disability and RTW and identify incentives and barriers to addressing these issues, and opportunities for improvement.	Cross-sectional Year: no information	423 PCPs, in Massachusetts	Study group: 181 physicians (43%) (31%♀); (59% GP and 41% internal medicine).	Questionnaire with case scenario	Proportion of sick-leave cases among the PCPs, the proportion of PSPs who experienced different types of barriers, who have different opinions, or handle situations differently in sick-leave cases	Sick listing issues were relevant for around 10% of the PCP's patients. Almost 80% of all PCPs agreed that early RTW is beneficial to patients. Barriers were addiction, mental disorders, somatisation, sick-leave request, conflict with the employer, and low work satisfaction. Other difficulties were to assess time to RTW and lack of information on possibilities for adjustment of work tasks. A majority (65%) considered lack of guidelines on RTW as an obstacle.	1, 3
Ratzon 2006, [62] Israel	To determine factors predicting a delayed RTW	Prospective cohort study. Year: not given	All surgeons at one clinic & their consecutive patients who had surgery for carpal tunnel syndrome	Study population: all surgeons at one clinic, 50 patients. Participants; all 5 surgeons at the clinic; 49 patients (98%), (88% ♀). The majority of patients were women working in offices, or with cleaning, catering or care work.	Information from a questionnaire before surgery, and telephone interviews one month after surgery and thereafter every 14 days up to 90 days after surgery. Data on recommended time on sick-leave and from clinical functional tests from the surgeon's summary	Predictors of delayed RTW, defined as >21 sick-leave days, which was the medium recommended sick leave by the surgeon after carpal tunnel surgery	Advice of surgeon on sick leave varied from 1 to 36 days. Medium length was 21 days. No information on the reason for the variation in sick-leave days. Surgeon's advice for sick-leave period was the strongest predictor among many other factors influencing delayed RTW.	2

Reiso 2004 [63] Norway	To examine the accuracy of physicians' predictions of their patients' certified sickness absence status 4 weeks ahead, and which factors that were associated with the accuracy of the predictions	Cohort 1996	All GPs and occupational physicians (OP) in a Norwegian county and their consecutive patients, sick-listed <20 weeks	Study population: 91 physicians. Participants: 52 (57%) whereof 49 GPs, 3 OPs (25% ♀), and the physician's answers on questionnaires for 796 of their patients; 486 patients on shorter sick-leave (<3 weeks), 310 patients on longer (3-20 weeks).	Survey/ Survey/audit. The physician's prognosis for each patient about RTW 4 weeks ahead. Data on duration of sick leave from the Social Insurance Register.	Percentage of correct prognosis for the patient's RTW and continued sick leave after 4 weeks. Positive predictive value (PPV) for having made the correct prediction. OR for accurate prediction related to a number of variables: age, sex, diagnosis, assessed work capacity, the basis for assessment.	The physicians' RTW prognosis were more positive than the actual outcome for both groups of patients. PPV was 84% for RTW 4 weeks later among patients on sick leave <3 weeks and lower, 53% for RTW among patients on longer sick leave. The corresponding PPV for that the patient would still be on sick leave was 72% and 91% at short and long sick leave, respectively. Physicians more often correctly prognosed the duration of sick leave and RTW for patients with respiratory disorders (OR 2.84) than for mental disorders (OR 0.4). For those long-term sickness absent, the OR for correct prognoses was low for injuries (0.12), mental (0.54), and musculoskeletal disorders (0.33). No associations between PPV and the patient's or the physician's age or gender or any of the other factors.	1, 2

Shiels 2006 [64] UK	To investigate associations between sick listing and gender of patient and GP	Cross-sectional 2000-2001	Sickness certificates issued by GPs in 9 practices in the north-west of UK and their 6271 consecutive patients	Sickness certificates (N=13 127) during 12 months for 6271 patients. Study group: 3906 (55% ♀) patients for who gender of both physician & patient were recorded and the patient had several sick-leave spells within the same diagnostic category issued by the same GP. 67 GPs (52% ♀) had issued those certificates.	Information from sickness certificates	Sickness certificates issued for intermediate (6-28 weeks) and long-term absence (>28weeks) .	No gender differences were found, except that men consulting a male GP were more likely than women consulting a female GP to be sick listed for intermediate period (6-28 weeks), controlled for patient factors (age, diagnosis, deprivation). This gender interaction was most pronounced for mild mental disorders. For long-term absence no association was found for diagnosis respectively gender of physician or patient.	1, 2

