



Ministerie van Sociale Zaken en  
Werkgelegenheid

Opdrachtgever

UWV



Opdrachtnemer

Bert Cornelius

Onderzoek

*A view beyond the horizon. A  
prospective cohort study on mental  
health and long-term disability*

*Startdatum – 1 oktober 2008*

*Einddatum – 31 december 2010*

Categorie

Arbeidsmarkt

# A view beyond the horizon. A prospective cohort study on mental health and long-term disability

Link naar bestand

<http://www.onderzoekwerkeninkomen.nl/rapporten/iyghobq8>



# **A VIEW BEYOND THE HORIZON**

**A PROSPECTIVE COHORT STUDY ON MENTAL HEALTH  
AND LONG-TERM DISABILITY**

**BERT CORNELIUS**

The study presented in this thesis was conducted at the Department of Health Sciences, Community and Occupational Medicine, University Medical Center Groningen (UMCG), University of Groningen, The Netherlands. This department participates in the Dutch Research Center for Insurance Medicine, along with the VU University Medical Center, Amsterdam Medical Center, University of Amsterdam and the Dutch Social Security Institute (UWV).



Kenniscentrum  
Verzekeringsgeneeskunde

This study was funded by the UWV. Printing of this thesis was generously supported by the University of Groningen, UMCG and UWV.



rijksuniversiteit  
 groningen



umcg



UITVOERING WERKNEMERSVERZEKERINGEN

<b>Photos</b>	Bert Cornelius
<b>Lay-out</b>	Erica Eijklaar, Groningen
<b>Printed by</b>	Gildeprint, Enschede

**ISBN** 978-90-367-6608-1

© 2013 L.R. Cornelius

**RIJKSUNIVERSITEIT GRONINGEN**

# **A VIEW BEYOND THE HORIZON**

**A PROSPECTIVE COHORT STUDY ON MENTAL HEALTH  
AND LONG-TERM DISABILITY**

## **PROEFSCHRIFT**

ter verkrijging van het doctoraat in de  
Medische Wetenschappen  
aan de Rijksuniversiteit Groningen  
op gezag van de  
Rector Magnificus dr. E. Sterken,  
in het openbaar te verdedigen op  
woensdag 11 december 2013  
om 14.30 uur

## **DOOR**

**LAMMERT REINT CORNELIUS**

geboren op 17 juli 1952  
te Groningen

---

<b>Promotores</b>	Prof. dr. J.J.L. van der Klink Prof. dr. J.W. Groothoff
<b>Copromotor</b>	Dr. S. Brouwer
<b>Beoordelingscommissie</b>	Prof. dr. A.H. Schene Prof. dr. P. Verhaak Prof. dr. H. Wind

---

**Paranimfen**

Elise Michel  
Lex van de Ven



## CONTENTS

---

<b>Chapter 1</b>	General introduction	9
<b>Chapter 2</b>	Design of PREDIS: a prospective cohort study among disability claimants	21
<b>Chapter 3</b>	High prevalence of early onset mental disorders among long-term disability claimants	33
<b>Chapter 4</b>	Under-recognition and under-treatment of DSM-IV classified mood and anxiety disorders among disability claimants	49
<b>Chapter 5</b>	The performance of the K10, K6 and GHQ-12 to screen for present state DSM-IV disorders among disability claimants	67
<b>Chapter 6</b>	Development and validation of the Diagnostic Interview Adjustment Disorder (DIAD)	83
<b>Chapter 7</b>	Prognostic factors of long-term disability due to mental disorders: a systematic review	109
<b>Chapter 8</b>	Predicting improvement of functioning in disability claimants	137
<b>Chapter 9</b>	Predictors of functional improvement and future work status after the disability benefit claim: a prospective cohort study	153
<b>Chapter 10</b>	General discussion	175
<b>Summary</b>		195
<b>Samenvatting</b>		201
<b>Dankwoord</b>		209
<b>About the author</b>		213
<b>Research institute for Health Research SHARE</b>		215

**Voor Willemien en Mieke**

Haren, oktober 2013

## CHAPTER 1 GENERAL INTRODUCTION

---

### ›BEYOND THE HORIZON‹

Workers on long-term sick leave may eventually reach the disability gate at the horizon, where their disability benefit claim is assessed. All face unknown landscapes beyond this horizon. The studies described in this thesis explore unfamiliar territory after the disability gate, aiming to offer a prospective view on relations between mental health and disability.

### ›DISABILITY AND MENTAL DISORDERS‹

Mental disorders are leading causes for disability worldwide [1-3]. In all regions of the World Health Organization (WHO), mental disorders account for around 30% of years lost to disability [4]. In Europe, depression is the leading cause, accounting for 14% of all years lived with disability [1]. In the Netherlands, of all persons being granted first disability benefit in 2010, 31% has a primary diagnosis of mental disorder and 10% has a comorbid somatic disorder [5]. Aside from individual suffering by mental health complaints, long-term disability due to mental disorders is associated with reduced quality of life and higher morbidity/mortality rates [6]. Besides these negative personal consequences, the societal burden of direct and indirect costs caused by mental disorders in the workforce is enormous [7,8].

In contrast to what is commonly believed, the prevalence of mental disorders in the general population of western industrialized countries has not changed in the past decades [9,10]. However, in most countries, there is a rapid increase of newly granted disability benefits for persons with mental disorders [11] and mental disorders are strongly associated with disability benefit awards [12-14]. To illustrate, in some high-income countries, mental disorders now account for up to 50% of disability benefit claims, rising to as much as 70% for young adults [15]. In the Netherlands in the period 2006-2011, inflow into disability benefit related to mental disorders has risen slightly from 35% to 40% of all granted claims, but the proportion of those accepted for full benefit has increased from 39% to 75% [5,16].

The discrepancy between stable general population prevalence and raised disability benefit inflow may be related to the continuous increase of mental workload in the past decades in European countries [11,17,18]. The European Working Condition Surveys have showed several key trends that might be related to this process [17-19]. In the past decades, changing job requirements and work loads in high-knowledge services demand higher social skills and cognitive competences, making it increasingly difficult for workers with poor mental health to perform adequately [11]. The proportion of workers with temporary working contracts and related self-perceived job insecurity have increased and studies have shown a strong correlation between temporary employment and poorer mental health. On average, the number of hours worked per week has drifted downwards,

while working at high speed and to tight deadlines has stayed at the same high level. The proportion of workers having a double workload has risen. An increasing number of workers are having difficulties reconciling demands in working and non-working private life, e.g. household activities, child-rearing, care of dependent relatives and leisure time. All these gradually changing working and non-working conditions are likely to put persons with mental disorder at a higher risk of sickness absence and disability. At the same time, the discrepancy between prevalence and disability benefit inflow may also be related to gradually reduced stigma and discrimination, greater public awareness and better psychiatric services, and to shifted views on the work ability of persons with mental disorders [11].

Once disability benefit is awarded, only around 1-2% of all beneficiaries move back into employment [15]. Sickness absence and disability with long durations contribute disproportionately to the economic costs: a small proportion of disability episodes comprise up to 75% of absence costs [20,21]. Therefore, greater attention should be paid to prevention, addressing return-to-work (RTW) schemes for claimants with mental disorders being granted disability pensions. In recent years, several European countries have changed disability benefit policies to reduce inflow into disability benefit schemes [22]. These policy changes aim to promote re-entry into the workforce and participation of the disabled worker, providing financial compensation only for those with full work disability. However, increasing inflow into disability benefit suggests that RTW efforts for disability benefit claimants with mental disorders are still insufficient [11,23].

Preventive actions and interventions are needed to promote return to paid employment for those who are assessed as being able to work [11]. For such actions to be successful, it is required to have knowledge about the population at risk, i.e. to adequately describe socio-demography, diagnosis and treatment of claimants with mental disorders, and to assess the prognosis, i.e. to identify factors that predict improvement of functioning, and RTW after disability benefit has been claimed. Therefore, prognostic studies are needed specifically focusing on a population of persons claiming disability benefit after long-term sickness absence. However, to the best of our knowledge, such studies have not yet been conducted. Factors that predict improvement and RTW after the claim are not known. Evidence to support prevention and RTW schemes for persons with mental disorders claiming disability benefit after long-term sickness absence is lacking.

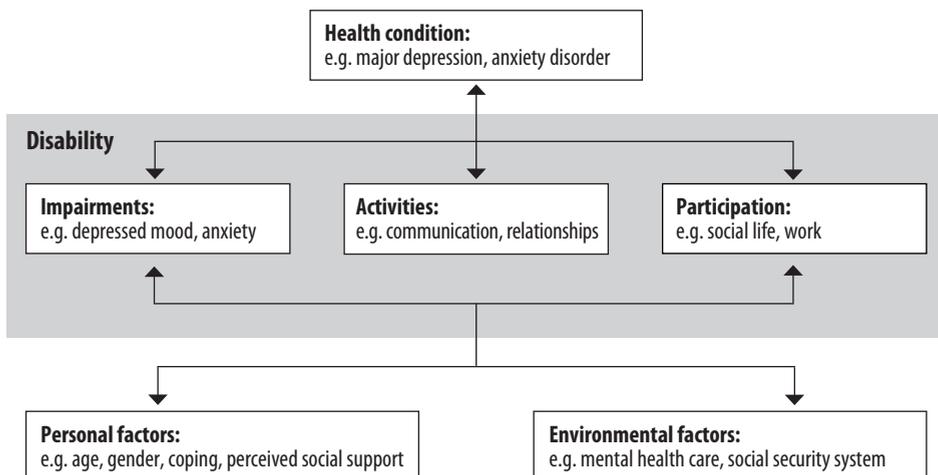
The studies presented in this thesis aim to fill this knowledge gap. They are part of a prospective study on long-term work disability in a cohort of persons claiming disability benefit after two years of sickness absence with specific focus on mental health, the PREDIS (PREdicting DISability) study. In this cohort study, claimants were followed up for one year after their disability benefit claim. Data from self-report questionnaires and comprehensive diagnostic interviews were linked with registry data. Setting, design and measures of the study are more elaborately described in Chapter 2 of this thesis.

## ›CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH‹

The difficulties people experience in performing routine activities at home, work, school or in other social areas, are important reasons for seeking treatment or reporting sick, rather than the disease itself [24]. In psychiatry, it is generally recognized that the clinical significance of mental disorders is better defined in terms of disability, i.e. impairment in social, occupational, or other important areas of functioning, then in number or severity of symptoms. Since disability and mental illness are different entities, they should be assessed separately. However, definition and measurement of disability is difficult, because it is influenced by person-environment interactions. To better understand this complicated interplay, the *International Classification of Functioning, Disability and Health* (ICF) is a useful consensus framework [25].

The ICF is a bio-psycho-social classification system to describe causes and consequences of disease. In general, it defines disability as an umbrella term for impairments, i.e. body functions and structures, activity limitations, and participation restrictions. Disability refers to the negative aspects of the interaction between a health condition and personal and environmental factors. Figure 1 shows the model reflecting the ICF, applied to disability benefit claimants with mental health problems.

**Figure 1** The ICF-model specified for disability claimants with mental disorder



## ›CLASSIFICATION OF MENTAL DISORDERS‹

Mental disorders vary over time and across cultures, depending on what is considered to be normal and abnormal in specific times and populations. Therefore, mental disorders, in contrast to many somatic disorders, do not exist as nosological entities. Two of the

currently most widely accepted systems to classify mental disorders are the fourth version of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) [26] and the tenth version of the *International Classification of Diseases* (ICD-10) [27]. In this thesis, both systems are used to classify mental disorders. Since the diagnosis of mental disorders among disability claimants is a key issue in this thesis, both systems are briefly introduced.

### DSM-IV

The fourth edition of the DSM-IV was published in 1994 building on its predecessors as a categorical classification system with specific criteria to in- or exclude diagnoses of mental disorders. The DSM-IV is based on consensus among psychiatrists, i.e. members of the American Psychiatric Association. The categories are prototypes of mental disorders, offering full descriptions of specific mental disorder phenotypes. A mental disorder is said to be present when a minimal number of diagnostic criteria are met. For some classifications, the DSM-IV uses specifiers to indicate severity, i.e. mild, moderate and severe, and course, i.e. in partial or full remission, and prior history. The DSM-IV is multi-axial: it organizes different aspects of mental disorder on five dimensions or axes: clinical disorders (Axis I), personality disorders and mental retardation (Axis II), general medical conditions (Axis III), psychosocial and environmental problems (Axis IV) and Global Assessment of Functioning (GAF, Axis V). This multi-axial classification is meant to capture the complexity of clinical situations and the heterogeneity of persons presenting with the same diagnosis. The DSM-IV claims to be a-theoretical, disregarding any underlying etiology. This approach reflects the insight that mental disorder results from complex interplay between biological, psychological and social factors, and that clear pathophysiological causes of mental disorder are not known.

The fifth edition of the DSM (DSM-5) [28] was published in May 2013, just after the cohort study described in this thesis was completed. In the DSM-5, mental disorders are no longer organized in a multi-axial system and denotes important psychosocial and contextual factors (formerly Axis IV) and disability (formerly Axis V) separately. A major change is the replacement of the GAF with the WHO Disability Assessment Schedule (WHODAS) [24] to measure severity of impairment on a scale of 1 (mild) to 3 (severe). A person with a severity index of 1 cannot be diagnosed with a mental disorder. The WHODAS based on the ICF has been used in this thesis to provide a global measure of disability.

### ICD-10

The current tenth edition of the ICD was published in 1992 by the World Health Organization in an effort to optimize international standardization and to include as many prevalent mental disorders as possible. The ICD-10 is designed to be used by medical professionals of any discipline, whether in the somatic or mental domain, and therefore, like its predecessors, includes classifications of both somatic and mental disorders. Like the DSM-IV, the ICD-10 is a categorical system, indicating whether a mental disorder is present or not. Clinical features of mental disorders are described with explicit ex- and inclusion criteria for the diagnosis. Section F of the ICD-10 deals with mental disorder

in 319 categories (codes Foo.o to F99). Unlike the DSM-IV, the ICD-10 classifies mental disorder in one dimension (axis) only, disregarding other relevant aspects, such as the co-occurrence of other mental or somatic disorder and environmental conditions.

## »DIAGNOSTICS OF MENTAL DISORDERS«

In this thesis, mental disorders are diagnosed at baseline with the *World Mental Health Composite International Diagnostic Interview* (WMH-CIDI) and after follow-up with a shortened version thereof. Both generate classifications of mental disorders according to the DSM-IV and ICD-10. Adjustment disorders are diagnosed with the *Diagnostic Interview Adjustment Disorder* (DIAD, an new interview schedule we developed for use in our cohort study).

### COMPOSITE INTERNATIONAL DIAGNOSTIC INTERVIEW

The WMH-CIDI is a fully structured diagnostic interview that generates classifications of lifetime, 12-month and 30-day mental disorders according to the DSM-IV and the ICD-10 [29]. It is the instrument of choice in large-scale psychiatric epidemiological research. The WMH-CIDI can be administered by trained lay interviewers using laptop computer or paper-and-pencil.

The full interview counts 41 sections. The first section contains a life time review with a series of diagnostic stem questions for any of the core disorders under study. The use of stem questions as a screener preceding the probe questions in the following sections for specific diagnoses, increases the accuracy of diagnostic assessments by reducing respondent fatigue and unwillingness to disclose on stem question endorsement [30]. The following 22 sections contain probe questions to generate classifications of specific mental disorder on Axis I of the DSM-IV: two sections for mood disorders, seven sections for anxiety disorders, two sections for substance-use disorders, four sections for childhood disorders and seven sections for other disorders. Four sections assess functioning and physical comorbidity. Two sections assess treatment. Four sections assess risk factors. Six sections assess socio-demographics. Two final sections are methodological. The WMH-CIDI includes only screening sections for psychotic disorder and for personality disorder, but does not yield classifications for the full diagnoses. Questions about treatment are included at the end of each CIDI diagnostic section. When criteria for a DSM-IV classification are met, respondents are asked if they ever in their life talked to a medical doctor or other health professional, about the disorder. After a positive answer, respondents are asked how old they were the first time they did so.

In general population samples, interview time of the full WMH-CIDI is reported to be two hours on average, depending on the mental health state of the respondent. Sections for a specific disorder are asked only when a respondent screens positive for that disorder in the first introductory section. Sections with a negative screen are skipped. This procedure shortens interview time considerably for respondents without mental health problems.

For the baseline diagnosis of mental disorders among disability claimants, we used the WMH-CIDI [29]. For follow-up, we used a shortened version of the CIDI (CIDI 2.1) [31], which assesses 12-month DSM-IV classifications of mental disorders only.

### **DIAGNOSTIC INTERVIEW ADJUSTMENT DISORDER**

An important limitation of the CIDI is the absence of a section dealing with adjustment disorder (AD). Since AD and other stress-related disorders are one of the most commonly reported types of work-related illness [32-34], it was important to assess AD among disability claimants participating in the study described in this thesis. We would have preferred to use an already existing diagnostic instrument with proven validity and reliability that could also be administered by lay interviewers. However, such an interview schedule is not available. Therefore, to make up for the deficiency in the CIDI, we developed a new fully structured interview schedule, to be used in this study for the diagnosis of present state AD: the *Diagnostic Interview Adjustment Disorder* (DIAD). The development of the DIAD and its initial validation is described in Chapter 6 of this thesis.

### **›AIM OF THE THESIS‹**

The studies described in this thesis aim to fill an important knowledge gap in disability research. Its general aim is to describe this population in terms of demographic characteristics, diagnosis and treatment of mental disorders, and to examine the prognosis, i.e. to identify factors that predict functional improvement and RTW in the period after disability benefit has been claimed and assessed. More knowledge on these important, but in this population under-researched issues may help insurance physicians (IP's) to improve their diagnostic, therapeutic and prognostic skills when assessing disability benefit claims. The results may support them and other professionals in disability settings to promote effective treatment and interventions, aimed at improvement of functioning and health, occupational rehabilitation, RTW and prevention of permanent disability.

### **›RESEARCH QUESTIONS‹**

#### **MAIN RESEARCH QUESTIONS**

- 1** What are prevalence, age-of-onset and severity of mental disorders and what is the rate of their co-occurrence with somatic disorders among disability claimants?
- 2** Are mental disorders adequately diagnosed by IP's assessing the disability benefit claim?
- 3** Are mental disorders among disability claimants adequately treated in the health care sector?
- 4** What is known in the disability research literature about prognostic factors of long term disability, RTW and recovery of mental health symptoms in persons sick listed due to mental disorders?
- 5** What is the accuracy of the prediction of functional improvement by disability claimants as compared to that of IP's assessing their disability benefit claim?

- 6 Which factors significantly predict improvement in functioning and work status of disability claimants following the assessment of their disability benefit claim?

#### ADDITIONAL RESEARCH QUESTIONS

A screening procedure was implemented within the overall design of the cohort study. Its purpose was to screen for eligibility for re-interviewing with the CIDI at follow-up. For this, we used three short mental health screeners embedded in the self-report questionnaire. The design and measures of this screening is more comprehensively described in Chapter 2. The screening gave rise to an additional research question:

- 7 What are the psychometric properties of three short mental health screeners to detect present-state DSM-IV classifications of mental disorders among disability claimants?

Our development and use of the *Diagnostic Interview Adjustment Disorder* (DIAD), an innovative and not yet validated instrument to diagnose adjustment disorder, gave rise to another additional research question:

- 8 What are the content and construct validity of the DIAD to diagnose adjustment disorder among disability claimants?

#### »THEESIS OUTLINE«

In **Chapter 1**, an introduction is given to the issues addressed in this thesis by presenting information on disability related epidemiology, classification and diagnosis of mental disorders.

In **Chapter 2**, setting, design and methods are described of PREDIS (PREdicting DISability), a prospective cohort study with one year follow-up on long-term work disability and mental disorders among persons claiming disability benefit after two years of sickness absence with specific focus on mental health.

In **Chapter 3**, information is given on diagnoses on registry certificates, on prevalence, age-of-onset and severity of DSM-IV classifications of mental disorders, and on mental-mental and somatic-mental comorbidity among persons claiming disability benefit after two years of sickness absence (research question 1).

In **Chapter 4**, the focus is on recognition and treatment of DSM-IV classifications of mental disorders in our sample. The important question is addressed whether mental disorders is adequately recognized by IP's during the disability benefit claim assessment and whether mental disorder is adequately treated in the preceding period (research questions 2 and 3).

In **Chapter 5**, the psychometric properties are presented of three short mental health

screeners in terms of sensitivity, specificity, optimal cutoff and predictive values to detect present state DSM-IV classifications of mental disorder (research question 7).

In **Chapter 6**, the development is described and initial validity estimates are presented of the *Diagnostic Interview Adjustment Disorder* (DIAD) (research question 8).

In **Chapter 7**, a systematic review is given of current scientific evidence about the prognostic factors for long term disability and RTW of persons sick listed due to mental health problems, and factors for recovery of mental health symptoms (research question 4).

In **Chapter 8**, the accuracy of predictions of future improvement of functioning by disability claimants and their social insurance physicians are compared. Difference in accuracy is studied between subgroups of claimants with mental or somatic health conditions (research question 5).

In **Chapter 9**, results are presented of the PREDIS cohort study on predictors of functional improvement and future work status after the disability benefit claim (research question 6).

In **Chapter 10**, the main findings, methodology and practical implications of this thesis are discussed, and directions are recommended for further research.

