

Disability Evaluation: A place for the International Classification of Functioning Disability and Health?

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Summary

Summary

Individuals who are sick and unable to work may receive wage replacement benefits from social insurance. To receive wage replacement or support for return to work, the work-disabled person has to undergo a disability evaluation for social insurance. Medical reports of disability evaluation are criticised for lack of standardisation and transparency in European countries. The International Classification of Functioning, Disability and Health (ICF) was developed by the World Health Organisation to express the situation of people with disability and therefore it might be a solution to bring more standardization and transparency for disability evaluation. However, it is unclear whether the ICF framework and/or the ICF classification can reproduce the content of medical reports because it was not developed for disability evaluation. The objectives of this thesis are: (1) to study if the content in medical reports of disability evaluation is similar across European countries; (2) to investigate *if and how* the ICF framework and classification can depict the content of medical reports; and finally (3), to study *to what extent* the ICF framework and classification can depict in practice the content in medical reports.

This thesis consists of four different studies: 1) a survey on the content of summary and conclusion of medical reports in 15 different European countries, 2) a conceptual study assessing the ICF framework and classification in medical reports, 3) an empirical study linking 72 Swiss medical reports to categories of the ICF classification and investigating if existing ICF core sets for specific health condition might be used for medical reports, and 4) a content validation of the EUMASS Core Set in 6 European countries.

Different European countries have different ways to organize disability evaluation, but medical reports in social security contain similar key features among European countries: (1) health condition, (2) working capacity, (3) socio-medical history, (4) feasibility of interventions, (5) prognosis of disability, (6) causality, (7) consistency of the situation of the claimant, and (8) legal disability. The

ICF classification is not implemented in disability evaluation in social insurance but attempts are underway.

The ICF was not developed for disability evaluation but we can use some elements of it. The ICF framework allows medical experts to describe the claimant in a bio-psycho-social manner and thereby fits the current thinking about disability. The ICF classification covers work capacity to some extent: What a person is able and unable to do can be depicted in general terms (such as carry, sit, walk) but current ICF categories run short of typical descriptions of work capacity (such as overhead working, change positions). The 7 other key features of medical reports in social security are more cumbersome to cover or cannot be covered at all by the ICF classification as they require specifications of categories or new aspects to be included in the ICF, such as describing relations of time and cause and effect.

The ICF classification with its 1424 categories is not practicable for daily routine. Therefore researchers started to develop core sets: purpose specific abstracts of the ICF. The study on the validation of the EUMASS core set shows that such a core set might be a good for making medical reports more transparent.

I conclude that it is possible that ICF categories about work capacity help promote standardized presentation and enhance transparency in disability evaluation in social insurance. More research is necessary to clarify the optimal way of development of one or more core sets.

Given that the labour markets and the health conditions between European countries might not be completely different, medical examiners could join efforts in developing a core set that is applicable in all European countries. Such a core set would also facilitate exchange of information among European countries and allow for comparison and collaboration.

The application of such an international core set may still be different between countries as legal disability processes of disability evaluation are different among European countries.

Chapter 1

Introduction

Case description

Jan is a 50-year-old worker for a construction company. Two years ago, after a period of depressive mood, a psychiatrist diagnosed depression. About the same time, Jan started having problems in doing his work as a constructing worker and he reported sick. For one year Jan tried to return to his work several times despite his bad mental condition. He received treatment (went once a week to a psychiatrist and he has been on medication). However, he still did not have the ability to perform his previous job and he had to stay sick-listed. After this year of repetitive absences, his boss and general physician advised him to apply for a disability benefit from social insurance. Jan's work ability and return back to work prognosis were not promising.

So, Jan applied for disability benefit. To receive wage replacement and / or support to return to work he had to undergo a medical evaluation for work disability where he had to fulfil legal and medical criteria. A psychiatrist performed the disability evaluation. He interviewed Jan about his medical history and treatment, and performed diagnostic tests to assess Jan's current health condition(s), and symptoms. Finally, the psychiatrist wrote a medical report. Therein, he discussed what Jan could do and what he could not do referring to the present and an alternative work.

After a while, Jan received the decision of the social insurance. He did not understand how the medical examiner and social insurance officer got to the judgment that he is 75% able to work in his present and 100% in an alternative job. He did not comprehend how the psychiatrist could diagnose a depression on the one hand but only 0 – 25 % restriction in work capacity on the other hand...

This is not an exceptional story. Many claimants feel like Jan across European countries...

People who work may get sick. Several of them do not recover and are unable to resume work such as Jan. An important reason to discontinue working before retiring age are health complaints that limit work capacity to such an extent that work demands cannot be fulfilled any longer¹. Those individuals are becoming work disabled. They need support to return to work and / or wage replacement.

To receive wage replacement or support in return to work the work disabled person has to undergo a disability evaluation. Medical examiners who perform medical evaluation for work disability (further: disability evaluation) and social insurance officers who appraise the degree of disability decide if a claimant is able to work or not and receive a disability benefit. Medical examiners document the results of the disability evaluation in medical reports. However, in those medical reports, it is often intransparent how medical examiners deduce work capacity (what a claimant can and cannot do) from health conditions, and how they deduce work disability (degree of disability) from work capacity . For further explanation of the terms see the glossary (chapter 3). Consequently the conclusion is often difficult to understand and to accept. Therefore the medical examiner's and social insurance officer's decision about work disability is less credible for claimants. This also happened to Jan: he could not understand how the psychiatrist got to this result nor did he understand how he would be able to work 100% in an alternative work than in his own. Not only claimants but also judges, at least in Switzerland, do not understand how medical examiners get from work capacity to legal disability².

Prevalence

The drain out of work due to illness or injury is substantial in most Western countries^{3,4}. Across the OECD countries, one in seven people of working age regard themselves as having a chronic health condition which complicates their daily life. Around 6% of the OECD working-age population collected disability benefits in 2007⁵. More than half of the OECD countries have seen a substantial growth in disability beneficiary rates in the past decade. The average percentage of people receiving disability benefits across countries is 6% (ranging from Hungary 12% to Italy 3,8%)⁵ In Switzerland live 238'333 disability pensioners, that is, 4.8% of the working age population in 2011^{6,7}. In 2009, Medical examiners in Switzerland performed 3,851 disability evaluations in social security² .

The probability of people on disability benefit returning to work is below 2% per year across OECD countries⁸. Work disability is a global matter that is associated with substantial social and economic consequences such as work loss and productivity loss⁹.

Disability Evaluation in Europe

In Western countries, social insurance is a substantial part of public social expenditures and an important part of the social safety net¹. This system organizes and finances return to work and if return to work turns out to be impossible, claimants may receive wage replacement^{7,8,10}.

To receive wage replacement and / or support for return to work, a claimant has to fulfil both legal and medical requirements¹¹⁻¹³. Legal requirements include that a sick-listed individual has paid premiums for the insurance and that he has to file a claim and undergo a disability evaluation, which is performed by medical examiners after a certain duration of sick-leave^{14,15}. Duration of sick leave prior to disability evaluation is different across countries^{14,16}. Medical requirements include for example that inability to work is due to the claimants' health condition¹⁷⁻¹⁹ and not because of lack of motivation.

The process in performing disability evaluation varies across European countries^{14,16,20-22}: In Switzerland after one year of sick leave the sick person has the right to file a claim for disability benefit²³. A medical examiner who is trained in disability evaluation typically assesses the claimant's health condition on the basis of medical files and examination, and he also evaluates work capacity for the present work and alternative work. As a result of this disability evaluation, social insurance officers define legal disability, in percentages or otherwise. They also decide if a claimant can be supported to return to work or if he receives a disability benefit until retiring age¹⁸.

Another example is Finland, where sick leave is maximal 300 days. Disability evaluation is also performed by medical examiners. However, the medical examiners do not assess claimants with an interview or examination; the decision of health condition and work capacity in medical reports is

based only on medical files^{14,16}. Social insurance officers define if a person is disabled or not; legal disability is not subdivided in percentages like in Switzerland.

Criticism and recent changes in Disability Evaluation

Since there is a growth in disability beneficiary rates, disability evaluation has become more important.

In recent years, the way medical examiners evaluate claimants has been a common topic of discussion²⁴. It is difficult to determine who does and who does not need protection in the form of a disability benefit, because health conditions cannot simply be translated into work capacity^{25–30}. In disability evaluation no gold standard exists to evaluate work capacity and legal disability^{22,31–33}. As a result medical reports in disability evaluation lack transparency and reliability in many countries^{2,34–40}. Lack of transparency and reliability may raise concerns for claimants, social insurances and society.

Standardized approaches may increase transparency and reliability. Tools that allow assessing and expressing what a person can do and cannot do, in a transparent and reliable manner, would be welcomed by social insurance officer and judges in medical reports.

Some changes are being implemented in European policies to improve the quality of disability evaluation. A common trait has been a stronger emphasis on the evaluation on work capacity and weaker one on health conditions per se¹⁶. The International Classification of Functioning, Disability and Health (ICF) may offer an approach to support this trend further. More specifically, the ICF might be a starting point to develop a tool to describe work capacity.

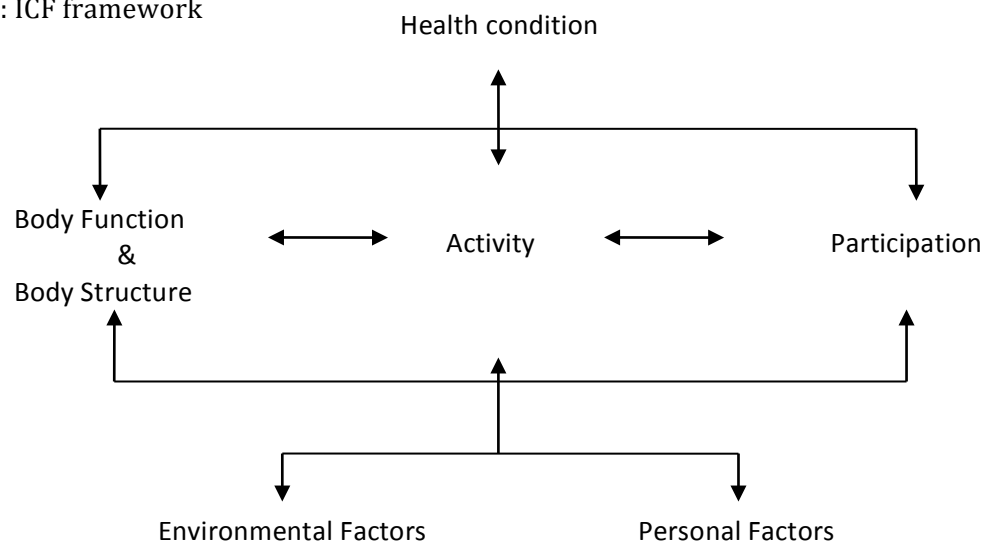
International Classification of Functioning, Disability and Health

The ICF provides “a description of situations with regard to human functioning and its restrictions” and serves as a framework to structure the information in a “meaningful, interrelated and easily accessible way” (ICF p. 7)⁴¹.

In 2001 the World Health Assembly (WHA) adopted the ICF as a means to describe health, functioning and disability for populations and individuals within health related domains⁴¹. The ICF was developed by the World Health Organisation (WHO). The ICF is the successor of the International Classification of Impairments, Disabilities and Handicaps (ICIDH), which was developed in 1980.

The ICF is presented as a conceptual framework, and as a hierarchical classification. The ICF framework reflects a bio-psycho-social approach to describe health and disability^{41,42} in different components (domains). In general, the ICF framework dwells on the interaction of the health condition with functioning of the individual (rather than on aetiology or disease)⁴³. It also visualizes the relevance of environmental and personal factors for all components¹⁷ (Figure 1).

Figure 1: ICF framework



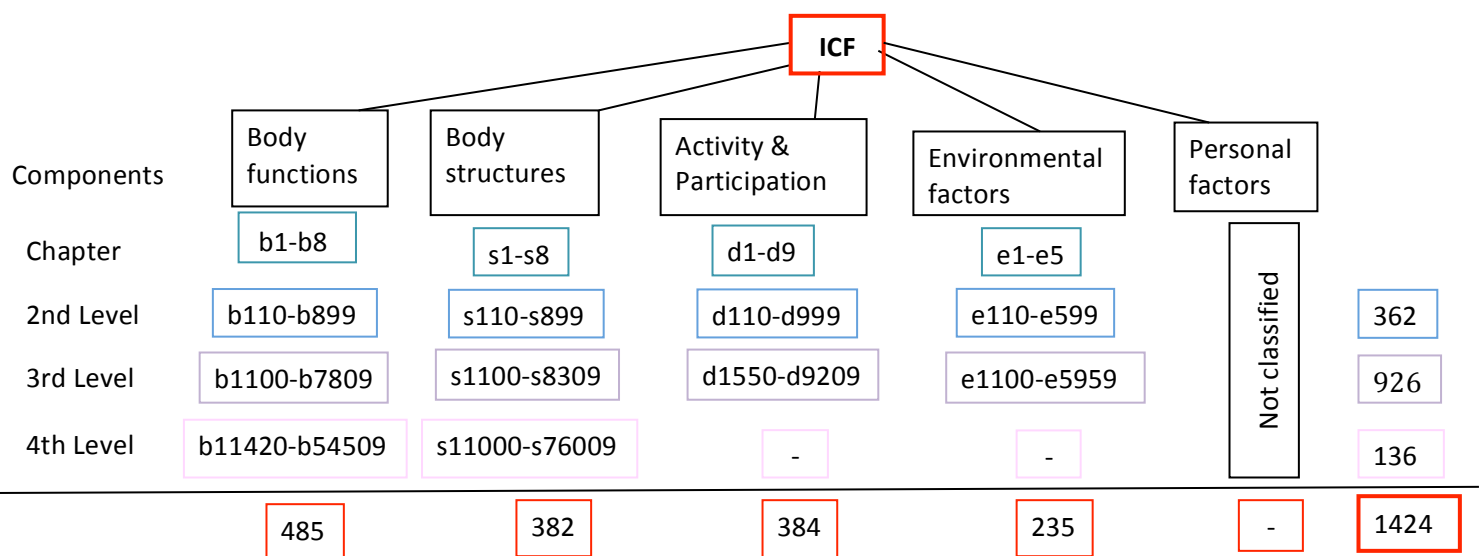
The *ICF framework* shows the individual's functioning in an interaction or complex relationship between the health condition and contextual factors (i.e. environmental and personal factors).

The different components are to be understood as follows: "Health condition is a disorder or disease. Body functions are physiological functions of body systems (including psychological functions). Body structures are anatomical parts of the body such as organs, and limbs. Activity is the execution of a task or action by an individual and participation is involvement in a life situation. Environmental factors make up the physical, social and attitudinal environment in which people live and conduct

their lives” (ICF, p. 10). “Personal factors refer to the particular background of an individual's life and living and comprise features that are not part of a health condition or health states” (ICF, p. 17)^{41,44,45}.

The *ICF classification* consists of the components body structures, body functions, activity & participation, and environmental factors. The body functions and body structures are taken apart, whereas activity and participation are taken together, which is different from the framework. The arrows that indicate relations between components in the framework disappear in the classification. These ICF components are subdivided into 1424 categories on different levels. Personal factors are not subdivided in categories, but there exists some research to classify personal factors^{46,47}. In WHO's international classifications health conditions as such are classified in the International Classification of Diseases (ICD-10)⁴¹ and not in the ICF (Figure 2). Thus, the ICF and ICD-10 can be seen as complementary.

Figure 2: The classification of ICF categories in hierarchical organization



The components body function, body structure, activity & participation, environmental factors are subdivided in categories of different levels. The higher the number the more precise is the category. For instance: d1 = learning and applying knowledge; d155 = acquiring skills; d1550 = acquiring basic skills

Researchers have begun to test the ICF to picture the situation of people with disability^{41,49,50}. So far, practical application of the classification appears to be limited^{51,52}. A main challenge is the size of the classification system. In daily practice, clinicians and researchers, cannot work with a volume of > 1400 categories. Therefore researchers started to develop ICF core sets to make ICF manageable in practice⁵³. An ICF core set is a list of selected categories from the classification for specific application⁵¹. Researchers in German speaking countries developed core sets specific to health conditions (e.g. low back pain, stroke) and one for a setting-specific core set (vocational rehabilitation)⁵³⁻⁵⁶.

Disability evaluation and ICF

The ICF sounds promising for disability evaluation because it was developed to express the situation of people with disability. It is not sure however, if the ICF can actually standardize medical reports in disability evaluation and improve transparency and reliability. One could try to answer this question at a national or an international level or both. International comparative research helps to understand problems, shortcomings, and needs in a broader way than a national study and international research has more impact.

Medical reports are being criticized in several European countries. The ICF has drawn attention in the context of disability evaluation for this reason. Therefore it might be interesting to study disability evaluation at a European level. A point in favour of this approach is that ICF exists in different languages (such as Dutch, German, Swedish and English). Another point is that developing one international method to improve disability evaluation might be more efficient than developing different country specific methods.

Objectives of this research

The objectives of this thesis are: (1) to study if the content of medical reports for social insurance is similar across European countries; (2) to investigate if and how the ICF framework and classification can depict the content of medical reports; and finally (3), to study to what extent the ICF framework and classification can depict the content of medical reports in practice. This results in the following research questions:

Research questions

1. How can the ICF framework and classification be used to depict the medical reports in disability evaluation?
2. To what extent does the ICF framework and classification cover the content of medical reports?

Outline of this thesis

With different co-authors I completed the following studies:

In **study 1**, we performed a survey in European countries. We compared the official requirements about the content of disability evaluation for social insurance across European countries and we explored if the ICF is currently applied. We used the handicapped role, i.e. the rights and obligations of people with disabilities towards society as frame of reference.

In **study 2**, we conceptually described what the ICF framework and classification can and cannot depict about human functioning and limitation in medical reports and to what extent one might be able to implement the ICF theoretically in medical reports.

In **study 3**, we translated Swiss medical reports into ICF categories using the linking methodology^{57,58}. We established to what extent existing ICF core sets for low back pain and chronic widespread pain developed for rehabilitation can depict the content of medical reports.

In **study 4**, we investigated in a European study if an existing core set for disability evaluation in social insurance contains the right ICF categories and if medical examiners find this core set useful and sufficient to express work capacity.

In the **general discussion**, I present and discuss the main findings.

Glossary

Terminology changed throughout the preparation of this thesis. As no commonly accepted terminology exists in the field of social security I initially mainly used the terminology as used in Europe. In study 3 the first author used terminology used in the USA. For those interested I write in square brackets the technical terms as used in Switzerland.

In the following, I define the ultimate terminology:

1. *Medical evaluation of work disability in social insurance* or short *disability evaluation* (introduction, study 1, 2, 4, and general discussion), *medical work capacity evaluation* (study 3) [*Begutachten*]: Describes the entire process, including reading of medical records, examination of claimants, and writing medical reports.
2. *Medical report* [*Gutachten*]: In disability evaluation medical examiners write medical reports. In this thesis I concentrate on the content of medical reports. Studies 1, 2, and 4 concentrate on the summary and conclusion of medical reports in Europe, and study 3 on the content of socio-medical history, diagnoses, examination, summary and conclusion of medical reports in Switzerland.
3. *Work capacity* [*Leistungsfähigkeit*]: Work capacity is what a person can do or not do related to work. In the articles, we had interchangeably used the terms functional capacity (study 2, 4) and work capacity (study 1, 3) because medical examiners among countries use both terms. In the different working groups where we performed our studies authors had different opinions about these two terms. For the introduction and general discussion I consistently used the term work capacity.
4. *Legal disability* [*Arbeitsfähigkeit*]: Legal disability describes percentage, degree of disability, or working hours a claimant can work, as defined in legal texts. To avoid confusion of work capacity and work ability (study 2) I changed the term work ability to legal disability (introduction, study 1, and general discussion).

5. *Categories*: The term (ICF) *category* includes code and definition in the ICF classification. In the introduction, study 3, and the general discussion I do not distinguish between codes, categories, and definitions of the International Classification of Functioning, Disability, and Health.

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Chapter 2

Study 1: The handicapped role – a framework for reporting disability in social insurance in Europe

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Under review in Disability and Rehabilitation

The handicapped role – a framework for reporting disability in social insurance in Europe

Implications for Rehabilitation (research)

- The handicapped role is internationally a reference for reporting about disability in social insurance
- Medical examiners report about working capacity in medical reporting across European countries
- The formats of reporting on working capacity vary from free text to semi-structured report forms with free text to fully structured and scaled report forms of working capacity.
- To depict working capacity more standardized our study suggests the ICF as a reference for an international report form

Abstract

Purpose: To compare the official requirements about the content of disability evaluation for social insurance across Europe and to explore how the International Classification of Functioning, Disability and Health is currently applied, using the handicapped role, i.e. the rights and obligations of people with disabilities towards society as frame of reference.

Methods: Survey. Two researchers used a semi-structured questionnaire to interview members of the European Union of Medicine in Assurance and Social Security (EUMASS), who are central medical advisors in social insurance systems in their country. We performed two email follow-up rounds to complete and verify unclear responses.

Results: Fifteen respondents from 15 countries participated. In all countries, medical examiners are required to report about a claimant's working capacity and prognosis. In 14 countries, medical reporting ought to contain information about socio-medical history and feasible interventions to improve the claimant's health status. The format of medical reporting on working capacity varied widely (free text, semi- and fully structured reports). Five countries make formal or informal reference to the ICF in their reports on working capacity, others consider doing so.

Conclusion: Official requirements on medical reporting about disability in social insurance across Europe follow the frame of the handicapped role. There is an increasing trend to make informal or formal reference to the ICF in the reports about working capacity. The handicapped role and the ICF may provide common references across countries to describe working capacity, facilitating national and international research.

Keywords: Disability evaluation, work capacity evaluation, working capacity, handicapped role, ICF

Background

In Western countries, people who are unable to work because of ill health can receive support for return to work and/ or wage replacement benefits. In order to qualify for benefit, the claimant must fulfil medical criteria for disability. Legal rules require claimants to file a claim and undergo an evaluation of their disability for work, according to social insurance criteria (further: disability evaluation). Disability evaluation is typically performed by medical examiners who report their findings to social insurance.