Shiels 2007 [65] United Kingdom	To estimate the various contributions made by patient-, clinician-, and general practice-based factors in explaining variation in long-term (>28 weeks) certified sickness absence	Cross-sectional 2000-2001	Sickness certificates issued by GPs in 9 practices in the north-west of UK and their 6271 consecutive patients	Sickness certificates during 12 months (N=13 127) for 6271 patients. Included were the 3385 patients (54.8% ♀), who had a continuous sick-leave spell where the same GP had certified all periods of the spell with the same diagnoses. No. included GPs: 44. No. included sick-leave spells >28 weeks: 308, i.e., 9.8% of all patients.	Information from sickness certificates	Patient (sex, age, social deprivation score, sick-leave diagnoses, sick-leave length), clinician (certifying GP), and general practice (practice code)	The explanatory factors, including diagnosis, explained only 27% of the variation in long-term sick leave. Diagnosis explained 18%, while certifying GP and general practice explained a very small part of the variation (3.4% respectively 2.8%). Older age, to be a man, living in a deprived area, and having mild mental disorder increased the risk for long-term sick leave (>28 weeks). Of the 308 patients on long-term sick leave, 37 % were sick listed with mental and 20 % with musculoskeletal diagnoses. Compared to other diagnosis, mild mental disorders doubled the risk for long-term sick leave. To live in a deprived area was the single most important factor that showed the highest risk (OR 2.6) for long-term sick leave. Wide variations were found among GPs regarding number of sickness certificates issued respectively sick-leave length.	1
Swartling 2007 [67] Sweden	To explore GPs' view on sickness certification practices	Cross-sectional 2003-2004	A strategic sample of GPs from 17 Primary Health Care Centres (PHCC) in four Swedish counties	Study population: 29 GPs were selected on age, sex, and PHCC location. Participants: 19 GPs, 66% (47% ♀)	Qualitative analyses of transcripts of semi structured individual interviews.	Views on and responsibility for sickness certification and rehabilitation	Large differences in GPs' views on sickness certification regarding several of factors, e.g., view on their own role and the role of the patient. All GPs experienced a potential conflict between society's and patient's interests and handled this in different ways.	3

Swartling 2007 [68] Sweden	To quantify the extent of emotionally straining sick-listing problems among three categories of physicians and find associations with workplace characteristics	Cross-sectional 2004	Physicians below 65 years in two Swedish counties.	Study population; 7665 physicians; response rate: 71% Study group: the 3997 physicians (50% ♀), having consultations including consideration of sickness certification who had stated type of clinic; 954 GPs, 189 in orthopaedic clinics, 2854 in other clinics	Questionnaire	Frequency and OR for experiencing the following problems: problem in general with sickness certification, conflicts with patients, worry of being threatened or of to be reported to the disciplinary board in connection with sick leave cases, conflict between the two roles as treating physician and medical expert, different opinions than the patients on sick leave.	60% of GPs and 53% of orthopaedics experienced sickness certification as problematic at least once a week compared to 23% among other physicians. The corresponding figures for having conflict with the patients were 22% respectively 6%. The figures for at least once a month feeling threatened or worrying about being reported to the disciplinary board were 13 and 3% respectively 11 and 3%. The adjusted ORs for GPs compared to all others were; to find sickness certification problematic at least once a week, OR 4.9, to find it very or fairly problematic to handle the double roles, OR 4.6, to experience conflicting situations, OR 3.8, and to feel threatened at least once a month, OR 3.0. Physicians who often had sickness certification consultations had much higher ORs than others for experiencing sickness certification as problematic; GPs: OR 7.0, orthopaedic 6.9, and other physicians 7.4.	2, 3

Swartling 2008 [69] Sweden	To explore how orthopaedic surgeons view their sick-leave commission and sickness certification practice	Cross-sectional 2004	Orthopaedic surgeons at five different orthopaedic clinics in four Swedish counties	A strategic sample of all the 108 orthopaedic surgeons at five orthopaedic clinics, based on age, sex, subspecialty, research experience and type of clinic; 32 were offered to participate. Of these, 20 agreed to participate and 17 participated (Drop out 15%) (12% ♀).	Transcripts of recorded individual interviews. Phenomeno-graphic analysis	Orthopaedics' view on the sickness certification commission and on good sickness certification practice	There was a relationship between the orthopaedic surgeon's view of the sick-listing commission and their views on their role in the health care system. Three different categories of such roles were identified; the isolated specialist, the counsellor, and the physicians who consider themselves as part of the system. The latter two considered the sick-listing commission as a part of their work tasks. Some found it difficult to handle if they and the patient had different views on the need for sick leave.	2, 3