## REFERENCES

- 1 WHO Regional Office for Europe. Mental health and well-being at the workplace – protection and inclusion in challenging times. Ed. Baumann A, Muijen M, Gaebel W. Accessed Jan 2 2012: [http://www.euro.who.int/data/assets/pdf\\_file/0018/124047/e94345.pdf](http://www.euro.who.int/data/assets/pdf_file/0018/124047/e94345.pdf).
- 2 Alonso J, Angermeyer MC, Bernert S et al. ESEMeD/MHEDEA 2000 Investigators, European Study of the Epidemiology of Mental Disorders (ESEMeD) Project. Prevalence of mental disorders in Europe: results from the ESEMeD project. *Acta Psychiatr Scand Suppl* 2004a;420:21-27.
- 3 Demyttenaere K, Bruffaerts R, Posada-Villa J et al. WHO World Mental Health Survey Consortium. Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *JAMA* 2004;291:2581-2590.
- 4 WHO. The global burden of disease: 2004 update. Accessed Jan 2 2012: [http://www.who.int/healthinfo/global\\_burden\\_disease/GBD\\_report\\_2004update\\_full.pdf](http://www.who.int/healthinfo/global_burden_disease/GBD_report_2004update_full.pdf).
- 5 UWV factsheet (in Dutch). 2011. Accessed Jan 5 2012: <http://www.uvw.nl/overuwv/Images/111031%20Factsheet.pdf>.
- 6 Alonso J, Angermeyer MC, Bernert S et al. ESEMeD/MHEDEA 2000 Investigators, European Study of the Epidemiology of Mental Disorders (ESEMeD) Project. Disability and quality of life impact of mental disorders in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatr Scand Suppl* 2004b;420:38-46.
- 7 Johnston K, Westerfield W, Momin S et al. The Direct and Indirect Costs of Employee Depression, Anxiety, and Emotional Disorders—An Employer Case Study. *J Occup Environ Med* 2009;51:564–577.
- 8 Smit F, Cuijpers P, Oostenbrink J et al. Costs of nine common mental disorders: implications for curative and preventive psychiatry. *J Ment Health Policy Econ* 2006;4:193-200.
- 9 Kessler RC, Demler O, Frank RG et al. Prevalence and Treatment of Mental Disorders, 1990 to 2003. *N Engl J Med* 2005a;352:2515-23.
- 10 de Graaf R, ten Have M, van Gool C et al. Prevalence of mental disorders and trends from 1996 to 2009. Results from the Netherlands Mental Health Survey and Incidence Study-2. *Soc Psychiatry Psychiatr Epidemiol* 2012;2:203-13.

- 11 OECD. Sick on the Job? Myths and Realities about Mental Health and Work. Chapter 6: Summary and Conclusions. 2011. Accessed 5th Jan 2012: <http://www.oecd.org/dataoecd/18/1/49227343.pdf>.
- 12 Mykletun A, Overland S, Dahl AA et al. A population-based cohort study of the effect of common mental disorders on disability pension awards. *Am J Psychiatry* 2006;8:1412–8.
- 13 Bültmann U, Christensen KB, Burr H et al. Severe depressive symptoms as predictor of disability pension: a 10-year follow-up study in Denmark. *Eur J Public Health* 2008;18:232–4.
- 14 Gjesdal S, Ringdal PR, Haug K et al. Long-term sickness absence and disability pension with psychiatric diagnoses: A population-based cohort study. *Nord J Psychiatry* 2008;62:294–301.
- 15 OECD. Sickness, Disability and Work: keeping on track in the economic downturn - background paper. 2009. Accessed 5th Jan 2012: <http://www.oecd.org/dataoecd/42/15/42699911.pdf>.
- 16 UWV Knowledge Centre. Knowledge report 2012-1 (in Dutch: Kenniscentrum UWV, Kennisverslag 2012-1). Amsterdam: Directie SBK, 2012.
- 17 European Foundation for the Improvement of Living and Working Conditions. Quality of Work and Employment in Europe: issues and challenges. Accessed June 21 2012: <http://www.eurofound.europa.eu/pubdocs/2002/12/en/1/efo212en.pdf>.
- 18 European Working Condition Surveys. Accessed Jan 19 2012: <http://www.eurofound.europa.eu/surveys/ewcs/index.htm>.
- 19 European Foundation for the Improvement of Living and Working Conditions. Changes over time – First findings from the fifth European Working Conditions. Survey. Accessed Dec 23 2012: <http://www.eurofound.europa.eu/pubdocs/2010/74/en/3/EF1074EN.pdf>.
- 20 Henderson M, Glozier N, Holland EK. Long term sickness absence. *BMJ* 2005;330(7495):802–3.
- 21 Hashemi L, Webster BS, Clancy EA. Trends in Disability Duration and Cost of Workers' Compensation Low Back Pain Claims (1988- 1996). *J Occup Environ Med*. 1998 dec;40(12):1110-9.
- 22 de Boer WEL, Besseling JJM, Willems JHBM. Organisation of disability evaluation in 15 countries. *Pratiques et organisation des soins* 2007;38:205-217.

- 23 OECD policy brief: disability programs in need of reform. OECD, 2003. Accessed April 19 2012: <http://www.oecd.org/social/socialpoliciesanddata/2496616.pdf>.
- 24 Ustün TB, Kostanjsek N, Chatterji S, Rehm J. Measuring Health and Disability Manual for WHO Disability Assessment Schedule (WHODAS 2.0). World Health Organization, 2010.
- 25 WHO. International classification of functioning, disability and health (ICF). Geneva: WHO, 2001.
- 26 Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> ed. (DSM-IV). Washington D.C.: American Psychiatric Association, 1994.
- 27 WHO. International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10). Accessed April 19 2012: <http://apps.who.int/classifications/icd10/browse/2010/en>.
- 28 Diagnostic and Statistical Manual of Mental Disorders, 5th ed. (DSM-5). Washington D.C.: American Psychiatric Association, 2013.
- 29 Kessler RC, Ustün TB. The World Mental Health (WMH) Survey Initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res* 2004;13:93-121.
- 30 Kessler RC, Wittchen H-U, Abelson JM et al. Methodological studies of the Composite International Diagnostic Interview (CIDI) in the US National Comorbidity Survey. *International Journal of Methods in Psychiatric Research* 1998;7:33-55.
- 31 Robins LN, Wing J, Wittchen HU et al. The Composite International Diagnostic Interview: An epidemiologic instrument suitable for use in conjunction with different diagnostic systems and in different cultures. *Arch Gen Psychiatry* 1988;45(12):1069-1077.
- 32 Health and Safety Executive. Stress-related and psychological disorders in Great Britain. London: Health and Safety Executive, 2011.
- 33 National Institute for Occupational Safety and Health. NIOSH Program Portfolio. 2011. Accessed April 1 2012: <http://www.cdc.gov/niosh/programs/workorg/risks.html>.
- 34 UWV Knowledge Center. UWV Quarterly report 2007 (in Dutch: UWV Kwartaalverkenning 2007). Amsterdam: UWV, 2007.



## CHAPTER 2 DESIGN OF PREDIS: A PROSPECTIVE COHORT STUDY AMONG DISABILITY CLAIMANTS

---

### ›INTRODUCTION‹

This chapter describes setting, design and methods of the PREDIS (PREdicting DISability) cohort study, a longitudinal prospective study with one year follow-up on long-term work disability and mental disorders among persons claiming disability benefit after two years of sickness absence. As stated in the introductory chapter, its general aim is to describe this population in terms of socio-demography, diagnosis and treatment, and to identify factors that predict functional improvement and work status in the period after disability benefit has been claimed and assessed.

### ›SETTING‹

The PREDIS study was conducted from October 2008 to January 2011 among persons claiming disability benefit at the regional office of the Social Security Institute (SSI) in the city of Groningen, servicing two northern provinces of the Netherlands (Groningen, Drenthe). In the Dutch social security system, sick listed workers may apply for disability benefit after they have been on continued sick leave for two years. During these two years, employers are obliged to pay benefit for sick listed workers they have under permanent employment contract. These workers are assessed and counseled on their ability to return to work by occupational physicians under contract by the employer. For sick listed workers without an employment contract, i.e. temporary agency workers and for those whose contract expires during the sickness absence, sick leave benefit is paid by the SSI. These workers are assessed and counseled by SSI professionals. If all efforts to realize return to work have been proven unsuccessful, the sick listed worker may submit a disability benefit claim at the SSI.

Medical aspects of disability are then assessed by insurance physicians (IP's) of the SSI in face-to-face semi-structured interviews and examinations, focusing on the evaluation of the medical condition (disease, symptoms, impairments), the functional status (limitation of activities) and rehabilitation efforts [6]. In their interviews, IP's use standard medical history-taking, inquire after complaints and symptoms, treatment and medication. They specifically focus on activity limitations and participation restrictions. For their assessment of diagnosis and treatment of the disorder(s) as cause of disability, IP's rely in part on historic and actual medical data provided by occupational and treating physicians.

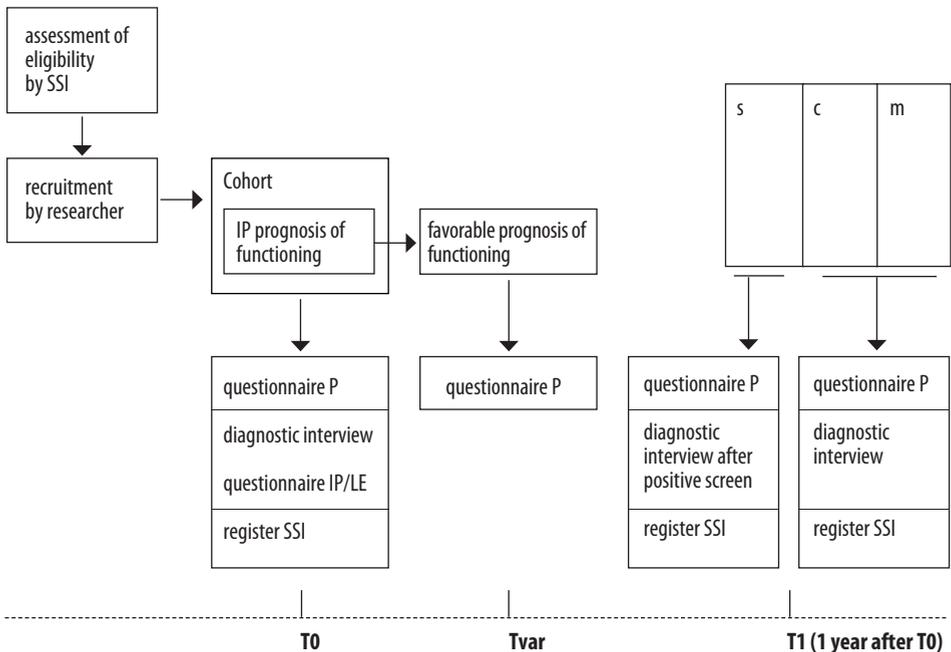
On the basis of the IP assessment, labour experts (LE's) of the SSI subsequently match the claimants work ability with the functional demands of theoretically available jobs. Claimants fully unable to perform any work due to a seriously disabling medical condition are exempted from assessment by the LE and are being granted full benefit on medical grounds. The LE assessment results in a selection of jobs claimants are still able

to perform. Disability benefit is then determined by the loss of earning capacity (LEC), defined as the difference between the wage of the claimants initial own job and that of the selected jobs. The final outcome of the disability assessment is expressed in four categories: no disability (LEC < 35%), partial disability (LEC = 35-80%), full disability (LEC ≥ 80%) with a favorable prognosis and full disability (LEC ≥ 80%) with a poor prognosis of recovery according to the IP assessing the claim. Fully disabled claimants with a favorable prognosis of recovery are eligible for re-assessment. Those with no or partial disability are supported to return to work matching their work ability by rehabilitation professionals of the SSI.

»DESIGN«

The study presented in this thesis was designed as a prospective inception cohort study with one year follow-up. The study was conducted among persons claiming disability benefit after two years of sickness absence. After the recruitment of eligible claimants, participants were measured at baseline (T0) after the assessment of their disability benefit claim, but before the waiting period of two years had expired and before the SSI had decided whether or not disability benefit was awarded. Participants were measured at two different time points, at baseline (T0) and after one year follow-up (T1). Participants with a favorable prognosis of functional improvement were additionally measured at an intermediate moment between T0 and T1 (Tvar). The study design is presented in figure 1.

Figure 1 Diagram of the PREDIS study design



Abbreviations: SSI = Social Security Institute, P = participant, IP = insurance physician, LE = labour expert, s = somatic disorder, c = somatic-mental comorbidity, m = mental disorder.

## ►RECRUITMENT OF PARTICIPANTS◀

### IN- AND EXCLUSION CRITERIA

Included were persons who claimed disability benefit after the full waiting time of two years had expired. Inclusion was irrespective of the diagnosis, i.e. all diagnoses certified as cause of disability were included, both mental and somatic. Excluded were persons whose disability benefit claim was a re-evaluation of an earlier claim.

### PROCEDURE

#### Recruitment

Eligibility of disability claimants to participate was assessed by a SSI research assistant, especially assigned to the PREDIS study. To guarantee complete confidentiality and to prevent data flow without informed consent, measures were taken to put up a strict division between the eligibility assessment and subsequent recruitment by the researcher. Therefore, the consent procedure was organised in two steps. As a first step, the SSI research assistant contacted eligible claimants by telephone shortly after the disability benefit assessment by the IP was completed, asking permission to send information about the study and a consent form. When permission was granted, name and address were given by the SSI assistant to the researcher, who then sent an information letter and a consent form as a second step. If eligible claimants could not be contacted by telephone, the information letter and the consent form were sent by the SSI assistant. Claimants willing to participate returned signed consent forms to the researcher. If the consent form sent by either the researcher or by the SSI assistant, was not returned within two weeks, a reminder was sent.

#### Baseline measurement (To)

At To, participants were administered a comprehensive diagnostic interview at their home, after having been send a self-report questionnaire. The questionnaire was returned to the interviewer after completion of the interview. IP's of the SSI involved in the disability benefit claim assessment of participants provided data on diagnosis certified as cause of disability and were asked to predict improvement of functioning in the period after the claim. LE's of the SSI provided data on educational level of the claimants that were not granted full benefit on exclusive medical grounds. The SSI registry provided additional data on demographics, LEC and whether participants had paid work at baseline.

#### Intermediate measurement (Tvar)

Participants with a favorable prognosis of functional improvement according to the IP assessment, were sent a self-report questionnaire with a postage paid return envelope at a variable moment Tvar, i.e. in the month functioning was predicted to have been improve. The Tvar questionnaire was identical to the one used at To. Participants eligible for assessment at Tvar were not interviewed.

#### Follow-up measurement (T1)

At T1, one year after To, all participants were sent a self-report questionnaire with a postal

paid return envelope. This questionnaire was identical to the one used at To. From the SSI registry data were obtained whether participants had paid work at T1.

### Screening procedure

A screening procedure was implemented within the overall design of the cohort study. The purpose of this procedure was to screen for eligibility for re-interviewing with the CIDDI at T1. Participants scoring above a predetermined cut-off value on three short scales on general and mental health embedded in the T1-questionnaire, were re-interviewed at T1. After the T1-questionnaire was returned and interview eligibility was determined, participants were re-interviewed at their home. Included for re-interviewing at T1 were participants meeting any of the following criteria: (1) positive screen for any mental disorder, based on the screening result at T1; (2) the presence of any (comorbid) mental disorder diagnosed at To; (3) failure to return the T1-questionnaire.

### Interview training

A total of twelve interviewers (four SSI insurance physicians, three SSI rehabilitation coaches, three SSI secretaries, two medical students) were trained and qualified by certified trainers of the WHO Training Center, located at the psychiatry department of the University Medical Center Groningen, the Netherlands. None of the interviewers was in any way involved with the actual disability benefit assessment of participants. Quality of interviewing techniques was evaluated bimonthly in training sessions led by the researcher (LRC).

## ►MEASURES◄

### PARTICIPANT QUESTIONNAIRE

The To- and T1-questionnaires included sections on demography, general mental health, psychological distress, alcohol use, functioning, health care utilization, coping and social support. The Tvar-questionnaire was identical to the To- and T1-questionnaires, but the demographic section was excluded.

### Socio-demography

The questionnaire for participants included a section on demography, i.e. age, gender, marital status. Marital status was dichotomized into living with or without partner.

### General mental health

General mental health complaints were assessed with the 12-item *General Health Questionnaire* (GHQ-12). The GHQ-12 is used in the community and in primary care settings [7]. For the GHQ-12 we used the 0-1-2-3 scoring method with 'not at all' (for questions 1, 3, 4, 7, 8 and 12: 'better than usual') (0), 'same as usual' (1), 'rather more than usual' (2), 'much more than usual' (3). The reference period is the last few weeks. Sum scores range from 0 to 36. Higher scores signify more complaints.

### Psychological distress

Non-specific psychological distress was assessed with the 10-item *Kessler Psychological Distress scale* (K10). The K10 has strong psychometric properties and is able to discriminate psychiatric cases from non-cases [8]. The K10 consists of 10 items with each five Likert-type response categories: 'none of the time' (1), 'a little of the time' (2), 'some of the time' (3), 'most of the time' (4) and 'all of the time' (5). The reference period of the K10 is 30 days. Sum scores range from 10 to 50. Higher scores on the K10 signify more complaints.

### Alcohol use

Alcohol dependence and less severe alcohol problems were assessed with the *Alcohol Use Disorders Identification Test* (AUDIT) [9]. The AUDIT is widely used as a means of screening for the spectrum of alcohol use disorders in various settings and populations. It consists of a total of 10 items with a five point response scale distributed over 4 subscales (alcohol consumption, drinking behaviour, adverse reactions and alcohol-related problems). Sum scores ranges from 0 to 40. Higher scores reflect more problems.

### Functioning

Functioning was assessed by the *World Health Organization Disability Schedule 2.0* (WHODAS 2.0) [10]. The full WHODAS is a generic instrument asking respondents to indicate whether physical or mental health problems have caused difficulties in seven activity domains in the past thirty days: *Understanding and Communicating* (6 items), *Getting around* (5 items), *Self-care* (4 items), *Getting along with people* (5 items), *Household activities* (4 items); *Work/school* (4 items) and *Participation* (8 items). The WHODAS asks respondents to skip the domain *School/work* when they do not work or do not go to school. All items of the WHODAS have a five-point rating scale with answer options ranging from 'no difficulty'(1) to 'extreme difficulty or inability to perform the activity'(5). Domain scores aggregate to a total score. Higher scores signify worse functioning.

### Health care utilization

Health care utilization was assessed with the *Trimbos/iMTA questionnaire for Costs associated with Psychiatric Illness* (TiC-P), a self-report questionnaire assessing health care consumption [11]. We used questions whether or not in the past three months respondents had contacted a general practitioner, a psychologist, a psychiatrist, a mental health care professional, a mental health clinic as out-patient, a medical specialist, a paramedic and whether they were hospitalized. Using the TiC-P operationalization, we added a question whether respondents had contact with a rehabilitation professional in the past three months. The TiC-P does not aggregate to a total sum score.

### Coping

Coping with stress was assessed with a shortened 15-item version of the *Utrecht Coping List* (UCL) [12], with 2 subscales *Confronting problems* (7 items) and *Avoiding problems* (8 items). Answer options are 'seldom /never' (1), 'sometimes' (2), 'often' (3) and 'very often' (4). Sum scores range from 7 to 28 (Confronting) and from 8 to 32 (Avoiding). Higher scores represent more coping problems.

## Social support

We used the *Social Support Questionnaire for Transactions* (SSQT) to measure perceived social support, assessing supportive transactions and satisfaction with supportive transactions (SSQS) [13]. The SSQT consists of 23 items with response categories 'seldom or never' (1), 'now and then' (2), 'regularly' (3) and 'often' (4). Sum scores of SSQT range from 23 to 92. Higher SSQT scores signify more social support. To assess satisfaction with supportive transactions, we used the *Social Support Questionnaire for Satisfaction* (SSQS). The SSQS runs parallel with the SSQT and consists of 23 items with options 'much less than I like' (1), 'less than I like' (2), 'just as much as I like' (3), 'more than I like' (4). Sum scores of the SSQS range from 23 to 92.

## STRUCTURED DIAGNOSTIC INTERVIEW

### Composite International Diagnostic Interview

At To, all respondents were interviewed at their home, using the Dutch translation of the World Mental Health (WMH) version 3.0 of the World Health Organization (WHO) *Composite International Diagnostic Interview* (WMH-CIDI) [14]. The CIDI is a laptop assisted fully-structured interview to be administered by lay interviewers, generating classifications according to the 4<sup>th</sup> edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) [15] and ICD-10 [16]. For the present study, we included the sections Depression (major depressive disorder, dysthymia, bipolar disorder), Mania, Panic Disorder, Social Phobia, Agoraphobia (with or without Panic Disorder), Generalized Anxiety Disorder, Obsessive Compulsive Disorder, Posttraumatic Stress Disorder, Suicidality and Psychosis screen. At T1 for respondents meeting criteria for re-interviewing, we used a shortened version of the CIDI (CIDI 2.1) [17], which assesses 12-month DSM-IV classifications of mental disorders only.

### Diagnostic Interview Adjustment Disorder

As stated in the introductory chapter, the CIDI lacks a section dealing with adjustment disorder (AD). Therefore, a newly developed and fully structured interview schedule was used to diagnose AD: the *Diagnostic Interview Adjustment Disorder* (DIAD). The development and initial validation of the DIAD is described in Chapter 6 of this thesis. The DIAD contains a total of 29 questions to identify and assess stressful events and related symptoms, and their relation in time.