Critics across Europe have pointed to the lack of reliability and transparency in disability evaluation¹⁻⁶, with the heterogeneous presentation of findings in the medical reports being one of the reasons. When confronted with similar challenges a decade ago, the international rehabilitation community has started to picture the situation of people with disability by using the ICF⁷. The ICF provides a hierarchical classification to document functional information in relation to disability and health using the components 'body structures', 'body functions', 'activities and participations', and 'environmental factors'. These components are further subdivided in 1424 categories⁸. The ICF provides a common point of reference for conceptualizing disability² which may facilitate standardized reporting about work disability across countries^{4,9}.

Although the ICF is widely introduced as a global standard for reporting on (dis-)ability¹⁰, its implementation into practice is still in its infancy¹¹. Various experts have recommended the classification in disability evaluation^{9,12,13}, but the recommendations lack specific advice on how to apply it in practice. For instance there is some evidence that the ICF contains enough and sufficiently precise categories to summarize the results of a disability evaluation^{14,15}. On the other hand, we do not know to what extent the classification is already used for disability evaluation for social insurance¹⁰.

Western social security systems have developed separately in each country. As a result, legal criteria (e.g. duration of sick leave prior to disability evaluation), the conditions that count as disabling for

work or the routines in performing disability evaluations vary¹⁶. Disability evaluations across countries also share similarities. For instance, they focus primarily on working capacity and inform what a person can and cannot do^{16,17}. To date, it is unclear whether European countries have a common concept of disability evaluation.

Recently, researchers have proposed the handicapped role as a suitable framework for evaluating work disability in the context of social insurance^{15,18–20}. The handicapped role describes the right of people with disabilities to be (partly) exempt from work depending on the individual's health condition and to receive appropriate care. It states the individual's obligation to strive for recovery as much as possible and to return to work at his or her earliest convenience. Finally, the handicapped role entails the individual the obligation to be held accountable^{20,21}.

So far, no studies compared empirically the official requirements about the content of disability evaluation in social insurance in Europe.

The objective of this study is to describe the content of legal work disability across Europe, i.e. the official requirements about the content of disability evaluation for social insurance and to compare these requirements to the handicapped role as outlined above. We assume that statements on working capacity are always required. That reporting of working capacity varies across countries, and that some but not all countries use ICF categories to describe working capacity.

This study continues a series on European comparisons on disability evaluation in social insurance^{16,18,19,22,23}.

Methods

We used a survey as study design. In 2011, two researchers (JA and WB) interviewed central medical advisors in social insurance in European countries used a semi-structured questionnaire²⁴. We performed an initial face-to-face interview with two subsequent follow-ups via email to allow for subsequent verification of the information and completion of questionnaires where required²⁵. To

facilitate comparability among countries, we focus on the summary and conclusion of the reports.

We asked medical advisors the following questions:

What items should a medical expert report in the medical summary and conclusion section of a long-term disability evaluation according to the requirements in his / her country?

Do these items meet the four characteristics of the handicapped role?

To ensure that the responses to the first question are official requirements, we requested the medical advisors to provide further information:

Where is it documented that these items are always required for reporting on long-term disability?

How is working capacity described in the medical reports?

Do medical examiners use an instrument based on the ICF classification to depict working capacity?

Sampling

We approached central medical advisors through the council of the EUMASS. EUMASS coordinates the exchange of information on social insurance medicine between 18 European countries and helps to maintain and improve standards in social insurance medicine. Central medical advisors are physicians who hold positions at the interface of policy and practice and are knowledgeable to our questions. The medical advisors were encouraged to consult persons in their organisation if this would facilitate in answering our questions.

The interview

We invited the medical advisors by email and attached the questionnaire to enable them to prepare for the interview. Those who were unavailable at the conference were offered to reply by email and telephone²⁴. We started the interview with an open-ended question, and subsequently narrowed it down to the handicapped role. We checked our understanding during the interview with additional questions and transcribed the answers²⁵. Following transcription, we returned the answers to each respondent for review and clarification. We circulated a table with all answers for final approval²⁵.

Furthermore, we confirmed the official legal references through the official European website on legislation in social security²⁶.

Ethics

The project received approval by the Basel (Switzerland) ethics commission (project number 170/12).

Results

Respondents from 15 out of 18 EUMASS countries participated. We report the results of 13 face-to-face interviews and two interviews done through email and telephone.

In all 15 countries, the medical examiners are required to report on working capacity and prognosis. Medical examiners in all but France are required to report about socio-medical history. In France, this information has already been gathered by the medical examiners during the earlier process of sick leave certification. Medical examiners in all but Czech Republic are required to report on possible interventions to improve a claimant's health and his ability to return to work. In the Czech Republic, suggestions on possible medical interventions are an exclusive task of health care professionals in curative medicine (Table 1). In some EUMASS countries, medical examiners report on additional items such as diagnoses, medical factors, decision on benefit, percentage of disability, and impaired body structures. These issues are beyond the handicapped role and therefore not within the scope of this study.

[Insert table 1]

In eight countries, legal articles specify the content of the medical reporting. Eight countries use guidelines that prescribe the content of the medical reports of disability evaluation. In seven countries, compulsory report forms guide the medical examiner through the required items. (See Table 2 for a summary and appendix 1 for specific references).

[Insert table 2]

The formats of reporting on working capacity vary from free text to semi-structured report forms with free text to fully structured and scaled report forms of working capacity (Table 3)²⁷⁻²⁹. The Swedish report¹ form is explicitly based on the ICF categories whereas the British, the Icelandic and the Dutch report forms were drafted before the ICF was published. These report forms however, do contain comparable categories (see appendix 2 for a detailed comparison). In none of the other countries reference is made to the ICF classification, however several countries expressed increasing interest in integrating the ICF categories in the practice of disability evaluation. For instance, in Germany, the principle of the ICF has been adopted in the Social Code, but the classification has not been implemented in the evaluation. The Dutch expert group explored the ICF for its “functional ability list” but refrained from using it for the perceived complexity of its structure. Implementing the ICF in disability evaluation is currently under consideration in Belgium.

Medical examiners in the Czech Republic, Romania, and Slovakia use a Barema method¹⁷ to report legal work disability. Since Baremas does not specify working capacity in terms of a person’s functioning, we excluded these countries from table 3.

[Insert table 3]

Discussion

In this comparative study, we found the four elements of the handicapped role in the disability reports of almost all countries. Medical examiners use different formats to describe working capacity. Sweden was the only country that explicitly referred to the ICF categories. Respondents from several countries mentioned interest in integrating ICF categories in the practice of disability evaluation. This is the first international comparison on the content of medical reporting on legal work disability. Our findings are based on the responses of national experts in the field and were confirmed by official documents.

¹ In Sweden this report form was being implemented at the time we submitted this article

Previous studies about legal criteria of disability¹⁷ and the organisation of work disability evaluation across Europe¹⁶ did not address the content in medical reporting, but they noticed that the process of disability evaluation resembled the handicapped role, and that guidelines seemed to reproduce their characteristics, too^{16,18-20}. Our study now confirms empirically that the handicapped role captures the content of medical reporting in different countries and thus provides a reference for international research and development in disability evaluation.

Studies have investigated if medical reporting in disability evaluation can be translated to ICF categories. Researchers translated reports from claimants with low back pain and chronic widespread pain to the ICF classification^{9,30,31}. Others tested an ICF based instrument to assess working capacity in patients with mental health problems¹³. Results indicate that ICF categories can partly, but not fully cover working capacity in disability evaluation. The ICF offers categories to describe working capacity and as such provides a potential point of reference for disability evaluation in a legal context. While it might be desirable to develop a common European instrument for disability evaluation based on the ICF, more work is needed to fill the gaps in the classification to allow comprehensive reporting in the context of social insurance.

Insurance medicine related to social and private insurance slowly becomes a focus of systematic research that is urgently needed to inform decision makers. However, emerging international research collaborations such as the evidence-based insurance medicine research network (www.asim.unibas.ch/index.cfm?5C42F7E3F602AA8EB78C0528B4736823) lack a repertoire of tools and instruments to perform high quality studies.

The findings of this study - the widespread framework of the handicapped role in disability evaluation and the growing acceptance of the ICF as a standard for reporting disability - are starting points to enable international research activities. We therefore encourage initiatives across Europe to combine resources for developing common instruments that national insurance organisations can apply for routine practice of disability evaluation and simultaneously allow research on an international level.

Conclusion

Official requirements from social insurance about medical reporting on disability across Europe follow the four domains of the handicapped role. Medical examiners are expected to address working capacity albeit in different formats. Various instruments in use to describe working capacity can be related to the ICF categories. The handicapped role and the ICF may provide common references across countries to describe working capacity, facilitating urgently needed national and international research in insurance medicine.

Competing interests

The authors declare they have no competing interests.

Authors' contributions

JA and WB designed the study and interviewed the central medical advisors and interpreted the data. JA wrote the first draft of the manuscript. RK and WB critically reviewed the manuscript and gave essential input to its various versions.

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Tables

Table 1: Content of medical reports related to the handicapped role across Europe

Domains of the handicapped role	~Countries	
	Compulsory reporting	No requirement
Working capacity	All	--
Socio-medical history	BE, CH, CZ, DE, FI, IS, IT, NL, NO, RO, SE, SI, SK, UK	FR
Possible recommendations for interventions (treatment /rehabilitation)	BE, CH, DE, FI, FR, IS, IT, NL, NO, RO, SE, SI, SK, UK	CZ
Prognosis of the disability	All	--

~ Belgium (BE), Switzerland (CH), Czech Republic (CZ), Germany (DE), Finland (FI), France (FR), Island (IS), Italy (IT), Netherlands (NL), Norway, (NO), Romania (RO), Sweden (SE), Slovakia (SK), Slovenia (SI), and Great Britain (UK) (<http://www.iana.org/domains/root/db>).

Table 2: Documents that regulate content of medical reports

Document	Country*
Law	CZ, FI, FR, IT, NL, NO, RO, UK
Guideline	BE, CH, CZ, DE, IS, NO, RO, SE
Compulsory report format	BE, CZ, DE, FI, IS, IT, NL, SE, SI, UK

* Belgium (BE), Switzerland (CH), Czech Republic (CZ), Germany (DE), Finland (FI), France (FR), Island (IS), Italy (IT), Netherlands (NL), Norway, (NO), Romania (RO), Sweden (SE), Slovakia (SK),Slovenia (SI), and Great Britain (UK) (<http://www.iana.org/domains/root/db>).

Table 3: Format of reporting on working capacity in medical reports across Europe *

Free text	Semi structured	Fully structured	Instruments or checklists in place
BE, CH, FI, FR, IT, NO, SI			
	DE		The report on working capacity should address the following ICF categories: Body functions, activities environmental factors
		IS	Personal Capacity Assessment: Body functions, activities
		NL	Functional Ability List: Body functions, Activities, environmental factors, personal factors
		SE	ICF List: Activities
		UK	Working Capacity Assessment: Body functions, activities

Legend: In the free text format, the medical examiner does not use an instrument or established definitions to write about working capacity. In the semi-structured format, the examiner applies a report form but also uses free text. In the fully structured format, the medical examiner ticks relevant categories from a fixed list of an instrument:

* Belgium (BE), Switzerland (CH), Germany (DE), Finland (FI), France (FR), Island (IS), Italy (IT), Netherlands (NL), Norway, (NO), Sweden (SE), Slovenia (SI), and Great Britain (UK) (<http://www.iana.org/domains/root/db>).

Chapter 3

Study 2: Evaluation of Work Disability and the International Classification of Functioning, Disability and Health: What to Expect and What not

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DEBATE

Open Access

Evaluation of work disability and the international classification of functioning, disability and health: what to expect and what not

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Abstract

Background: Individuals who are sick and unable to work may receive wage replacement benefits from an insurer. For these provisions, a disability evaluation is required. This disability evaluation is criticised for lack of standardisation and transparency. The International Classification of Functioning, Disability and Health (ICF) was developed to express the situation of people with disability. We discuss potential benefits of the ICF to structure and phrase disability evaluation in the field of social insurance. We describe core features of disability evaluation of the ICF across countries. We address how and to what extent the ICF may be applied in disability evaluation.

Discussion: The medical reports in disability evaluation contain the following core features: health condition, functional capacity, socio-medical history, feasibility of interventions and prognosis of work disability. Reports also address consistency, causal relations according to legal requirements, and ability to work. The ICF consists of a conceptual framework of functioning, disability and health, definitions referring to functioning, disability and health, and a hierarchical classification of these definitions. The ICF component 'activities and participation' is suited to capture functional capacity. Interventions can be described as environmental factors but these would need an additional qualifier to indicate feasibility. The components 'participation' and 'environmental factors' are suited to capture work requirements. The socio-medical history, the prognosis, and legal requirements are problematic to capture with both the ICF framework and classification.

Summary: The ICF framework reflects modern thinking in disability evaluation. It allows for the medical expert to describe work disability as a bio-psycho-social concept, and what components are of importance in disability evaluation for the medical expert. The ICF definitions for body functions, structures, activity and participation, and environmental factors cover essential parts of disability evaluation. The ICF framework and definitions are however limited with respect to comprehensive descriptions of work disability.

Keywords: International Classification of Functioning, Disability and Health, Disability evaluation, Handicapped role

Background

Individuals who are unable to work because of sickness or injury can receive support for return to work and/or wage replacement benefits if they are unable to return to work. The legal rules require these individuals to file a claim and undergo a medical evaluation of work disability in the field of social insurance (hereafter: disability evaluation). The concept of 'disability evaluation in social insurance' itself is equivocal. Literature defines disability

evaluation in different ways [1-4]. One way to settle this matter is to analyse the reports of disability evaluation in different countries. Different countries have different ways to organise disability evaluation, but the reports seem to share essential characteristics: Reports describe a claimant's (in-) capacities and relate these to his health condition (rather than to a non-medical cause) [3,5], and his efforts to recover and return to work [4,6-9].

Critics across Europe have pointed to the lack of quality and transparency of disability evaluation [10-14], and in the last decade, the rehabilitation community has begun to use the International Classification of Functioning, Disability and Health (ICF) to picture the situation

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of people with disability [15]. The ICF provides “a description of situations with regard to human functioning and its restrictions” and serves as a framework to structure the information in a “meaningful, interrelated and easily accessible way” (ICF p 7) [15]. The ICF concepts and definitions promote standardised reporting of work disability [13,16] which could facilitate comparison of disability evaluation across countries. The authors from one study envision the ICF as an international point of reference for conceptualisation work disability [17]. The question of the application of the ICF to disability evaluation however, remains unanswered, especially since in the frame of social insurance legal equity requires specific reporting [18].

In this article, we will first describe the core features of disability evaluation and the core features of the ICF. Then we address how and to what extent the ICF might be applicable in disability evaluation. We concentrate on the medical reports, as these are better documented than the processes of disability evaluation.

Discussion

Comparing the output of disability evaluation across Europe

Despite the wide variation of social insurance systems across Europe and country-specific organization of disability evaluation and differences in structure and size of medical reports, we identified 4 core features of work disability for medical experts [6]: 1) the functional capacity of the claimant; 2) the socio-medical history, including the development and severity of the claimant's health condition, his/her previous efforts to regain health and return to work, and his/her job and social career; 3) the individual prognosis of work disability; 4) the feasibility of interventions to promote recovery and return to work. These features reflect the “handicapped

role” [19], which refers to the role expectations that exist between a disabled person and those in his social environment when the disabled person is in need of support. In the context of work disability, the „handicapped role“ indicates that the claimant may expect support if a) he/she is long-term unable to do work that society normally expects him to perform, and if his/her b) health condition accounts for this disability, and c) provided he/she makes sufficient effort to undergo treatment and rehabilitation.

Professional guidances on disability evaluation advise the medical expert to draft a holistic picture of the claimant [9,20,21].

The medical report must also follow legal requirements, such as to establish a causal relation between a claimant's health condition and his/her functional capacity. Lack of motivation or lack of opportunity to find work [18,22] does not suffice as reason for work disability. As a testimony of credibility, a consistent description is required, that incorporates claimant's impairments, limitations in activity, restrictions in work participation and work disability [7,20,23]. Medical examiners must also provide a general statement about work ability; this can be expressed as a percentage, degree of disability or in working hours. Few countries explicitly require the medical examiners to report separately on the health condition, given that the description of functional capacity covers the health condition implicitly [6,22]. Table 1 summarizes the core features of reports on disability evaluation [6].

The international classification of functioning, disability and health

In 2001 the World Health Organisation (WHO) adopted the International Classification of Functioning and Disability and Health as a means to describe health,

Table 1 Reporting about work disability in social insurance: a European comparison

Core features for assessing work (in-)capacity	Countries required to report the core features
1) Functional capacity of the claimant	BE, CH, CZ, DE, FI, FR, GB, IT, NL, NO, SE, SI, SK ¹
2) Health condition (disease, symptoms, complaints)	CH, FI, NL, NO, SE
3) Socio-medical history (claimant's development and severity of ill health condition, his previous efforts to regain health and return to work, job and social career)	BE, CH, CZ, DE, DK, FI, FR, IT, NL, NO, RO, SE, SI, SK
4) Prognosis of work disability (Prognosis of disease and functional capacity)	BE, CH, CZ, DE, FI, FR, GB, IT, NL, NO, RO, SE, SI, SK
5) Feasibility of therapeutic and rehabilitative interventions	BE, CH, DE, FI, FR, GB, IT, NL, NO, RO, SE, SI, SK
6) Causality: functional incapacity exclusively caused by a health condition	CH, DE, FR, NL
7) Consistency between impairments, activity limitations and restrictions in work	CH, DE, NL
8) Ability to work	Expressed as percentage in BE, CH, FR Expressed as degree of disability in CZ, NL, SL, SI, RO Expressed as hours of work: DE

BE = Belgium, CH = Switzerland, CZ = Czech Republic, DE = Germany, FI = Finland, FR = France, GB = Great Britain, IT = Italy, NL = Netherlands, NO = Norway, RO = Romania, SE = Sweden, SI = Slovenia, SK¹ = Slovakia. According to international abbreviation: <http://www.iana.org/domains/root/db>.

functioning and disability for populations and individuals within health related domains [15], such as rehabilitation [24], statistical analysis [25], education [26], and governance [27]. The ICF is presented as a conceptual framework of disability and health, as well as a hierarchical classification of 1424 coded categories and 1122 definitions. For the purpose of this article, we consider coded categories and definitions separately because coded categories serve for coding and definitions explain the content of the categories.

The ICF framework reflects a bio-psycho-social approach to depict health and disability in different components: health condition, body structure and body function, activity, participation, environmental factors, and personal factors (see Figure 1) [15,28]. Body functions are physiological functions of body systems (including psychological functions). Body structures are anatomical parts of the body such as organs, limbs etc. Activity is the execution of a task or action by an individual and participation is involvement in a life situation. Activity and participation can be described as performance (when considering the real life situation/environment) and capacity (when considering a standardized environment). Environmental factors make up the physical, social and attitudinal environment in which people live and conduct their lives (ICF, p. 10). They can be either a facilitator or a barrier to the individual. Personal factors refer to the particular background of an individual's life and living and comprise features that are not part of a health condition or health states (ICF, p. 17) [15].

In the ICF classification, the same components are used (except the health condition) but body structures and body functions are taken apart and activity and participation are taken together. The components, with the exception of personal factors, are subdivided into 1424

categories (Figure 2). Each category is linked to a unique code. 1122 categories (in body functions, activity and participation, and environmental factors) have an explicit definition. Body structures are not defined but mentioned as categories [15]. Qualifiers (no-, mild-, moderate-, severe- and complete problem) can be used to indicate the severity of problems in a category. Table 2 presents an example of an ICF category, its code and definition.

The WHO refrained from classifying personal factors in the ICF classification but researchers have started to propose such definitions to address a perceived gap [29,30]. Figure 2 summarises the alphanumeric structure of the ICF and details of the hierarchical classification.

The ICF framework is widely accepted in rehabilitation, research and policy communities [24]. However, the large number of categories and definitions make it cumbersome to apply the ICF classification in clinical practice and research [31,32]. Disease or setting-specific core sets (e.g. for chronic conditions, acute care, rehabilitation facilities [33,34]) are introduced in order to make using the classification manageable [24].