Söderberg 2005 [70] Sweden	To assess the quality of sickness certificates as a basis for Social Insurance Officers' (SIO) decisions regarding entitlement to sickness benefits	Cross-sectional Sept. 2002	All new sickness certificates covering >28 days that was received at the SIOs in a Swedish county	All new sickness certificates covering >28 days (n=2249) that was received during one week at the SIO. 13 certificates were excluded because they were unreadable. Included: 2236 (99%) (64% ♀)	Data was extracted from the sickness certificates using a template and analysed with quantitative and qualitative methods	Data from the sickness certificates about: clinical unit, physician educational level (specialist/non specialist), sex, age, number of sick-leave days, partial sick leave, diagnosis (ICD10), function, employment status, work tasks, objective clinical findings, prognosis, suggested rehabilitation measures	57% of the sickness certificates were issued in primary health care. The quality of certificates varied widely. GPs and physicians under specialist training provided comparatively more essential information on patients, e.g., type of work tasks and medical examination results than certificates from other physicians. Important information was missing on 73% of the sickness certificates. Information on type of employment was more often lacking on the certificates issued by hospital physicians than by GPs (48% vs. 31%). Proposals for rehabilitation measures were missing more often in certificates for women than for men (64% vs. 36%).	2, 4

Watson 2008 [66] UK	To investigate if GP beliefs about back pain measured on the Pain Attitudes and Beliefs Scale (PABS) were more predictive of sick notes for non-specific low back pain (LBP) than a general predisposition to sick certify patients with other non-specific conditions	Cross-sectional, 2005-2006	All GPs registered, practicing and resident in the Island of Jersey. All sickness certificates throughout 2005 for absences >2 days were received from the States of Jersey Employment & Social Security Department	Study population: 94 GPs Participants: 83 GPs (88%) (26% ♀)	Questionnaire data; physician's age, sex, years in practice, no. working hours, no. patients with LBP/ month, and answers of PABS subscales (biomedical and psychosocial). Sick-leave diagnoses from sickness certificates	Number of issued sickness certificates in 2005 on LBP, common mental illness, and respiratory disorders	There was no association between the GPs´ score of PABS and number of certificates issued for LBP but there was association for common mental illness and respiratory disorders. The longer time as a GP and the more hours working the more certificates were issued for LBP. No association between number of LBP patients per month and number of sickness certificates issued for BP. Sickness certification for LBP was predicted by sickness certification behaviour in general and not by scores on PABS.	2

von Knorring 2008 [53] Sweden	To identify what problems physicians experience in their work with sickness certification of patients	Cross-sectional 2004	GP, Ortho-paedics, Psychiatrists Rehabili-tation medicine physicians, Obste-tricians	Study population: 380 physicians from urban & rural areas, different regions, and clinics were strategically selected and invited to focus groups. Participants: 26 (50% ♀)	Qualitative analyses of transcripts from six focus group discussions. From the transcripts, statements of problems were extracted and analysed using content analyses.	Categories of problems experienced by the physicians	GPs experienced problems related to four areas; society- and social insurance system, the organisation of health care system, performance of other actors in the health care system, and problems related to the physician's own working situation. Lack of leadership and managerial responsibility with regard to sickness certification were identified as problem in all four areas. Many physicians described fatigue, despair, and lack of pride in their work, as they felt that they contributed to medicalization and prolonged sick leaves for the patients. Specific problems included; to handle the two roles of treating physician and medical expert, to handle conflict with patient regarding sick leave, to assess patient's function and work capacity, and to collaborate with other actors within and outside health care.	3

Østerås 2009 [71] Norway	The aim was to evaluate intervention effects on important GP parameters; knowledge, attitudes, self-efficacy towards functional assessments and knowledge about patient work factors	Con-trolled inter-vention: Mars-Oct. 2005	GPs and consecutive patients who were on full- or part-time sick leave for 8-26 weeks	Study population: 360 GPs were invited to participate in the study, 57 agreed to participate. 29 (35% ♀) GPs randomized to an intervention group using the method for up to 10 consecutive patients; 29 (38% ♀) physicians in the control group, assessing work capacity as usual. 26 (90%) of them were present at all data collections. 22 (79%) of them followed through. 133 patients on full or part-time sick leave in 8-26 weeks, with a good prognosis for RTW.	Data from patient: self-reported functional ability, work exposure and perceived stressors at work prior to consultation. Data from GP: the main questionnaire completed 3 times; immediately before the consultation, after the intervention period, and at follow-up 6 months later including questions about GP's knowledge and attitudes about functional assessment, self-efficacy, knowledge about patient work factors.	Effects of intervention regarding change in GP's confidence in assessment of work capacity, knowledge of the patient's work situation and stressors, and GP's attitude to functional assessment	The point of departure of this study was the lack of knowledge in insurance medicine among GPs. Knowledge improved significantly more in the intervention group than in the control group, as well as their confidence in making functional assessments, their knowledge of patients' work situation and stressors, according to both GPs and patients. The results also remained 6 months after the intervention. GPs' attitudes to functional assessment did not change.	3, 6