## INSURANCE PHYSICIAN QUESTIONNAIRE

### Certificate diagnosis

To classify somatic and mental disorders as cause of disability, IP's use a classification system (Dutch Classification for Occupational Health and Social Insurance: CAS) derived from the ICD-10 and developed for use in occupational health and social security in the Netherlands [16,18]. The registry of the SSI allows one diagnosis code for any (somatic or mental) disorder as primary cause of disability, and two additional codes for any comorbid disorders as secondary or tertiary cause of disability. We obtained CAS codes of somatic and mental disorder certified as primary, secondary or tertiary cause for disability by IPs assessing the disability benefit claim of respondents at To.

### Prognosis of functioning

At T<sub>0</sub>, IP's were asked whether they expected any functional improvement after the disability claim assessment and if so, in which month they expected this improvement to occur. Answers were dichotomized in improvement within one year versus improvement later than one year/not at all.

### LABOUR EXPERT QUESTIONNAIRE

At T<sub>0</sub>, LE's provided data on education. Educational level was categorized into low (elementary, preparatory middle-level), intermediate (middle-level applied; higher general continued) and high (university applied sciences; research university).

### SSI REGISTRY

#### Residence

Residence of participants was obtained from the local SSI administrative registry. Urbanization was categorized into rural (<10.000 inhabitants), midsize urban (10.000-100.000 inhabitants) and urban (>100.000 inhabitants).

#### Loss of earning capacity

The disability assessment outcome for all respondents in terms of loss of earning capacity (LEC) was obtained from the SSI registry. For analysis in the present study, we dichotomized the four categories of LEC in full disability (LEC  $\geq$  80%) and no/partial disability (LEC < 80%).

#### Work status

We obtained from the SSI registry data from the POLIS database on work status at T<sub>0</sub> and at T<sub>1</sub>. In the Netherlands, this database registers all workers that carry out paid work for any number of hours, whether in regular, supported or sheltered jobs, and have paid wage tax. Work related day activities or voluntary work are not included in the POLIS database.

#### Missing data from IP/LE questionnaire

Data on ICD-10 classification of disorders as cause of disability and on educational level that were missing as a result from non-response by IP's and LE's, were complemented by the SSI registry.

#### Data from target population and non-responders

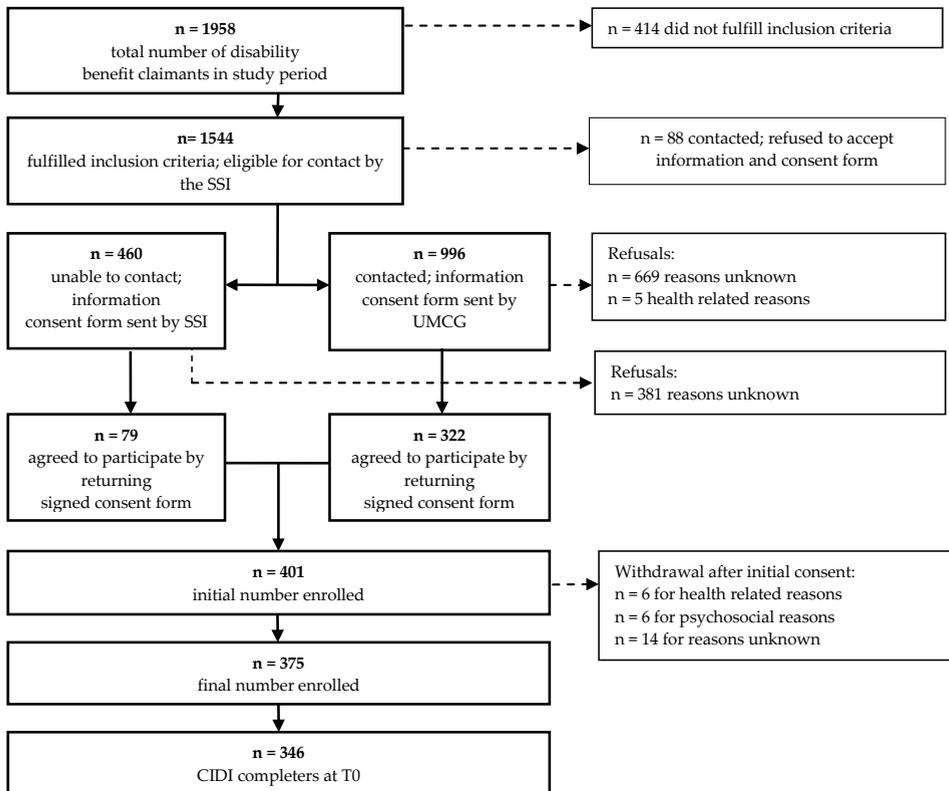
For the assessment of representativeness, generalizability, selective non-response and drop-out, data on demography, educational level and ICD-10 classification as primary cause of disability were obtained from the SSI registry.

### ►RESPONSE◀

Out of a total of 1544 eligible disability claimants, 375 persons consented to participate in PREDIS. The response rate is 24.3%. Figure 2 shows a flow diagram of participants. Of

the final number of enrolled participants ( $n=375$ ), 346 (92,3%) completed the diagnostic interview at T<sub>0</sub>, 337 (89,9%) returned the questionnaire at T<sub>0</sub> and for 280 cases (74,7%) the IP's returned the IP questionnaire. Based on the IP prognosis, 111 respondents were indicated to complete a questionnaire at T<sub>var</sub>. Of these 111 respondents, 89 (80,2%) returned the T<sub>var</sub>-questionnaire. Of all participants ( $n=375$ ), 252 persons met any of three criteria for the second interview at T<sub>1</sub>. Of those indicated, 192 (76,2%) persons were re-interviewed at T<sub>1</sub>. Of all participants ( $n=375$ ), 297 (79,2%) returned the questionnaire at T<sub>1</sub>.

**Figure 2** Flow diagram of participants



## ► STATISTICAL ANALYSIS ◀

Simple frequency statistics and cross tabulations were used to describe determinants and outcomes (all chapters), Chi-square tests to assess representativeness and generalizability of the study sample for target populations (all chapters), Receiver Operating Characteristic (ROC) analysis to calculate sensitivities, specificities, positive and negative predictive values (chapters 5 and 8), linear and logistic regression analyses to assess associations

(Chapters 6, 8 and 9) and multilevel analysis to calculate the probability of improvement (Chapter 8). In general, analyses were performed with the statistical software package in IBM SPSS 18-20. For all analyses, we used a confidence interval of 95% and a level of significance  $p \leq 0.05$ .

### ►ETHICAL CONSIDERATIONS◀

The Medical Ethics Committee of the University Medical Center Groningen, the Netherlands, approved the research protocol, study design, recruitment and informed consent procedures, and permitted linking questionnaire and interview data with SSI registry data.

The disability benefit assessment after two years of sickness absence is generally recognised as a possible stressing event that has important consequences for future work and income of claimants. Therefore, the study was designed not to burden claimants unnecessarily. The disability benefit assessment at the SSI was strictly separated from recruitment and data collection by the researchers. For instance, informed consent was not obtained during the disability benefit claim assessment by the IP, but by the researcher, shortly after this assessment was completed. The information letter stated explicitly that (non-)participation would not influence the disability assessment by the SSI nor its outcome. The screening procedure at T<sub>1</sub> to determine eligibility for a second comprehensive diagnostic interview was also aimed to reduce respondent burden. At any time during the study participants could consult an independent physician, either about the study procedures or about possible health complaints related to the study. Participants could leave the study at any moment without consequences for their disability benefit or for efforts by the SSI for their rehabilitation.

### ►RELEVANCE◀

The study is designed to describe a population of persons claiming disability benefit after long-term sickness absence and to identify factors that predict improvement of functioning and work status after the claim with focus on mental health. It aims to provide more knowledge on diagnosis, treatment of mental disorders and prognosis of related work disability. The results may support IP's involved in disability assessments to improve their diagnostic and prognostic skills. The identification of predictors amenable to change even after disability benefit has been assessed, may help to design and implement interventions to prevent permanent disability, to promote participation and return to work. In the end, the results of this study might contribute to less personal and societal costs of work disability.

**REFERENCES**

- 1 OECD. *Sickness, Disability and Work: keeping on track in the economic downturn - background paper*. 2009. Accessed 5th Jan 2012: <http://www.oecd.org/dataoecd/42/15/42699911.pdf>.
- 2 OECD. *Sick on the Job? Myths and Realities about Mental Health and Work*. Chapter 6: Summary and Conclusions. 2011. Accessed 5th Jan 2012: <http://www.oecd.org/dataoecd/18/1/49227343.pdf>
- 3 UWV factsheet (in Dutch). 2011. Accessed 5th Jan 2012: <http://www.uwv.nl/overuwv/Images/111031%20Factsheet.pdf>
- 4 Hashemi L, Webster BS, Clancy EA. Trends in Disability Duration and Cost of Workers' Compensation Low Back Pain Claims (1988-1996). *J Occup Environ Med*. 1998;40(12):1110-9.
- 5 Henderson M, Glozier N, Holland EK. Long term sickness absence. *BMJ*. 2005;330(7495):802-3.
- 6 de Boer WEL, Besseling JJM, Willems JHBM. Organisation of disability evaluation in 15 countries. *Prat Org Soins*. 2007;38:205-217.
- 7 Goldberg D, Williams P: *A user's guide to the General Health Questionnaire*. Windsor: NFER-NELSON; 1998.
- 8 Kessler RC, Andrews G, Colpe LJ et al. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychol Med*. 2002;32:959-76.
- 9 Reinert DF, Allen JP. The Alcohol Use Disorders Identification Test: An Update of Research Findings. *Alcohol Clin Exp Res*. 2007;31(2):185-199.
- 10 Ustün TB, Kostanjsek N, Chatterji S, Rehm J. *Measuring Health and Disability Manual for WHO Disability Assessment Schedule WHODAS 2.0*. Geneva: World Health Organization, 2010.
- 11 Hakkaart-van Roijen L. *Manual Trimbos/iMTA questionnaire for Costs associated with Psychiatric Illness (TiC-P)*. Rotterdam: Institute for Medical Technology Assessment; 2002.
- 12 Schreurs KM, van den Willige G, Brosschot JF. *De Utrechtse Coping Lijst [Utrecht Coping Questionnaire]*. Lisse: Swets and Zeitlinger; 1993.

- 13 Doeglas D, Suurmeijer T, Briancon S et al. An international study on measuring social support: interactions and satisfaction. *Soc Sci Med.* 1996;43(9), 1389-97.
- 14 Kessler RC, Ustün TB. The World Mental Health (WMH) Survey Initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res.* 2004;13:93-121.
- 15 Diagnostic and Statistical Manual of Mental Disorders (4th ed.). Washington D.C.: American Psychiatric Association. 1994.
- 16 WHO. International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10). Accessed April 19th 2012: <http://apps.who.int/classifications/icd10/browse/2010/en..>
- 17 Robins LN, Wing J, Wittchen HU et al. The Composite International Diagnostic Interview: An epidemiologic instrument suitable for use in conjunction with different diagnostic systems and in different cultures. *Arch Gen Psychiatry.* 1988;45(12):1069-1077.
- 18 Ouwehand P, Wouters PHM. CAS, Classificaties voor Arbo en SV (CAS, Classification for Occupational Health and Social Security). Amsterdam: UWV, 2002.



## CHAPTER 3 HIGH PREVALENCE OF EARLY ONSET MENTAL DISORDERS AMONG LONG-TERM DISABILITY CLAIMANTS

SUBMITTED FOR PUBLICATION

L.R. CORNELIUS | J.J.L. VAN DER KLINK | M.R. DE BOER | S. BROUWER | J.W. GROOTHOF

---

### ›ABSTRACT‹

#### OBJECTIVE

Information on prevalence, mental-mental and somatic-mental comorbidity, age-of-onset, and severity of mental disorders among persons claiming disability after long-term sickness absence is scarce. Such information is needed to promote return to work and to prevent unnecessary disability.

#### METHODS

Cross-sectional analysis of a nationally representative sample of Dutch disability claimants (n=346). CIDI 3.0 was used to generate lifetime, 12-month and 30-day DSM-IV classifications of mental disorder, age-of-onset and severity; registry data on demographics and ICD-10 classifications of somatic disorder certified as primary cause of disability were obtained.

#### RESULTS

The mean age of respondents was 49.8 (range 22-64). The prevalence of DSM-IV classifications was 69.9% for lifetime, 44.5% for 12-month and 25.4% for 30-day mental disorder. The most prevalent broad categories of mental disorders were mood and anxiety disorders with a prevalence of 28.6% and 32.9%, respectively. Mood and most anxiety disorders had ages of onset in adolescence and early adulthood. The phobias start at school age. Of all respondents, 33.7% had  $\geq 1$  12-month mental disorder. Co-occurrence of substance use disorders, phobias and depression/anxiety disorders are frequent. Urogenital and gastrointestinal diseases, and cancer coincide with 12-month mental disorder in 66.7%, 53.9% and 51.7% of cases, respectively. More than two out of three specific mental disorders are serious in terms of disability and number of days out of working role.

#### CONCLUSIONS

Disability claimants constitute a vulnerable population with a high prevalence of serious mental disorder, substantial comorbidity and ages-of-onset in early working careers. More research is needed to support secondary and tertiary prevention of long-term sickness absence and disability of claimants with mental health problems.

**Key terms** DSM-IV - prevalence - comorbidity - age-of-onset - severity - mental disorder - disability claimants

## ›INTRODUCTION‹

In the past decades, rising inflow into disability benefit due to poor mental health has become a subject of major concern in industrialized countries [1]. Besides large economic costs [2], long term disability due to mental disorders is associated with lower socio-economic status, reduced quality of life and higher morbidity/mortality rates [3]. In recent systematic reviews of studies that were carried out to better understand this increased inflow, it was concluded that there is still limited understanding of related factors, due to the limited number of studies, with different designs, varying methodological quality, different methods of data collection and the use of different diagnostic criteria [4,5,6]. To assess prevalence of mental disorder, studies included in those reviews and other studies, have relied on administrative records and sick leave certificates with limited diagnostic validity [4,7,8]. As a result, there not only is limited reliable information about prevalence, but also on severity, comorbidity and age-of-onset. Such information is needed to help professionals in disability settings to adequately assess functional impairment and to initiate effective interventions to promote return to work of claimants with mental health problems. The present study focuses on mental health in a group of disability claimants with presumably complex mental health problems. We aim to gain more knowledge on prevalence, severity, mental-mental (MM) and somatic-mental (SM) comorbidity and age-of-onset of mental disorders.

## ›METHOD‹

### SETTING AND PROCEDURES

The present study is a cross-sectional analysis of the baseline measure of the PREDIS (PREdicting DISability) study, a prospective cohort study with one year follow-up on prognostic factors of long term disability due to mental disorders. In the Dutch social security system, disability benefit assessment takes place after two years of sickness absence. Disability is assessed by insurance physicians (IP's) and labour experts (LE's) of the Dutch Social Security Institute (SSI). Participants eligible for the present study were recruited using registry data from the local SSI office in the city of Groningen, servicing Groningen and Drenthe, two northern provinces of the Netherlands. Recruitment started at October 1<sup>st</sup> 2008 and ended at 31<sup>st</sup> December 2009. The Medical Ethics committee of the University Medical Center Groningen, the Netherlands, approved recruitment, consent and field procedures. All participants gave written informed consent to participate in this study. Participants capacity to consent was established by self-report: all participants declared they had fully understood the information about the study given in the information letter.

### PARTICIPANTS

For inclusion, two criteria were used: (1) the disability benefit was claimed after the full waiting time of two years had been expired, and (2) the disability benefit claim was not a re-evaluation of an earlier claim. Inclusion was irrespective of the diagnosis, i.e. all

diagnoses were included, both mental and somatic. Out of a total of 1544 eligible long term sick listed workers, 375 persons consented to participate in PREDIS (response rate: 24.3%). For the present study, we included only those participants from whom we obtained complete data. As a result, the study sample consisted of 346 participants, see the recruitment flowchart in the introductory chapter of this thesis (Fig. 2, page 28).

## MEASURES

We used the Dutch translation of the computer assisted version 3.0 of the Composite International Diagnostic Interview (CIDI) to assess lifetime, 12-month and 30-day prevalence, age of onset and severity of DSM-IV classifications of mental disorders. The CIDI is a fully-structured interview designed to be used by trained lay interviewers for the assessment of DSM-IV defined mental disorders (9). All respondents were face-to-face interviewed at their home. Twelve interviewers were trained by certified CIDI-trainers. Quality of interviewing techniques was evaluated bimonthly in training sessions. The validity of the CIDI in assessing mental disorders is generally good, as compared with structured diagnostic interviews administered by clinicians [10].

### Prevalence

To assess lifetime, 12-month and 30-day prevalence of DSM-IV classified mental disorder, we included from the CIDI the sections Depression, Mania, Panic Disorder, Specific Phobia, Social Phobia, Agoraphobia, Generalized Anxiety Disorder, Suicidality, Alcohol Use, Illegal Substance Use, Obsessive Compulsive Disorder, Psychosis Screen, Posttraumatic Stress Disorder, Personality Disorders Screen, Attention Deficit Disorder, Conduct Disorder and Separation Anxiety Disorder.

### Severity

Severity of 12-month DSM-IV mental disorder was defined according to Kessler et al. [11] in terms of disability, number of days out of working role, suicidality, positive psychosis screen and the presence of 12-month DSM-IV bipolar disorder. At the end of each diagnostic section, the CIDI includes five questions that assess disability and number of days out of working role as a consequence of the specific disorder. Four of these questions form the Sheehan Disability Scale (SDS) [12] which asks respondents to rate the impairments during the month in the past year when it was most severe in each of four areas of life: household management, work, close personal relationships and social life on a 0–10 visual analogue scale with impairment categories of none (0), mild (1–3), moderate (4–6) and serious (7–10). Previous methodological studies have documented good internal consistency across the SDS domains with Cronbach's alpha in the range 0.82– 0.92. The fifth question asks respondents to estimate the total number of days in the past twelve months when they were totally unable to work or carry out their other usual activities because of the focal disorder. According to the criteria proposed by Kessler et al. [11], we classified cases as serious if they had any of the following: 12-month suicide attempt with serious lethality intent; serious disability in  $\geq 2$  domains of the SDS;  $\geq 1$  positive answer in the CIDI section Psychosis Screen; prevalence of bipolar I or II disorder;  $\geq 30$  days out of working role in the last year. We defined cases as moderate if they had any of the

following: suicide gesture, plan, or ideation; negative psychosis screen; moderate disability in  $\geq 2$  domains of the SDS;  $< 30$  days out of working role in the last year. Disorders were defined as mild when criteria for serious or moderate disorders were not met.

### **Mental-mental comorbidity**

Mental-mental (MM) comorbidity was defined as ‘disease(s) that coexist(s) in a study participant in addition to the index condition that is the subject of the study’, according to the *Dictionary of epidemiology* [13]. With this definition, lifetime disorders occurring consecutively separated by time can formally not be comorbid. To assess DSM-IV MM comorbidity, we included recent (12-month) and present state (30-day) DSM-IV classifications only.

### **Somatic-mental comorbidity**

Somatic-mental (SM) comorbidity was defined as the co-occurrence of 12-month DSM-IV classifications of mental disorders with codes of somatic diagnoses certified by IPs as primary, secondary or tertiary cause of disability. To classify somatic (and mental) disorders, Dutch IPs use a classification system (Dutch Classification for Occupational Health and Social Insurance: CAS) derived from the ICD-10 and developed for use in occupational health and social security in the Netherlands [14].

### **Age-of-onset**

In each diagnostic section of the CIDI, respondents are asked about the age they experienced the specific disorder for the very first time.

## **STATISTICAL ANALYSIS**

To describe the outcome measures of the present study, we used simple frequency statistics and cross tabulations. We calculated 95% confidence intervals (95% CI) for all prevalence's of lifetime, 12-month and 30-day DSM-IV classifications using according to Jeffreys [15]. To assess MM-comorbidity, we calculated the association measure Cramér's V based on Chi-square test for nominal variables for all possible pairs of lifetime, 12-month and 30-day DSM-IV classifications of specific mental disorders. We considered pairs with V's  $\geq 0.4$  to have moderate to strong relationships according to Altman [16]. For the assessment of SM-comorbidity, we examined the co-occurrence of the most prevalent DSM-IV classifications as found in the study sample with ICD-10 classified somatic disorders.

## **›RESULTS‹**

### **NON-RESPONSE ANALYSIS**

To assess representativeness of the PREDIS cohort for the local population of disability claimants, we compared responders ( $n=375$ ) with non-responders ( $n=1169$ ) as to age, gender and mental diagnosis certified by the SSI as cause of disability. We found no significant differences between responders and non-responders as to gender ( $p=0.850$ ) and classifications of somatic and mental disorder certified as cause of disability ( $p=0.682$ ).

As to age, we found responders to be significantly older than non-responders ( $p < 0.001$ ). Age categories 45-54 years and 55-65 years are over-presented among responders. To assess representativeness for the target population as to gender, age category and educational level, we compared the study sample ( $n=346$ ) with a national population of all persons claiming disability benefit in the Netherlands in the years 2006-2010 ( $n=166,581$ ) [17]. To assess whether the study sample ( $n=346$ ) represents the target population as to prevalence of certified mental and somatic disorders, we compared the study sample with the population of disability benefit claimants in the Netherlands from Jan. 1st 2006 to July 31st 2007 ( $n=56,267$ ) [17]. In these comparisons, we found no significant differences as to gender ( $p=0.544$ ) and prevalence of certified mental ( $p=0.344$ ) and physical ( $p=0.876$ ) disorders. However, the study sample is significantly older ( $p < 0.001$ ) and higher educated ( $p < 0.001$ ) than the target population.