There is on-going scientific discussion of the precise boundaries and possible shortcomings of the ICF framework or the classification [35-38]. Some of these items of discussion are relevant to our argument:

1. The definitions are connected in a hierarchical fashion that allows specification and aggregation but no other relationships between the definitions, such as causal relationships. This gives the ICF classification the character of a dictionary [39].
2. The dynamic aspect of the development of disability over time is not addressed in the ICF framework or the classification. The descriptions of health or health-related domains represent a given moment

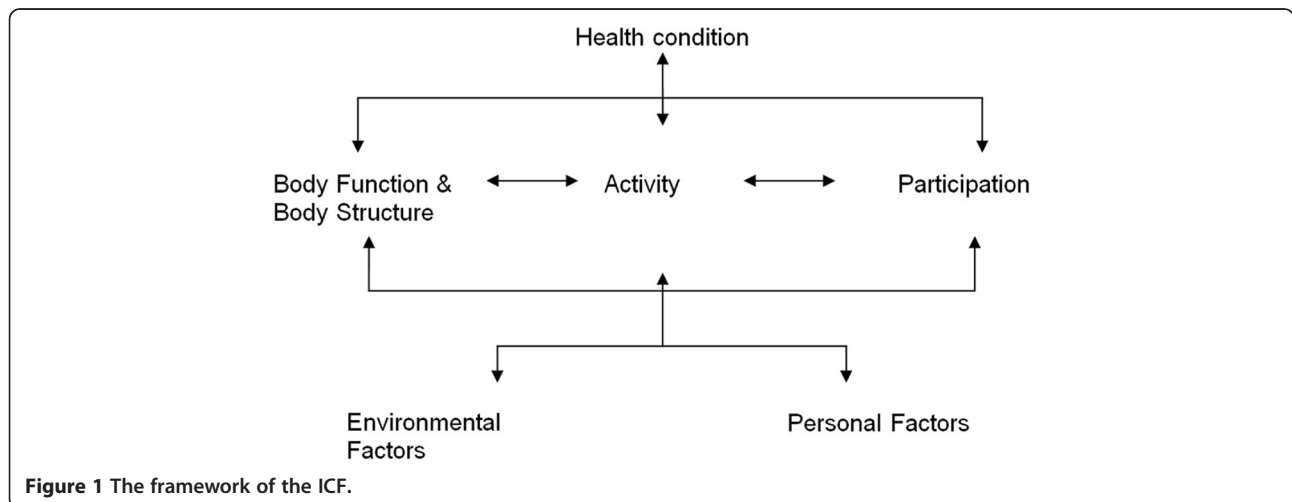
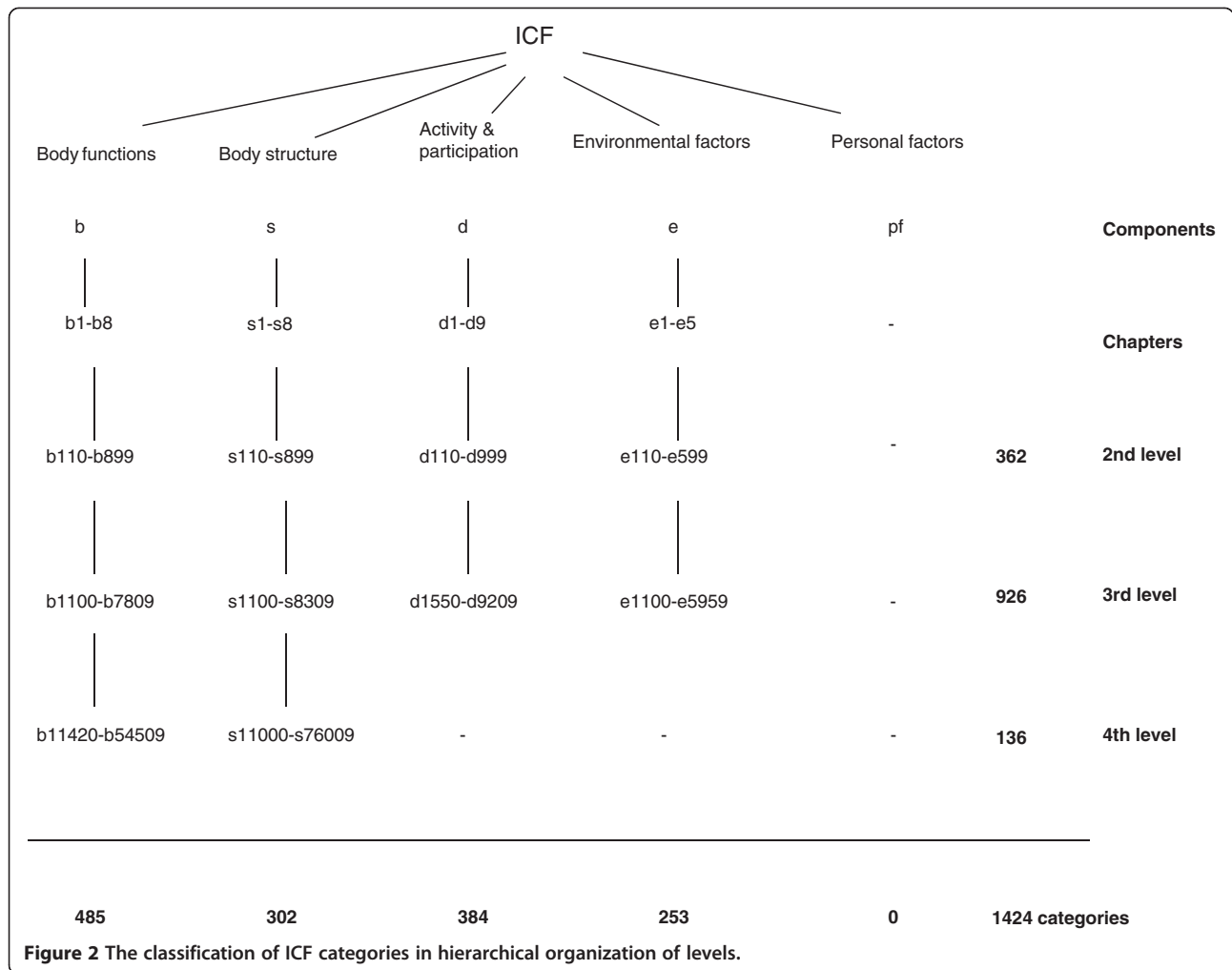


Figure 1 The framework of the ICF.



while the disability evaluation explores a claimant's history and prognosis. A line-up of several snapshots of the claimant's health and health-related domains would be required to indicate the dynamic of the development over time (ICF, p. 220) [15].

Medical evaluation of work disability in the social insurance and the ICF: bringing the two together

In this section, we discuss as to what degree the current ICF framework, the definitions, and the classification

Table 2 Example of a code, category and definition

Code	Category	Definition
b280	Sensation of pain	Sensation of unpleasant feeling indicating potential or actual damage to some body structure. Inclusions: sensations of generalized or localized pain in one or more body part, pain in a dermatome, stabbing pain, burning pain, dull pain, aching pain; impairments such as myalgia, analgesia and hyperalgesia

may capture the core features in the reports on work disability (see Table 3).

The framework

The ICF framework describes disability as a composite concept that integrates impairments, activity limitations, and participation restrictions with personal and environmental factors. As such, the framework is well suited to present work disability as a particular manifestation of disability. In general, the ICF framework dwells on the interaction of the health condition with the functioning of the individual (rather than on aetiology or disease) [40]. It also visualizes the relevance of environmental and personal factors on all components [23]. Professional guidance to insurance physicians from an increasing number of countries keeps stressing the importance of the benefits of the framework and discourages a traditional biomedical approach that simplifies disability as a specific state of health [20,21,41].

Disability is a process rather than a state. Disability refers to the past, present, and future outcome of a

Table 3 Core features in disability evaluation and their coverage in the ICF

Core features for assessing work (in-)capacity	ICF Framework	ICF Definitions	Remarks
1) Functional capacity of the claimant	Activity and participation	Activity and participation	
2 Health condition (Disease, symptoms, complaints)	Health condition Body functions/structures	(∅) Body functions/ structure	Disease is a component of the ICF framework but not included in the ICF definitions. It can be coded in the ICD [*] .
3) Socio-medical history (claimant's development and severity of ill health condition, his previous efforts to regain health and return to work, job and social career)	Implicit in the framework but no explicit presentation	∅	The ICF definitions do not cover the development over time.
4) Prognosis of disease and functional capacity	∅	Partly: capacity	The ICF framework and ICF definitions do not cover the time perspective.
5) Feasibility of interventions and rehabilitation	Environmental factors	Environmental factors (facilitators and barriers)	The ICF framework and ICF definitions cover intervention and rehabilitation however; they do not cover dynamic time perspective or the qualification 'requirement to comply'.
6) Causality: functional incapacity exclusively caused by health condition	∅	∅	The ICF framework displays a person holistically
7) Consistency of the situation of the claimant	Partly: between the impairments, activity limitations and restrictions in work	∅	
8) Ability to work (in general hours and %)	∅	∅	

Legend: ∅ = not part of the ICF framework or the ICF definitions, *ICD: International Classification of Disability.

person's interaction with his/her physical, social, cultural and legislative environment [17]. The ICF framework does not address this process aspect explicitly. The personal factors include aspects of the past (such as education) but in a static way. We are unable to describe the dynamic development of health and health-related domains, nor are there means to express the future events and prognosis of work [38]. With capacity, we can indicate the expected performance in a standardized environment but are still missing the dynamic development. This is a significant limitation of the ICF framework.

In several countries such as such as France [42], Germany [21], the Netherlands [41], and Switzerland [20] restricting the causal relation between the health condition and activities is explicitly requested in order to recognise legal work disability. Limitation of activities resulting from lack of motivation, or lack of participation resulting from unemployment does not count. The ICF framework distinguishes the domains and their interaction but does not foresee a restricted

causal relation. The guidance of disability evaluation in these countries encourages the insurance physicians to first draw a holistic picture of the claimant, compatible with the framework and to then discount the non-medical factors from the overall judgement of disability. It is unclear how the ICF framework can capture these aspects of disability evaluation.

The definitions

As stated above, the ICF classification contains 1122 explicit definitions (not including body structures or personal factors). The definitions can serve to standardize and harmonise the evaluation reports, and avoid ambiguity and variation in the presentation and interpretation of the findings. Our question is if the ICF definitions capture the core features of disability evaluation.

The core features functional capacity, health state, and the ability to participate in working life can be described with the components 'body structure/function' and 'activity and participation'. As the ICF has not been specifically

developed for work disability, it stands to be tested if the present set of definitions is comprehensive in this field.

Aspects of the socio-medical history and prognosis can be depicted with the definitions, but it is not practicable to line up the content in a chronological sequence. Like the framework, the definitions, do not describe the dynamic development of disability. Therefore, socio-medical history, and prognosis are not easily covered in the ICF definitions.

Interventions can be described as facilitating environmental factors. In disability evaluation, we need to qualify some interventions as feasible. Such qualifiers do not exist currently, which stresses the need to develop them within the ICF concept of environmental factors.

Further, disability evaluation gives a judgment on the claimant's situation. This can be given from two different viewpoints: the (self-) perception of the claimant and the perception of the medical expert. Medical experts usually integrate both perceptions in their reports. Applying the ICF would make it necessary to keep the two systematically apart. Although it is no difficult to separate the two and it can be considered beneficial to do so, it is not a common practice.

Restricting the cause why a person is not able to work is an important statement in disability evaluation. The ICF definitions cannot describe causal relation because the current ICF definitions cannot be put together.

Finally, medical examiners must also provide a general statement about work ability. Percentage, degree of disability or in working hours cannot be described with ICF definitions

The classification

The classification organises categories and definitions in a hierarchical system. The applicability of the classification goes as far as the application of the definitions goes. The refined coding system of the ICF classification can be useful in research, or for documentation, or in the statistics of a social insurance administration. For these purposes core sets have been published in the field of disability evaluation as well. These core sets facilitate the description of functional capacity [16,43]. For the other core features different core sets could be developed.

Overall, we feel that using the ICF for development of disability evaluation does hold promises but it also has its limitations. The ICF framework fits modern thinking about disability evaluation. It helps medical experts to describe work disability as a bio-psycho-social phenomenon rather than as biomedical phenomenon only. The framework illustrates the connections between the different components in the disability evaluation that the medical expert has to address. The ICF definitions for body functions, structures, activity and participation, and environmental factors cover essential parts of the

disability evaluation. Empirical testing is needed to establish if the definitions are useful and sufficiently detailed. Clear and broadly accepted definitions will support the understanding of the medical reports for professionals and administration and allow the development of instruments.

The ICF framework and definitions are limited in the following aspects: the dynamism of development of disability, definitions for personal factors and, causality and consistency. An explicit time dimension could supplement the present ICF framework. Describing "history and prognosis" in words may overcome the lack of dynamic time perspective. For feasibility of interventions qualifiers could be developed.

Empirical research would be needed to test our considerations in practice. Several studies are underway. In one study, we are testing the consensus-based 20-item core set for functional capacity suggested by the European Union of Medicine in Assurance and Social Security (EUMASS) [16] for applicability and usefulness across several European social insurance systems.

In another study, Kirschneck et al. translated concepts of disability evaluation to ICF categories by linking medical reports from claimants with low back pain and chronic widespread pain and compared them with the existing core set of these conditions [13]. The preliminary results of the study show consistency between the pre-existing core sets and the medical reports in Germany [44].

In a third study, we tested the potential of applicability the ICF core sets of low back pain and chronic pain in disability evaluation in Switzerland [45]. We studied 72 medical reports from claimants with low back pain/chronic widespread pain and linked those to the ICF categories.

In a fourth study, Linden et al. have tested an ICF-based instrument to assess functional incapacity in patients with mental health problems [46]. The instrument probes on 13 items of the ICF-component 'activity and participation' that are commonly affected in patients with mental disease (e.g. endurance or self-assertiveness).

Summary

We determined how and to what extent the ICF could capture the medical reports of disability evaluation by defining the key aspects of the disability evaluation and relating them to the framework and the definitions of the ICF.

When evaluating work disability, the medical expert describes the claimant's health condition and functional limitations, socio-medical history, feasible interventions and prognosis and relates his/her findings to the requirements of the social insurance scheme. The ICF

framework seems to reflect the view of the modern medical expert, especially with regard to functional capacity. However, the framework does not incorporate certain critical elements of a disability evaluation such as the dynamic time perspective or the restricted causal connection between functional capacity and the health condition. The ICF definitions enable the medical expert to report systematically about health aspects and actual functional capacity, and to a lesser extent, work characteristics. The ICF might provide useful concepts and definitions, especially in countries where medical examiners do not describe functional capacity in a structured manner [6].

Before advancing with applied research around the optimal use of the ICF in disability evaluation, the professional community needs to specify its expectations: in what way should the ICF framework and the classification be used to express a claimant's functional capacity? How could the application of the ICF improve the medical report? What additional benefit would an ICF-based functional capacity assessment provide to the professionals who perform the disability evaluation, to the administrators in the social insurances who use the results, and to researchers who want to support disability evaluation with evidence? Ongoing research indicates the potential of the ICF to express functional capacity in disability evaluation.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Jessica Anner and Wout de Boer prepared the first draft of this paper. The other authors have made substantial comments on the content of this manuscript. All authors read and approved the final manuscript.

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Chapter 4

Study 3: Aspects of functioning and environmental factors in medical work capacity evaluations of persons with chronic widespread pain and low back pain can be represented by a combination of applicable ICF Core Sets

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RESEARCH ARTICLE

Open Access

Aspects of functioning and environmental factors in medical work capacity evaluations of persons with chronic widespread pain and low back pain can be represented by a combination of applicable ICF Core Sets

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Abstract

Background: Medical work capacity evaluations play a key role in social security schemes because they usually form the basis for eligibility decisions regarding disability benefits. However, the evaluations are often poorly standardized and lack transparency as decisions on work capacity are based on a claimant's disease rather than on his or her functional capacity. A comprehensive and consistent illustration of a claimant's lived experience in relation to functioning, applying the International Classification of Functioning, Disability and Health (ICF) and the ICF Core Sets (ICF-CS), potentially enhances transparency and standardization of work capacity evaluations. In our study we wanted to establish whether and how the relevant content of work capacity evaluations can be captured by ICF-CS, using disability claimants with chronic widespread pain (CWP) and low back pain (LBP) as examples.

Methods: Mixed methods study, involving a qualitative and quantitative content analysis of medical reports. The ICF was used for data coding. The coded categories were ranked according to the percentage of reports in which they were addressed. Relevance thresholds at 25% and 50% were applied. To determine the extent to which the categories above the thresholds are represented by applicable ICF-CS or combinations thereof, measures of the ICF-CS' degree of coverage (i.e. content validity) and efficiency (i.e. practicability) were defined.

Results: Focusing on the 25% threshold and combining the Brief ICF-CS for CWP, LBP and depression for CWP reports, the coverage ratio reached 49% and the efficiency ratio 70%. Combining the Brief ICF-CS for LBP, CWP and obesity for LBP reports led to a coverage of 47% and an efficiency of 78%.

Conclusions: The relevant content of work capacity evaluations involving CWP and LBP can be represented by a combination of applicable ICF-CS. A suitable standard for documenting such evaluations could consist of the Brief ICF-CS for CWP, LBP, and depression or obesity, augmented by additional ICF categories relevant for this particular context. In addition, the unique individual experiences of claimants have to be considered in order to assess work capacity comprehensively.

Keywords: International Classification of Functioning, Disability and Health (ICF), Work capacity evaluation, Chronic widespread pain, Low back pain, Standardization

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Background

Even though the process of disability evaluation varies between countries, medical work capacity evaluations usually play a crucial role in deciding on a claimant's eligibility for benefits provided by national disability insurance schemes. Because of the key role they play, such evaluations ought to be transparent and comprehensible for all persons involved [1-4]. To enhance transparency and comprehensibility, the claimant's lived experience in relation to his or her functioning as well as with regard to influencing contextual factors should be assessed comprehensively [2,5]. Moreover, the evaluations' comparability in terms of both interrater reliability between medical experts and content validity is considered as an important quality criterion [6-8]. Finally, standardization is seen as one means to ensure comparability in disability assessments [9,10].

Medical standards usually refer to features which are considered as relevant to a target group in general and less so to individuals' unique experiences [11,12]. As a basis for comprehensive disability evaluations, however, a suitable standard should also allow the description of relevant experiences unique to the individual, thus complementing the whole process of evaluation [12].

In reality, decisions on work capacity often lack transparency and comprehensibility [10,13-15]. Also, disability assessments are often insufficiently standardized [5,16,17], which affects their content validity and interrater reliability negatively [8,9,17]. In the Swiss national disability insurance scheme, for example, there is no generally accepted tool to guide the structure and content of disability evaluations [3]. Furthermore, decisions on work capacity for certain disorders are partly based on blanket rulings by the Swiss Federal Court [3]. Somatoform pain disorders, for instance, do generally not lead to incapacity for work. Because they are considered to be caused by psychosocial factors, the Swiss Social Security law does not recognize them as a sufficient reason for a disability pension, except if they are accompanied by a psychiatric co-morbidity like, for example, a depressive disorder [18]. By contrast, pain disorders caused by structural impairments (e.g. by a severe intervertebral disc disorder) normally entitle a person to receive disability benefits. However, diagnoses or impairments, are only loosely connected with functional limitations at work [19-21]. Moreover, the World Health Organization defines *impairment* as a loss or abnormality of a psychological, physiological, or anatomical structure or function and *disability* as a restriction or lack of ability to perform an activity in a manner considered to be normal for a human being [22]. Based on these definitions, focusing only on impairments is not sufficient to give a proper statement about a claimant's functional capacity at work.

Because pain is a subjective sensation, its impact on a claimant's functional capacity is difficult to objectify. Claimants with somatoform pain disorders could have the same or even a lower functional capacity than persons with a disorder related to a structural impairment. Nevertheless, according to Swiss jurisprudence their work capacity is usually rated higher. With respect to this controversy between the medical and the legal view, it seems crucial to apply a disability-oriented approach and to comprehensively assess the aspects which might influence a claimant's functioning and health in order to ensure transparent disability evaluations for persons with chronic pain.

Several attempts have been undertaken to enhance transparency and standardization in disability evaluations [23]. The *Guides to the Evaluation of Permanent Impairment* of the American Medical Association (AMA) are used for disability and impairment assessment and as a standard for workers' compensation evaluations in the United States and many English-speaking countries [24]. Furthermore, a number of standardized procedures for work capacity assessments have been developed like, for example, the *Functional Capacity Evaluation* (FCE) [25-27].

FCE, however, is not appropriate for multidisciplinary assessments as it is not geared towards a comprehensive evaluation of the claimant's functioning. It focuses on physical functional limitations and not on mental functioning [25], and it does not address environmental factors, an important component to ensure transparency in disability evaluations [5,28]. The AMA Guides have been questioned regarding their applicability in disability assessments of claimants with chronic pain [1], because they follow a diagnosis-based and impairment-oriented rather than a disability-oriented approach [29].

As part of the shift in recent years from impairment-oriented to disability-oriented assessments in European social security institutions, it has been suggested that the comprehensive conceptual framework and standardized taxonomy of the *International Classification of Functioning, Disability and Health* (ICF) [30] could improve the disability determination process [16,31-33]. Since the ICF offers a scientific basis for describing results and determinants of functioning, disability and health which also considers contextual factors [30], standardization and transparency in disability evaluations might be enhanced if the taxonomy would be used as a blueprint.

While the ICF framework was generally well-received, the actual application of the taxonomy has been hampered by the sheer number of categories to be assessed, i.e. 362 on the second level and up to 1,424 when applying the more detailed third and fourth levels. Consequently, *ICF Core Sets* (henceforth ICF-CS) have been

developed in order to simplify the use of the taxonomy in clinical settings.

ICF-CS preserve the model of the ICF in a useable mode, and they come in two flavors: (1) *brief* ICF-CS include a minimum number of categories describing the most relevant aspects related to functioning in persons with a specific health condition or in a specific setting [34]; (2) *comprehensive* ICF-CS include all categories of the respective brief ICF-CS but also additional ones so as to facilitate multidisciplinary assessments in the clinical context [35].

Because they involve high costs and time resources of medical experts are limited, medical work capacity evaluations should not only be transparent but also efficient and practical [36]. ICF-CS allow to describe a person's lived experience in a comprehensive and systematic way [35], and might be applied as practical standards regarding *what* should be documented in disability assessments. So far there have been only few attempts to examine the applicability of ICF-CS in disability evaluations [16,37]. To ascertain their potential it is, therefore, vital to provide further empirical evidence.

Currently ICF-CS exist for about 30 health conditions [38]. The ICF-CS for chronic widespread pain (CWP) [39] and low back pain (LBP) [40] were published in 2004 and subsequently validated in the clinical context [41-43]. Due to the high prevalence of disability claims and large social costs based on CWP and LBP [44-47], we chose them as our index conditions. Both conditions are also often diagnosed concurrently [48].

Moreover, CWP has been found to be related to depression [49] and chronic LBP to obesity [50]. Such comorbidities are routinely addressed in disability assessments of claimants with chronic pain. We, therefore, also included in our analysis the ICF-CS for depression [51] and obesity [52].

Objective

The objective of the study was to establish whether or not and how the relevant content of medical work capacity evaluations can be captured by ICF-CS, using medical reports from disability claimants with the index conditions CWP and LBP as examples.

Specific aims

(1) We wanted to examine to what extent the relevant aspects of functioning and environmental factors in medical reports of claimants with CWP and LBP are represented by applicable ICF-CS. (2) We wanted to determine by which ICF-CS, or combinations thereof, these aspects are best represented.

Methods

Study design

A mixed methods study [53] was conducted, involving a qualitative and quantitative content analysis [54,55] of medical reports. The ICF was used for data coding.

Ethics

The study was approved by the Ethics Commission of Basel, Switzerland, project number 134/08, and was performed in accordance with the Declaration of Helsinki.

Sample

The reports analyzed were derived from an elicitation of all medical reports received by the major Swiss health and accident insurers between February 1 and April 31, 2008, as part of a study on the quality of medical work capacity evaluations in Switzerland [3]. Insurance employees selected and anonymized all reports containing a diagnosis of CWP and/or LBP based on the *International Classification of Diseases (ICD-10)* (see Table 1). The diagnoses were checked by two health professionals. To ensure comparability, only reports in German submitted to the Swiss national disability insurance scheme were selected. Reports in French and Italian as well as from accident, health and liability insurances were excluded.