				The intervention: a one-day course plus phone support using a structured method for functional assessments of persons on long-term sick-leave in general practice.	Evaluation score sheet filled in by both GP and patient directly after consultation			

Table 4. Summary of results from the studies with results regarding the six subcategories in the category "What patient-related factors influence physicians´ sickness certification practice?"

A plus sign (+) indicates that the study found an association, a minus sign (-) means that no such association was found. Both a plus and minus signs (+/-) indicate conflicting findings in the study. When no sign is given, that aspect was not addressed in the study.

Type of patient factor **No. of studies** **Summary**	**Studies included in this literature review**							**Studies in the SBU review** [7]
	Campbell 2006 [45]	Joling 2003 [52]	Löfvander 2003 [56]	Norrmén 2008 [60]	Pransky 2002 [61]	Reiso 2004 [63]	Shiels; 2006 & 2007 [64, 65][1]	Englund 2000 [73]
Patient age **3** Results go in different directions				**-** No association between patient age and physician's decision to issue sick notes		- No association with patient age and if physician correctly predicts duration of sick leave or return to work	+ Higher mean age among those who were sick listed >28 days	
Patient sex **5** Results go in different directions		- No association between patient sex and likelihood of being called to the occupational physician	+/- Association with how physicians judged women's and men's work incapacity varied with different factors	**-** No association between patient sex and physician's decision to issue sick notes		**-** No association with patient sex and that physician makes a correct prognoses regarding sick leave or return to work	+/- No sex differences, with one exception: a higher proportion of men who met male GPs had a sick-leave spell of (6-28 w)	
Educational level/type of job **3** Results go in different directions		+ High level of education, work in manufacturing industries, small companies (10-49 employees) increased the chance of being called to the	+ Low educational level (<7 years) in male patients increased the odds ration that the physician assessed work capacity as reduced	- No association between patient educational level or occupation and physician's decision to issue sick notes				

		occupational physician						
Patients' disease/symptom **7** Results go in different directions	+ GPs were more likely to issue a sick note to patients with mental disorders than with somatic complaints	+ Employees with mental disorders had 24% higher probability of being called to the occupational physician, than those with musculoskeletal disorders	+ There was a positive correlation between physicians' assessment of work incapacity and depression and pain behaviour in men.	+ There was a positive association between having musculoskeletal disorders or fatigue and that the physician issued a sick note	+ Somatisation, substance abuse, and mental disorders were seen as obstacles to support patients in return to work	+/- Physicians more often correctly prognosed duration of sick leave and return to work for patients with respiratory disorders than for mental disorders. For those long-term sickness absent, the odds ratios for correct prognoses was low for injuries, mental and musculoskeletal disorders	+ A higher rate of the men sick listed for 6-28 weeks by a male physicians were that with mild mental disorders	
Patient requests a sickness certificate **2** Results go in different directions	- GP's decision to issue a sick note was not affected by whether the patient requested this							+ GP's decision to issue a sick note for patients with low back pain and insomnia was affected by whether the patient requested this
The patient's assessment of his/her work capacity **2** The results go in the same direction			+ There was a strong positive association between physicians' and patients' assessment of work incapacity in women	+ If the patient assessed that her/his work capacity was limited there was a higher risk of sick leave				

Table 5. Summary of results from the studies with results regarding the five subcategories in the category "What physician-related factors influence sickness certification practice?" A plus sign (+) indicates that the study found an association, a minus sign (-) means that no such association was found. Both a plus and minus signs (+/-) indicate conflicting findings in the study regarding this, e.g., for subgroups. When no sign is given, the respective aspect was not addressed in the study.