### DEMOGRAPHIC CHARACTERISTICS

The study sample ( $n=346$ ) comprised 174 men (50.3%). The mean age was 49.8 (range 22-64). The primary cause of disability was a somatic disorder in 74.8% ( $n=259$ ) and a mental disorder in 25.2% ( $n=87$ ) of the respondents. Further information on demographic characteristics (educational level, urbanization) and specific diagnoses (somatic, mental) certified as primary cause of disability, is presented in Table 1.

### PREVALENCE

Of all respondents, 69.9% met criteria for one or more DSM-IV diagnoses once in their lifetime, 44.5% did so in the year preceding the interview and 25.4% in the last month. The prevalence of broad categories and of specific DSM-IV classifications are shown in Table 2. Anxiety disorders showed the highest prevalence (53.2%, 32.9% and 20.2% for lifetime, 12-month and 30-day prevalence, respectively). Of specific 12-month DSM-IV mood disorders, major depressive disorders were the most prevalent (43.1%, 24.0% and 7.2% for lifetime, 12-month and 30-day prevalence, respectively). Of specific 12-month DSM-IV anxiety disorders, general anxiety disorders (18.2%, 10.4% and 5.2% for lifetime, 12-month and 30-day prevalence, respectively), posttraumatic stress disorders (17.9%, 11.0% and 5.8% for lifetime, 12-month and 30-day prevalence, respectively) and social phobia (17.3%, 10.7% and 6.4% for lifetime, 12-month and 30-day prevalence, respectively) were the most prevalent. Of all respondents, 58.1% had more than one lifetime DSM-IV mental disorder (not in table).

**Table 1**

Demographic characteristics and prevalence of ICD-10 classifications of somatic (n=259) and mental (n=78)<sup>a</sup> disorders as primary cause of disability in the total study sample (n=346)

	n (%)
male	174 (50.3)
female	172 (49.7)
age, mean (range)	49.8 (22-64)
<b>Age categories</b>	
15-24	1 (0.3)
25-34	23 (6.6)
35-44	76 (22.0)
45-54	121 (35.0)
55-65	125 (36.1)
<b>Educational level<sup>b,c</sup></b>	
low	61 (17.6)
intermediate	235 (67.9)
high	43(12.4) <sup>c</sup>
<b>Urbanization</b>	
rural	116 (33.5)
midsize urban	167 (48.3)
urban	63 (18.2)
<b>ICD-10 somatic</b>	
cardiovascular	35 (10.1)
musculoskeletal	136 (39.3)
nervous	20 (5.8)
respiratory	8 (2.3)
gastro-intestinal	13 (3.8)
genito-urinary	18 (5.2)
other <sup>d</sup>	29 (8.5)
<b>ICD-10 mental</b>	
mood	27 (7.8)
anxiety	18 (5.2)
other <sup>e</sup>	33 (9.5)

a We could not obtain ICD-10 mental codes in 9 cases

b Obtained from SSI registry

c We could not obtain educational data in 7 cases

d Blood/blood-forming, skin/subcutaneous, endocrine/nutritional/metabolic, ear/mastoid, eye/adnexa

e Stress-related, substance use, somatoform, personality, psychotic disorders

**Table 2**

Lifetime (lt), 12-month (12-m) and 30-day (30-d) prevalence (%) of DSM-IV diagnoses with 95% confidence intervals (95% CI) and ages of onset with median and IQR (n=346)

	prevalence						age-of-onset	
	lt	95% CI	12-m	95% CI	30-d	95% CI	median	IQR
<b>Any DSM-IV mental disorder</b>	69.9	65.0-74.6	44.5	39.3-49.8	25.4	21.1-30.2		
<b>Mood Disorders</b>								
Dysthymia	9.5	6.8-13	8.4	5.8-11.6	4.3	2.6-6.9	31	20-41
Minor depressive disorder	4.3	2.6-6.9	1.4	0.6-3.1	0.3	0-1.3	33	27-52
Major depressive disorder	43.1	38.2-48.6	24.0	19.7-28.7	7.2	4.8-10.3	28	18-42
Hypomania	3.5	1.9-5.8	1.7	0.7-3.5	1.2	0.4-2.7	20	17-21
Mania	1.7	0.7-3.5	0.9	0.2-2.3	0.6	0.1-1.8	22	16-41
Bipolar I disorder	5.2	0.7-3.5	3.5	0.6-3.1	2.3	0.4-2.7	17	13-23
Bipolar II disorder	0.6	0.4-2.7	0.6	0.2-2.3	0.0	0-1.3	35	14-51
Any mood disorder	50.6	45.3-55.8	28.6	24.0-33.5	9.5	6.8-13.0		
<b>Anxiety Disorders</b>								
Agoraphobia	5.5	3.5-8.3	1.7	0.7-3.5	0.9	0.2-2.3	23	15-30
Social phobia	17.3	13.6-21.6	10.7	7.8-14.3	6.4	4.1-9.3	12	10-16
Specific phobia	13.0	9.8-16.9	8.4	5.8-11.6	6.9	4.6-10.0	10	4-20
Panic attack	38.7	33.7-43.9	15.9	12.3-20.0	5.2	3.2-7.9	28	15-40
Panic disorder	7.2	4.8-10.3	4.6	2.8-7.2	3.8	0.9-3.9	25	14-32
Separation anxiety disorder	3.8	2.1-6.2	1.2	0.4-2.7	0.0	0-0.7	6	5-10
Adult separation anxiety disorder	7.2	4.8-10.3	2.9	1.5-5.1	1.2	0.4-2.7	25	14-37
General anxiety disorder	18.2	14.4-22.5	10.4	7.5-14.0	5.2	3.2-7.9	26	16-42
Posttraumatic stress disorder	17.9	14.2-22.2	11.0	8-14.6	5.8	3.7-8.6	23	14-40
Obsessive compulsive disorder	7.2	4.8-10.3	4.6	2.8-7.2	3.8	2.1-6.2	22	9-32
Any anxiety disorder	53.2	47.9-58.4	32.9	29.2-38.0	20.2	16.3-24.7		
<b>Substance Use Disorders</b>								
Alcohol abuse	14.7	11.6-19.1	1.2	0.4-2.7	0.3	0-1.3	22	18-35
Alcohol dependence	3.2	1.7-5.4	1.2	0.4-2.7	0.0	0.1-1.8	28	18-46
Drug abuse	8.4	5.8-11.6	2.0	0.9-3.9	1.7	0.7-3.5	30	18-42
Drug dependence	5.8	3.7-8.6	2.6	1.3-4.7	0.9	0.2-2.3	32	18-42
Any substance use disorder	22.0	7.8-26.5	4.6	2.7-7.2	2.3	1.1-4.3		

## SEVERITY

The severity of 12-month major depressive disorder, general anxiety disorder, posttraumatic stress disorder and social phobia was almost completely defined by disability in home management, work, close relationships with other people and social life, and by number of days out of working role, see Table 3. Other criteria (suicidality, positive psychosis screen, co-occurrence of bipolar disorder) play a less important role. In terms of disability and days out of working role, two out of three of major depressive disorder or general anxiety disorder were serious. The severity of posttraumatic stress disorder and social phobia was relatively more moderate.

**Table 3**

Severity<sup>1</sup> of 12-month DSM-IV major depressive disorder (mdd), general anxiety disorder (gad), posttraumatic stress disorder (pts) and social phobia (so)<sup>1</sup>

	mdd (n=83)			gad (n=36)			pts (n=38)			so (n=37)		
	n/m <sup>2</sup>	mod <sup>3</sup>	ser <sup>4</sup>	n/m	mod	ser	n/m	mod	ser	n/m	mod	ser
Disability												
<i>home management</i>	8.4	32.5	59.1	22.2	38.9	38.9	31.6	39.5	28.9	48.7	32.4	18.9
<i>ability to work</i>	4.8	13.3	81.9	8.4	27.8	63.8	15.8	26.3	57.9	16.2	35.1	48.7
<i>close relationships</i>	20.5	26.5	53.0	19.4	36.1	44.5	36.8	31.6	31.6	16.2	43.2	40.6
<i>social life</i>	14.5	31.3	54.2	22.2	33.3	44.5	34.2	34.2	31.6	16.2	48.6	35.2
<i>total</i>	6.0	18.1	75.9	13.9	22.2	63.9	23.7	36.8	39.5	18.9	35.2	45.9
Days out of working role	18.1	13.3	68.7	22.2	11.1	66.7	18.4	15.8	65.8	18.9	8.1	73.0
Suicidality	80.7	15.7	3.6	75.0	19.4	5.6	81.6	18.4	0.0	83.8	16.2	0.0
Positive psychosis screen	93.2	-	6.8	86.1	-	13.9	84.2	-	15.8	78.4	-	21.6
Bipolar I/II	92.8	-	7.2	94.4	-	5.6	94.7	-	5.3	94.6	-	5.4

1 severity in % of the total number of mdd, gad, pts and so.

2 none/mild

3 moderate

4 serious

**Table 4**

Cramér's V correlation coefficient (V) of associations between lifetime, 12-month and 30-day DSM-IV disorders<sup>2</sup> (n=346).

	V <sup>1</sup>		
	lifetime	12-month <sup>2</sup>	30-day
alcohol dependence			
alcohol abuse	0.296	0.747	0.706
bipolar I disorder			
hypomania	0.738	0.701	0.703
bipolar I disorder			
mania	0.567	0.493	0.496
drug dependence			
drug abuse	0.595	0.492	0.704
major depressive disorder			
dysthymia	0.331	0.490	0.653
panic attack			
panic disorder	0.328	0.469	0.613
specific phobia			
social phobia	0.390	0.402	0.348
major depressive disorder			
general anxiety disorder	0.418	0.296	0.337

1 All V significant at the 0.01 level (2-sided)

2 V in column 12-month is ranked.

## COMORBIDITY

With regard to MM comorbidity, the prevalence of more than one 12-month and 30-day mental disorder was 33.7% and 15.8%, respectively (not in table). We found 8 pairs of DSM-IV classifications that were associated with one another with Cramér's  $V \geq 0.4$ , whether once in the lifetime, in the last 12 months or in the last 30 days. These associations are shown in Table 4.

As to SM comorbidity, 163 persons (47.1%) were found to have both a somatic disorder as primary cause of disability and a lifetime DSM-IV classification of mental disorder and 88 persons (25.4%) had both a primary somatic disorder and a 12-month DSM-IV classification (not in table). The SM comorbidity of broad categories of somatic disorders certified as primary cause of disability with the most prevalent 12-month DSM-IV classifications, i.e. major depressive disorder, general anxiety disorder, posttraumatic stress disorder and social phobia, is shown in table 5. Of all respondents ( $n=136$ ) with an ICD-10 musculoskeletal disorders as primary cause of disability, 30.1% had a co-occurring 12-month DSM-IV classification of mental disorder. Of all respondents with an ICD-10 genitourinary disorder, 66.7% had a co-occurring DSM-IV classification of mental disorder.

**Table 5** Prevalence P (n, (%)) of broad categories of CAS-defined physical disorders as primary cause of disability and comorbidity with 12-month major depressive disorder (mdd), general anxiety disorder (gad), social phobia (so) and posttraumatic stress disorder (pts) ( $n=346$ ).

	P	mdd	gad	so	pts	total
musculoskeletal	136 (39.3)	19 (14.0)	7 (5.1)	7 (5.1)	8 (5.9)	41 (30.1)
cardiovascular	34 (9.8)	7 (20.6)	2 (5.9)	2 (5.9)	3 (8.8)	14 (41.2)
neoplasm	31 (9.0)	7 (22.6)	2 (6.5)	1 (3.2)	6 (19.4)	16 (51.7)
nervous	20 (5.8)	1 (5.0)	0.0	1 (5.0)	1 (5.0)	3 (15.0)
genitourinary	18 (5.2)	2 (11.1)	3 (16.7)	2 (11.1)	5 (27.8)	12 (66.7)
gastrointestinal	13 (3.8)	5 (38.5)	1 (7.7)	0.0	1 (7.7)	7 (53.9)
respiratory	8 (2.3)	0.0	0.0	0.0	0.0	0.0

## AGE-OF-ONSET

Mood and most anxiety disorders had onsets in adolescence and early adulthood. Some anxiety disorders, i.e. social and specific phobia, started in childhood. Further data on onset of specific DSM-IV diagnoses are presented in Table 2.

## DISCUSSION

The high lifetime, 12-month and 30-day prevalence and the severity of DSM-IV mental disorder found among long disability claimants, is indicative of the vulnerability of this specific population. For comparison, the 12-month prevalence of any mood disorder in this study sample is almost five times higher and the prevalence of any anxiety disorder is three times higher as in the working population [7]. Mental disorders were not only found to be highly prevalent, but also for the most part serious in terms of disability in important areas of life and days out of working role. For comparison, the proportion of serious

disorders in this study sample is two to three times higher as was found by the National Comorbidity Survey Replication (NCS-R) in the general US population [11], using the same criteria for severity.

We found all mood disorders and most anxiety disorders (except specific and social phobia) to have onsets in adolescence and early adulthood, when most people start working. The phobias start much earlier and have onsets at school age. This is consistent with findings in community surveys, where chronic mental disorders in the general population were found to originate mostly in youth and in the early working career of adolescents [18,19]. In these surveys, the phobias and separation anxiety disorder have early ages of onset, while generalized anxiety disorder, panic disorder, posttraumatic stress disorder and mood disorders have much later onsets. Substance use disorders are first seen in early adulthood and the prevalence increases rapidly thereafter [19,20]. Mental health problems tend to accumulate with age, since comorbid mental disorders have later onsets [20]. In our sample with a mean age of 49.8 years, the early onsets we found suggest that a number of participants were already experiencing poor mental health some 20 years before the moment they called in sick, two years before the baseline measure of the present study. This may mean that these disability claimants were able to continue their work for a considerable period of time despite having mental health problems. In general, many mental disorders are known to have multiple recurrent episodes, each one of them increasing the risk for a consecutive and more severe episode [21]. It could be that study participants experienced previous spells of short-term sickness absence due to such recurrent episodes, making them vulnerable for future long-term sickness absence and disability. When confronted with an additional burden, e.g. a co-occurring somatic disorder, problems at work or at home, they may cross a critical threshold, finally call in sick with a serious mental health problem and not be able to return to work for a long period of time.

As to DSM-IV defined MM comorbidity, the high association of comorbid mental disorders confirms for the most part the existence of well-known conditions, such as major depressive disorder with dysthymia (double depression) and major depressive disorder with general anxiety disorder (anxious depression) [11]. The prevalence of lifetime and 12-month mental disorders co-occurring with somatic disorders certified as primary cause of disability, i.e. SM comorbidity, among the claimants in our study sample, is high. This finding reflects the general insight that, in a bio-psycho-social model, body-mind-environment interactions play an important role in the pathogenesis and clinical expression of physical and mental disorders. It has been shown in numerous studies that SM comorbidity increases symptom burden, and impairs self-care and treatment adherence. SM comorbidity has both additive and synergistic effects on the severity of disability, and leads to increased mortality risk [22,23]. The high MM and SM comorbidity we found is likely to be associated with more severe and persistent disability. This may lead to increased morbidity and mortality if co-occurrent mental disorders are not adequately recognized and treated. IPs should closely collaborate with professionals in primary, secondary and occupational health care to promote effective treatment and interventions aimed at return to work and prevention of permanent disability.

## STRENGTHS AND LIMITATIONS

Our study is the first to assess prevalence, severity, comorbidity, onset of DSM-IV mental disorders among persons claiming disability benefit after two years sickness absence. Strong points are the use of the latest version of the CIDI, with almost complete covering of potential DSM-IV mental disorders; the employment of well trained interviewers, whose interviewing techniques were frequently evaluated and controlled. Other strengths of this study are the representativeness of the sample for the population of disability claimants in the Netherlands as to diagnostic classification; its uniqueness in linking data collected with the CIDI to diagnostic data on disability certificates. However, several limitations must be taken into account as well. First, a potential limitation is the low response rate of 24.3%. This may be due to the stepped procedure necessary to require informed consent from eligible disability claimants and the comprehensiveness of the CIDI. The low response rate may have led to selection bias as to age and educational level. We found respondents significantly older and higher educated than in a national Dutch population of disability claimants. In general, poor mental health is prevalent at all ages with the highest prevalence occurring in the youngest age groups [24]. Prevalence rates of life time mental disorders found in the present study may therefore have been overestimated, and 12-month and 30-day prevalence may have been underestimated. It is difficult to estimate whether over-inclusion of respondents with higher education in the study sample has led to selection bias as to prevalence of mental disorder, since the associations between levels of education with prevalence rates of mental disorder are not clear [25]. However, it is generally assumed that higher prevalence is found among lower educated persons [24]. Therefore, the prevalence of mental disorder in the study sample may have been underestimated due to the over-inclusion of higher educated respondents. Second, the CIDI does not assess all possible DSM-IV diagnoses. Notably, the CIDI, as well as any other structured psychiatric interview, does not contain a section dealing with adjustment disorders. However, these disorders and other stress-related disorders are prevalent in populations of long term sick listed workers [17,26]. It can not be excluded that in the present study, the CIDI has diagnosed depression or anxiety disorders, while in fact adjustment disorders are present. If so, the prevalence of DSM-IV classifications for depression and anxiety disorders in the study sample may have been overestimated.

## IMPLICATIONS FOR PRACTICE

Professionals in primary and occupational health care should be aware that many mental health problems have early onsets, often co-occur with somatic disorders and may lead to future long-term sickness absence and disability. As secondary prevention, these professionals should include counseling and treatment of persons at risk, while at the same time being careful not to medicalize normal life problems. When secondary preventive measures fail, for some vulnerable workers only tertiary prevention might succeed to avert long-term sickness absence and disability. For this late prevention to be successful, IPs should be able to identify claimants at risk. In disability assessment interviews, they should carefully take claimants medical history to identify factors that caused them to call in sick. Factors that have contributed to sick leave and are amenable to change, may direct interventions to promote RTW. More research is needed to provide

evidence to support tertiary prevention and RTW schemes for persons with mental disorders claiming disability benefit after long-term sickness absence. Such evidence will provide a scientific base for protocols and guidelines for IPs.

## **CONCLUSION**

This study describes a vulnerable population of disability claimants with a high prevalence of single and comorbid mental disorder that are predominantly severe and start in early working careers. The early ages of onset of mental disorders in this specific population of disability claimants suggest that for some vulnerable workers psychosocial and work related problems in addition to poor mental health may accumulate over time into long-term sickness absence and disability. More research is needed to support secondary and tertiary prevention of long-term sickness absence and disability of claimants with mental health problems.

## **CONFLICTS OF INTEREST**

None declared.

## **AUTHORS' CONTRIBUTIONS**

All authors participated in the design of the study and helped to draft successive concepts of the manuscript. BLRC drafted all concepts and the final manuscript, and performed the statistical analysis. All authors read and approved the final manuscript.

## **ACKNOWLEDGEMENTS**

The authors would like to thank the participants of the study. This research project was funded by the Social Security Institute, the Netherlands. The authors declare that they have no conflict of interest.

**REFERENCES**

- 1 OECD. *Sickness, Disability and Work: keeping on track in the economic downturn*, background paper. See: <http://www.oecd.org>. Accessed 4th June 2011.
- 2 Smit F, Cuijpers P, Oostenbrink J, Batelaan N, de Graaf R, Beekman A. Costs of nine common mental disorders: implications for curative and preventive psychiatry. *J Ment Health Policy Econ* 2006;9:193-200.
- 3 Alonso J, Angermeyer MC, Bernert S et al. ESEMeD/MHEDEA 2000 Investigators, European Study of the Epidemiology of Mental Disorders (ESEMeD) Project. Disability and quality of life impact of mental disorders in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatr Scand Suppl* 2004;420:38-46.
- 4 Hensing G, Wahlstrom R. Swedish Council on Technology Assessment in Health Care (SBU). Chapter 7. Sickness absence and psychiatric disorders. *Scand J Public Health Suppl* 2004;63:152-180.
- 5 Blank L, Peters J, Pickvance S et al.. A systematic review of the factors which predict return to work for people suffering episodes of poor mental health. *J Occup Rehabil* 2008;18:27-34.
- 6 Cornelius LR, van der Klink JJ, Groothoff JW, Brouwer S. Prognostic factors of long term disability due to mental disorders: a systematic review. *J Occup Rehabil*. 2011 Jun;21:259-74.
- 7 Laitinen-Krispijn S, Bijl RV. Mental disorders and employee sickness absence: the NEMESIS study. *Netherlands Mental Health Survey and Incidence Study. Soc Psychiatry Psychiatr Epidemiol* 2000;35:71-77.
- 8 Stansfeld S, Feeney A, Head J et al.. Sickness absence for psychiatric illness: the Whitehall II Study. *Soc Sci Med* 1995;40:189-197.
- 9 Kessler RC, Ustun TB. The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res* 2004;13:93-121.
- 10 Haro JM, Arbabzadeh-Bouchez S, Brugha TS et al. Concordance of the Composite International Diagnostic Interview Version 3.0 (CIDI 3.0) with standardized clinical assessments in the WHO World Mental Health surveys. *Int J Methods Psychiatr Res* 2006;15:167-180.