From this basic sample a subsample was randomly drawn. The determination of the final sample size was based on two criteria: (1) *heterogeneity*, i.e. the relevant medical disciplines of pain-assessment and the index conditions (CWP, LBP) were to be included proportionally; and (2) *saturation*, i.e. the collected information was considered to be sufficient when no new second-level ICF category emerged in five successive reports analyzed [56-58]. In order to satisfy the heterogeneity requirement, i.e. a proportional inclusion of the medical disciplines and the index conditions, a minimum size of the subsample was determined.

Analysis plan

For the data analysis the sample was divided into two sub-groups: (1) reports with CWP diagnoses, and (2) reports with LBP diagnoses. Reports including both diagnoses entered the data analysis twice, once with the pure CWP and once with the pure LBP reports.

To examine the extent to which the relevant aspects of functioning and environmental factors in medical reports of claimants with CWP and LBP are represented by applicable ICF-CS, we first did a content analysis of the reports, using the ICF for data coding. We then ranked the coded categories for both sub-groups according to their relevance, i.e. their relative frequency across reports, setting thresholds at 25% and 50%. Next, we examined whether the relevant ICF categories in CWP

Table 1 ICD-10 diagnoses included in the sample

ICD-10 diagnoses for CWP		ICD-10 diagnoses for LBP	
F45.0	Somatization disorder	M42	Spinal osteochondrosis (.15-.17, .95-.97)
F45.1	Undifferentiated somatoform disorder	M45	Ankylosing spondylitis
F45.4	Persistent somatoform disorder	M46	Other inflammatory spondylopathies (.0, .1, .2, .3)
F54	Psychological and behavioral factors associated with disorders or diseases classified elsewhere	M47	Spondylosis and (osteo-)arthrosis of spine (.05-.07, .15-.17, .25-.27)
F62.8	Chronic pain personality syndrome	M48	Other spondylopathies (.05-.07, .15-.17, .25-.27)
F32	Mild, moderate and severe depressive episode, with somatic symptoms	M51	Other intervertebral disc disorders (.0, .1)
F33	Recurrent depressive disorder, with somatic symptoms	M53	Other dorsopathies, not elsewhere classified (.25-.27, .3, .86-.87, .96-.97)
F34.1	Dysthymia (in relation with pain)	M54	Dorsalgias (.05-.07, .15-.17, .3, .4, .5, .85-.87)
F43.2	Adjustment disorders	M99	Biomechanical lesions, not elsewhere classified (.03, .13, .23, .33, .43, .53, .63, .73, .83, .93)
M79.7	Fibromyalgia		
R52.2	Other chronic pain		
R52.9	Pain, unspecified		

reports, i.e. the ones above the thresholds, are represented by the ICF-CS for the index condition (CWP) and major co-morbidities (LBP, depression). For LBP reports, we did the same analysis with the ICF-CS for the index condition (LBP) and major co-morbidities (CWP, obesity). By calculating and comparing values for their coverage (i.e. their content validity) and efficiency (i.e. their potential practicability) we determined to what extent the relevant aspects in the reports are represented by the ICF-CS for the index-condition, the co-morbidities, and a combination thereof and which ICF-CS or combination thereof is best representing these aspects.

Analysis

Content analysis

Our raw data consisted of reports on disability claimants. They comprised one or more medical disciplines and included information on: (a) socio-medical history, (b) medical examination, and (c) work capacity evaluation. This content was coded to the ICF by applying established linking rules [59,60].

The reports were dissected into text passages, each representing a self-contained *unit of meaning* (e.g. “the claimant suffers from pain while walking”). The various *concepts* underlying a unit of meaning were determined

(e.g. pain, walking) and coded to the most precise ICF category (e.g. b280 Sensation of pain, d450 Walking) by two health professionals trained in the ICF. A concept could be linked to more than one ICF category. Each instance of a category code being assigned to a concept was referred to as a *coding*. Concepts not appropriately codeable to ICF categories were flagged as either *personal factors* (e.g. individual attitudes and beliefs), *not covered* (e.g. degree of disability), *not definable* (e.g. demanding activities), or *health condition* (e.g. diabetes). The two coders assessed whether the categories represented *limitations* (e.g. “the claimant suffers from back pain”) or, in case that they were environmental factors, whether they were *barriers* (e.g. “the surgery made the pain worse”) or *facilitators* (e.g. “the surgery was helpful”) for the claimant, were *no problem* (e.g. “the surgery had no effect”), or *facts* (e.g. “the surgery was performed recently”). Finally, the coders had to agree on the chosen codes. Any disagreement was solved in consultation with a third person experienced in the linking method.

Reliability and saturation

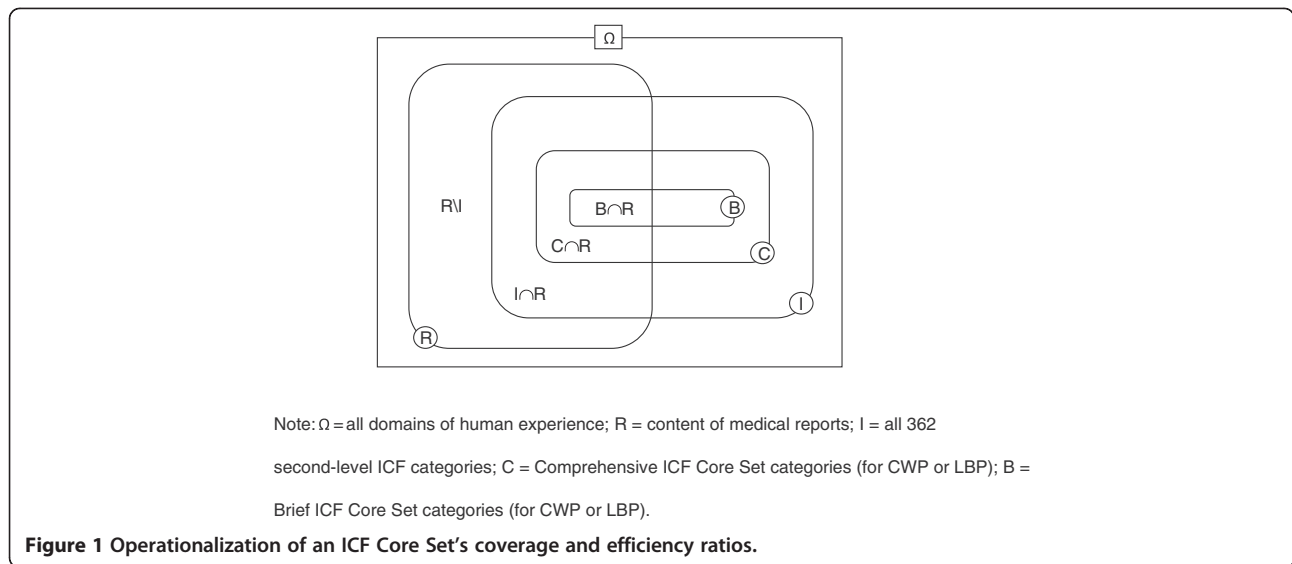
The interrater agreement was calculated using Cohen’s kappa coefficient [61]. The saturation level was checked after each additional report analyzed.

Relevance ranking

Referring to the *absolute frequency* for determining relevance was deemed potentially misleading because different writing styles of medical experts could have led to varying degrees of content repetitions. Therefore, we operationalized the *relevance* of a coded category as its *relative frequency* across reports, i.e. the percentage of reports in which it appeared as a *limitation*, *barrier* or *facilitator* for the claimant. In order to ensure comparability with the ICF-CS, which refer to aspects that are problematic or supportive for the patients, we did not include the ICF categories assessed as *no problem* or *facts* in the ranking. Moreover, since the concepts not appropriately codeable with the ICF were not further specified in this study, they were not included in the ranking. Thus, the final ranking involved only second-level ICF categories coded either as a limitation, barrier or facilitator. For the ensuing data analysis we defined two *thresholds of minimum relevance*, the more lenient one at 25% or more of the reports, the more stringent one at 50% or more.

Coverage and efficiency ratios

We used two criteria to examine the extent to which the relevant content of medical reports involving CWP and LBP is represented by ICF-CS. (1) The *coverage ratio*, i.e. the ability of ICF-CS to capture the relevant aspects of the context in which they are applied (namely the index



conditions CWP and LBP and the assessment of work capacity as part of disability evaluations). It was calculated as the number of ICF-CS categories above the threshold of 25% (or 50%) divided by the total number of ICF categories above the threshold. (2) The *efficiency ratio*, i.e. the ability of ICF-CS to be manageable and to contain only as many categories as necessary. It was calculated as the number of ICF-CS categories above the threshold divided by the total number of categories in the ICF-CS. A definition of efficiency which is similar to ours was applied in a recent study where it was defined as the ability of a measurement instrument to be manageable and to contain as few items as possible that measure variables outside a domain set of ICF categories used in that study [62].

ICF-CS should ideally show a high coverage ratio and be efficient at the same time.

Referring to Figure 1, the operationalization of the coverage and efficiency ratios can be further illustrated as follows:

$$\text{Coverage ratio (Brief ICF-CS)} = (B \cap R) / (I \cap R)$$

$$\begin{aligned} \text{Coverage ratio (Comprehensive ICF-CS)} \\ = (C \cap R) / (I \cap R) \end{aligned}$$

$$\text{Efficiency ratio (Brief ICF-CS)} = (B \cap R) / B$$

$$\begin{aligned} \text{Efficiency ratio (Comprehensive ICF-CS)} \\ = (C \cap R) / C \end{aligned}$$

Results

Sample characteristics

In order to satisfy the heterogeneity requirement, the required minimum sample size had been determined to

be 72 medical reports, representing about one third of the basic sample of 209 reports. The saturation criterion was already reached after coding 30 reports. The number and type of disciplines in the reports are displayed in Table 2.

27 reports contained only a CWP diagnosis, 22 only a LBP diagnosis, and 23 both a CWP and LBP diagnosis. Of the 50 reports with CWP diagnoses, 24 (48%) also included a diagnosis of the ICD-10-four-character subcategory "Mood [affective] disorders". Of the 45 reports with LBP diagnoses, 13 (29%) additionally

Table 2 Medical disciplines represented in the reports

	CWP	LBP
Number of medical disciplines in report		
One	20	14
Two	4	5
More than two	26	26
Medical discipline		
Psychiatry	45	31
Rheumatology	21	22
Internal medicine	16	16
Neurology	10	11
Orthopedics	9	12
General medicine	11	9
Neurosurgery	1	5
Orthopedic surgery	1	3
Neuropsychology	1	3
Pneumology	1	-
Hand surgery	1	1
Functional capacity evaluation	-	1

Table 3 Relative frequency ranking of the ICF categories found in the CWP reports (n = 50)

Rank	ICF code	ICF category	CWP		LBP		Depression		Relative frequency (%)	Absolute frequency
			Brief (k=24)	Compr. (k=67)	Brief (k=35)	Compr. (k=78)	Brief (k=31)	Compr. (k=121)		
1	b280	Sensation of pain	X	X	X	X	.	X	100	2531
2	b152	Emotional functions	X	X	X	X	X*	X	98	640
3	b130	Energy and drive functions	X	X	X	X	X*	X	98	393
4	d850	Remunerative employment	X	X	X	X	.	X	96	344
5	b126	Temperament and personality functions	.	X	.	X	X*	X	94	445
6	b134	Sleep functions	X	X	X	X	.	X	92	222
7	e310	Immediate family	X	X	X	X	X	X	90	332
	e110†	Products or substances for personal consumption	X*	X*	X	X	X*	X*	90	184
8	e580	Health services, systems and policies	.	X	X	X	X	X	88	106
9	d240	Handling stress and other psychological demands	X	X	X	X	X	X	86	177
10	d570	Looking after one's health	.	X	.	X	X	X	86	154
11	b270	Sensory functions related to temperature and other stimuli	.	X	.	.	.	.	82	225
12	e1101	Drugs	X	X	X*	X*	X	X	82	140
	b160†	Thought functions	X*	X*	.	.	.	X	80	337
13	b730	Muscle power functions	X	X	X	X	.	.	78	180
14	b710	Mobility of joint functions	.	X	X	X	.	.	74	365
15	b1602	Content of thought	X	X	.	.	.	X	74	145
16	e570	Social security services, systems and policies	X	X	X	X	.	X	74	130
17	s760	Structure of trunk	.	.	X	X	.	.	70	571
18	d415	Maintaining a body position	.	X	X	X	.	.	70	201
19	e165	Assets	.	.	.	.	.	X	70	89
20	d450	Walking	X	X	X	X	.	.	68	141
21	d760	Family relationships	X	X	X	X	X	X	68	103
22	d230	Carrying out daily routine	X	X	.	.	X*	X	68	98
23	b435	Immunological system functions	.	.	.	.	.	.	64	207
24	b735	Muscle tone functions	.	X	X	X	.	.	64	122
25	d430	Lifting and carrying objects	X	X	X	X	.	.	64	104
26	b455	Exercise tolerance functions	X	X	X	X	.	.	64	102
27	d870	Economic self-sufficiency	.	.	.	.	.	X	64	73
28	d920	Recreation and leisure	X	X	.	X	.	X	64	66
29	d770	Intimate relationships	X	X	.	X	X	X	62	74
30	d410	Changing a basic body position	.	X	X	X	.	.	58	84
31	d750	Informal social relationships	.	.	.	.	.	X	58	53
32	s750	Structure of lower extremity	.	.	.	X	.	.	56	179
33	d845	Acquiring, keeping and terminating a job	.	X	X	X	X	X	56	68
34	b140	Attention functions	.	X	.	.	X	X	56	60
35	b147	Psychomotor functions	X	X	.	.	X	X	54	80
36	b144	Memory functions	.	.	.	.	.	X	52	65
37	b530	Weight maintenance functions	.	.	.	.	.	X	50	86
38	e565	Economic services, systems and policies	.	.	.	.	.	.	48	50
39	e410	Individual attitudes of immediate family members	X	X	X	X	X	X	46	72
40	e225	Climate	.	.	.	X	.	X	44	53

Table 3 Relative frequency ranking of the ICF categories found in the CWP reports (n = 50) (Continued)

41	d720	Complex interpersonal interactions	.	X	.	.	.	X	44	45
42	d160	Focusing attention	.	X	.	.	.	.	44	44
43	d475	Driving	.	X	.	X	.	X	44	38
44	b240	Sensations associated with hearing and vestibular function	.	.	.	.	.	.	42	47
45	b810	Protective functions of skin	.	.	.	.	.	.	42	39
46	d445	Hand and arm use	.	.	.	X	.	.	40	56
47	b420	Blood pressure functions	.	.	.	.	.	.	40	44
48	d350	Conversation	.	.	.	.	X	X	40	32
49	b460	Sensations associated with cardiovascular and respiratory functions	.	.	.	.	.	X	38	44
50	s720	Structure of shoulder region	.	.	.	.	.	.	38	43
51	b110	Consciousness functions	.	.	.	.	.	.	38	40
52	e325	Acquaintances, peers, colleagues, neighbours and community members	.	X	.	X	X	X	38	28
53	e315	Extended family	.	.	.	.	.	.	36	31
54	d440	Fine hand use	.	.	.	.	.	.	34	52
55	b620	Urination functions	.	.	.	X	.	.	34	42
56	b535	Sensations associated with the digestive system	.	.	.	.	.	X	34	34
57	e120	Products and technology for personal indoor and outdoor mobility and transportation	.	.	.	X	.	.	32	67
58	d640	Doing housework	X	X	X	X	.	X	32	35
59	e245	Time-related changes	.	.	.	.	.	X	32	35
60	b780	Sensations related to muscles and movement functions	.	X	.	X	.	X	32	33
61	b415	Blood vessel functions	.	.	.	.	.	.	32	31
62	b510	Ingestion functions	.	.	.	.	.	.	32	24
63	d166	Reading	.	.	.	.	.	X	32	16
64	b525	Defecation functions	.	.	.	.	.	.	30	33
65	b770	Gait pattern functions	.	.	.	X	.	.	30	31
66	s740	Structure of pelvic region	.	.	.	X	.	.	30	30
67	d660	Assisting others	.	X	.	X	.	X	28	27
68	s120	Spinal cord and related structures	.	.	X	X	.	.	28	27
69	b750	Motor reflex functions	.	.	.	X	.	.	28	26
70	d540	Dressing	.	X	X	X	.	X	28	25
71	e355	Health professionals	X	X	X	X	X	X	28	23
72	d455	Moving around	.	X	.	X	.	.	28	20
73	e320	Friends	.	.	.	.	X	X	28	18
74	d740	Formal relationships	.	.	.	.	.	.	26	33
75	b164	Higher-level cognitive functions	.	X	.	.	.	X	26	25
76	b830	Other functions of the skin	.	.	.	.	.	.	26	20
77	s730	Structure of upper extremity	.	.	.	.	.	.	24	45
78	e430	Individual attitudes of people in positions of authority	.	X	.	.	.	X	24	37
79	d460	Moving around in different locations	.	.	.	X	.	.	24	27
80	e510	Services, systems and policies for the production of consumer goods	.	.	.	.	.	.	24	24
81	d710	Basic interpersonal interactions	.	.	.	X	.	X	24	23

Table 3 Relative frequency ranking of the ICF categories found in the CWP reports (n = 50) (Continued)

82	d950	Political life and citizenship	.	.	.	.	.	X	24	21
83	b640	Sexual functions	.	X	.	X	.	X	24	20
84	e115	Products and technology for personal use in daily living	.	.	.	.	.	.	24	19
85	d330	Speaking	.	.	.	.	.	X	24	19
86	s320	Structure of mouth	.	.	.	.	.	.	24	16
87	d620	Acquisition of goods and services	.	X	.	X	.	X	24	14
Ranking of the remaining categories of the Brief ICF Core Sets for CWP, LBP and depression:										
92	b740	Muscle endurance functions	.	X	X	X	.	.	22	17
95	e450	Individual attitudes of health professionals	.	X	X	X	X	X	20	14
98	e135	Products and technology for employment	.	.	X	X	.	.	18	18
99	s770	Additional musculoskeletal structures related to movement	.	X	X	X	.	.	18	13
100	e550	Legal services, systems and policies	.	.	X	X	.	.	18	12
103	d859	Work and employment, other specified and unspecified	.	.	X	X	.	.	16	20
116	d163	Thinking	.	.	.	.	X	X	14	9
117	b760	Control of voluntary movement functions	X	X	.	.	.	.	14	8
121	b715	Stability of joint functions	.	.	X	X	.	.	14	7
139	e415	Individual attitudes of extended family members	.	.	.	.	X	X	8	11
161	d530	Toileting	.	.	X	X	.	.	6	4
185	d510	Washing oneself	.	X	.	X	X	X	4	2
210	d175	Solving problems	X	X	.	.	X	X	2	1
212	e420	Individual attitudes of friends	.	X	.	.	X	X	2	1
221	d177	Making decisions	.	.	.	.	X	X	2	1

Note: k = total number of categories in the respective ICF Core Set; † = ICF categories that were ignored in the ranking because the Brief and Comprehensive ICF Core Sets for CWP contain them on the more specific third level; X = included in the particular ICF Core Set (CWP, LBP or depression); * = in the particular ICF Core Set the stated category is included at the next lower (third) or next higher (second) level.

involved a diagnosis related to “Obesity and other hyperalimentation”.

The overall interrater agreement (Cohen’s kappa) at the second ICF-level was 0.80 (0.79 - 0.81; 95% bootstrap confidence interval [63]).

Reports with CWP diagnoses

Content analysis

21,562 units of meaning gave rise to 45,365 (100%) codings. 30,042 (66.2%) represented links to ICF categories. The remainder (15,323 or 33.8%), i.e. R/I in Figure 1, were not classifiable appropriately with the ICF. Of these, 4,276 (9.4%) codings represented *personal factors*, the as yet unspecified fifth component of the ICF. 4,094 (9%) codings were labeled as *not covered*, 4,710 (10.4%) as *not definable*, and 2,243 (4.9%) as *health condition*.

Relevance ranking

76 ICF categories passed the 25% and 37 the 50% threshold and were identified as relevant for CWP reports.

Table 3 shows if the categories are included in the ICF-CS for CWP, LBP and depression.

Coverage and efficiency ratios

Focusing on the more inclusive 25% threshold, the relevant aspects of functioning and environmental factors in CWP reports are represented with a coverage of 29% [54%] and an efficiency of 92% [61%] by the Brief [Comprehensive] ICF-CS for CWP (see Table 4).

When combining the ICF-CS for CWP, LBP and depression, the coverage ratio of the Brief [Comprehensive] ICF-CS was with 49% [82%] substantially higher and the efficiency ratio with 70% [47%] lower compared to the ICF-CS for CWP.

Reports with LBP diagnoses

Content analysis

21,707 units of meaning led to 42,116 (100%) codings. 28,876 (68.6%) represented ICF categories. Of the 13,240 (31.4%) codings not classifiable appropriately with the ICF, 3,111 (7.4%) were labeled as *personal factors*, 3,322

Table 4 Coverage and efficiency ratios of the different ICF Core Sets for the CWP-reports (n = 50) and the two relevance thresholds

	Number of overlapping categories	Coverage ratio (%)	Efficiency ratio (%)
Relevance threshold \geq 25% (m = 76)			
CWP Brief (k = 24)	22	29	92
CWP Comprehensive (k = 67)	41	54	61
LBP Brief (k = 35)	29	38	83
LBP Comprehensive (k = 78)	43	57	55
Depression Brief (k = 26†)	19	25	73
Depression Comprehensive (k = 90†)	43	57	48
CWP + LBP + Depression Brief (k = 53*)	37	49	70
CWP + LBP + Depression Comprehensive (k = 131*)	62	82	47
Relevance threshold \geq 50% (m = 37)			
CWP Brief (k = 24)	19	51	79
CWP Comprehensive (k = 67)	29	78	43
LBP Brief (k = 35)	21	57	60
LBP Comprehensive (k = 78)	26	70	33
Depression Brief (k = 26†)	14	38	54
Depression Comprehensive (k = 90†)	26	70	29
CWP + LBP + Depression Brief (k = 53†*)	29	78	55
CWP + LBP + Depression Comprehensive (k = 131†*)	36	97	27

Note: m = total number of ranked categories above the respective threshold; k = total number of categories in the respective ICF Core Set; † = categories aggregated on the second level (expect categories only available on the third level in the Comprehensive ICF Core Set); * = adjusted for overlap between the categories of the three ICF Core Sets.