-Type of physician factor -Number studies -Summary	**Studies in this literature review**											**Studies in the SBU review** [7]				
	Coudeyre, 2006 [46]	Gulbrandsen, 2007 [50]	Larsson, 2006 [54]	Löfgren; Swartling; Arrelöv, 2007 [44, 55, 68][2]	Löfvander, 2003 [56]	Norrmén, 2006 [59]	Reiso, 2004 [63]	Shiels, 2006 [64]	Swartling, 2008 [69]	Söderberg, 2005 [70]	Watson, 2008 [66]	Chew-Graham, 1999 [75]	Englund, 2000 [73]	Jensen, 2000 [77]	Löfvander, 1997 [72]	Peterson, 1997 [74]
Physician age or years in the work **6** The results go in different directions				+/- Rate experiencing problems decreases with years as physician		+ Older physicians or those with long experience as GPs more often wrote sick notes	- No association between physicians' age and how they could predict patients' duration of sick leave or RTW				+ The more years the physician had worked, the more sick notes issued with mental & res-piratory disorders		- No association between age and sick-leave costs			+ Older physicians sickness certified more often
Physician's sex **9** The results go in different directions		- No sex differences in attitudes among GPs	+/- Only one difference: more male than female obstetricians believed that low back pain during pregnancy was influenced by personal problems	+/- Sex differences in certain problem areas	- No sex differences in assessment of work incapacity	- No sex differences in no. of sick notes	- No association between physician sex and how they could predict patients' duration of sick leave or RTW	+/- Men issued more certificates of male patients with minor mental disorders in cases <28 w. For spells >28 w: no association with sex					+ Women issued certificates more often than men and had higher sick-leave costs			- No sex differences in assessments

Physi-cians' beliefs **7** The results go in different direc-tions	+ GPs with high fear avoidance believes issued longer sick leaves for acute low back pain	- No association between physicians' attitudes and their sickness certification practices			+ The GPs were affected emotionally by the patients' stories				+/- Unclear whether orthoaedics' believes affected their practice		+/- No association between fear avoidance believes and number of sick notes with low back pain but with mental and respiratory disorders	+ Inability to handle some situations and fear of disturbing the patient relation led to not address certain issues			+ 2nd opinon GPs judged that patients had more work capa-city than the treating GP	
Physi-cian's specialty **4** Major differ-ences between specia-lities				+ Large differences between specialists in how often they sick list, in experience problems, and in measures taken						+ Large differences bet-ween differ-rent groups of physi-cians in the quality of sick notes			+ GPs issued more sick notes than orthopaedics and less than psychiatrists	+ Diffe-rence between ortho-paedic and treating physi-cians in assess-ment of need of treat-ment or rehabi-litation		

Table 6. Summary of results from the studies with results regarding the seven subcategories in the category "What problems do physicians experience regarding sickness certification?"

A plus sign (+) means that the study found that physician experienced this as a problem. If no plus sign is given, that aspect was not included in the study. No studies reported that physicians found any of these aspects unproblematic.

Number of studies and type of problem	**Studies in this literature review**											**Studies in the SBU review** [7]		
	Edlund 2002 [47]	Gulbrandsen 2007 [50]	Hussey 2004 [51]	Larsson 2006 [54]	Löfgren 2007 [44, 55, 68][1]	Mortelmans 2007 [58]	Pransky 2002 [61]	Swartling 2007 [67]	Swartling 2008 [69]	von Knorring 2008 [53]	Østerås 2009 [71]	Cassis 1996 [79]	Chew-Graham 1999 [75]	Timpka 1995 [78]
Eight studies showed that physicians have problems to manage the two roles as the treating physician and as a medical expert		+	+	+	+			+	+	+				+
Eight studies found that physicians find it problematic to handle situations when the physician and patient have different opinions about the need for sick leave			+	+	+			+	+	+			+	+
Eight studies found that physicians have problems in assessing patients' functioning, work capacity, or need for sick leave			+	+	+			+		+	+	+		+
Two studies showed that physicians find it problematic to handle prolongations of sick-leave spells initiated by another physician					+									+
Five studies found that physicians find it problematic that their knowledge is limited on e.g., labour market and social security system	+		+				+				+			+
Nine studies found that physicians are experiencing problems in collaboration with other professional groups or other stakeholders in sick-leave cases, e.g., with hospital physicians or in contacts with employer or the social insurance	+		+	+	+	+	+	+		+				+
In two studies, the importance of organisational factors was highlighted, e.g., regarding leadership and management of these tasks or managerial support					+					+				

[1] In these three studies, data from the same questionnaire are used, but with different issues and different subgroups [44, 55, 68]

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