- 11 Kessler RC, Chiu WT, Demler O, Merikangas KR, Walters EE. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry* 2005;62:617-627.
- 12 Leon AC, Olfson M, Portera L, Farber L, Sheehan DV. Assessing psychiatric impairment in primary care with the Sheehan Disability Scale. *Int J Psychiatry Med.* 1997;27:93-105.
- 13 Last JM. *A Dictionary of epidemiology.* Oxford University Press, New York 1995.
- 14 Ouwehand P, Wouters PHM. *CAS, Classificaties voor Arbo en SV (CAS, Classification for Occupational Health and Social Security).* Utrecht : Tica, 1997.
- 15 Jeffreys H. *Theory of Probability (3rd Ed),* Clarendon Press, Oxford 1961 pp. 179-192.
- 16 Altman DG. *Practical statistics for medical research.* Chapman and Hall, London 1991.
- 17 Kenniscentrum UWV Kwartaalverkenning 2007 – III (Knowledge Center UWV Quarterly Report 2007 – III): <http://www.uwv.nl>. Accessed 15th January 2009.
- 18 Murray CJL, Lopez AD. *The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020.* Cambridge: Harvard University Press, 1996;
- 19 Kessler RC, Berglund P, Demler O et al. Lifetime Prevalence and Age-of-Onset Distributions of DSM-IV Disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry.* 2005;62:593-602
- 20 Kessler RC. Lifetime prevalence and age-of-onset distributions of mental disorders in the world health organization's world mental health survey initiative. *World psychiatry* 2007;6:168-176.
- 21 Post RM. Mechanisms of Illness Progression in the Recurrent Affective Disorders. *Neurotox Res* (2010) 18:256–271.
- 22 Scott KM, Von Korff M, Alonso J et al. Mental-physical co-morbidity and its relationship with disability: results from the World Mental Health Surveys. *Psychol Med* 2009;39:33-43.
- 23 Katon W, Ciechanowski P. Impact of major depression on chronic medical illness. *J Psychosom Res* 2002;53:859-863.
- 24 WHO International Consortium in Psychiatric Epidemiology. Cross-national comparisons of the prevalences and correlates of mental disorders. *Bull World Health Organ* 2000;78:413-426.

- 25 Alonso J, Angermeyer MC, Bernert S et al. ESEMeD/MHEDEA 2000 Investigators, European Study of the Epidemiology of Mental Disorders (ESEMeD) Project. Prevalence of mental disorders in Europe: results from the ESEMeD project. *Acta Psychiatr Scand Suppl* 2004;420:21-27.
- 26 van der Klink JJ, Blonk RW, Schene AH, van Dijk FJ. Reducing long term sickness absence by an activating intervention in adjustment disorders: a cluster randomised controlled design. *Occup Environ Med* 2003;60:429-437.



## CHAPTER 4 UNDER-RECOGNITION AND UNDER-TREATMENT OF DSM-IV CLASSIFIED MOOD AND ANXIETY DISORDERS AMONG DISABILITY CLAIMANTS

DISABILITY AND REHABILITATION. 2013. DOI: 10.3109/09638288.2013.833310

L.R. CORNELIUS | J.J.L. VAN DER KLINK | S. BROUWER | J.W. GROOTHOFF

---

### ›ABSTRACT‹

#### PURPOSE

This study aimed to examine under-recognition, under-treatment and severity of under-treated DSM-IV mood and anxiety disorders among disability claimants.

#### METHOD

In a representative sample of Dutch disability claimants ( $n=346$ ), registry codes certified according to the International Classification of Diseases 10th edition (ICD-10) by insurance physicians, were compared with classifications according to the Diagnostic Statistical Manual of Mental Disorders (DSM-IV) detected by the Composite International Diagnostic Interview (CIDI). Levels of ICD-10/DSM-IV agreement were assessed for mood and anxiety disorder in the total sample, and prevalence of recent DSM-IV mood and anxiety disorder in a pure ICD-10 somatic subgroup. Treatment and severity of undertreated DSM-IV mood and anxiety disorder were assessed in two subgroups of disability claimants with either a ICD-10 somatic or mental disorder as primary cause of disability, irrespective of any ICD-10 comorbidity.

#### RESULTS

Levels of ICD-10/DSM-IV agreement were poor ( $\kappa$ 's: 0.237 for mood and 0.260 for anxiety disorder). In the pure ICD-10 somatic subgroup, the prevalence of DSM-IV mood and anxiety disorder was 3.8% and 11.4%, respectively. In the ICD-10 somatic subgroup irrespective of any ICD-10 comorbidity, 45.2% (major depressive disorder), 80.0% (social phobia) and 53.3% (general anxiety disorder) were under-treated. In the ICD-10 mental subgroup, these percentages were 44.7%, 80.9% and 33.4%, respectively. In both of these subgroups, under-treated DSM-IV mood and anxiety disorders were predominantly serious in terms of impairment and disability.

#### CONCLUSIONS

Serious mental disorders were found to be substantially under-diagnosed and under-treated among disability claimants. To optimize diagnosis and treatment of disabling mental disorder, medical professionals in insurance, occupational and in the health care sector should closely collaborate. For claimants with undertreated mental disorders tailor made multidisciplinary interventions are needed to promote return to work and to prevent permanent disability.

**Key words** disability claimants, mood disorder, anxiety disorder, diagnosis, treatment

## ›INTRODUCTION‹

The societal burden due to poor mental health in high-income countries is generally assumed to be underestimated, since population-based studies in these countries have shown that a considerable number of serious cases are not treated [1-3]. Large scale epidemiological studies revealed widespread under-recognition and under-treatment of mental disorders in health care settings [4]. These studies showed that only 54%-58% of depressed patients were recognized as cases by their general practitioner and that only 15%-26% were given a specific diagnosis of depression. Treatment of mood and anxiety disorders often was inappropriate, even when cases were recognized.

Few studies deal with under-treatment of mental disorders in occupational settings, i.e. among sick listed workers. In the Dutch survey Nemesis I, a subgroup of workers was studied [5]. In this subgroup, sickness absence was found to be strongly related to non-treatment: almost 25% of workers sick listed due to a pure mental disorder did not seek help; of those sick listed with a somatic disorder and a co-occurring mental disorder, more than 40% did not seek treatment. Inadequate medical diagnosis and non-treatment of mental disorder in occupational settings lengthens the duration of sickness absence and time to return to work [6-10], and in the end may result in long-term or even permanent work disability.

In social security systems worldwide, medical doctors, i.e. insurance physicians (IP's), assess medical aspects of disability benefit claims, such as diagnosis and treatment of the disabling disorder [11]. Studies on under-recognition and under-treatment in disability assessment settings are scarce. In a recent Dutch study among persons with long term work disability due to mental health problems, levels of agreement between diagnoses of mental disorder certified by IPs and recent mental disorders classified according to the 4<sup>th</sup> edition of the Diagnostic Statistical Manual of Mental Disorders (DSM-IV)[12], were found to be very low (Cohens kappas <0.23), indicating substantial under-diagnosis by IPs assessing the disability benefit claim [13]. A Norwegian study reported that more than 30% of persons being awarded disability pension involving mental illness, never had treatment for any mental health problem [14]. Under-treatment may not be a serious problem, because many untreated mental disorders might be mild or self-limiting [15]. However, mental health problems related to long-term sickness absence and disability are likely to be serious. To our knowledge, severity of under-treated mental disorders in disability settings has not been investigated as yet.

The aim of the present study was to examine under-recognition, under-treatment and severity of under-treated mental disorder classified according to the DSM-IV among persons claiming disability benefit after two years of sickness absence.

## ›METHOD‹

### SETTING AND PROCEDURES

The present study is a cross-sectional study among persons claiming disability benefit two years after the onset of sickness absence. Claimants eligible to participate in the present

study were recruited from the registry of the Dutch Social Security Institute (SSI) at the local SSI office in the city of Groningen. This office services Groningen and Drenthe, two northern provinces of the Netherlands. Recruitment started at October 1<sup>st</sup> 2008 and ended at 31<sup>st</sup> December 2009. All participants were measured after medical aspects of their disability claim was assessed by IPs, but before the SSI had decided whether or not to award disability benefit. The Medical Ethics committee of the University Medical Center Groningen, the Netherlands, approved recruitment, consent and field procedures.

## MEASURES

### ICD-10 classified disorders

In the Dutch social security system, medical aspects of sickness absence are assessed by occupational physicians. Only after two years of continuous sick leave, one can apply for disability benefit. Medical aspects of disability are then assessed by IPs employed by the SSI in face-to-face interviews and examinations. For their assessment of diagnosis and treatment of the disorder(s) as cause for disability, IPs rely in part on historic and actual medical data provided by occupational physicians. The SSI registry allows one diagnosis code for any (somatic or mental) disorder as primary cause of disability, and two additional codes for any comorbid disorders as secondary or tertiary cause of disability. For example, a claimant may be certified with myocardial infarction as primary diagnosis, panic disorder as secondary diagnosis and hypertension as tertiary diagnosis. To classify somatic and mental disorders, IPs use a classification system derived from the International Classification of Diseases 10<sup>th</sup> edition (ICD-10) [16] and developed for use in occupational health and social security in the Netherlands [17]. To assess prevalence, we obtained ICD-10 codes of somatic and mental disorder certified as primary, secondary or tertiary cause for disability by IPs assessing the disability benefit claim of respondents. For the present study, we included all ICD-10 codes for somatic disorders (Chapters I to IV and VI to XXI). Of ICD-10 mental disorder (Chapter V), we included mood disorders (manic episode F30.9, depressive episode F32.9, bipolar affective disorder F31.9, dysthymia F34.1, other depressive disorder F39) and anxiety disorders (posttraumatic stress disorder F43.1, panic disorder F41.0, generalized anxiety disorder F41.1, agoraphobia F40.0, social phobia F40.1, obsessive compulsive disorder F42.9, other anxiety disorder F41.9).

### DSM-IV classified mental disorders

All respondents were face-to-face interviewed at their home, using the Dutch translation of the World Mental health (WMH) version 3.0 of the World Health Organization (WHO) *Composite International Diagnostic Interview* (WMH-CIDI) [18]. The CIDI is a laptop assisted fully-structured interview to be administered by lay interviewers and the state-of-the-art instrument of choice in psychiatric epidemiological research, generating DSM-IV and ICD-10 classifications of mental disorder. The validity of the CIDI in assessing mental disorders is generally good, as compared with structured diagnostic interviews administered by clinicians [19]. For the present study, we included the sections Depression (major depressive disorder, dysthymia, bipolar disorder), Mania, Panic Disorder, Social Phobia, Agoraphobia (with or without Panic Disorder), Generalized Anxiety Disorder, Obsessive Compulsive Disorder, Posttraumatic Stress Disorder, Suicidality and Psychosis screen.

The DSM-IV classification system and its expression in algorithms of the CIDI include a number of hierarchical rules. This rule entails that in the presence of a disorder, a concomitant less pervasive disorder would not be diagnosed. In assessing prevalence and comorbidity, we did not apply any hierarchical rules, allowing to record all the diagnoses whose criteria were met by each respondent. Twelve interviewers were trained by certified CIDI-trainers. Quality of interviewing techniques was evaluated bimonthly in training sessions.

### **Under-recognition**

We examined under-recognition of mental disorder among disability claimants in two samples. First, in the total study sample, we assessed agreement between DSM-IV and mental ICD-10 classifications of mood and anxiety disorders. For this assessment, we compared prevalence of 30-day DSM-IV classified mood and anxiety disorders with ICD-10 classified mood and anxiety disorders, certified by IP's assessing the disability claim as primary, secondary or tertiary cause of disability. For a valid comparison of DSM-IV with ICD-10 classifications, the assessment of present state conditions is needed, both in the DSM-IV and the ICD-10 classification system. Therefore, we used 30-day (instead of 12-month) DSM-IV classifications. We considered mental disorder to be under-recognized when levels of agreement between ICD-10 and DSM-IV classifications were poor ( $\kappa < 0.40$ ) and/or, using the CIDI as gold standard, prevalence of false-negative ICD-10 classifications was high. Second, we assessed the prevalence of 30-day DSM-IV mental disorder in a subgroup of respondents with only (an) ICD-10 somatic disorder(s) as primary (or additionally as secondary and tertiary) cause of disability, i.e. without any ICD-10 mental disorder. We considered any 30-day DSM-IV mental disorder detected in this ICD-10 pure somatic subgroup as being under-recognized.

### **Under-treatment**

Questions about treatment were included at the end of each CIDI diagnostic section, except for the section posttraumatic stress disorder. Respondents meeting criteria for a DSM-IV mental disorder were asked if they ever in their life talked to a medical doctor or other health professional, about the disorder. After a positive answer, respondents were asked how old they were the first time they did so.

Over time, untreated mental disorders may become more complex and more difficult to treat [20]. For the present study, we considered respondents to be under-treated when more than 3 years had elapsed between onset of the disorder and first treatment contact, or when they had never received any treatment at all.

To examine under-treatment, we assessed the probability of treatment of 12-month DSM-IV mental disorder. We have chosen for a CIDI recall period of 12 months (instead of 30 days) to minimize the risk of missing any under-treated cases. Under-treatment was assessed in two subgroups of disability claimants, with either an ICD-10 somatic or ICD-10 mental disorder as primary cause of disability, irrespective of any ICD-10 somatic or mental comorbidity as secondary or tertiary causes of disability.

## Severity

Severity of under-treated 12-month DSM-IV mental disorder was defined according to Kessler et al. [15] in terms of impairment, disability, suicidality, positive psychosis screen and the presence of 12-month DSM-IV bipolar disorder. At the end of each diagnostic section, the CIDI includes five questions that assess impairment and disability as a consequence of the specific disorder. Four of these questions form the Sheehan Disability Scale (SDS) [21], which asks respondents to rate the impairments during the month in the past year when it was most severe in each of four areas of life: household management, work, close personal relationships and social life on a 0–10 visual analogue scale with impairment categories of none (0), mild (1–3), moderate (4–6) and serious (7–10). The fifth question asks respondents to estimate the total number of days in the past twelve months when they were totally unable to work or carry out their other usual activities because of the focal disorder. We classified cases as serious if they had any of the following: 12-month suicide attempt with serious lethality intent; serious disability in  $\geq 2$  domains of the SDS;  $\geq 1$  positive answer in the CIDI section Psychosis Screen; prevalence of bipolar I or II disorder;  $\geq 30$  days out of working role in the last year. We defined cases as moderate if they had any of the following: suicide gesture, plan, or ideation; negative psychosis screen; moderate role disability in  $\geq 2$  domains of the SDS;  $< 30$  days out of working role in the last year. Disorders were defined as mild when criteria for serious or moderate disorders were not met.

We assessed severity of under-treated 12-month DSM-IV classified mental disorders in two subgroups of disability claimants, with either a ICD-10 somatic disorder or with a ICD-10 mental disorder as primary cause of disability, with or without any comorbid ICD-10 mental or somatic disorder as secondary or tertiary cause of disability.

## STATISTICAL ANALYSIS

To assess external validity, i.e. the representativeness of the study sample for the national population of disability claimants in the Netherlands, we compared study data with data from the SSI [22] on gender, age, educational level and prevalence of ICD-10 defined somatic and mental disorders, using Chi-square goodness-of-fit tests to assess significant differences. DSM-IV diagnoses were made automatically, using algorithms integrated in the CIDI software. Diagnostic data obtained from the CIDI were merged from interview laptops and imported into IBM SPSS 19.0 statistics package. We calculated levels of agreement using kappa statistics for dichotomous values (Cohen's kappa). Kappa values  $< 0.40$  were defined as poor,  $0.41 < \text{kappa} < 0.60$  as moderate, and  $\text{kappa} > 0.60$  as good [23]. We used a confidence interval of 95% and a level of significance  $p \leq 0.05$ .

## RESULTS

### STUDY SAMPLE DESCRIPTION

Out of a total of 1544 eligible disability claimants, 375 persons consented to participate. The response rate was 24.3%. To assess representativeness, we compared responders ( $n=375$ ) with non-responders ( $n=1169$ ) as to age, gender and mental diagnosis certified by

**Table 1**

Demographic characteristics and prevalence of ICD-10 classifications of somatic (n=259) and mental (n=78)<sup>a</sup> disorders as primary cause of disability in the total study sample (n=346)

		Total (%)
<b>Gender</b>	male	174 (50.3)
	female	172 (49.7)
<b>Age, mean</b>		49.8
	range	22-64
<b>Age categories</b>		
	15-24	1 (0.3)
	25-34	23 (6.6)
	35-44	76 (22.0)
	45-54	121 (35.0)
	55-65	125 (36.1)
<b>Educational level<sup>b</sup></b>		
	low	61 (17.6)
	intermediate	235 (67.9)
	high	43(12.4)
<b>Urbanization</b>		
	rural	116 (33.5)
	midsize urban	167 (48.3)
	urban	63 (18.2)
<b>ICD-10 somatic</b>		
	cardiovascular	35 (10.1)
	musculoskeletal	136 (39.3)
	nervous	20 (5.8)
	respiratory	8 (2.3)
	gastro-intestinal	13 (3.8)
	genito-urinary	18 (5.2)
	other <sup>c</sup>	29 (8.5)
<b>ICD-10 mental</b>		
	mood	27 (7.8)
	anxiety	18 (5.2)
	other <sup>d</sup>	33 (9.5)

a We could not obtain ICD-10 mental codes in 9 cases

b Obtained from SSI registry; we could not obtain educational data in 7 cases

c Blood/blood-forming, skin/subcutaneous, endocrine/nutritional/metabolic, ear/mastoid, eye/adnexa

d Stress-related, substance use, somatoform, personality, psychotic disorders

the SSI as cause of disability. We found no significant differences between responders and non-responders as to gender ( $p=0.850$ ) and classifications of somatic and mental disorder certified as cause of disability ( $p=0.682$ ). As to age, we found responders to be significantly older than non-responders ( $p<0.001$ ). Age categories 45-54 years and 55-65 years are over-presented among responders. For the present study, we included only those participants, from whom we obtained complete data on diagnosis of mental disorder. As a result, the study sample consisted of 346 CID1 interviewed participants, see figure 2 in the introductory chapter for a recruitment flowchart.

For a description of the total study sample ( $n=346$ ), see table 1. The study sample comprised 174 men (50.3%). The mean age was 49.8 (range 22-64). More than 70% of respondents was older than 45 years. Educational attainment was at intermediate level for almost 70% of respondents. More than 80% of respondents lived in rural (<10,000 inhabitants) or midsize urban (10,000-100,000 inhabitants) area's.

To assess external validity of the results of the present study as to prevalence of somatic and mental disorder classified in the ICD-10 system as primary cause for disability, we compared the study sample with a large national population ( $n=56,267$ ; source: SSI) of all persons claiming disability benefit in the years 2006-2007. We found the study sample not to differ significantly from this national population as to prevalence of ICD-10 defined somatic disorders ( $p=0.876$ ) and mental disorders ( $p=0.344$ ).

To assess external validity as to demographic characteristics, we compared the study sample with a national population ( $n=166,581$ ; source: SSI) of all persons claiming disability benefit in the Netherlands in the years 2006-2010. We found no significant differences as to gender ( $p=0.544$ ). However, the study sample is significantly older ( $p<0.05$ ) with a higher proportion of the age range 45-65 year (71.1% for the study sample and 54.4% for the national population), and higher educated ( $p<0.05$ ) with a higher proportion of intermediate/higher attainment (82.0% for the study sample and 69.9% for the national population).

### UNDER-RECOGNITION

The sample of respondents we examined for under-recognition of recent, i.e. 30-day DSM-IV mood and anxiety disorder, consisted of 343 persons (in 3 cases ICD-10 codes were missing). In this sample, the prevalence of any ICD-10 mood disorder as primary, secondary or tertiary cause of disability was 10.8% ( $n=37$ ) and of any 30-day DSM-IV mood disorder 9.5% ( $n=33$ ). We found ICD-10/DSM-IV disagreement in 48 (14.0%) cases ( $\kappa=0.237$ ). Of 33 cases, diagnosed by the CIDI as having a 30-day DSM-IV mood disorder, 22 cases were not diagnosed by IPs in ICD-10 classification (66.6% false-negatives). Of 310 cases without 30-day DSM-IV mood disorder, IP's certified 26 cases with a ICD-10 mood disorder (8.4% false-positives). The prevalence of any ICD-10 anxiety disorder was 6.1% ( $n=21$ ) and of any 30-day DSM-IV anxiety disorder was 20.4% ( $n=70$ ). ICD-10/DSM-IV disagreement was present in 61 (17.8%) cases ( $\kappa=0.260$ ). Of 70 cases with an anxiety disorder as diagnosed by the CIDI, 55 cases were not detected by IPs using ICD-10 (78.6% false-negatives). Of 273 cases without 30-day DSM-IV anxiety disorder, 6 cases were diagnosed with ICD-10 anxiety disorder (2.2% false-positives).

The sample of respondents certified by IPs with a pure somatic disorder classified in ICD-10 as primary cause of disability without any ICD-10 mental comorbidity, consisted of 236 persons. The prevalence of 30-day DSM-IV classified mental disorders in this sample is shown in table 2. The more prevalent classes of somatic disorders were musculoskeletal (55.7%), cardiovascular (18.7%) and nervous system (13.0%) (not in table). In this ICD-10 pure somatic subgroup, the prevalence of any 30-day DSM-IV classified mood disorder was 3.8% and of any 30-day anxiety disorder 11.4%. The more prevalent specific 30-day DSM-IV classifications were major depressive disorder (3.0%), social phobia (2.1%), general anxiety disorder (3.4%) and posttraumatic stress disorder (2.5%).