(7.9%) as *not covered*, 4,236 (10.1%) as *not definable*, and 2,571 (6.1%) as *health condition*.

Relevance ranking

74 ICF categories passed the 25% and 33 the 50% threshold and were identified as relevant for LBP reports. Table 5 shows if the categories are included in the ICF-CS for LBP, CWP and obesity.

Coverage and efficiency ratios

Focusing on the 25% threshold, the relevant aspects of functioning and environmental factors in LBP reports are represented with a coverage of 36% [58%] and an efficiency of 77% [55%] by the Brief [Comprehensive] ICF-CS for LBP (see Table 6).

When combining the ICF-CS for CWP, LBP and obesity, the coverage ratio of the Brief [Comprehensive]

ICF-CS was with 47% [80%] substantially higher and the efficiency ratio with 78% [41%] lower compared to the ICF-CS for LBP.

Discussion

We found that the relevant content of medical work capacity evaluations involving CWP and LBP can be captured to a considerable, albeit not perfect, extent by a combination of applicable ICF-CS. The relevant aspects of functioning and environmental factors in the reports were either represented by the ICF-CS for the index conditions (CWP, LBP) or for major co-morbidities (depression, obesity). In both groups of reports and for both relevance thresholds, a combination of the ICF-CS analyzed showed substantially higher coverage ratios than the condition-specific ICF-CS, i.e. they represented the relevant aspects of medical work capacity evaluations involving CWP and LBP to a higher extent. There is, however, a trade-off. Due to the increased number of categories when combining the ICF-CS, the efficiency ratios decreased considerably compared to the condition-specific ICF-CS in most cases.

An interesting finding with regard to the medical disciplines involved in the medical reports was that, in fact, psychiatry appeared in both groups of reports as the most frequent discipline. This clearly indicates the relevance of psychiatric assessments for multidisciplinary medical work capacity evaluations of persons with CWP and LBP and is also in line with the finding that a considerable percentage of our medical reports included a co-morbid disorder from the ICD-10 chapter "Mood [affective] disorders".

Overall, our results are in line with previous research in the field which found that the Comprehensive ICF-CS for CWP and LBP have a potential for structuring work capacity assessments [37].

Our findings are also in agreement with the recently developed *ICF Core Sets for vocational rehabilitation* [64] regarding the importance of highlighting the components activities, participation and environmental factors in the context of work and work capacity.

Finally, with regard to the *generic core set for disability evaluation in social security* [32] we feel that its lack of environmental factors may be a potential limitation if one aims for a comprehensive and transparent documentation of a claimant's work capacity. While the authors argue that environmental aspects are implicitly covered by the participation items, we found in our analysis of medical reports prepared in the context of disability evaluations that a number of environmental factors (e.g. e310 Immediate family; e165 Assets) are explicitly and frequently reported as barriers or facilitators for the claimants (see Tables 3 and 5).

Table 5 Relative frequency ranking of the ICF categories found in the LBP reports (n = 45)

Rank	ICF Code	ICF Category	LBP		CWP		Obesity		Relative Frequency (%)	Absolute Frequency
			Brief (k=35)	Compr. (k=78)	Brief (k=24)	Compr. (k=67)	Brief (k=8)	Compr. (k=109)		
1	b280	Sensation of pain	X	X	X	X	.	X	100	2462
2	d415	Maintaining a body position	X	X	.	X	.	X	100	289
3	s760	Structure of trunk	X	X	.	.	.	X	98	958
4	b710	Mobility of joint functions	X	X	.	X	.	X	98	490
5	d850	Remunerative employment	X	X	X	X	.	X	91	325
6	b730	Muscle power functions	X	X	X	X	.	.	91	192
7	b270	Sensory functions related to temperature and other stimuli	.	.	.	X	.	.	87	260
8	d450	Walking	X	X	X	X	X	X	87	158
9	b735	Muscle tone functions	X	X	.	X	.	.	87	119
10	b134	Sleep functions	X	X	X	X	.	X	84	157
11	d430	Lifting and carrying objects	X	X	X	X	.	X	84	151
12	d570	Looking after one's health	.	X	.	X	X	X	82	122
13	b152	Emotional functions	X	X	X	X	.	X	80	446
14	b126	Temperament and personality functions	.	X	.	X	.	X	80	335
15	b130	Energy and drive functions	X	X	X	X	X	X	80	277
16	d410	Changing basic body position	X	X	.	X	.	X	80	111
17	e110	Products or substances for personal consumption	X	X	X*	X*	X	X	78	188
18	e580	Health services, systems and policies	X	X	.	X	.	X	76	101
19	e310	Immediate family	X	X	X	X	X	X	73	171
20	b435	Immunological system functions	.	.	.	.	.	X	71	171
21	e570	Social security services, systems and policies	X	X	X	X	.	X	69	97
22	s750	Structure of lower extremity	.	X	.	.	.	X	64	275
23	b530	Weight maintenance functions	.	.	.	.	X	X	64	81
24	e165	Assets	.	.	.	.	.	.	64	57
25	b160	Thought functions	.	.	X*	X*	.	.	62	202
26	d240	Handling stress and other psychological demands	X	X	X	X	X	X	62	137
27	d920	Recreation and leisure	.	X	X	X	.	X	62	73
28	d230	Carrying out daily routine	.	.	X	X	.	.	60	90
29	b420	Blood pressure functions	.	.	.	.	.	X	60	40
30	d870	Economic self-sufficiency	.	.	.	.	.	X	58	55
31	d760	Family relationships	X	X	X	X	.	X	56	64
32	d845	Acquiring, keeping and terminating a job	X	X	.	X	.	X	53	40
33	b455	Exercise tolerance functions	X	X	X	X	.	X	51	57
34	s720	Structure of shoulder region	.	.	.	.	.	.	49	48
35	e225	Climate	.	X	.	.	.	X	47	52
36	d445	Hand and arm use	.	X	.	.	.	.	44	49
37	b750	Motor reflex functions	.	X	.	.	.	.	44	43
38	d750	Informal social relationships	.	.	.	.	.	X	44	38
39	d455	Moving around	.	X	.	X	X	X	42	38
40	d770	Intimate relationships	.	X	X	X	.	X	42	35
41	b147	Psychomotor functions	.	.	X	X	.	.	40	60
42	b770	Gait pattern functions	.	X	.	.	.	.	40	42

Table 5 Relative frequency ranking of the ICF categories found in the LBP reports (n = 45) (Continued)

43	b144	Memory functions	.	.	.	.	.	.	38	61
44	e565	Economic services, systems and policies	.	.	.	.	.	.	38	44
45	d440	Fine hand use	.	.	.	.	.	.	36	50
46	b140	Attention functions	.	.	.	X	.	.	36	49
47	e245	Time-related changes	.	.	.	.	.	.	36	35
48	s740	Structure of pelvic region	.	X	.	.	.	.	36	34
49	b415	Blood vessel functions	.	.	.	.	.	X	36	28
50	d350	Conversation	.	.	.	.	.	.	36	25
51	b810	Protective functions of the skin	.	.	.	.	.	.	36	22
52	s120	Spinal cord and related structures	X	X	.	.	.	.	33	37
53	b620	Urination functions	.	X	.	.	.	X	33	25
54	s730	Structure of upper extremity	.	.	.	.	.	.	31	72
55	b240	Sensations associated with hearing and vestibular functions	.	.	.	.	.	.	31	37
56	d160	Focusing attention	.	.	.	X	.	.	31	35
57	d640	Doing housework	X	X	X	X	.	X	31	30
58	d475	Driving	.	X	.	X	.	X	31	29
59	d540	Dressing	X	X	.	X	.	X	31	27
60	b755	Involuntary movement reaction functions	.	.	.	.	.	.	31	27
61	b715	Stability of joint functions	X	X	.	.	.	.	31	26
62	d720	Complex interpersonal interactions	.	.	.	X	.	.	31	24
63	e325	Acquaintances, peers, colleagues, neighbours and community members	.	X	.	X	.	X	31	22
64	b525	Defecation functions	.	.	.	.	.	.	31	20
65	e315	Extended family	.	.	.	.	.	.	29	26
66	e115	Products and technology for personal use in daily living	.	.	.	.	.	X	29	21
67	b535	Sensations associated with the digestive system	.	.	.	.	.	X	27	30
68	e410	Individual attitudes of immediate family members	X	X	X	X	.	X	27	25
69	b460	Sensations associated with cardiovascular and respiratory functions	.	.	.	.	.	.	27	24
70	b780	Sensations related to muscles and movement functions	.	X	.	X	.	.	27	23
71	b740	Muscle endurance functions	X	X	.	X	.	.	27	19
72	e430	Individual attitudes of people in positions of authority	.	.	.	X	.	.	27	18
73	b640	Sexual functions	.	X	.	X	.	X	27	15
74	d166	Reading	.	.	.	.	.	.	27	15
75	e120	Products and technology for personal indoor and outdoor mobility and transportation	.	X	.	.	.	X	24	62
76	b164	Higher-level cognitive functions	.	.	.	X	.	.	24	43
77	e510	Services, systems and policies for the production of consumer goods	.	.	.	.	.	X	24	26
78	b110	Consciousness functions	.	.	.	.	.	.	22	20
79	s320	Structure of mouth	.	.	.	.	.	.	22	19
80	b755	Involuntary movement functions	.	.	.	.	.	.	22	18
81	d620	Acquisition of goods and services	.	X	.	X	.	X	22	13
82	s770	Additional musculoskeletal structures related to movement	X	X	.	X	.	X	22	12

Table 5 Relative frequency ranking of the ICF categories found in the LBP reports (n = 45) (Continued)

Ranking of the remaining categories of the Brief ICF Core Sets for LBP, CWP and obesity:										
89	e355	Health professionals	X	X	X	X	.	X	20	11
92	d859	Work and employment, other specified and unspecified	X	X	.	.	.	.	18	20
94	e135	Products and technology for employment	X	X	.	.	.	.	18	15
103	e450	Individual attitudes of health professionals	X	X	.	X	.	X	16	13
104	b760	Control of voluntary movement functions	.	.	X	X	.	.	16	13
105	e155	Design, construction and building products and technology of buildings for private use	X	X	.	.	.	X	16	11
122	e550	Legal services, systems and policies	X	X	.	.	.	.	11	13
201	d175	Solving problems	.	.	X	X	.	.	2	1
-	d530	Toileting	X	X	.	.	.	X	0	0

Note: k = total number of categories in the respective ICF Core Set; X = included in the particular ICF Core Set (LBP, CWP or obesity); * = in the particular ICF Core Set the stated category is included at the next lower (third) or next higher (second) level.

Table 6 Coverage and efficiency ratios of the different ICF Core Sets for the LBP-reports (n = 45) and the two relevance thresholds

	Number of overlapping categories	Coverage ratio (%)	Efficiency ratio (%)
Relevance threshold $\geq 25\%$ (m = 74)			
LBP Brief (k = 35)	27	36	77
LBP Comprehensive (k = 78)	43	58	55
CWP Brief (k = 24)	21	28	88
CWP Comprehensive (k = 67)	41	55	61
Obesity Brief (k = 8)	8	11	100
Obesity Comprehensive (k = 108†)	41	55	38
LBP + CWP + Obesity Brief (k = 45†*)	35	47	78
LBP + CWP + Obesity Comprehensive (k = 143†*)	59	80	41
Relevance threshold $\geq 50\%$ (m = 33)			
LBP Brief (k = 35)	21	64	60
LBP Comprehensive (k = 78)	25	76	32
CWP Brief (k = 24)	17	52	71
CWP Comprehensive (k = 67)	26	79	39
Obesity Brief (k = 8)	7	21	88
Obesity Comprehensive (k = 108†)	27	82	25
LBP + CWP + Obesity Brief (k = 45†*)	26	79	58
LBP + CWP + Obesity Comprehensive (k = 143†*)	32	97	22

Note: m = total number of ranked categories above the respective threshold; k = total number of categories in the respective ICF Core Set(s); † = categories aggregated on the second level; * = adjusted for overlap between the categories of the three ICF Core Sets.

Study limitations

Our study has some limitations. Our sample only included medical reports in German of the Swiss national disability insurance scheme with an ICD-10-diagnosis for CWP and/or LBP. The results may therefore not be generalizable to other health conditions, nor to other insurance schemes or other countries with different disability evaluation procedures. Future research should involve validation studies which look into the generalizability of our findings.

Another limitation was the significant amount of content not appropriately addressed in the current ICF taxonomy. This refers mainly to some specific aspects of functioning related to work capacity (e.g. demanding activities) and to personal factors, which may influence work capacity [65] and could, when explicitly addressed, contribute to more transparent disability evaluations [66]. This limitation could have potentially missed factors critical and relevant to the process of work capacity evaluation which should be taken into account in future research.

Finally, one could argue that context-specific ICF-CS relevant to the field of work capacity evaluation, like the ones for vocational rehabilitation or the generic core set for disability evaluation in social security, may have been included in our analysis as well. However, as our sample included medical reports with the index conditions CWP and LBP, we decided to focus rather on condition-specific ICF-CS than on context-specific or generic ones. It might be an issue for further research to determine the extent to which these ICF-CS are representing the content of medical reports of disability claimants.

Practical implications

Combining ICF-CS (e.g. CWP with LBP and depression, or LBP with CWP and obesity) is a more

effective approach for work capacity evaluations involving CWP and LBP than using solely condition-specific ICF-CS. Taken together, the ICF-CS show a potential for guiding comprehensive multidisciplinary assessments. In particular, they could ensure transparency in disability evaluations as well as standardize them in terms of what should be documented. However, efficiency and practicability become problematic when simply combining ICF-CS due to the high number of categories to be assessed. To ensure high coverage *and* efficiency, a suitable standard for medical work capacity evaluations involving CWP and LBP could include:

- (1) All categories of the Brief ICF-CS for the index conditions and major co-morbidities because Brief ICF-CS are considered as a minimum standard or data set to be reported in different settings so as to enhance comparability [35];
- (2) Those categories of the Comprehensive ICF-CS identified as relevant for the present context;
- (3) Those categories not included in the ICF-CS but identified as relevant for the present context (e.g. b435 Immunological system functions for CWP reports; e165 Assets for LBP reports).

Our relevance rankings display the categories which should be included in the standard. To ensure comprehensive evaluations, we recommend to focus on categories above the 25% threshold. Before being applied, however, future research would have to focus on a validation of the categories by experts in the field of work capacity evaluation.

Furthermore, the proposed ICF categories are the basis for a transparent documentation of those aspects of functioning which are relevant for a claimant's work capacity and should be seen as a complement to the claimant's diagnosis without necessarily having a direct implication on the work capacity decision itself. Whereas the categories can be used as a guideline for the evaluations in terms of *what* aspects should be documented, they are not addressing the issue of how these aspects should be *assessed*. This latter problem could be approached by assigning existing validated rating instruments to the suggested ICF categories.

Last but not least, it is important to emphasize that aspects of functioning which refer to the unique individual experience of a claimant, but are not necessarily addressed by the abovementioned ICF categories, should be considered in addition as complementary source of information to provide a comprehensive picture of the claimant.

Conclusions

The relevant content of medical work capacity evaluations involving CWP and LBP can be represented to a considerable extent by a combination of the ICF-CS for the index conditions and major co-morbidities. A suitable approach for a standardized documentation of the evaluations and for enhancing their transparency could consist of the Brief ICF-CS, augmented by additional ICF categories relevant for this particular context. Aspects not appropriately addressed in the current ICF taxonomy, such as personal factors, should be specified and eventually incorporated in such a standard as well. In addition, the unique individual experiences of claimants have to be taken into account in order to assess work capacity comprehensively.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

Urban Schwegler and Bruno Trezzini prepared the first draft of this paper. All other co-authors made substantial comments on the content of this manuscript. All authors read and approved the final manuscript.

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Chapter 5

Study 4: Validation of the EUMASS Core Set for Medical Evaluation of Work Disability

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Validation of the EUMASS Core Set for Medical Evaluation of Work

Disability

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Implications for Rehabilitation

- In medical reports of evaluation of work disability, reporting about functional capacity is often unstructured in free text, making the reports difficult to understand.
- The EUMASS Core Set contains common definitions for expressing functional capacity and is expected to support taking decisions, to improve the quality of decisions and to allow national and international comparisons
- Our study suggests the EUMASS core set to be comprehensive, useful and sufficient to express functional capacity in disability evaluation

Abstract

Objective: To perform a content validation of the EUMASS Core Set across 6 European social insurance systems. The EUMASS Core Set contains 20 categories to describe the functional (in-) capacity of claimants for disability benefits.

Method: We performed an exploratory, cross-sectional study. We used the EUMASS Core Set, added scales to rate the relevance of the 20 categories, and added additional questions concerning comprehensiveness, usefulness, and sufficiency of the instrument. Medical examiners from European countries filled in this instrument in 10 consecutive claim assessments.

Results: 48 medical examiners in 6 different countries evaluated 446 claimants. The medical examiners used all categories to describe the claimants' functional (in-) capacity. Medical examiners missed 41 different categories, often mental functions (n=17). They rated the instrument as useful in 68.4% and as sufficient in 63.2% of the claims. Perceived usefulness varied among countries, but not among disease groups. Perceived sufficiency varied among countries and disease groups.

Conclusion: The EUMASS Core Set is promising for reporting about functional (in-) capacities. It contains relevant categories for disability evaluation among countries and disease groups. Adding more *mental functions* might make it more applicable. Medical examiners found it useful and sufficient to evaluate functional (in-) capacity.

Background

Throughout Europe, individuals who are unable to continue their occupational activities due to illness or accident can apply for income replacement¹⁻³. In order to qualify for long-term work disability benefits, the claimant has to meet medical criteria. Legal rules require claimants to file a claim and undergo a medical evaluation of work disability (further: disability evaluation) which is performed by medical examiners. Critics across Europe have pointed to the lack of transparency and reliability of disability evaluations⁴⁻⁹, the heterogeneous presentation of findings in the medical reports being one of the reasons.

National social security systems across Europe have evolved more or less independently from the end of the 19th century onward. As a consequence, legal criteria of disability¹⁰ and the processes of disability evaluations differ substantially^{11,12}. For example, medical examiners may evaluate claimants in an interview and examination, or perform a file-based evaluation.

Nonetheless, medical reports of disability evaluation share essential characteristics by reporting about current functional (in-) capacity, socio-medical history, feasibility of additional health care and return to work-interventions and prognosis of disability^{11,13}. In some countries medical examiners use free text to describe functional (in-) capacity, in other European countries (Great Britain, Iceland, and the Netherlands) medical examiners use instruments. These instruments tend to include different items and have not yet been tested scientifically¹⁴⁻¹⁷.

To harmonize the presentation of medical findings, and to perform international comparative analyses between different national schemes we need first of all common definitions. The International Classification of Functioning, Disability, and Health (ICF) offers a worldwide consensus on key-concepts describing human functioning, the consequences of health problems on activity and participation, and contextual factors which represent the background of an individual life¹⁸. The ICF classification is divided in 1424 categories which are ordered hierarchically (1.-4. level). Core sets, i.e.

selections of categories relevant to describe a particular health condition or situation, should make the ICF classification practicable¹⁹.

An international working group of the European Union of Medicine in Assurance and Social Security (EUMASS) used an expert consensus process to develop the ICF-based EUMASS Core Set²⁰ that allows to express functional (in-) capacity in disability evaluation for long-term work disability benefits. The EUMASS Core Set is expected to support taking decisions, to improve the quality of decisions, to allow national and international comparisons, and to establish a firmer base for research²⁰. The EUMASS Core Set contains 20 ICF categories on the second level of the ICF: 5 body functions, and 15 activities /participations, see table1.

[Insert table 1 about here]

The EUMASS Core Set has attracted attention in Germany and Sweden. Timner found that medical examiners frequently rated limitations in the category *handling stress and other psychological demands*, while they did not observe limitations in the categories *watching* and *listening* in 302 claimants on long-term work disability²¹.

In Sweden, medical examiners are testing an 18 categories-instrument based on the EUMASS Core Set in long-term work disability claimants and evaluate in addition the degree of the limitation, if the recorded limitations are consequence of disease, and if they are based on observed findings²².

However, the content of the EUMASS Core Set was not tested up till now. The EUMASS Core Set is anticipated to represent an acceptable minimal set of categories to express functional (in-)capacity in the context of working life. The categories should be useful for disability evaluation, but not necessarily sufficient in every country. The EUMASS Core Set should be valid across countries and applicable to all pathologies that may qualify for disability benefits. Therefore we initiated an international process of content validation to establish if the EUMASS Core Set captures the functional (in-) capacities of claimants for disability benefits, regardless of the underlying pathologies

and the national social security system. For practical use a requirement could be that medical examiners do not need extra sources of information to express functional (in-) capacity.

The objective of this study is to explore 1) if the ICF categories of the EUMASS Core Set are relevant to express functional (in-) capacity in claimants applying for long-term disability benefits in social insurance; 2) if the EUMASS Core Set is comprehensive enough to express functional (in-) capacity in evaluating long-term disability in social insurance; 3) if medical examiners find the EUMASS Core Set useful and sufficient to express functional (in-) capacity in evaluating long-term disability in social insurance and 4) if medical examiners need additional sources of information to use the EUMASS Core Set. 5) Finally we were interested in the time needed to fill in the EUMASS Core Set.

Methods

Design: We performed an exploratory, cross-sectional multi-centre study.

Development of the validation instrument: We generated two different EUMASS ICF instruments (EII) (one for person-encounter disability evaluation and one for paper-file disability evaluation) by adding qualifiers to each of the 20 categories of the EUMASS Core Set to express the degree of an individual claimant's impairments and limitations. Qualifiers ranged from no impairment/ no limitation to complete impairment/ limitation on a 5-item-ordinal-scale. In addition medical examiners in person-encounter disability evaluation could indicate if a category was not relevant to describe the claimant's disability. The medical examiners doing file-based disability evaluation could indicate if information was missing in the claimant's file. Furthermore, medical examiners could document additional categories necessary to express the functional (in-) capacity of a particular claimant that were missing in the current EII.