**Table 2**Prevalence (%) of comorbid 30-day DSM-IV mood and anxiety disorder among respondents (n=236) with a pure<sup>a</sup> ICD-10 somatic disorder

	Total (%)
<b>Any mood disorder</b>	3.8
dysthymia	1.3
major depressive disorder	3.0
mania	0.0
bipolar I/II disorder	0.4
<b>Any anxiety disorder</b>	11.4
agoraphobia	0.4
panic disorder	0.8
social phobia	2.1
obsessive compulsive disorder	1.3
general anxiety disorder	3.4
posttraumatic stress disorder	2.5

a Without any ICD-10 classification of mental disorder.

### UNDER-TREATMENT AND SEVERITY

We examined under-treatment of 12-month DSM-IV mood and anxiety disorder in a sample of respondents classified with either any ICD-10 somatic or any ICD-10 mental disorder as primary cause of disability, irrespective of any secondary or tertiary ICD-10 classification. This sample consisted of 337 persons (in 9 cases ICD-10 codes were missing). Of this sample, 259 (76.8%) respondents were primarily classified with an ICD-10 somatic disorder, and 78 (23.2%) respondents primarily with a ICD-10 mental disorder. Table 3 shows probability of treatment of the more prevalent 12-month DSM-IV classified disorders, i.e. major depressive disorder, general anxiety disorder and social phobia for these two ICD-10 somatic and mental subgroups. According to our definition of under-treatment, i.e. treatment delay of more than 3 years or no treatment at all, in the ICD-10 somatic group, 45.2% of major depressive disorder, 53.3% of general anxiety disorder and 80.0% of social phobia were under-treated. In the ICD-10 mental group, we found 44.7% of major depressive disorder, 33.3% of general anxiety disorder and 80.9% of social phobia under-treated.

Table 4 presents the severity of under-treated 12-month DSM-IV classified disorders in these two ICD-10 subgroups. In the ICD-10 somatic subgroup, 73.7% of under-treated major depressive disorders are serious in terms of disability, i.e. SDS outcome, and 68.4% of these disorders are serious in terms of role impairment, i.e. days out of role. In this group, corresponding percentages for under-treated social phobias and general anxiety disorder are 33.3% and 75.0%, respectively, and of under-treated general anxiety disorders 62.5% and 50.0%, respectively. In the ICD-10 mental subgroup, in terms of disability and days out of role, 70.6% of under-treated major depressive disorders and 71.4% of under-treated general anxiety disorders are serious. Under-treated social phobias in this subgroup are serious in 47.1% of cases in terms of disability, and in 76.5% in terms of days out of role. Other criteria for severity were met in fewer cases. One respondent with an untreated general anxiety disorder reported having attempted suicide with lethality intent.

**Table 3**

Treatment and under-treatment (%) of 12-month DSM-IV major depressive disorder (mdd), general anxiety disorder (gad) and social phobia (so) in subgroups with ICD-10<sup>a</sup> somatic and mental disorder as primary cause for disability<sup>b</sup>

	ICD-10 somatic (n=259)			ICD-10 mental (n=78)		
	n	treatment	under-treatment	n	treatment	under-treatment
<b>12-month DSM-IV</b>						
mdd	42	23 (44.8)	19 (45.2)	40	22 (55.3)	18 (44.7)
gad	15	7 (46.7)	8 (53.3)	21	14 (66.7)	7 (33.3)
so	15	3 (20.0)	12 (80.0)	21	4 (14.1)	17 (80.9)

a We could not obtain ICD-10 codes in 9 cases

b With or without any ICD-10 somatic/mental comorbidity as secondary or tertiary cause of disability

**Table 4**

Severity (%) of under-treated 12-month DSM-IV major depressive disorder (n=36), social phobia (n=29) and general anxiety disorder (n=15) in subgroups with ICD-10 somatic (n=259) and mental (n=78<sup>a</sup>) disorders as primary cause for disability<sup>b</sup>

	ICD-10					
		somatic			mental	
	none/mild	moderate	serious	none/mild	moderate	serious
<b>major depressive disorder</b>						
disability	5.3	21.1	73.7	5.9	23.5	70.6
days out of working role	15.8	15.8	68.4	17.6	11.8	70.6
suicidality	78.9	21.1	0.0	88.2	11.8	0.0
positive psychosis screen	94.7	-	5.3	88.2	-	11.8
bipolar I/II	94.7	-	5.3	88.2	-	11.8
<b>social phobia</b>						
disability	25.0	41.7	33.3	23.5	29.4	47.1
days out of working role	16.7	8.3	75.0	11.8	11.8	76.5
suicidality	91.7	8.3	0.0	76.5	23.5	0.0
positive psychosis screen	100.0	-	0.0	64.8	-	35.3
bipolar I/II	100.0	-	0.0	88.2	-	11.8
<b>general anxiety disorder</b>						
disability	25.0	12.5	62.5	14.3	14.3	71.4
days out of working role	25.0	25.0	50.0	28.6	0.0	71.4
suicidality	100.0	0.0	0.0	42.8	42.9	14.3
positive psychosis screen	87.5	-	12.5	85.7	-	14.3
bipolar I/II	100.0	-	0.0	85.7	-	14.3

a We could not obtain ICD-10 codes in 9 cases

b With or without any ICD-10 somatic/mental comorbidity as secondary or tertiary cause of disability

## DISCUSSION

In the total study sample, the prevalence of certified ICD-10 mood disorder was slightly higher than the prevalence of 30-day DSM-IV/CIDI mood disorder: 10.7% vs. 9.5%. However, level of agreement between ICD-10 and DSM-IV classified mood disorder was very poor ( $\kappa=0.237$ ). Differences in corresponding percentages for any anxiety disorder were more pronounced: 6.1% (ICD-10) vs. 20.2% (DSM-IV), also with very poor level of agreement ( $\kappa=0.260$ ). For both classes of mental disorder, we found a high number of false-negative and a low number of false-positive ICD-10 classifications. These findings suggest substantial under-recognition of recent mood and anxiety disorders among disability claimants and confirm results of recent research in a comparable population [13].

The CIDI we used in the present study generates both DSM-IV and ICD-10 classifications of mental disorder. However, we used the DSM-IV classification system, since this system is the *de facto* standard in psychiatric research. This enabled us to compare our results with those found in other populations. However, by comparing DSM-IV with ICD-10, differences between prevalence of DSM-IV and ICD-10 classified mental disorder may be based on different definitions of mental disorder in the DSM-IV and ICD-10 system [24]. It has been documented that in the ICD-10, thresholds for mental disorder are lower than in the DSM-IV, resulting in a higher prevalence of ICD-10 classifications [25,26]. However, in the present study, we found a much lower ICD-10 prevalence for any anxiety disorder. Therefore, as far as anxiety disorder is concerned, the difference we found between the prevalence of DSM-IV and ICD-10 classifications cannot be explained by any classification difference.

In the subgroup with ICD-10 pure somatic disorder certified as primary cause for disability (without any ICD-10 mental comorbidity), the prevalence of comorbid 30-day DSM-IV classified mental disorder, especially anxiety disorder, was substantial. This finding may also be indicative of under-recognition of disabling co-occurring mood and anxiety disorder among disability claimants with a somatic disorder as primary cause of disability.

The comorbid 12-month DSM-IV classified mental disorders, i.e. major depressive disorder, social phobia and general anxiety disorder, both in the ICD-10 somatic and mental subgroup were found to be predominantly serious and substantially under-treated. Since we defined under-treatment conservatively as treatment delay longer than 3 years or no treatment at all, under-treatment is probably underestimated. In general, individuals with mental illness may not seek professional help, because they do not perceive their mental health problem as serious. However, in the present study, the under-treated disorders were reported by participants to be for the most part serious in terms of disability and days out of role.

Because of the cross-sectional design of the present study, it remains unclear whether or not IPs have acted upon their recognition of under-treated serious mental disorder, for instance, by psychiatric consultation or by referral to specialized mental health care. However, in the ICD-10 somatic subgroup, any follow up of serious under-treated mental disorders is unlikely, since they were largely not recognized to begin with.

Different factors may underlie the under-treatment of mental disorders that we found in the present study. In studies on depression and anxiety, several barriers to treatment were identified by patient self-report: not knowing where to go for help, a preference to self-manage mental health problems, inability to afford treatment, lack of health insurance, shame, stigma, perceived lack of effectiveness of treatment and inadequate recognition by health care professionals [3,27]. In the Netherlands, protocols and guidelines for the assessment of disability due to both somatic and mental disorder have been developed by the Dutch Health Council and the Dutch Association of Insurance Medicine (NVVG) for use by IPs [28]. In these protocols, diagnosis and treatment of (comorbid) mental disorder are considered to be key aspects [29]. The present study does not provide information whether or not the IPs have adhered to these protocols. However, since the present study indicates that mental disorders are under-recognized, protocol adherence with regard to assessment of mental comorbidity by IPs may be suboptimal. If so, IPs did not differ from other medical professionals in primary and occupational care [30,31] as to insufficient adherence to guidelines. Indeed, in general, adherence to clinical guidelines by physicians in all kinds of settings is often suboptimal [32]. A failure to optimally adhere to guidelines by IPs in disability settings with regard to diagnosis and treatment of mental disorder may have several negative outcomes, i.e. under-recognition of need for treatment, suboptimal assessment of disability benefit claims, a longer duration of sickness absence and a longer time to return to work.

#### **STRENGTHS AND LIMITATIONS**

Our study is the first to assess under-recognition and under-treatment of DSM-IV classified disorders among persons claiming disability benefit after long-term sickness absence. It is unique in comparing reliable data on prevalence, treatment and severity of DSM-IV classified mental disorder collected with the CIDI with diagnostic data on ICD-10 somatic and mental disorders registered on disability certificates. Other strengths of this study are: the use of the latest version of the CIDI, with complete covering of potential DSM-IV classifications of mood and anxiety disorders; the employment of well trained interviewers, whose interviewing techniques were frequently evaluated and controlled; the representativeness of the sample for the population of disability claimants in the Netherlands as to diagnostic classification, allowing results to be generalized to much larger populations.

However, several limitations must be taken into account as well. First, a potential limitation is the response rate of 24.3%. There may have been several reasons for this low response. It may be due to the stepped informed consent procedure, necessary to guarantee complete confidentiality and to prevent uninformed data flow between the researchers and the SSI. The same consent procedure was used in another Dutch study on mental health problems among long term work disabled persons [13]. The response rate in that study was comparably low: 25.8%. The low response rate in the present study may also be related to the comprehensiveness of our measures, i.e. a lengthy psychiatric interview (CIDI). This may have kept eligible participants from giving consent. The low response rate in the present study may have resulted in selection bias in different ways. In general, persons suffering from mental illness might be less inclined to participate in surveys on

mental health [19]. This could have led to lower prevalence of mental disorders in the study sample.

We found respondents to be significantly older as compared with both non-responders and with a national Dutch population of disability claimants. In general, poor mental health is prevalent at all ages with the highest prevalence occurring in the youngest age groups [33]. Prevalence rates of mental disorders found in the present study may therefore be an underestimation. We also found respondents to be significantly higher educated as compared with a national Dutch population of disability claimants. It is difficult to estimate whether this has led to selection bias as to prevalence of mental disorder, since the association of level of education with prevalence rate of mental disorder is not clear [34]. It is generally assumed that higher prevalence is found among lower educated persons [33]. Therefore, the prevalence of mental disorder in the study sample may also have been underestimated due to the over-inclusion of higher educated respondents. However, selection bias is not likely, since we found no significant difference as to the prevalence of most frequent mental disorders found among disability claimants, i.e. mood, anxiety and stress-related disorders, diagnosed by the IPs in the study sample as compared to the national population of disability claimants. Second, the power of our ICD-10 somatic and mental subgroup analyses is limited due to small sample sizes. Results of these analyses should therefore be interpreted with caution. Third, the cross-sectional design of this study does not allow any assessment of causal relationships.

## »CONCLUSION«

Using the CIDI, we found DSM-IV classified mood and anxiety disorders to be substantially under-recognized and under-treated among disability claimants. Under-treated 12-month DSM-IV mental disorders were found to be predominantly serious in terms of disability and days out of role. Further studies are needed to confirm these findings and to help develop interventions to prevent negative consequences of under-recognition and under-treatment of mental disorders in this vulnerable population.

Professionals in primary and occupational health care are challenged to distinguish between mild self-limiting mental health problems and more severe mental disorders with a high risk of disability if untreated. IPs and other medical professionals involved in disability assessment, should be aware of substantial under-treatment of serious mood and anxiety disorder among disability claimants. These professionals should closely follow their professional guidelines to prevent negative outcomes of under-recognition and under-treatment. Once mental disorder has been recognized and under-treatment has been ascertained, IPs should closely collaborate with professionals in primary, secondary and occupational mental health care to promote effective treatment and interventions aimed at health improvement, occupational rehabilitation, return to work and prevention of permanent disability. Future studies should target ways how this collaboration can be best organized.

### **IMPLICATIONS FOR REHABILITATION**

- To promote rehabilitation of disability claimants with mental disorders, insurance physicians should closely collaborate with professionals in primary, secondary and occupational health care.
- To rehabilitate claimants with hitherto under-diagnosed and under-treated serious mental disorders, tailor-made multidisciplinary interventions are needed.
- These multidisciplinary interventions should involve professionals in mental health care, occupational and revalidation medicine, and should be aimed at improvement of mental health, functioning and return-to-work.

### **ACKNOWLEDGMENT**

We wish to thank Prof. Ute Bültmann for reviewing an early draft of this article.

### **DECLARATION OF INTEREST**

The authors report no declarations of interest.



**REFERENCES**

- 1 WHO World Mental Health Survey Consortium. Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *JAMA* 2004;291:2581-90.
- 2 Ormel J, Petukhova M, Chatterji S, et al. Disability and treatment of specific mental and somatic disorders across the world. *Br J Psychiatry* 2008;192:368-75.
- 3 van Beljouw I, Verhaak P, Prins M et al. Reasons and determinants for not receiving treatment for common mental disorders. *Psychiatr Serv* 2010;61:250-7.
- 4 Lecrubier Y. Widespread underrecognition and undertreatment of anxiety and mood disorders: results from 3 European studies. *J Clin Psychiatry* 2007; 68(Suppl 2):36-41.
- 5 Laitinen-Krispijn S, Bijl R. Werk, psyche en ziekteverzuim. Aard en omvang van psychische stoornissen, ziekteverzuim en zorggebruik in de beroepsbevolking (Work, mental health and sickness absence. Nature and extent of mental disorder, sickness absence and health care use among workers). Utrecht: Netherlands Institute of Mental Health and Addiction; 2002.
- 6 Nieuwenhuijsen K, Verbeek JH, de Boer AG et al. Predicting the duration of sickness absence for patients with common mental disorders in occupational health care. *Scand J Work Environ Health* 2006 Feb;32:67-74.
- 7 Flach PA, Groothoff JW, Krol B, Bültmann U. Factors associated with first return to work and sick leave durations in workers with common mental disorders. *Eur J Public Health* 2011. DOI:10.1093/eurpub/ckr102.
- 8 Bültmann U, Rugulies R, Lund T et al. Depressive symptoms and the risk of long-term sickness absence: a prospective study among 4747 employees in Denmark. *Soc Psychiatry Psychiatr Epidemiol* 2006;41:875-80.
- 9 Bültmann U, Christensen KB, Burr H et al. Severe depressive symptoms as predictor of disability pension: a 10-year follow-up study in Denmark. *Eur J Public Health* 2008;18:232-4.
- 10 van der Feltz-Cornelis CM, Hoedeman R, de Jong FJ et al. Faster return to work after psychiatric consultation for sicklisted employees with common mental disorders compared to care as usual. A randomized clinical trial. *Neuropsychiatr Dis Treat* 2010;6:375-85.
- 11 de Boer WEL, Besseling JJM, Willems JHBM. Organisation of disability evaluation in 15 countries. *Pratiques et organisation des soins*.2007;38:205-217.

- 12 Diagnostic and Statistical Manual of Mental Disorders. 4<sup>th</sup> ed. , 1994. Washington D.C.: American Psychiatric Association; 1994. p 623-27.
- 13 Langerak W, Langeland W, Draijer N et al. Diagnostiek en classificatie van psychiatrische aandoeningen bij een steekproef van langdurig psychisch arbeidsongeschikten (Diagnostics and classification of psychiatric disorders in a cohort of long-term work disabled persons due to mental health problems). *Tijdschr Bedrijfs Verzekeringsgeneeskd.* 2011;19:14-21.
- 14 Overland S, Glozier N, Krokstad S, Mykletun A. Undertreatment Before the Award of a Disability Pension for Mental Illness: The HUNT Study. *Psychiatr Serv* 2007;58:1479-82.
- 15 Kessler RC, Chiu WT, Demler O et al. Prevalence, severity and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry* 2005;62:617-27.
- 16 World Health Organization. International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) – [cited 2012 July 1]. Available from: <http://apps.who.int/classifications/icd10/browse/2010/en>
- 17 Ouwehand P, Wouters PHM. CAS, Classificaties voor Arbo en SV (CAS, Classification for Occupational Health and Social Security). Amsterdam: UWV; 2002 – [cited 2012 June 12]. Available from: <http://www.debus.nl/images/PDF/cas-code%20boekje.pdf>.
- 18 Kessler RC, Ustun TB. The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res* 2004;13:93-121.
- 19 Haro JM, Arbabzadeh-Bouchez S, Brugha TS et al. Concordance of the Composite International Diagnostic Interview Version 3.0 (CIDI 3.0) with standardized clinical assessments in the WHO World Mental Health surveys. *Int J Methods Psychiatr Res* 2006;15:167-180.
- 20 WHO World Mental Health Survey Consortium. Delay and failure in treatment seeking after first onset of mental disorders in the World Health Organization's World Mental Health Survey Initiative. *World Psychiatry* 2007;6:177-185.
- 21 Leon, AC, Olfson, M, Portera et al. Assessing psychiatric impairment in primary care with the Sheehan Disability Scale. *Int J Psychiatry Med.* 1997;27:93-105.
- 22 UWV Knowledge Center. Quarterly report 2007-III (in Dutch: Kenniscentrum UWV Kwartaalverkenning 2007 – III). Amsterdam: UWV, 2007.

- 23 Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics* 1977;33:159-74.
- 24 First MB, Pincus HA. Classification in psychiatry: ICD-10 versus DSM-IV. *Br J Psychiatry* 1999;175:205-9.
- 25 Peters L, Slade T, Andrews G. A comparison of ICD-10 and DSM-IV criteria for posttraumatic stress disorder. *J Trauma Stress* 1999;12:335-43.
- 26 Andrews G, Slade T. The classification of anxiety disorders in ICD/10 and DSM-IV: a concordance analysis. *Psychopathology* 2002;35:100-6.
- 27 Olfson M, Guardino M, Struening E et al. Barriers to the treatment of social anxiety. *Am J Psychiatry* 2000;157:521-7.
- 28 Gezondheidsraad. Verzekeringsgeneeskundige protocollen. [Dutch Health Council: Protocols for insurance physicians]. Den Haag: Gezondheidsraad; 2006 – [cited 2012 Feb 29]. Available from: <http://www.nvvg.nl/protocollen>
- 29 Schellart AJM, Zwerver F, Knol DL et al. Development and reliability of performance indicators for measuring adherence to a guideline for depression by insurance physicians. *Disability and Rehabilitation* 2011;33:2535-43.
- 30 Lugtenberg M, Burgers JS, Besters FC et al. Perceived barriers to guideline adherence: A survey among general practitioners. *BMC Family Practice* 2011;12:98.
- 31 Rebergen D, Hoenen J, Heinemans A et al. Adherence to mental health guidelines by Dutch occupational physicians. *Occup Med* 2006;56:461-8.
- 32 Cabana MD, Rand CS, Powe NR et al. Why don't physicians follow clinical practice guidelines? A framework for improvement. *JAMA* 1999;282:1458-65.
- 33 WHO International Consortium in Psychiatric Epidemiology. Cross-national comparisons of the prevalences and correlates of mental disorders. *Bull World Health Organ* 2000;78:413-26.
- 34 ESEMeD/MHEDEA 2000 Investigators. Prevalence of mental disorders in Europe: results from the ESEMeD project. *Acta Psychiatr Scand* 2004;420:21-7.



## CHAPTER 5 THE PERFORMANCE OF THE K10, K6 AND GHQ-12 TO SCREEN FOR PRESENT STATE DSM-IV DISORDERS AMONG DISABILITY CLAIMANTS

BMC PUBLIC HEALTH 2013, 13:128.

L.R. CORNELIUS | J.W. GROOTHOFF | J.J.L. VAN DER KLINK | S. BROUWER

---

### ›ABSTRACT‹

#### BACKGROUND

Screening for mental disorders among disability claimants is important, since mental disorders seem to be seriously under-recognized in this population. However, performance of potentially suitable scales is unknown. We aimed to evaluate the psychometric properties of three scales, the 10- and 6-item Kessler Psychological Distress Scale (K10, K6) and the 12-item General Health Questionnaire (GHQ-12), to predict present state mental disorders, classified according to the Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> Edition (DSM-IV) among disability claimants.

#### METHODS

All scales were completed by a representative sample of persons claiming disability benefit after two years sickness absence (n=293). All diagnoses, both somatic and mental, were included. The gold standard was the Composite International Diagnostic Interview (CIDI 3.0) to diagnose present state DSM-IV disorder. Cronbach's alpha, sensitivity, specificity, positive (PPV) and negative predictive values (NPV), and the Areas Under the receiver operating characteristic Curve (AUC) were calculated.

#### RESULTS

Cronbach's alpha's were 0.919 (K10), 0.882 (K6) and 0.906 (GHQ-12). The optimal cut-off scores were 24 (K10), 14 (K6) and 20 (GHQ-12). The PPV and the NPV for the optimal cut point of the K10 was 0.53 and 0.89, for the K6 0.51 and 0.87, and for the GHQ-12 0.50 and 0.82. The AUC's for 30-day cases were 0.806 (K10; 95% CI 0.749-0.862), 0.796 (K6; 95% CI 0.737-0.854) and 0.695 (GHQ-12; 95% CI 0.626-0.765).

#### CONCLUSIONS

The K10 and K6 are reliable and valid scales to screen for present state DSM-IV mental disorder. The optimal cut-off scores are 24 (K10) and 14 (K6). The GHQ-12 (optimal cut-off score: 20) is outperformed by the K10 and K6, which are to be preferred above the GHQ-12. The scores on separate items of the K10 and K6 can be used in disability assessment settings as an agenda for an in-depth follow-up clinical interview to ascertain the presence of present state mental disorder.

**Key words** disability, mental disorder, screening, CIDI, K10, K6, GHQ-12, psychometric, predictive value.

## ►BACKGROUND◀

According to the Organization for Economic Co-operation and Development (OECD), poor mental health now accounts for one-third of all new disability benefit claims on average, rising to as high as 40-50% in some member states [1,2].

Despite their high prevalence, mental disorders often go unrecognized in health care settings [3-8], among workers [9-12] and among disability claimants [13]. A Dutch study in a cohort of persons with long term work disability due to mental health problems, mental disorders were found to be substantially under-diagnosed by social insurance physicians (IPs) assessing the disability benefit claim [13]. In a study (article submitted) of our own among disability claimants, we found very poor levels of agreement ( $\kappa < 0.260$ ) between mental disorder certified by IPs and mental disorder classified according to the Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> Edition (DSM-IV) [14], detected by the Composite International Diagnostic Interview (CIDI) [15] and, in a subgroup certified with a pure somatic disorder, the CIDI detected DSM-IV mood and anxiety disorder in 3.7% and 11.6% of cases, respectively. These findings are indications of serious under-recognition of mental disorder among disability claimants. In turn, the under-recognition of mental health problems in this group may lead to needs for treatment not being met, delayed return to work and unnecessary disability. Therefore, it is important that a reliable and valid screening instrument be made available for IPs for routine use in their assessment of disability benefit claims.

Most widely used short scales to screen for poor mental health are the Kessler Psychological Distress Scale with 10 (K10) or 6 items (K6) [16] and a short version of the General Health Questionnaire with 12 items (GHQ-12), adapted from Goldberg's original 60-item GHQ [17]. These scales have been extensively used as screening tools in general population based studies, in primary care and in other samples of specific interest [18-24].

However, for several reasons, validity estimates for the K10, K6 and GHQ-12 observed in community samples, primary care and other populations may very well not be applicable in persons claiming disability after long-term sickness absence. In general, the validity and optimal cut-off values of screening instruments in differentiating psychiatric cases from non-cases differ depending on the population in which the validity study is carried out, the golden standard that is used, the classification and the recall period of the disorders assessed and the method how to score screener responses. More specific, the prevalence of mental disorder in disability settings is much higher than in the general population and in primary care [25]. To add, studies have shown personal and environmental factors to interplay with mental health in sustaining long-term sickness absence and disability [26-28]. Therefore, in a population of disability claimants, validity of screening scales are likely to differ from those found in other populations. Therefore, it is important to provide new information on the psychometric properties, including reliable cut-off values of the K10, K6 and GHQ-12 for use in this specific population. In the present study, we aim to determine the sensitivity, specificity and predictive power of these scales to detect any current DSM-IV psychiatric disorder in a population of disability claimants, and to determine the optimal cutoff score of all scales.

## ►METHODS◀

### SETTING AND PROCEDURES

In the Dutch social security system, one can apply for disability benefit after two years of continuous sick leave. Medical aspects of disability are then assessed by IP's employed by the Dutch Social Security Institute (SSI) in face-to-face interviews and examinations. For their assessment of diagnosis and treatment of the disorder(s) related to the disability claimed, IPs rely additionally in part on historic and actual medical data provided by occupational physicians who have assessed the sickness absence in the period preceding the disability claim. To classify diagnoses related to sickness absence and disability, IPs use a classification system derived from the ICD-10 and developed for use in occupational health and social security in the Netherlands [29]. The registry of the SSI allows one diagnosis code for any (somatic or mental) disorder as primary cause of disability, and two additional codes for any comorbid disorders as secondary or tertiary cause of disability.

For the present study, data were collected in the initial wave of a larger prospective cohort study with one year follow-up among disability claimants (PREDIS), conducted in the province of Groningen in the Netherlands. All persons claiming disability benefit at the SSI office in the city of Groningen in the period October 1<sup>st</sup> 2008 until January 1<sup>st</sup> 2010, were eligible to participate in the present study. As a result, all diagnoses were included, both mental and physical. The recruitment procedure was organised in two steps. As a first step, a SSI research assistant contacted eligible claimants by telephone asking permission to sent information about the study and a consent form. When permission was granted, name and address were given by the SSI assistant to the researcher, who then sent an information letter and a consent form as a second step. If eligible persons could not be contacted by telephone, the information letter and the consent form were sent by the SSI. Persons willing to participate returned signed consent forms to the researcher. The Medical Ethics committee of the University Medical Center Groningen (UMCG) approved recruitment, consent and field procedures.

Out of a total of 1544 eligible disability claimants, 375 persons participated in PREDIS after giving their informed consent prior to their inclusion in the study. The response rate is 24.3%. For the present study, we included 293 participants from whom we obtained complete data sets. Each participant was sent a questionnaire including the K10, with the K6 embedded, and GHQ-12. Subsequently, each respondent was face-to-face interviewed at home with the CID1. Respondents returned completed questionnaires at the end of the interview.

To assess representativeness of the study sample for the target population, i.e. the national population of disability claimants in the Netherlands, we compared study data on prevalence of the most frequent ICD-10 defined mood, anxiety and stress-related disorders as primary cause of disability with a large national population (n=56.267) of all persons claiming disability benefit in the years 2006-2007 [2]. We found the study sample not to differ significantly from this national population, see Table 1.

**Table 1**

Prevalence of ICD-10 defined mental disorders a in the study sample (n=293) and in the total population of disability claimants (n=56.267) b

ICD-10 category	Study sample n (%)	Population n (%)	$p^c$	$\chi^2$
Mood disorders	24 (8.2)	5.387 (10.2)	0.452	0.564
Anxiety disorders	15 (5.1)	2.668 (5.1)	0.730	0.119
Stress-related disorders	17 (5.8)	2.511 (4.8)	0.248	1.332
Total	56 (19.1)	10.566 (20.1)	0.491	6.423

a Classified by IPs as primary cause of disability.

b Disability benefit claimants in the Netherlands from Jan. 1st 2006 to July 31st 2007 (source: SSI).

c Proportions were tested with Chi-square goodness-of-fit test;  $P < 0.05$ .

## MEASURES

### K10 AND K6

The 10-item Kessler Psychological Distress scale (K10) and its 6-item short-form the K6, measure non-specific psychological distress. Both scales have strong psychometric properties and are able to discriminate psychiatric cases from non-cases [8,19,21,23,30]. The K10 consists of 10 items with each five Likert-type response categories: 'none of the time' (1), 'a little of the time' (2), 'some of the time' (3), 'most of the time' (4) and 'all of the time' (5). Sum scores range from 10 to 50. The reference period of the K10 is 30 days. The K6 is a subset of the K10, using items 2, 4, 5, 8, 9 and 10 only, with sum scores ranging from 6 to 30. We used the official Dutch translation of the K10 [31].

### GHQ-12

The 12-item General Health Questionnaire (GHQ-12) is a self-report instrument for the detection of mental disorders in the community and in primary care settings [24,32]. For the GHQ-12 we used the 0-1-2-3 scoring method with a four-point response scale: 'not at all' (for questions 1, 3, 4, 7, 8 and 12: 'better than usual') (0), 'same as usual' (1), 'rather more than usual' (2), 'much more than usual' (3) [24]. The reference period is the last few weeks. Sum scores range from 0 to 36. For the present study we used the Dutch version of the GHQ-12.

### GOLD STANDARD: THE COMPOSITE INTERNATIONAL DIAGNOSTIC INTERVIEW (CIDI)

As gold standard we used the Dutch translation of the CIDI, version 3.0 [15,33]. The CIDI is a comprehensive, fully-structured interview designed to be used by trained lay interviewers for the assessment of mental disorders according to the definitions and criteria of the DSM-IV. The validity of the CIDI 3.0 in assessing anxiety, mood and substance use disorders is generally good, as compared with clinical interviews [34]. Earlier CIDI versions also assess disorders with generally acceptable reliability and validity, with the exception of psychosis [35,36]. We included the sections Depression (D), Mania (M), Panic Disorder

(PD), Specific Phobia (SP), Social Phobia (SO), Agoraphobia (AG), Generalized Anxiety Disorder (G), Suicidality (SD), Alcohol Use (AU), Illegal Substance Use (IU), Obsessive Compulsive Disorder (O), Psychosis Screen (PS), Post-Traumatic Stress Disorder (PT), Personality Disorders Screen (P), Attention Deficit Disorder (AD), Conduct Disorder (CD), Separation Anxiety Disorder (SA) and Interviewer's Observation (IO). All respondents were face-to-face interviewed at their home. Interviewing was laptop computer-assisted. Mean interview time was 3 hours, but occasionally 5 to 6 hours, depending on the mental state of the respondent. For the present study, we used only DSM-IV Axis 1 disorders that occurred in the month preceding the interview (30-day diagnosis). This time frame corresponds with the recall period of the K10 and GHQ-12. Twelve CIDI interviewers (4 social insurance physicians, 2 medical students, 3 rehabilitation coaches, 3 insurance health secretaries) were trained by certified CIDI-trainers. Quality of interviewing techniques was evaluated bimonthly in group training sessions. Interviewers were blind to the classification of respondents to the K10 and GHQ-12.

### STATISTICAL ANALYSIS

We calculated the internal consistency (Cronbach's alpha) of the K10, K6 and GHQ-12. An alpha coefficient of 0.70 or higher was considered to indicate good internal consistency. We analyzed the Receiver Operating Characteristic (ROC) [37] to calculate sensitivities, specificities, positive (PPV) and negative predictive values (NPV) for different cut-off values of all three scales in detecting any DSM-IV Axis I disorder that occurred in the last 30 days prior to the interview. Sensitivity is the probability that a person with the disorder is recognized by the test, while specificity is the probability that a person without the disorder is correctly recognized by the test. Positive predictive value (PPV) is the proportion of persons with true-positive test results. Negative predictive value (NPV) is the proportion of persons with true-negative test results.

We calculated the areas under the ROC curve (AUC) for all three scales with 95% confidence intervals. The ROC curve is a graphical plot of true positives (sensitivity) against the false positives (1-specificity) as the discrimination threshold (or cut-off point) is varied. The AUC equals the probability that a test will rank a randomly chosen respondent with a disorder higher than a randomly chosen respondent without a disorder. We defined as optimal cut-off score the value that gives the highest sum of the sensitivity and specificity, which is the point of the ROC-curve nearest to the upper left-hand corner of the graph. For the assessment of representativeness of the study sample for the target population, we used Chi-square goodness-of-fit test ( $P < 0.05$ ). For all statistical analyses we used SPSS version 16.0 for Windows.

## RESULTS

### SAMPLE CHARACTERISTICS

The study sample ( $n=293$ ) comprised 154 female respondents (52.6%). The mean age was 50.0 (range 22-64). For further demographic characteristics as to educational level and urbanicity, see Table 2.

**Table 2**

Demographics and prevalence of present state DSM-IV disorders (n=293)

	Total n(%)
<b>Gender</b>	
Female	154 (52.6) <sup>a</sup>
Male	139 (47.4)
<b>Age, mean (range)</b>	50.0 (22-64)
<b>Highest educational level<sup>b</sup></b>	
Low	51 (17.6)
Intermediate	197 (67.9)
High	39 (13.4)
<b>Urbanicity</b>	
Rural (<10,000)	95 (32.4)
Midsize urban (10,000-100,000)	141 (48.1)
Urban (>100,000)	57 (19.5)
<b>Any (one or more) disorder</b>	76 (25.9)
<b>Any mood disorder</b>	
Major depressive disorder	22 (7.5)
Minor depressive disorder	1 (0.3)
Dysthymia	15 (5.1)
Bipolar I/II disorder	8 (2.7)
(Hypo)mania	6 (2.1)
<b>Any anxiety disorder</b>	
Panic attack	16 (5.5)
Panic disorder	5 (1.7)
Posttraumatic stress disorder	20 (6.8)
Social phobia	18 (6.1)
Agoraphobia	9 (3.0)
Specific phobia	21 (7.2)
Obsessive compulsive disorder	12 (4.1)
Generalized anxiety disorder	15 (5.1)
<b>Any substance use disorder</b>	
Alcohol abuse	1 (0.3)
Alcohol dependence	2 (0.7)
Drug abuse	6 (2.0)
Drug dependence	3 (1.0)
<b>Other</b>	
Adult separation anxiety disorder <sup>c</sup>	4 (1.4)

a Parenthetical numbers are percentages.

b Low: elementary, preparatory middle-level; intermediate: middle-level applied; higher general continued; preparatory scientific; high: university applied sciences; research university; 6 cases are missing

c Adult Separation Anxiety Disorder is not listed in the DSM-IV.

In total, 76 participants (25.9%) met DSM-IV criteria for one or more 30-day mental disorder. Of this group, 49 participants (64.5%) had more than one mental disorder. The prevalence of any DSM-IV mood and any anxiety disorders was 10.2% and 20.1%, respectively, see Table 1. The 30-day prevalence of specific DSM-IV mental disorders in the

study sample is also presented in Table 1. The median time between completing the K10, K6 and GHQ-12 and the CIDI was 4 weeks (SD: 5 weeks).

**INTERNAL CONSISTENCY**

The internal consistency (Cronbach’s alpha) of all three scales used in the total sample (n=293) was good to excellent: 0.919 for the K10, 0.882 for the K6 and 0.906 for the GHQ-12.

**SENSITIVITY, SPECIFICITY AND PREDICTIVE VALUE**

The AUC of the K10 for any 30-day DSM-IV disorder was 0.806 (CI 0.749-0.862), for the K6 0.796 (CI 0.737-0.854) and for the GHQ-12 0.695 (CI 0.626-0.765). Sensitivity, specificity, PPV and NPV for different cut-off scores of the K10, K6 and GHQ-12 for any 30-day DSM-IV disorder are presented in Table 3. The optimal cut-off score of the K10 was 24, of the K6 14 and of the GHQ-12 20 (see Table 3).

**Table 3**

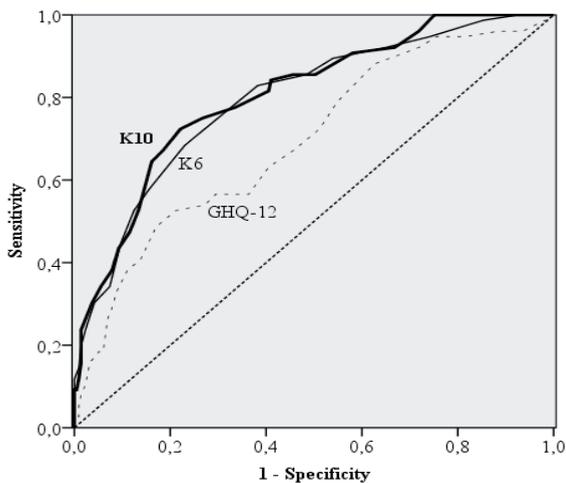
Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) for different cut-off scores of the K10, K6 and GHQ-12 for any present state DSM-IV disorder (n=293)

	sensitivity	specificity	PPV	NPV
<b>score K10</b>				
21	0.816	0.594	0.41	0.90
22	0.776	0.664	0.45	0.89
23	0.750	0.733	0.50	0.89
24	0.724	0.779	0.53	0.89
25	0.671	0.816	0.56	0.88
26	0.645	0.839	0.58	0.87
27	0.526	0.866	0.58	0.84
<b>score K6</b>				
11	0.855	0.516	0.38	0.91
12	0.829	0.618	0.43	0.91
13	0.750	0.700	0.47	0.89
14	0.684	0.770	0.51	0.87
15	0.579	0.843	0.56	0.85
16	0.526	0.876	0.60	0.84
17	0.447	0.903	0.62	0.82
<b>score GHQ-12</b>				
17	0.566	0.705	0.40	0.83
18	0.539	0.728	0.41	0.82
19	0.526	0.788	0.46	0.83
20	0.487	0.829	0.50	0.82
21	0.408	0.862	0.51	0.81
22	0.382	0.889	0.55	0.80
23	0.329	0.912	0.57	0.80

Fig.1 shows the ROC-curves for all three scales predicting any 30-day DSM-IV disorder. In this graph, the dotted diagonal line represents the performance of a chance screener. All curves are located above this line of no information, indicating that all scales screen better than chance.

**Figure 1**

ROC curves for the K10, K6 and the GHQ-12 predicting any present state DSM-IV disorder



## DISCUSSION

Our aim was to assess the sensitivity, specificity and predictive power of three short screening scales, the K10, its subset the K6 and the GHQ-12, to detect any present state DSM-IV mental disorder in a population of persons claiming disability benefit after two years of sickness absence. Our results show that all three scales have excellent Cronbach's alpha's. The K10 proved to be of good validity with an AUC of 0.806, while the AUC of the K6 is only marginally lower. In line with existing literature [20], both the K10 and the K6 seem to outperform the GHQ-12 as to validity. However, validity differences are statistically not significant, since confidence intervals overlap. The GHQ-12 may not be optimally suited for screening a population of long term disabled persons suffering from chronic mental health conditions. The GHQ-12 asks respondents to compare their present mental health, i.e. as experienced in the last few weeks, to their usual state and to indicate any changes. Therefore, persons with chronic poor mental health may respond that their present state is not different from their usual state. This may result in GHQ-12 scores that are too low.

We calculated an optimal cutoff score of 24 for the K10 (score range 10-50), 14 for K6 (score range 6-30) and 20 for the GHQ-12 (score range 0-40). These optimal scores are obtained by maximizing the sum of the sensitivities and the specificities of the three scales and represented by the points of the corresponding ROC-curves nearest to the

upper left hand corner of the graph. However, in general, optimal cutoff values of a test are not determined by the outcome of simple statistics. They should be chosen after careful consideration, balancing costs and benefits that can be expected from correct and incorrect test outcomes [38]. However, in-depth analysis of expected costs and benefits of mental health screening is beyond the scope of this article. Instead, we show reliability data on the K10, K6 and GHQ-12 for different cutoff values. This allows physicians in insurance and occupational practice using these tests to choose the cut-off value that fits best their specific needs. For example, a practicing IP, using the K10 as mental health screener in an individual disability assessment and expecting unacceptable costs of a false-negative outcome for the claimant, may consider to choose a cut-off point lower than 24 we calculated as optimal cut-off score. If the claimant screens positive, the following clinical interview is likely to show without any further costs whether or not this positive screen result is false.

Since the psychometric properties of the GHQ-12 seem to be inferior to those of the K10 and the K6, we limit our discussion on how our validity findings compare to the literature to the K10 and the K6. We found the optimal cut-off score of the K10 to be 24 with sensitivity (SE):0.724 and specificity (SP): 0.779, and of the K6 to be 14 (SE: 0.684 and SP: 0.770). As we point out in the introductory section, it is difficult to compare the validity estimates we found for the K10 and K6 with those found in other studies, conducted in other populations, using other interviewing methods as golden standards, assessing different sets of DSM-IV classifications with different time-frames and using different scoring methods. The optimal cut-off value (24) we found for the K10 is higher than found by Donker et al. (2009) [8] in a Dutch primary care sample (optimal cut-off point 20; SE: 0.80; SP: 0.81) and by Fassaert et al. (2008) [23] in a general population sample of ethnic Dutch (optimal cut-off point 16.5; SE: 0.792; SP:0.768). It seems that in a population of disability claimants, the threshold for caseness is higher compared to the general population and primary care. This may primarily be based on population differences. First, it is well known that among long-term disabled persons psychosocial factors interplay with mental health related factors in sustaining long-term sickness absence and disability [26-28]. The importance of these psychosocial factors increase with the duration of sickness absence [26]. Therefore, distress found in the study sample may also be associated with psychosocial factors related to the sickness absence duration of two years, adding to the distress caused by the mental disorder itself. Second, the prevalence of mental disorder in our sample of disability claimants is much higher than found in other populations [39,40]. Although a higher prevalence does not systematically result in either higher or lower sensitivity and specificity, diagnostic test accuracy may vary with prevalence [41]. The study sample with a higher prevalence of mental disorder may include more severe disorders, resulting in higher cut-off scores for the K10. The optimal cut-off value (14) we found for the K6 almost equals the cut-off point found by Kessler et al. (2003) in a community sample, i.e. 13 (SE: 0.36 and SP: 0.96), while a higher cut-off point was to be expected. This may in our view primarily be explained by methodological differences: Kessler et al. used another structured psychiatric interview, assessing 12-month, not present state DSM-IV disorders and excluded substance-use disorders.

## STRENGTHS AND LIMITATIONS

The strengths of this study are the use of the latest version of the CIDI, with almost complete covering of potential present state DSM-IV mental disorders, the employment of well trained interviewers, whose interviewing techniques were frequently evaluated and controlled, the use of three scales with proven reliability and validity in other research areas, and the representativeness as to mental health of the sample for the total population of disability claimants in the Netherlands.