We asked medical examiners to what extent they perceived the EII as useful and sufficient to describe a claimant's functional (in-) capacities on a 5-item-ordinal scale ranging from 'totally agree' to 'totally disagree'. Usefulness and sufficiency were not further defined. Finally, we asked the

medical examiners to indicate if they had to consult additional sources such as the ICF, functional and psychological tests to be able to fill in the EII, and the time needed to fill in the EII.

Application in different countries: EUMASS members of the participating countries translated the validation form into the national languages using the ICF in their languages. We asked these members to recruit in their countries five to ten medical examiners with a minimum experience of one year in evaluating claims for long-term work disability. The way of recruiting was left to the EUMASS members to decide on, depending on local circumstances. The medical examiners filled out a short questionnaire on personal characteristics.

The medical examiners applied the validation form to maximum 10 consecutive claimants for disability evaluation. The EUMASS members from Germany, Iceland and Norway translated free text comments from the medical examiners into English. JA and WB translated the Dutch (Belgium) and French comments.

Data analysis

We classified the categories reported missing into a (ICF) category. We used descriptive statistics to report the results. We grouped the claimants' underlying diseases according to ICD-10 into neoplasms (C00-D48), mental and behavioural disorders (F00-F99), diseases of the circulatory system (I00-I99), diseases of the musculoskeletal system and connective tissue (M00-M99), and other diseases. We also described comprehensiveness, usefulness and sufficiency to express functional (in-)capacity of the EII in total, by country and the main ICD-10 disease groups, use of additional sources and time consumption.

We compared perceived usefulness and sufficiency of the EII by countries, and main disease groups using multiple pair wise comparisons after application of Kruskal-Wallis rank sum test. We evaluated the correlation between usefulness and sufficiency with the Spearman rank correlation coefficient. All analyses were conducted with R²³.

Ethics

The project received approval by the Norwegian South Regional Committee for Medical and Health Research Ethics (project number 2.2007.1123).

Results

Sample

In total 48 medical examiners from 6 different countries (table 2) evaluated 446 claimants (table 3) for long-term work disability benefits using the EII. Medical examiners from Belgium, France, Iceland, and Romania, performed the disability evaluation in personal encounters; in one country (Norway) medical examiners performed exclusively file-based disability evaluations. In Germany, medical examiners applied both, disability evaluations in personal encounters and file-based disability evaluations. Not all medical examiners answered all questions, which leads to differing sample sizes.

[Insert table 2 about here]

[Insert table 3 about here]

Relevance of the 20 categories of the EII for disability evaluations

The medical examiners used all 20 ICF categories of the EII to describe the claimants' functional (in-) capacity in their 446 reports. The most frequently listed limitations of claimants (not accounting for severity) were *sensation of pain* (66 %); *lifting and carrying objects* (64 %) and *handling stress and other psychological demands* (63 %). *Watching* (13%) and *listening* (10%) were least frequent. Figure 1 shows the extent of the impairments and limitations observed in each category of the EII.

[Insert Figure 1 about here]

Subgroup analysis by country and disease groups showed that the medical examiners of all 6 countries applied each of the 20 ICF categories of the EII at least once to express a claimant's

limitation, and each of the 20 ICF categories were represented at least once as a limitation in the 5 disease groups.

Comprehensiveness of the EII for summarizing functional incapacity

Out of 48 medical examiners, 19 (Belgium: 9 insurance physicians; Germany: 2 family physicians, 1 internal physician, 2 surgeons; France: 1 rehabilitation physician, 1 internal physician; Norway: 2 family physicians, 2 family physicians / community physicians, 1 occupational physician; Iceland 1 rehabilitation physician) mentioned missing categories. They mentioned in 42 different categories as missing to describe the claimants' functional (in-)capacities: 27 categories of body functions (17 of which were mental functions), 11 of activity and participation, 3 of environmental factors, and 1 of personal factors. Sixteen categories were mentioned more than once, the category "global mental functions" was mentioned 6 times. All in all 74 times medical examiners missed categories (full details in appendix 2).

The medical examiners' reports of "missing categories" differed among countries: 40% (median; range: 80% Belgium to 0% Romania) of the medical examiners reported at least one category missing in 8% (median; 67% France, to 0% Romania) of the claimants.

Categories were missed most frequently for claimants with mental disorders (17%), followed by "other diseases" (13%), diseases of the musculoskeletal system (10%), neoplasms (9%), and diseases of the circulation system (5%).

Perceived usefulness and sufficiency of the EII to express functional (in-) capacity

Medical examiners evaluated the usefulness of the core set in 434 of 446 cases. In the majority of these 434 cases, medical examiners rated the EII as useful to express functional (in-) capacity in the context of long-term disability benefits. They responded "totally agree" in 27.2%, and "partly agree" in 41.2% of the claimants (figure 2a). Medical examiners from Norway and Belgium found the EII significantly less useful compared to their colleagues in Germany, Romania, France and Iceland

($p < 0.05$; figure 3a). No difference in usefulness was found among the main disease groups (figure 4a).

Medical examiners evaluated the sufficiency of the core set in 432 of 446 cases. In the majority of these 432 cases, medical examiners rated the EII as sufficient to express functional capacity in the context of long-term disability benefits. They responded “totally agree” in 23.1% and “partly agree” in 40.1% of the claimants (figure 2b). . Medical examiners who disagreed partly or totally with the EII’s sufficiency (113 cases) specified in 40 cases what was missing.

Medical examiners from Norway, Belgium and Romania perceived the EII as significantly less sufficient compared to their colleagues in Germany, France and Iceland ($p < 0.05$; figure 3b), and there were significant differences in the judgments among the main disease groups (figure 4b).

[Insert Figures 2a&2b, 3a&3b, 4a&4b about here]

Correlation of usefulness and sufficiency

We did not specify the meaning of useful and sufficient and it is possible the medical examiners mixed the two criteria. Therefore we estimated the correlation between the perception about usefulness and sufficiency of the EII. The Spearman rank correlation coefficient was $\rho = 0.533$ ($p < 0.001$). Overall, medical examiners perceived the EII more often than not as useful but felt that it was not always sufficient to express the claimants’ functional (in-)capacities (figure 5).

[Insert figure 5 about here]

Medical examiners needed 10 minutes (median; range 5.0 to 12.0 minutes) to fill in the EII. Fourteen medical examiners gathered additional information from other sources before administering the EII: the ICF browser or ICF book (3 Belgian, one French medical examiner); or various psychological and physiological tests (10 medical examiners from Romania).

Discussion

In this article, we present the results of an exploratory content validation study of the EUMASS ICF instrument (EII), based on the EUMASS Core Set, done by 48 medical examiners in 6 countries on 446 claimants with very different pathologies. The EUMASS Core Set does include relevant categories: medical examiners used all 20 categories of the EII, with varying frequencies. The EUMASS Core Set is not completely comprehensive: medical examiners suggested 42 additional categories that were not included in the EII, in particular categories to describe impairments in mental functions. In the majority of cases, the medical examiners perceived the EII as useful and sufficient to express functional (in-) capacity in the context of working life, but the judgments varied among countries and pathologies. These findings suggest that an instrument to express functional (in-)capacity, such as the EUMASS Core Set, can provide support in reporting about long term work disability for work.

Strengths of the study

This is to the best of our knowledge the first study validating an ICF Core Set for disability evaluation across different countries. It is an international study in the setting of a heterogeneous group of national social security systems. We were able to include a wide range of medical examiners, claimants and disease groups with different approaches to perform disability evaluations. Our results gain credence because they are case based: for every individual claimant a medical examiner filled in an EII.

Limitations of the study

Reporting about missing categories may well have been incomplete. Those medical examiners who did not find the EII sufficient only specified in 35% cases what was missing. In less than 10 % of the cases evaluations, less than half of the medical examiners reported at most 6 missing categories.

We included medical examiners of only 6 European countries, all of which have different processes to evaluate claims for disability benefits. To make our findings more generalizable, we would have needed to include more countries, particular the Netherlands and the United Kingdom, where there

is a tradition with reporting systematically about functional (in-)capacity. The subgroups by country and disease groups allow only preliminary conclusions due to the small number of observations in each group.

Medical examiners could only tick 'not relevant' in personal encounter and only 'info missing' in paper file evaluation. We did not specify the item 'not relevant', which may have led to different interpretations. We had intended 'relevant' to mean relevant for functioning in general. Medical examiners may have interpreted 'relevant' as relevance for the present job: a person with a sedentary job, say administrator, who had no demands whatsoever on the ability to lift and carry objects. In that case, it could be said, *lifting and carrying objects* had no relevance, even though a claimant might have a problem there.

Other studies

Compared to the German validation study of the EUMASS Core Set, the medical examiners in this study used most frequently sensation of pain as a limitation while it ranked 12 (of 20) in the German study²¹. Timmer studied existing files containing with free text descriptions of limitations whereas we used an instrument that proposed the category "pain". In both studies the authors did not observe limitations in the categories *watching* and *listening*.

Preliminary results of the Swedish Instrument testing show that "*Handling stress and other psychological demands*" was the category most frequently reported as a limitation and as a consequence of disease²². As in our study, the categories *watching* and *listening* were reported as a limitation only in a minority of cases.

Impact

All in all it seems to be possible to use one instrument to evaluate functional (in-) capacity despite different national or local processes in disability evaluation among countries. Such an instrument could promote transparency, reliability, homogenous presentation in practice, and data exchange in research. We will probably get a higher rating on usefulness and sufficiency if we delete the

categories *watching* and *listening* and add more categories of *mental functions*. With adding more categories of mental functions the EUMASS Core Set could also be more comprehensive.

The EUMASS Core Set does not contain any environmental- and personal factors²⁰. In this study medical examiners did not report environmental- and personal factors as missing, when describing functional (in-) capacity. If medical examiners use the EUMASS Core Set to describe the degree of disability, or work disability in a national setting, it is possible that environmental- and personal factors would be more important¹¹.

This is an explorative study which showed that a more definite study is feasible and of interest to the community. Such a study requires inclusion of more European countries, stratification of the disease groups, more information of where in the process of disability evaluation medical examiners specify functional (in-) capacity and how they could use this information in the processing of the claim. The instructions to the medical examiners need more standardization and piloting to ensure a common understanding. A larger sample and an operationalization of the qualifiers 'not relevant' and 'info missing' would allow sensitivity analyses to explore the best cut-off for a relevance threshold. The current study concentrated on the medical examiners responsible to decide on the limitations and fill in the EII. In order to use the results in handling the claims a follow up study needs to explore if administrative staff in the disability pension office are able to integrate this information in the decision making of the claim. In a next step we have to investigate if claimants find the EII appropriate to express their functional (in-) capacity. Claimants are the gist in the disability evaluation and they need to be sure that their work limitations can be evaluated correctly and objectively. It is also a frequent observation in countries which use instruments in work disability evaluation, such as the UK, Netherlands, Sweden, and Iceland, that detailed instructions are needed to support the use of the instruments and the given definitions.

Conclusion

The EII based on the EUMASS Core Set is a promising tool to support reporting about functional (in-) capacities in disability evaluations in long-term work disability. These first results indicate that the EII may be broadly applicable, but currently it lacks categories on mental functions to enable a universal use. The differences in subgroup analyses by countries and disease groups give directions for more focussed data collections and in depth analyses.

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Declaration of interests

The authors report no conflicts of interest.

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Tables

Table 1: EUMASS Core Set

	ICF Category	ICF Code
Body functions	Higher-level cognitive functions	b164
	Sensation of pain	b280
	Exercise tolerance functions	b455
	Mobility of joint functions	b710
	Muscle power functions	b730
Activity and participation	Watching	d110
	Listening	d115
	Acquiring skills	d155
	Making decisions	d177
	Undertaking multiple tasks	d220
	Handling stress and other psychological demands	d240
	Communication, unspecified	d399
	Changing basic body position	d410
	Maintaining a body position	d415
	Lifting and carrying objects	d430
	Fine hand use	d440
	Hand and arm use	d445
	Walking	d450
	Using transportation	d470
	Complex interpersonal interactions	d720

Table 2: Characteristics of medical examiners

Medical examiner	
Country	N (% of total)
Belgium	10 (21%)
France	3 (6%)
Germany	10 (21%)
Iceland	4 (8%)
Norway	10 (21%)
Romania	11(23%)
Sex	
Male	20 (54%)
Female	17 (46%)
Main specialisation	
Insurance physician	21 (45%)
Family medicine	10 (21%)
Rehabilitation	5 (11%)
Internal medicine	3 (6%)
Surgery	3 (6%)
Occupational medicine	2 (4%)
Orthopaedics	2 (4%)
Community medicine	1 (2%)
Median (interquartile range)	
Age (years)	51 (46-56)
Year of Graduation from medical school	1985 (1979-1990)
Experience as medical expert (years)	14.5 (6.0-20.5)

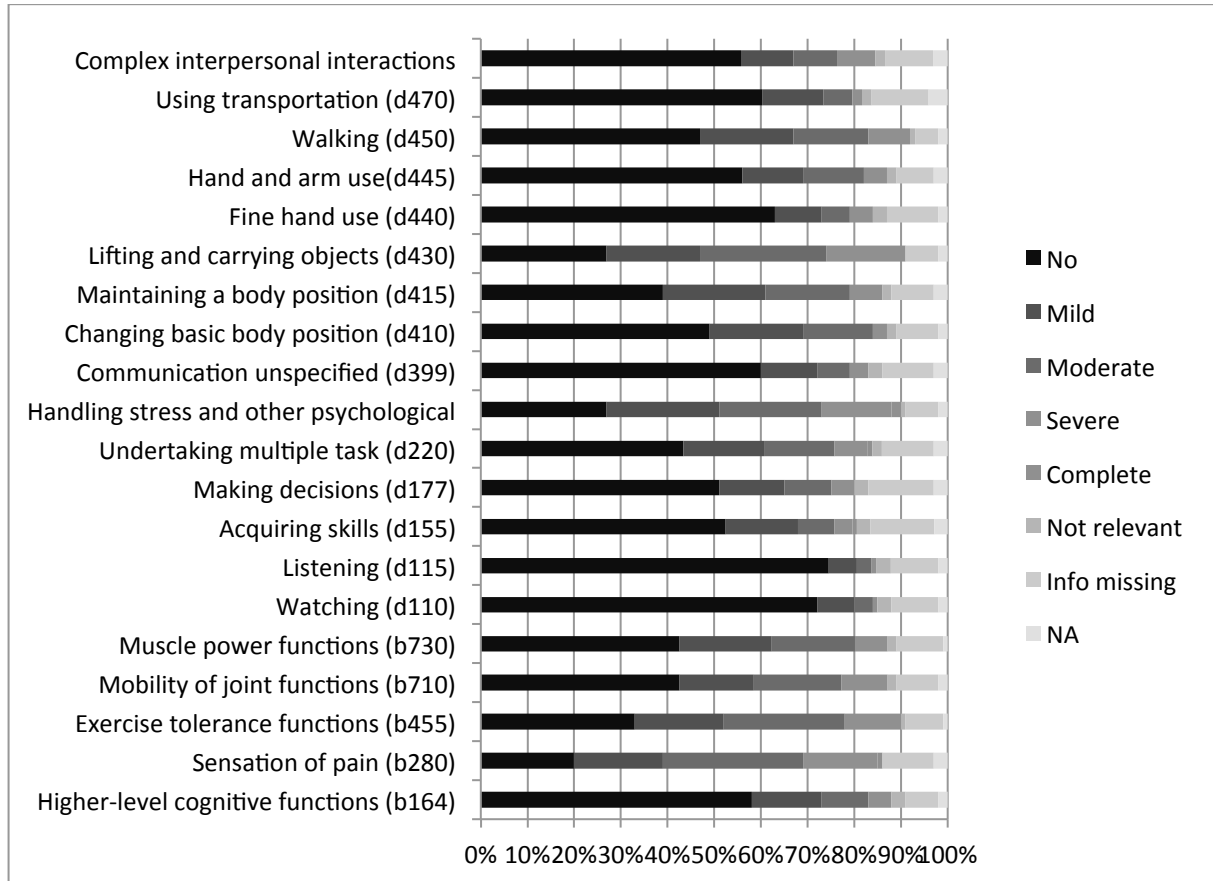
Table 3: Characteristics claimants

Claimant	
Country	N (% of total)
Belgium	100 (22%)
France	24 (5%)
Germany	99 (22%)
Iceland	40 (9%)
Norway	91 (20%)
Romania	92 (21%)
Sex	
Male	217 (49%)
Female	229 (51%)
Main medical diagnosis ICD-10	
Musculoskeletal diseases	144 (33%)
Mental disorders	120 (27%)
Neoplasms	34 (8%)
Circulatory diseases	43 (10%)
Others diseases	101 (23%)
Distribution of claimants' occupation (ISCO-88)²⁷	
Elementary occupations	97 (23%)
Crafts and related trade workers	91 (21%)
Service workers and shop and market sales workers	80 (19%)
Plant and machine operators and assemblers	65 (15%)
Clerks	43 (10%)
Technicians and associate professionals	24 (6%)

Professionals	15 (3%)
Legislator, senior officials, and managers	8 (2%)
Skilled agricultural and fishery worker	6 (1%)
Armed forces	1 (0%)
Unknown	1 (0%)
	Median (interquartile range)
Age (year)	49 (41-56)
Duration off work (months)	12 (8-25)

Figures

Figure 1: Severity of limitations across the 20 EUMASS categories in the 446 medical reports



Legend:

No impairment/limitation means the person has no problem

Mild impairment/limitation means a problem that is with an intensity a person can tolerate.

Moderate impairment/limitation means a problem that is present with an intensity which is interfering in the person's day to day life.

Severe impairment/limitation means a problem that is present with an intensity, which is partially disrupting the person's day to day life.

Complete impairment/limitation means a problem that is present with an intensity, which is totally disrupting the person's day to day life.

Not relevant: Category was not relevant to describe the claimants functional incapacity / not relevant for the claimant's main problem (personal encounter evaluation).

Info missing: Information for this category was missing in the claimant's file (file-based evaluation).

NA (No answer): Medical examiners did not fill in the category

Figure 2a: Perception of the medical examiners about the EUMASS ICF instrument being 'useful' to assess a claimant's functional (in-) capacities

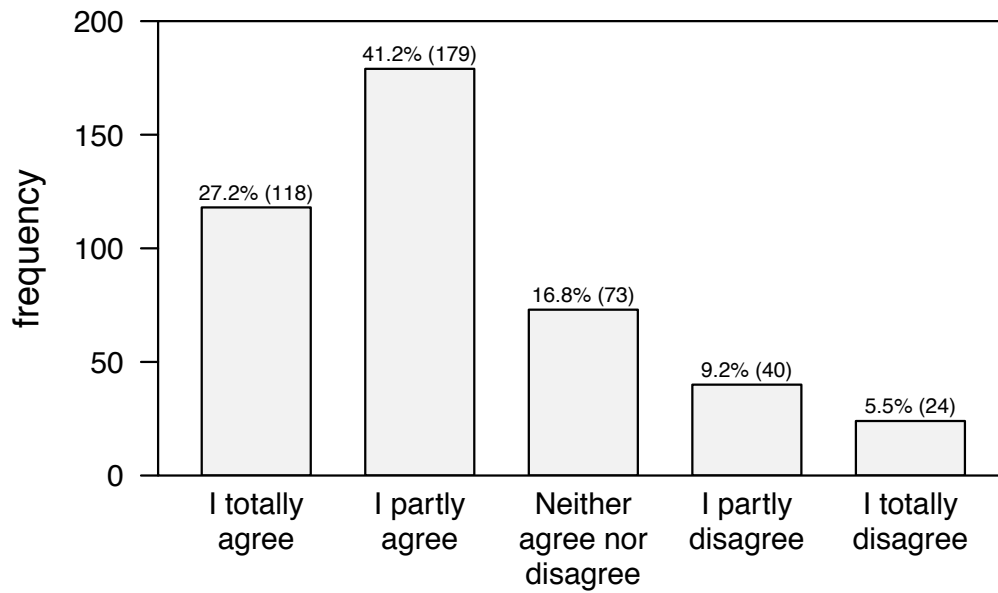


Figure 2b: Perception of the medical examiners about the EUMASS ICF instrument being 'sufficient' to assess a claimant's functional (in-) capacities

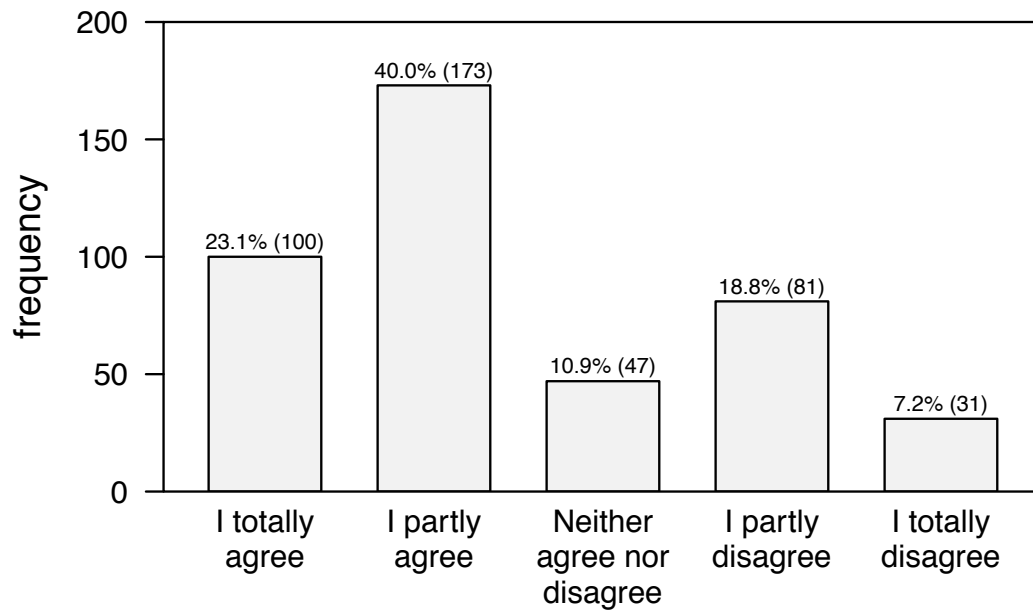
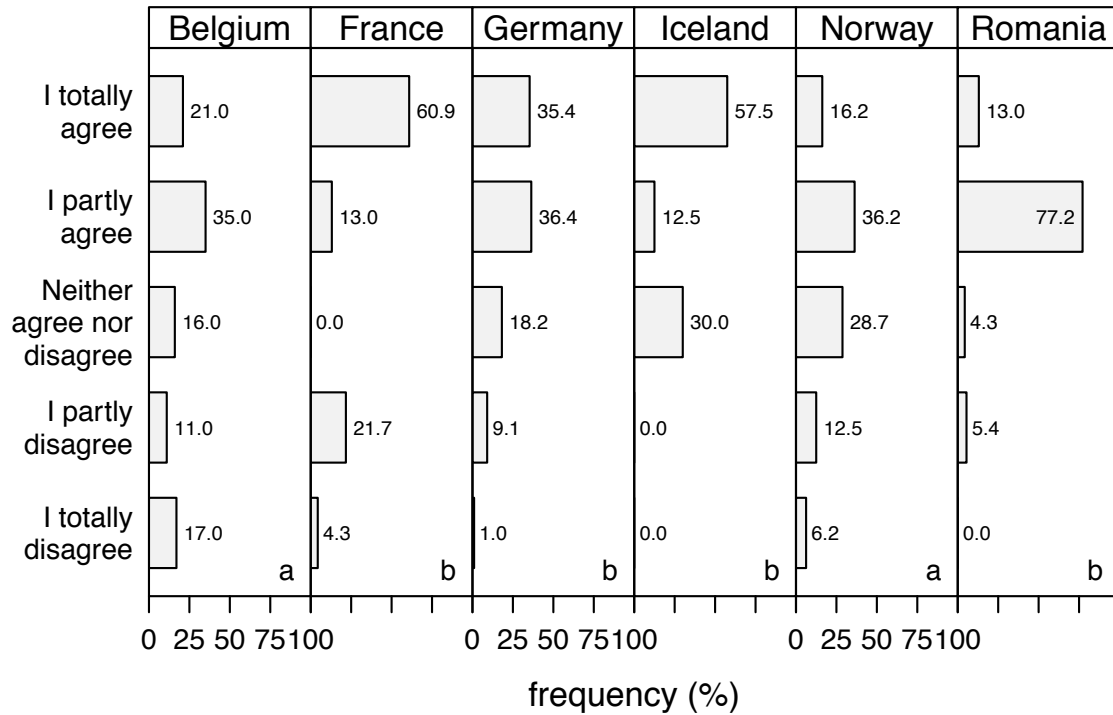
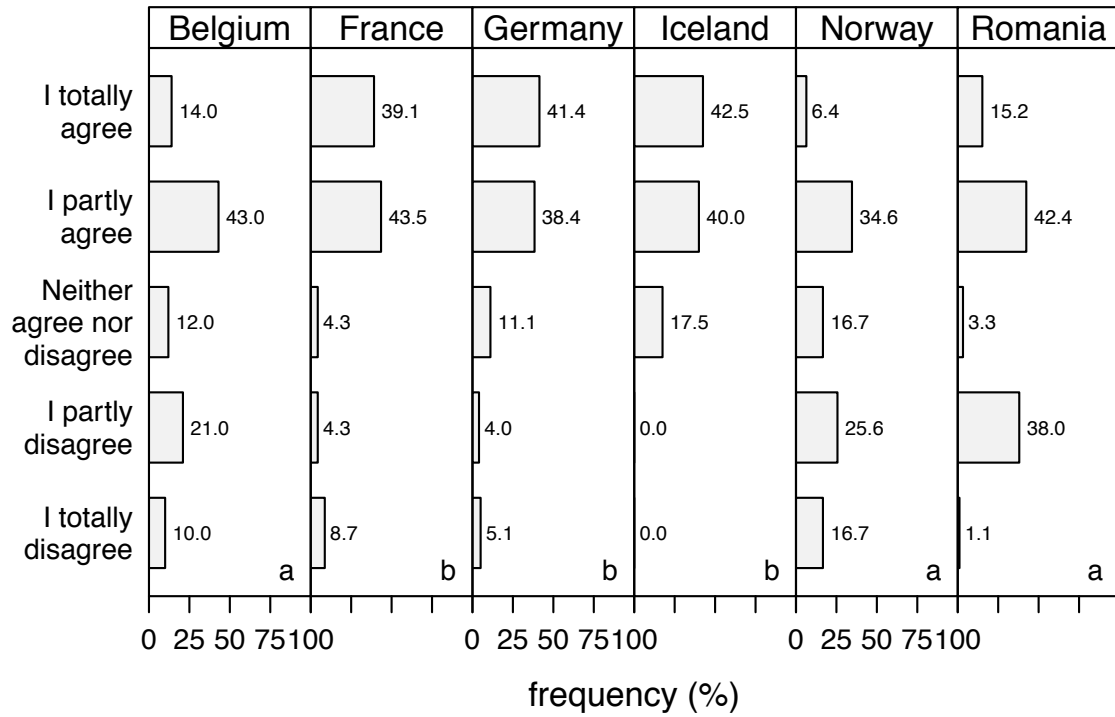


Figure 3a: Perception of the medical examiners about the EUMASS ICF instrument being ‘useful’ to express a claimant’s functional (in-) capacities, by country:



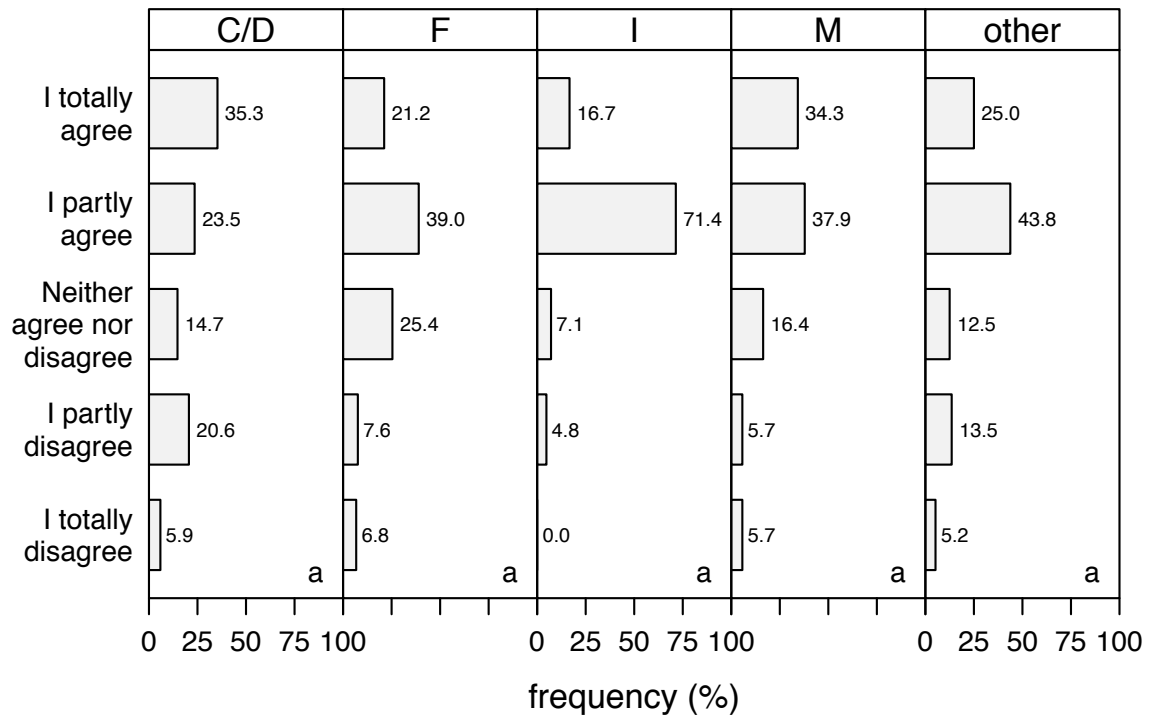
Legend: All countries with the letter “a” do not differ from each other, all countries with the letter “b” do not differ from each other; countries with the letter “a” differ from countries with the letter “b” ($p < 0.05$).

Figure 3b: Perception of the medical examiners about the EUMASS ICF instrument being ‘sufficient’ to express a claimant’s functional (in-) capacities, by country:



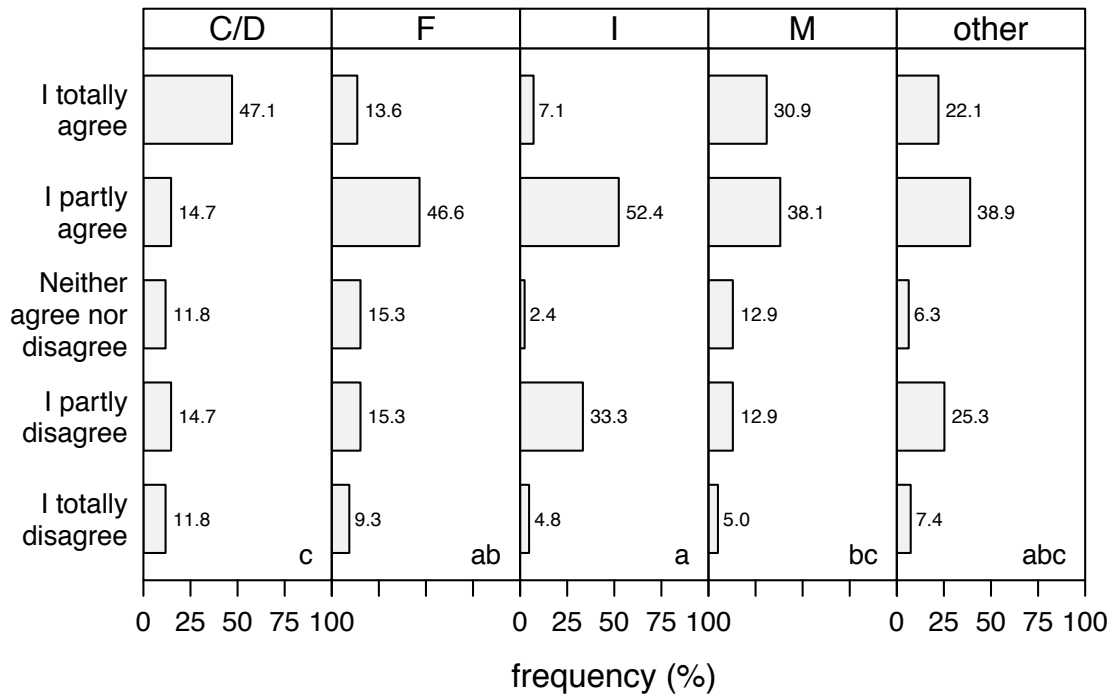
All countries with the letter “a” do not differ from each other, all countries with the letter “b” do not differ from each other; countries with the letter “a” differ from countries with the letter “b” ($p < 0.05$).

Figure 4a: Perception of the medical examiners about the EUMASS ICF instrument Set being 'useful' to express a claimant's functional (in-) capacities, disease groups:



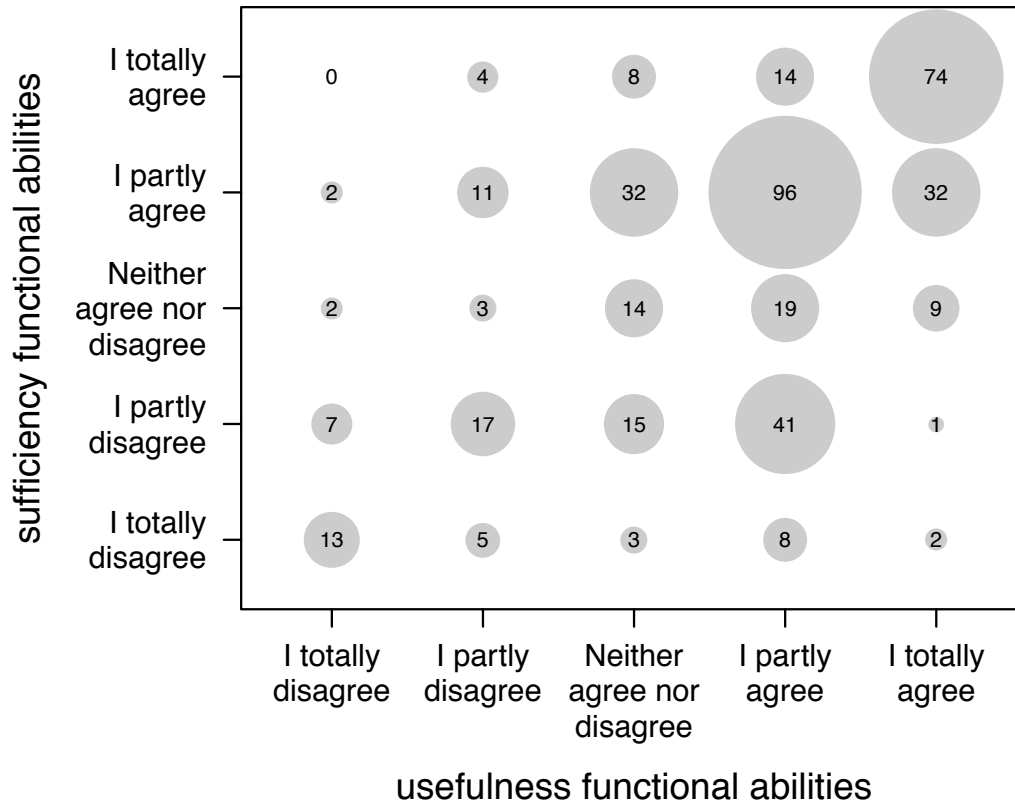
Legend: M= diseases of the musculoskeletal system and connective tissue, F= mental and behavioural disorders, C/D= neoplasms, I= diseases of the circulatory system, others = all other ICD-10 diseases. All disease groups with the letter "a" do not differ from each other.

Figure 4b: Perception of the medical examiners about the EUMAS Core Set being ‘sufficient’ to express a claimant’s functional (in-) capacities, disease groups:



Legend: M= diseases of the musculoskeletal system and connective tissue, F= mental and behavioural disorders, C/D= neoplasms, I= diseases of the circulatory system, others = all other ICD-10 diseases. All disease groups with the letter “a” do not differ from each other, all disease groups with the letter “b” do not differ from each other, all disease groups with the letter “c” do not differ from each other; disease groups with the letter “a” differ from disease groups with the letter “b” and “c”, disease groups with the letter “b” differ from disease groups with the letter “a” and “c”, disease groups with the letter “c” differ from disease groups with the letter “a” and “b”.

Figure 5: Correlation between perceived usefulness of the EUMASS ICF instrument to medical examiners versus sufficiency of its 20 categories in describing functional (in-) capacities. The areas of the circles are proportional to the absolut



Appendix

Appendix 1:

Core Set validation form

Below, we have listed 20 categories that should be considered when the medical doctor evaluates a claim for long-term incapacity for work. During your evaluation of the claimant, we want you to mark for each category the degree of impairment (for category 1-5) or the degree of activity limitation (for category 6-20) that he/she has, when he/she is using the usual supportive aids, such as hearing aids, glasses, or walking sticks. If necessary, use the ICF definition for all categories.

For the grading of answers use the following system:

No impairment/limitation means the person has no problem

Mild impairment/limitation means a problem that is with an intensity a person can tolerate.

Moderate impairment/limitation means that a problem that is present with an intensity which is interfering in the person's day to day life.

Severe impairment/limitation means that a problem that is present with an intensity, which is partially disrupting the persons day to day life.

Complete impairment/limitation means that a problem that is present with an intensity, which is totally disrupting the persons day to day life.

Data on the claimant:

Age.....

Gender.....

Main medical diagnosis underlying the claim.....

Other major health conditions affecting work ability.....

For how many months has the claimant been off work.....months

Professional category before leaving work (ISCO-88 categories):

- Legislators, senior officials, and managers
- Professionals
- Technicians and associate professionals
- Clerks
- Service workers and shop and market sales workers
- Skilled agricultural and fishery workers
- Crafts and related trade workers
- Plant and machine operators and assemblers
- Elementary occupations
- Armed forces

Code	Function	Extent of impairment/activity limitation					Not relevant°	Information lacking*
		No	Mild	Moderate	Severe	Complete		
b164	Higher-level cognitive functions							
b280	Sensation of pain							
b455	Exercise tolerance functions							
b710	Mobility of joint functions							
b730	Muscle power functions							
d110	Watching							
d115	Listening							
d155	Acquiring skills							
d177	Making decisions							
d220	Undertaking multiple tasks							
d240	Handling stress and other psychological demands							
d399	Communication, unspecified							
d410	Changing basic body position							
d415	Maintaining a body position							
d430	Lifting and carrying objects							
d440	Fine hand use							
d445	Hand and arm use							
d450	Walking							
d470	Using transportation							
d720	Complex interpersonal interactions							

°: only in questionnaire for personal encounter;

*: only in questionnaire for file-based assessment.

Did you miss any category (or categories) in this particular case:

1.....

2.....

3.....

Other comments to the list.....

.....

You have just used a preliminary core set in the evaluation of the claimant. Please answer the following questions about the core set in relation to this particular case

	I totally agree	I partly agree	Neither agree nor disagree	I partly disagree	I totally disagree
I found the core set useful in assessing the claimant's functional abilities					
I found the core set sufficient to assess the claimant's functional abilities					

How much extra time (in addition to your usual handling of the case) did you use to evaluate the 20 categories in the core set?

.....minutes

Did you have to consult additional sources to be able to use the core set?

Yes, I had to use.....

No

Thank you for your contribution

Appendix 2: Missing categories in the EUMASS ICF instrument

Missing ICF categories	ICF Codes	Country* (frequency)
Mental functions	b1	NO (n=6)
Temperament and personality functions	b126	BE (n=2)
Psychic stability	b1263	BE (n=3)
Confidence	b1266	BE (n=2)
Energy and drive functions	b130	BE (n=1), DE (n=2)
Energy level	b1300	BE (n=1), NO (n=1)
Motivation	b1301	BE (n=2)
Sleep functions	b134	BE (n=4)
Attention functions	b140	BE (n=3), NO (n=1)
Memory functions	b144	BE (n=3)
Emotional functions	b152	BE (n=1), NO (n=2)
Sensations associated with hearing and vestibular function	b240	FR (n=1), NO (n=1)
Procreation functions	b660	BE (n=2)
Transferring oneself	d420	FR (n=4)
Turning or twisting the hands or arms	d4453	FR (n=2)
Interpersonal interactions and relationships	d7	BE (n=1), NO (n=1)
Lack of activity to resume work	nd-d (not definable activity and participation)	BE (n=1), NO (n=1)
Lack of motivation for work	pf (Personal factor)	BE (n=1), DE (n=1)

Legend: *BE = Belgium, FR = France, DE = Germany, IS = Iceland, NO = Norway

Chapter 6:

General Discussion

Overview

In the following general discussion, I first summarize the background of the research presented in this thesis. Further, I present a short summary of the main results of the included studies and their strengths and limitations with a focus on the main questions. Finally, I discuss the impact of the research findings and indicate perspectives for research and practice.

Background

Medical reports in disability evaluation in social security are criticized for lack of standardization and transparency in European countries¹⁻⁷.

Various authors recommend the International Classification of Functioning, Disability and Health (ICF) for disability evaluation as it provides universal definitions^{4,8,9}. With these definitions, the ICF could facilitate a more standardized way of reporting work capacity^{4,8}. These authors do not specify how to use the ICF in practice^{4,8,9}.

In this PhD thesis, I describe four studies that I conducted with various co-authors to answer the following research questions:

1. How can the ICF framework and classification be used to depict the medical reports in disability evaluation?
2. To what extent does the ICF framework and classification cover the content in medical reports in disability evaluation?

Summary of the main results

In study 1, we interviewed central medical advisors from 15 European countries about medical reports in disability evaluation in the field of social insurance. We found that the handicapped role is a universal central concept in medical reports among these countries. Medical examiners are expected to report on the following four key features: work capacity, socio-medical history,

feasibility of interventions (to promote recovery and return to work), and prognosis of disability. Work capacity is operationalized differently among these countries. For example, medical examiners report on work capacity differently, using free text, semi-structured or fully structured report forms. All (semi-) structured forms can be related to the ICF but only the Swedish report form is explicitly based on ICF categories¹⁰. The Swedish disability insurance has studied first experiences with the recently developed Swedish report form¹¹.

Study 2 is based on a literature review. We discussed the four key features (work capacity, socio-medical history, feasibility of interventions, and prognosis of disability) from the first study and we found that an additional four key features (health condition, causality, consistency of the situation of a claimant, and legal disability) belonged to the content of the medical reports. Further, we discussed potential benefits of the ICF to structure and phrase medical reports in disability evaluation in social insurance. The *ICF framework* allows medical experts to describe the claimant in a bio-psycho-social way, reflecting the current approach of disability that is entering disability evaluation. However, the ICF framework cannot cover the dynamic time perspective of disability, and exclusive causal relationship between health condition and work capacity.

With the *ICF classification*, medical experts can systematically specify health conditions with ICF categories about body functions and body structures. Medical examiners can depict work capacity (body functions, and activity & participation) and to a lesser extent work characteristics (work environment, and activity & participation describing specific work) with ICF categories. The ICF categories do not cover socio-medical history, feasibility of interventions or prognosis of disability because the classification does not include categories for personal factors and dynamic time perspective. Furthermore the classification does not include categories to cover causality, consistency, and legal disability¹².

In study 3, we translated 72 medical reports in the field of social insurance (27 reports on chronic widespread pain, 22 reports on low back pain, and 23 reports on both health conditions) into ICF categories. We found that the content of the medical reports involving chronic widespread pain and

low back pain can be covered to some extent by combining ICF core sets of these health conditions with core sets of frequent comorbidity. Specific aspects of work capacity and specific terms of disability evaluation in the medical reports could not be depicted with the ICF core sets¹³.

In study 4, we performed content validation for the generic EUMASS Core Set. Forty-eight medical examiners from 6 different countries evaluated 446 claimants for long-term work disability benefits using the EUMASS Core Set. The medical examiners used all 20 categories of the EUMASS Core Set with varying frequencies to describe the claimants' work capacity. The medical examiners suggested additional categories that were not included in the EUMASS Core Set, in particular categories to describe impairments in mental functions. The medical examiners perceived the EUMASS Core Set as useful and sufficient to express work capacity for the majority of claimants, but the perceptions varied among countries and health conditions¹⁴.

Strengths and limitations

These are the first studies that compared the content of medical reports across European countries. The various studies presented in this PhD thesis provide the groundwork to understand whether there is common reporting content in medical reports across Europe. We found ways through which the ICF framework and classification have potential to contribute to improving medical reports, and where the ICF framework and classification have crucial gaps that limit their use. Our findings will guide further research in the area.

We explored the ICF in medical reports of disability evaluation from different viewpoints to get a broad view of the applicability of the ICF in medical reports of disability evaluation: 1) a conceptual study took a European perspective (study 2); 2) empirical studies with a Swiss (study 3) and European perspective (study 1 & 4); 3) the Swiss study explored disability evaluation from a research perspective (study 3), and the European studies took a professional perspective (study 1 & 4). We did not find any comparable studies in Europe or other parts of the world.

However, this thesis has limitations:

1. We only included medical examiners' perspective in this thesis. However, in many European countries, social insurance officers make decisions on the legal disability of the claimant¹⁵⁻¹⁷. We do not know how it is for social insurance officers to work with ICF based report formats. We did not evaluate the step from medical examiners evaluation about health condition and work capacity to social insurance officers' judgement about legal disability. Future research is required to address these gaps.
2. The terms we used are not completely consistent between countries and thus the information does suffer from limitations especially in study 1, and 4. We tried to avoid misunderstanding by clarifying the terms.
3. Medical examiners from six countries participated in study 4. It would have been advantageous to include medical examiners from all 15 countries that participated in the survey. Additionally, our results would have been more informative if we were able to successfully obtain the participation of medical examiners with working experience in standardized instruments (such as medical examiners from the Netherlands, the United Kingdom and Sweden).

Despite these limitations, this thesis provides a strong base for future research for medical reports in disability evaluation in the field of social insurance.

Important aspects regarding our research findings

In this paragraph I stress the impact of our research findings. The main focus how to improve standardization and transparency in medical reports of disability evaluation and to give some perspectives for future research and practice.

Content of medical reports

Recently, researchers have performed research on the legal-, the organisational- and the professional level for disability evaluation in social security among European countries¹⁷⁻²³. However, no studies

have investigated if the content of medical reports in disability evaluation is similar. The work from this thesis shows that medical reports share similar key features among European countries (health condition, work capacity, socio-medical history, feasibility of intervention, prognosis of disability, legal disability, causality, and consistency of the situation of the claimant), despite differences in operationalization of the content^{10,12}. This confirms that there is common basis for international research on, and the development of, the content of medical reports.

ICF framework in medical reports

Professional guidances on disability evaluation advise medical experts to draft a complete picture of the claimant^{16,24,25}. The bio-psycho-social framework of the ICF embodies with its different components (health condition with functioning, and environmental- and personal factors) a complete picture of the claimant^{26,27}. However, the ICF framework is not sufficient to standardize medical reports and to bring more transparency in medical reports because it describes disability on an abstract level. For more standardization medical examiners need common definitions.

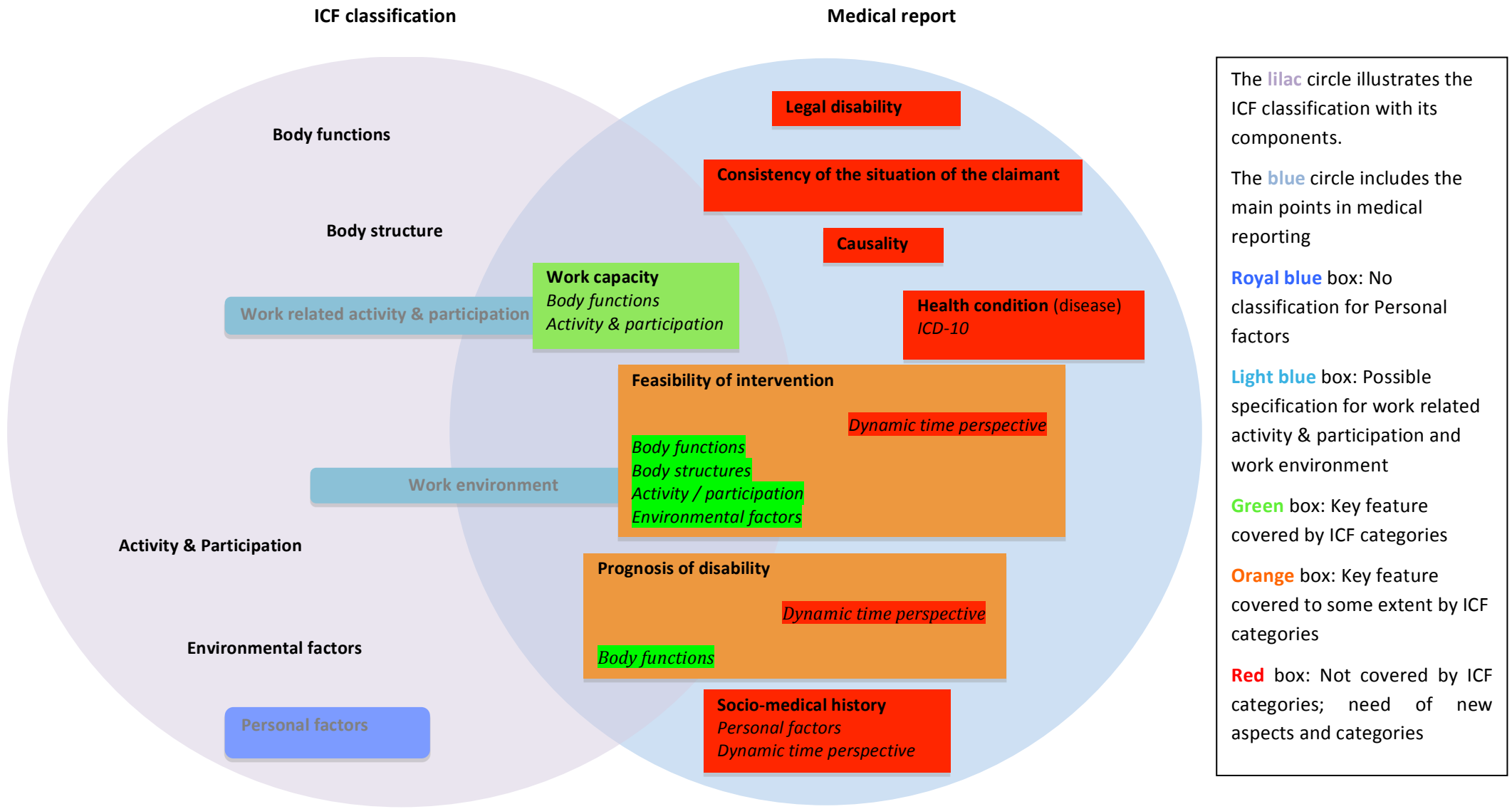
ICF classification in medical reports

The ICF classification with its categories might offer more standardization. The ICF classification appears to be able to cover *work capacity*: what a person can do and not do in relation to a work environment. What a person is able and unable to do can be depicted in general terms (such as carry, lift, sit, walk) and environmental factors can be depicted to some extent (such as sound, and light) with ICF categories. However, study 3, a different study from disability evaluation and studies from work rehabilitation show that current ICF categories run short of typical descriptions of work capacity (such as overhead working, change positions, high physical activity etc.)^{13,28-31}. Environmental factors lack categories to describe the work environment in sufficient detail, such as office work, mental work, and physical work³². In contrast the medical examiners who used the EUMASS Core Set (study 4) to describe work capacity evaluated the listed ICF categories mainly as useful and sufficient and did not miss many categories in the EUMASS Core Set to describe work capacity¹⁴. This difference

between study 3 and 4 may stem from various factors. In study 3, we analysed full reports with the complete ICF classification, whereas in study 4 we analysed a part of the conclusion of medical examiners with a core set of only 20 ICF categories. Furthermore, study 3 examined reports that were part of the real process of disability evaluation whereas in study 4 we asked the medical examiners to evaluate the EUMASS core set in a stand-alone fashion. Apart from work capacity as a key feature, we found seven more key features of medical reports. *Feasibility of intervention* and *prognosis of disability* are cumbersome to describe with ICF categories and can only be covered to a limited extent. The *Health condition* is classified primarily on an abstract level in ICD-10³³. The other four key features (*social-medical history, legal disability, causality, and consistency of the situation of the claimant*) cannot be covered at all; they need specifications of ICF categories or new aspects to be included in the ICF; such as ways to describe relations of time and cause and effect. The limitations of the ICF classification seem to be clear but how these limitations impact disability evaluation practice remains unclear.

Figure 1 illustrates to what extent the ICF classification can capture the content of medical reports.

Figure 1: Components of the ICF classification, key features of medical reports and their overlaps



Legend: This graphic illustrates the overlap of the ICF classification (with its components) and medical reports (with the required key features) in Europe.

The overlap illustrates which key features can be depicted to what extent with ICF categories.

ICF core sets for medical reports

We found that the ICF framework is rather general and the classification offers possibilities to standardise medical reports, albeit with clear limitations. The ICF classification with its 1424 categories is not usable for daily routine. It requires tailoring to the practice of disability evaluation. In order to make the ICF classification practicable, researchers have started to select the most important ICF categories, and developed core sets for specific health conditions (such as low back pain, and chronic widespread pain) and a generic core set (vocational rehabilitation) to describe a person's health and function (33 core sets were developed in the German speaking countries; January 2012)³⁴⁻⁴¹. Core sets might be useful in disability evaluation too.

Core sets for specific health conditions: Our study 3 and Kirschneck's study show that ICF core sets have potential for structuring medical reports because it is possible to use these core sets to cover to some extent the content of medical reports^{4,13,42}. However, to use health condition core sets is cumbersome because of two limitations: 1) there are not enough core sets to describe all health conditions 2) claimants often suffer from comorbidities and therefore medical examiners would often need to use several core sets in disability evaluation^{1,7}. This would make the process time consuming. Moreover, due to overlap of many categories between core sets, medical examiners might end up doing redundant work.

One might make core sets for specific health condition more practicable by combining several core sets; i.e., select the most frequent health conditions and comorbidities and merge these into broader core sets. We described this approach in study 3 where we merged the core sets on Low Back Pain, Chronic Widespread Pain and Obesity with the core sets on Low Back Pain, Chronic Widespread Pain and Depression. When including many health conditions, this approach moves towards a generic core set.

Generic core set: One could start with a generic core set as well. There is already one generic core set for disability evaluation, the EUMASS Core Set⁸. This generic core set is expected to be applicable for

all health conditions. Our research shows that this core set is promising. Medical examiners found this core set useful and sufficient to express work capacity but they missed mental function categories (study 4).

We found two other (semi)-generic core sets with potential for use in disability evaluation. The Swedish Core Set was developed on the basis of the EUMASS Core Set¹¹. The Swedish Core Set includes 18 activity categories. The body function categories of the EUMASS Core Set were replaced with the activity categories. With this core set, medical examiners hoped to bring more standardization and transparency in medical reports. The Swedish disability insurance is currently implementing the Core Set.

The mini-ICF APP is an example of a semi-generic core set for psychiatric and psychosomatic health conditions. It is based on the ICF classification and the Groningen Social Disability Schedule and allows psychiatrists to describe the functional capacity of patients with mental health problems^{43,44}. The mini-ICF APP was not developed for disability evaluation in social security, but researchers of the Academy of Swiss Insurance Medicine (asim) have recently started to test this semi-generic core set in the field of disability evaluation.

Given that the health condition core sets and the generic core sets already exist, one could adapt them for disability evaluation. However, these core sets are expert based and not based on empirical data from claimants and labour market such as what do claimants experience most frequently as limitations of their work capacity and what are the requirements of work that are most frequently an obstacle to people with disabilities? One could develop a generic core set after answering these questions in an empirical manner. This would provide a more solid evidence base than we have currently. A drawback of this approach is that it starts from scratch, which requires additional time and resources.

Medical examiners in different countries might all wish to develop their own specific core sets in disability evaluation. However, as I do not expect the labour markets and the health conditions between European countries to be radically different, medical examiners could also join efforts in

developing a core set that is applicable in all European countries. Such a core set would also make exchange of information between European countries easier and improves comparison and collaboration.

The application of such an international core set might however still be different between countries as legal disability processes of disability evaluation are different among European countries^{17,19,45-48}.

Given the findings from this PhD thesis, it seems possible that ICF categories can help to promote standardized presentation and enhance transparency in disability evaluation in social security. Whether report forms based on the ICF core sets can improve the reliability of medical reporting is still unsettled. Report formats based on ICF core sets might be easier to understand for Jan our example from the introduction, other claimants, social insurance officers, and judges.

Conclusion

Medical reports about disability for work show common key features among European countries. The ICF framework fits into the current thinking about disability, and the ICF classification could help standardize reporting in disability evaluation. Further research is required if ICF categories must be specified and extended to describe work capacity and work environment. Medical examiners and researchers could develop an international core set as a starting point to make medical reports more transparent and comparable across Europe. Further research is needed to investigate if a core set does indeed promote transparency in disability evaluation.

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Curriculum Vitae

Curriculum Vitae

Last Name	Anner
First Name	Jessica
Date of birth	23 February 1981
Nationality	Swiss

Work Experience

Jan 2012 – present	Health Prevention Specialist Novartis Pharma AG
May 2009 – Dez 2012	Junior researcher Academy of Swiss Insurance Medicine (asim), University Hospital Basel
Oct – Dez 2008	Internship IHBI Brisbane Australia Institute of Health and Biomedical Innovation, Queensland University of Technology Prof. Dr. Andrew Hills
Feb – Apr 2008	REHAB Basel Center of Paraplegic and Brain - Injuries Swiss Paraplegic Center, Basel
May 2006 – present	„Jugend & Sport“ Expert Tennis (Train the trainer)
Aug 2006 – Aug 2008	Member of the 1. Devision (NLA), Single and Double Player Tennis Club Old Boys, Basel
Apr 2004 – present	Tennis Coach, Fitness Coach / Personal Trainer Tennis School Vito Gugolz, Basel
Apr 2004 – Sep 2008	Fitness- and Coordination Coach Tennis Club Old Boys, Basel
Apr 2003 – Sep 2008	Tennis Coach Tennis Club Old Boys, Basel
Apr 2002 – Sep 2008	Tennis Coach Tennis Club Hakoah, Basel

Mentoring Programm

May 2012 – present **Women into Industry (WIN)** Novartis AG

Education

Oct 2009 -present **PhD** Institute of Exercise and Health Sciences
Faculty medicine, University of Basel and University Hospital of Basel
PhD thesis: “Disability evaluation and the International Classification of Functioning, Disability and Health“
Supervisors: Prof. Regina Kunz, asim, University Hospital Basel
 Dr. Wout de Boer, MD PhD, asim, University Hospital Basel
External Expert: PD Dr. Andreas Klipstein
Head of faculty: Prof. Dieter Kunz

- Oct 2005 – Jan 2008 **Master Degree** (MSc.) in Exercise and Health Sciences
 Focus on prevention & rehabilitation, University of Basel
 Master thesis: “Effects of low intensity whole body vibration on cardiovascular response and lower extremity blood flow in healthy middle-aged subjects“
 Supervisors: PD Dr. Susi Kriemler; University of Basel
 Prof. Kurt Jaeger; University Hospital Basel
- Oct 2002 - July 2005 **Bachelor Degree** (BSc.) in Exercise and Health Sciences Focus on prevention & rehabilitation
 University of Basel
- Oct 2004 – May 2005 **Bachelor Project** „Stiftung Olsberg – difficult educable children“
- Aug 1992 – Jun 2001 **Secondary School**
 Matura at Freies Gymnasium Basel
- Apr 1988 – June 1992 **Primary School**

Languages

German	Native language
English	Fluent
French	Good
Italian	Good
Spanish	Basics

Peer-Reviewed Publications

1. Shultz SP, **Anner J**, Hills AP. Paediatric obesity, physical activity and the musculoskeletal system. *Obes Rev.* 2009 Sep;10(5):576-82. Epub 2009
2. **Anner J**, Schwegler U, Kunz R, Trezzini B, De Boer W. Evaluation of work disability and the international classification of functioning, disability and health: what to expect and what not. *BMC Public Health* 2012, 12:470
3. **Anner J**, Kunz R, De Boer W. The handicapped role – a framework for reporting disability in social insurance in Europe [submitted *Disability and Rehabilitation*]
4. **Anner J**, Brage S, Donceel P, Falez F, Freudenstein R, Oancea C, De Boer W. Validation of the EUMASS Core Set for Medical Evaluation of Work Disability. [accepted *Disability and Rehabilitation*]
5. Schwegler U, **Anner J**, Boldt C, Glässel A, Lay V, de Boer WEL, Stucki G, De Boer W, Trezzini B. Aspects of functioning and environmental factors in medical work capacity evaluations of persons with chronic widespread pain and low back pain can be represented by a combination of applicable ICF Core Sets . *BMC Public Health* 2012, 12:1088
6. Schwegler U, **Anner J**, Glässel A, Brach M, De Boer W, Cieza A, Trezzini B. Specifications of the ICF taxonomy in the context of medical evaluations of work capacity involving claimants with chronic widespread pain and low back pain - To dive, to add and to fill the gap [submitted *Disability and Rehabilitation*]

Book Chapter

1. De Boer W, Anner J, Kunz R, Der Beweis der Arbeitsunfähigkeit - Neue Wege in der medizinischen Begutachtung. Riemer-Kafka G. Tagungsband Luzerner Zentrumstage.

Presentations

Plenary Session

1. **Anner J**. ICF in der Begutachtung – Eine Lösung auf der Suche nach einem Problem? Versicherungsforum SwissRe. Zürich (CH), September 2012
2. De Boer W, **Anner J**. Disability Evaluation and ICF. International Seminar on Insurance Medicine. Leuven, February 2012
3. De Boer W, **Anner J**. ICF und Begutachtung. Weiterbildungsveranstaltung Universität Luzern 2012

4. De Boer W, **Anner J**, Kunz R. Der Beweis der Arbeitsunfähigkeit. Luzern: Luzerner Zentrumstage. October 2012

Parallel Session

1. **Anner J**. Disability evaluation: A place for ICF? Riksstämman – Medicinska Riksstämman, Svenska Läkaresällskapet (annual convention of the Swedish medical association). Stockholm (SE), November 2012)
2. **Anner J**. The International Classification of Functioning, Disability and Health in disability evaluation: What can we expect from it? DICIM. Almere (NL) November 2012
3. **Anner J**, Brage S, Donceel P, Falez F, Freudenstein R, Oancea C, de Boer W. Validation of the EUMASS Core Set in Social Insurance. **XIXe** EUMASS Congress. Padova (I), June 2012
4. **Anner J**, de Boer W. Die funktionelle Leistungsfähigkeit in Gutachten von Versicherten mit Rückenschmerzen: Eine empirische Untersuchung. SIM-Tagung. Olten (CH), March 2012
5. **Anner J**, BrageS, Donceel P, Falez F, Freudenstein R, Oancea C, de Boer W. Validierung des EUMASS Core Sets für die Begutachtung in der Sozialversicherung. Rehabilitationswissenschaftliches-Kolloquium. Hamburg (D), March 2012
6. **Anner J**. Disability Evaluation. Ceb University Hospital. Basel (CH), November 2011
7. **Anner J**. The Output of medical evaluation of work disability in European countries: a place for ICF? DICIM. Almere (NL), November 2011
8. **Anner J**, de Boer W. Validation of the EUMASS core set. ICF Working group. Helsinki (FIN), September 2011
9. **Anner J**, Boldt C, Bollag Y, Cieza A, Glässer A, Gyr N, Schwegler U, Stucki G. Die Anwendung der ICF Core Sets in der Begutachtung von Patienten mit lumbalren Rückenschmerzen und generalisiertem Schmerzsyndrom. University professional in Versicherungsmedizin (Management von Behinderung und Funktionsfähigkeit in der Rehabilitation). Nottwil (CH) December 2009
10. De Boer W, **Anner J**. ICF and Evaluation of Work Disability in Social Insurance. **XIXe** EUMASS Congress. Padova (I), June 2012
11. De Boer W, **Anner J**, Kunz R. Expression of (dis)ability, the role of ICF. WDI. Groningen, October 2012

Poster Session

1. **Anner J**, Kunz R, De Boer W. Reporting about disability evaluation in European countries. Poster presentation. Swiss public health conference. Lausanne (CH), August 2012

2. **Anner J**, Brage S, Donceel P, Falez F, Freudenstein R, Oancea C, de Boer W. The validation of the EUMASS core set for disability evaluation. University of Southern Denmark PhD School in Rehabilitation Research 2011. Copenhagen (DAN), December 2011
3. **Anner J**, Schwegler U, Boldt C, Bollag Y, Glässer A, Karl K, Stucki G, Kunz, R. The Use of the ICF Core Sets for Medical Expertises of Patients Suffering Low Back Pain and Chronic Widespread Pain. Asim Jahrestagung. Basel (CH), December 2010

PhD Lectures

Autumn Semester 2011

4 ECTS PhD School in Rehabilitation Research 2011, University of Southern Denmark

Spring Semester 2011

3 ECTS Qualitative Forschungsmethodik
Institute of Exercise and Health Sciences, University Basel

1 ECTS SWISS TPH Research Seminar
Swiss Tropical and Public Health Institute, University of Basel

Spring Semester 2010

1 ECTS Scientific Paper Writing
University Basel

1 ECTS Mixed Methods Research and Evaluation
Swiss School of Public Health+, University of Basel

1.5 ECTS Schadenbearbeitung und Schadenbeurteilung
University of Professional Versicherungsmedizin, University of Basel

0.75 ECTS Individuelles Betreuungsmanagement
University of Professional Versicherungsmedizin, University of Basel

0.25 ECTS Interdisziplinäre Ansätze in Public Health und Epidemiologie
University of Professional Versicherungsmedizin, University of Basel

Autumn Semester 2010

1 ECTS How to write a paper... and get it published (1 ECTS)
Swiss School of Public Health+, University of Basel

0.75 ECTS Management von Behinderung und Funktionsfähigkeit in der REHA
University of Professional Versicherungsmedizin, University of Basel

0.5 ECTS Arbeitsmedizin
University of Professional Versicherungsmedizin, University of Basel

Autumn Semester 2009

3 ECTS Kranken und Unfall Versicherung
Unive