The present study has some potential limitations. First, the response rate of 24.3% may have influenced the prevalence of mental disorders in the study sample by selection bias and, as a consequence, the external validity of the results. Predictive values of a test are strongly influenced by the prevalence of the condition under study. The low response rate in the present study may have resulted in selection bias in different ways. In general, persons suffering from mental illness might be less inclined to participate in surveys on mental health [33]. The low response may also be due to the stepped informed consent procedure, necessary to guarantee complete confidentiality and to prevent uninformed data flow between the researchers and the SSI. The same consent procedure was used in another Dutch study on mental health problems among long term work disabled persons [13]. The response rate in that study was comparably low: 25.8%. Finally, the low response rate in the present study may also be related to our measures, i.e. an extensive questionnaire and a lengthy psychiatric interview. The comprehensiveness of these measures may have kept eligible participants from giving consent. However, selection bias is less likely, since we found no significant difference as to the prevalence of most frequent mental disorders, i.e. mood, anxiety and stress-related disorders, diagnosed by the IPs in the study sample as compared to the national population of disability claimants. Second, the CIDI did not assess all possible DSM-IV diagnoses. Adjustment disorder, psychotic disorder, i.e. schizophrenia, and personality disorders cannot be diagnosed with the CIDI. Therefore, the use of the CIDI could have led to underestimation of prevalence of DSM-IV mental disorder in the study sample. Third, the median time interval between the questionnaire and the CIDI was 4 weeks, resulting in imperfect overlap of the recall periods of the scales and the time frame of the CIDI. Since mental health problems associated with long term disability are chronic conditions not likely to change in a short period of time, we believe that this imperfect overlap did not influence the validity of the scales in a significant way. To test this assumption, we compared the K10 and K6 sum scores with 12-month DSM-IV classifications present in the year preceding the interview. For both the K10 and the K6, we found validity estimates for 12-month classifications only to differ marginally from those for 30-day classifications, showing our assumption is likely to be right (K10: optimal cut-off point 23; SE: 0.649; SP: 0.842; AUC:0.798; K6: optimal cut-off point 13; SE: 0.746; SP: 0.771; AUC:0.787). Fourth, in theory it is possible that participants have overstated their mental complaints hoping to be considered for higher benefit. This may have resulted in a higher prevalence of mental disorders. However, in the information letter we sent to all eligible disability claimants, we stated explicitly that participation in the PREDIS cohort study would not influence the disability assessment by the SSI nor its outcome. Fifth, the questionnaire we administered to participants included the K10, with the K6 embedded. However, for analysis purposes the K10 and K6 were

examined and reported on separately. It is possible that results could have been different had the K6 been administered as stand-alone. This means that any recommendation for use of the K6 as a stand-alone screening scale is cautionary.

## ›CONCLUSIONS‹

The K10 and K6 are reliable and valid instruments to screen for any present state DSM-IV disorder among disability claimants, with optimal cut-off scores of 24 for the K10 and 14 for the K6. The GHQ-12 has an optimal cut-off value of 20. The K10 and K6 are to be preferred above the GHQ-12. The K10 and the K6 are both very short scales and take only a few minutes to administer. While the validity of the K10 is slightly better than that of the K6, we advice to use the K10 instead of the K6 with cut-off values suitable for this particular population.

The scores on separate items of the K10 and the K6 can be used in disability assessments of long term sick listed workers as an agenda for an in-depth follow-up clinical interview to ascertain the presence of a present state mental disorder. By helping to identify concealed mental health problems and unmet needs for treatment in individual assessments, screening with the K10 or the K6 may be an important starting point of interventions to promote return to work and to prevent unnecessary long term disability, and may contribute to overall health improvement.

## COMPETING INTERESTS

The authors declare that they have no competing interests.

## AUTHORS' CONTRIBUTIONS

All authors participated in the design of the study and helped to draft successive concepts of the manuscript. BLRC drafted all concepts and the final manuscript, and performed the statistical analysis. All authors read and approved the final manuscript.

## ACKNOWLEDGEMENTS

The authors would like to thank the participants of the study. The authors also thank M. de Boer PhD, for critically reviewing and approving the final manuscript. This research project was funded by the Social Security Institute, the Netherlands. The funding institute had no role in design, in the collection, analysis, and interpretation of data; in the writing of the manuscript; and in the decision to submit the manuscript for publication.

**REFERENCE LIST**

- 1 OECD. Sickness, disability and work: Keeping on track in the economic downturn - background paper. Geneva, OECD; 2009.
- 2 Knowledge Center UWV. Quarterly Report 2007-III (in Dutch: Kwartaalverkenning 2007-III). Amsterdam: UWV; 2007.
- 3 Ellen SR, Norman TR, Burrows GD: MJA practice essentials. 3. Assessment of anxiety and depression in primary care. *Med J Aust* 1997;167:328-33.
- 4 Olfson M, Guardino M, Struening E et al. Barriers to the treatment of social anxiety. *Am J Psychiatry* 2000;157:521-7.
- 5 Gilbody SM, House AO, Sheldon TA. Routinely administered questionnaires for depression and anxiety: Systematic review. *BMJ* 2001;322:406-9.
- 6 Gilbody S, House AO, Sheldon TA. Screening and case finding instruments for depression. *Cochrane Database Syst Rev* 2005;19:CD002792.
- 7 Lecrubier Y. Widespread underrecognition and undertreatment of anxiety and mood disorders: results from 3 European studies. *J Clin Psychiatry* 2007;68 (Suppl 2):36-41.
- 8 Donker T, Comijs H, Cuijpers P et al. The validity of the Dutch K10 and extended K10 screening scales for depressive and anxiety disorders. *Psychiatry Res* 2010;176:45-50.
- 9 Stansfeld S, Feeney A, Head J et al. Sickness absence for psychiatric illness: The Whitehall II study. *Soc Sci Med* 1995;40:189-97.
- 10 Hensing G, Spak F. Psychiatric disorders as a factor in sick-leave due to other diagnoses. A general population-based study. *Br J Psychiatry* 1998, 172:250-6.
- 11 Laitinen-Krispijn S, Bijl RV. Mental disorders and employee sickness absence: The NEMESIS study. Netherlands Mental Health Survey and Incidence study. *Soc Psychiatry Psychiatr Epidemiol* 2000;35:71-7.
- 12 Laitinen-Krispijn S, Bijl R. Werk, psyche en ziekteverzuim. aard en omvang van psychische stoornissen, ziekteverzuim en zorggebruik in de beroepsbevolking (in Dutch). Utrecht: Institute of Mental Health and Addiction (Trimbos-instituut), 2002.
- 13 Langerak W, Langeland W, Draijer N et al. Diagnostics and classification of psychiatric disorders in a cohort of long-term work disabled persons due to mental health problems (article in Dutch; abstract in English). *Tijdschr Bedrijfs Verzekeringsgeneeskd* 2011; 19:14-21.

- 14 American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders. 4<sup>th</sup> Edition. Washington D.C.; 1994.
- 15 Kessler RC, Ustun TB. The World Mental Health (WMH) Survey Initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res* 2004;13:93-121.
- 16 Kessler RC, Mroczek DK. Final versions of our non-specific psychological distress scale. Ann Arbor: Ann Arbor Mi. Survey Research Center for Social Research, University of Michigan; 1994.
- 17 Goldberg D, Williams P. A user's guide to the General Health Questionnaire. Windsor: NFER-NELSON; 1998.
- 18 Andrews G, Slade T. Interpreting scores on the Kessler Psychological Distress Scale (K10). *Aust N Z J Public Health* 2001;25:494-7.
- 19 Furukawa TA, Kessler RC, Slade T, Andrews G. The performance of the K6 and K10 screening scales for psychological distress in the Australian national survey of mental health and well-being. *Psychol Med* 2003;33:357-62.
- 20 Furukawa TA, Kawakami N, Saitoh M et al. The performance of the Japanese version of the K6 and the K10 in the World Mental Health Survey Japan. *Int J Methods Psychiatr Res* 2008; 17:152-8.
- 21 Kessler RC, Barker PR, Colpe LJ et al. Screening for serious mental illness in the general population. *Arch Gen Psychiatry* 2003; 60:184-9.
- 22 WHO World Mental Health (WMH) Survey Initiative: Screening for serious mental illness in the general population with the K6 screening scale: results from the WHO World Mental Health (WMH) Survey Initiative. *Int. J. Methods Psychiatr Res* 2010; 19(Suppl 1):4-22.
- 23 Fassaert T, De Wit MA, Tuinebreijer WC et al. Psychometric properties of an interviewer-administered version of the Kessler Psychological Distress Scale (K10) among Dutch, Moroccan and Turkish respondents. *Int J Methods Psychiatr Res* 2009; 18:159-68.
- 24 Schmitz N, Kruse J, Tress W. Psychometric properties of the General Health Questionnaire (GHQ-12) in a German primary care sample. *Acta Psychiatr Scand* 1999;100:462-8.
- 25 OECD. Sick on the Job? Myths and Realities about Mental Health and Work. Geneva, OECD; 2011.

- 26 Flach PA, Groothoff JW, Krol B, Bültmann U. Factors associated with first return to work and sick leave durations in workers with common mental disorders. *Eur J Public Health* 2011. DOI:10.1093/eurpub/ckr102.
- 27 Blank L, Peters J, Pickvance S et al. A systematic review of the factors which predict return to work for people suffering episodes of poor mental health. *J Occup Rehabil* 2008; 18:27-34.
- 28 Cornelius LR, van der Klink JJ, Groothoff JW, Brouwer S. Prognostic factors of long term disability due to mental disorders: a systematic review. *J Occup Rehabil* 2011;21:259-74.
- 29 Ouwehand P, Wouters PHM. ICD-10 classificaties voor Arbo en SV. Classificatie van klachten, ziekten en oorzaken voor bedrijfs- en verzekeringsartsen (in Dutch). Utrecht: TICA; 1997.
- 30 Kessler RC, Andrews G, Colpe LJ et al. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychol Med* 2002;32:959-76.
- 31 ESEMeD: Sampling and methods of the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatr Scand* 2004; 109(Suppl 1):8-20.
- 32 Goldberg DP, Gater R, Sartorius N et al. The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychol Med* 1997;27:191-7.
- 33 Kessler RC, Üstün TB. The World Health Organization Composite International Diagnostic Interview. In: *The WHO World Mental Health surveys: Global perspectives on the epidemiology of mental disorders*. Cambridge: Cambridge University Press 2008;58-90.
- 34 Haro JM, Arbabzadeh-Bouchez S, Brugha TS et al. Concordance of the Composite International Diagnostic Interview version 3.0 (CIDI 3.0) with standardized clinical assessments in the WHO World Mental Health surveys. *Int J Methods Psychiatr Res* 2006;15:167-80.
- 35 Wittchen HU. Reliability and validity studies of the WHO--Composite International Diagnostic Interview (CIDI): A critical review. *J Psychiatr Res* 1994;28:57-84.
- 36 Andrews G, Peters L. The psychometric properties of the Composite International Diagnostic Interview. *Soc Psychiatry Psychiatr Epidemiol* 1998;33:80-8.
- 37 Zweig MH, Campbell G. Receiver-operating characteristic (ROC) plots: A fundamental evaluation tool in clinical medicine. *Clin Chem* 1993;39:561-77.

- 38 Smits N, Smit F, Cuijpers P, De Graaf R. Using decision theory to derive optimal cut-off scores of screening instruments: An illustration explicating costs and benefits of mental health screening. *Int J Methods Psychiatr Res* 2007;16:219-29.
- 39 ESEMeD: Prevalence of mental disorders in Europe: Results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatr Scand* 2004;109(Suppl 1):21-7.
- 40 Hensing G, Wahlstrom R. Sickness absence and psychiatric disorders. *Scand J Public Health* 2004;63(Suppl):152-80.
- 41 Leeflang MMG, Bossuyt PMM, Irwig L. Diagnostic test accuracy may vary with prevalence: implications for evidence-based diagnosis. *J Clin Epi* 2009;62:5-12.



## CHAPTER 6 DEVELOPMENT AND VALIDATION OF THE DIAGNOSTIC INTERVIEW ADJUSTMENT DISORDER (DIAD)

INTERNATIONAL JOURNAL OF METHODS IN PSYCHIATRIC RESEARCH (IN PRESS)

L.R. CORNELIUS | S. BROUWER | M.R. DE BOER | J.W. GROOTHOFF | J.J.L. VAN DER KLINK

---

### ›ABSTRACT‹

Adjustment disorders (AD) are under-researched due to the absence of a reliable and valid diagnostic tool. This paper describes the development and content/construct validation of a fully structured interview for the diagnosis of AD, the Diagnostic Interview Adjustment Disorder (DIAD). We developed the DIAD by partly adjusting and operationalizing DSM-IV criteria. Eleven experts were consulted on the content of the DIAD. In addition, the DIAD was administered by trained lay interviewers to a representative sample of disability claimants (n=323). To assess construct validity of the DIAD, we explored the associations between the AD classification by the DIAD and summary scores of the Kessler Psychological Distress Scale (K10) and the World Health Organization Disability Assessment Schedule (WHODAS) by linear regression. Expert agreement on content of the DIAD was moderate to good. The prevalence of AD using the DIAD with revised criteria for the diagnosis AD was 7.4%. The associations of AD by the DIAD with average sum scores on the K10 and the WHODAS supported construct validity of the DIAD. The results provide a first indication that the DIAD is a valid instrument to diagnose AD. Further studies on reliability and on other aspects of validity are needed.

**Key words** adjustment disorder, development, validation, DSM-IV, structured interview

## ►INTRODUCTION◀

The term adjustment disorder (AD) is used to describe a condition where an individual reacts to a stressful event with disproportionate symptoms and behaviors. AD is considered to be a common mental health problem in the general population, in primary and in secondary care (Casey, 2009). Although usually believed to be mild and self-limiting, AD is associated with long term sickness absence and disability (van der Klink et al., 2003). In several countries, stress-related disorders are one of the most commonly reported types of work-related illness (Health and Safety Executive, 2011; Knowledge Center UWV, 2007; National Institute for Occupational Safety and Health, 2011). In the Netherlands, stress-related disorders including AD are the second most important psychiatric diagnosis on certificates of benefit claimants, with a prevalence of 6,7% after one year, and of 4,8% after two years of sickness absence (Knowledge Center UWV, 2007).

The diagnostic instrument most commonly used in psychiatric epidemiological research, the Composite International Diagnostic Interview (CIDI), lacks a section dealing with AD (Kessler and Üstün, 2004). None of the large scale epidemiological surveys on mental health carried out in the USA and in Europe included AD for consideration (Kessler et al., 2000; Bebbington et al., 2000; Vollebergh et al., 2001; Wittchen and Jacobi, 2005). Only the Outcome of Depression International Network (ODIN) study, a general population survey carried out in five European countries, assessed AD (Casey et al., 2006). In that study, the prevalence of AD was found to be extremely low: 0.0% to 1.0%. Other studies that also incorporated the diagnosis of AD, used a variety of diagnostic methods and showed a varying prevalence of AD (Casey, 2009). As a result, reliable information on the prevalence and course of AD is scarce, and few strategies for the treatment of AD are evidence-based (van der Klink et al., 2003).

Criteria for the diagnosis of AD are described in the Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> edition (DSM-IV, 1994), see Table 1. These criteria are generally considered to be vague and ill-defined (Casey et al., 2001). In recent years, the non-specific classification of AD in the DSM-IV has been under dispute (Baumeister and Kufner, 2009a; Baumeister et al., 2009b; Casey and Bailey, 2011; Laugharne et al., 2008). Some critics argue that the concept AD medicalizes problems of ordinary life, while others put forward that a rigid 'cook-book' application of diagnostic criteria may result in an over diagnosis of other psychiatric disorders at the cost of AD (Casey et al., 2006). More specifically, the critique of the current DSM-IV conceptualization of AD concentrates upon the inadequate definition of clinical significance, the failure to distinguish AD from other Axis I disorders and the neglect of contextual factors accounting for excess symptoms of AD (Baumeister et al., 2009b). Therefore, Baumeister et al. (2009b) recommended to eliminate the criterion that requires the absence of another DSM-IV disorder, to define clinical significance with the requirement that both distress and impairment are present and to extend the bereavement exclusion criterion to other severe or uncommon stressful events (Baumeister et al., 2009b). These recommendations are still worth considering, since the proposed classification of AD in the upcoming Diagnostic and Statistical Manual of Mental Disorders, 5<sup>th</sup> edition (DSM-5, 2011) is very similar to the DSM-IV.

Recently, a questionnaire for the assessment of AD was developed and validated

(Einsle et al., 2010). However, this instrument is based on a new diagnostic proposal, that places AD in a spectrum of stress-response syndromes, along with posttraumatic stress disorder (Maercker et al., 2007). As this questionnaire is not compatible with DSM-criteria, a valid diagnostic instrument that enables lay interviewers to assess AD based on DSM-IV criteria is still missing. The present study is an attempt to make up for this deficiency by developing and validating a fully structured interview to diagnose AD, the Diagnostic Interview Adjustment Disorder (DIAD), that can be administered by lay interviewers, based on adjusted DSM-IV criteria as recommended by Baumeister et al. (2009b). We aimed to assess the content and the construct validity of the DIAD. Regarding construct validity, distress and impairment are defined as core symptoms of AD. Therefore, it can be expected that the diagnosis AD is associated with these symptoms. Therefore, we hypothesized that persons with AD have higher levels of distress and impairments than persons without AD.

## ►METHODS◀

### SETTING AND PARTICIPANTS

The present study is part of a cohort study on prognostic factors of long term disability due to mental disorders, PREDicting DISability (PREDIS) (Cornelius et al., 2012). Participants eligible for PREDIS were recruited using registry data from the local office of the Social Security Institute (SSI) in the city of Groningen, servicing Groningen and Drenthe, two northern provinces of the Netherlands. Recruitment started at October 1<sup>st</sup> 2008 and ended at 31<sup>st</sup> December 2009. Included were persons claiming disability benefit after two years of sickness absence due to any medical condition, whether somatic or mental. The SSI uses the ICD-10 classification system to certify diagnoses as cause of disability. The Medical Ethics committee of the University Medical Center Groningen (UMCG) approved recruitment, consent and field procedures. Out of a total of 1544 eligible long term sick listed workers, 375 persons consented to participate (response rate = 24.3%), see fig. 2 in the introductory chapter for a flow chart of participants.

At the first measurement, i.e. after two years of sickness absence, respondents were sent a questionnaire on demographics, general and mental health, alcohol use, functioning, health care use, coping behavior and social support. After they completed and returned the questionnaire, respondents were interviewed at home by lay interviewers using the CIDI, supplemented by the DIAD. The median time between completing the questionnaire and the CIDI/DIAD was 4 weeks (SD: 5 weeks). For the present study, we included only those participants from whom we could obtain complete interview data, both from the CIDI and the DIAD. As a result, the study sample consisted of 323 CIDI/DIAD completers.

To assess generalizability, we compared PREDIS responders (n=375) with non-responders (n=1169) as to age, gender and ICD-10 diagnosis on SSI certificates as cause of disability. We found no significant differences between responders and non-responders as to gender ( $p=0.850$ ;  $\text{Chi}^2=0.036$ ) and ICD-10 classifications of somatic and mental disorder as cause of disability ( $p=0.682$ ;  $\text{Chi}^2=1.500$ ). As to age, we found responders to be

**Table 1**

Criteria for adjustment disorder with diagnosis algorithm, specified according to the DSM-IV and adjusted/operationalized for use in the present study

nr	criterion	DSM-IV	adjusted/operationalized
1	stressor	identifiable stressor(s)	cluster of identifiable stressors in recall period of 3 years
2	1st time limit	occurring within 3 months of the onset of stressor(s)	symptoms within 3 months after onset of stressor cluster
3	distress	clinically significant as evidenced by marked distress that is in excess of what would be expected	4DSQ distress scale scoring >10
4	impairment	clinically significant as evidenced by significant impairment in social or occupational (academic) functioning	SDS impairment scale scoring $\geq 4$ in at least 2 domains
5	2nd time limit	once the stressor (or its consequences) has terminated, the symptoms do not persist for more than an additional six months	not used
6	DSM-IV Axis I/II	the stress-related disturbance does not meet the criteria for another specific Axis I disorder and is not merely an exacerbation of a preexisting Axis I or Axis II disorder	not used
7	bereavement	symptoms do not represent bereavement	symptoms due to bereavement or loss of health due to serious illness/injury as single stressor need to be present for longer than 12 months.
diagnosis algorithm		1 AND 2 AND (3 OR 4) AND 5 AND 6 AND 7	1 AND 2 AND 3 AND 4 AND 7

significantly older than non-responders ( $p < 0.001$ ;  $\text{Chi}^2 = 60.022$ ). Age categories 45-54 years and 55-65 years are over-presented in the study sample. We also compared the PREDIS cohort with a large national population ( $n = 56,267$ ) of all persons claiming disability benefit in the years 2006-2007 (Knowledge Center UWV, 2007). We found the sample not to differ significantly from this national population as to prevalence of ICD-10 somatic ( $p = 0.876$ ;  $\text{Chi}^2 = 1.214$ ) and ICD-10 mental disorders, i.e. mood, anxiety and stress-related disorders ( $p = 0.344$ ;  $\text{Chi}^2 = 7.870$ ), certified by the SSI as primary cause of disability.

## DEVELOPMENT

The DIAD was developed by two (LRC, JvdK) of the authors as a structured interview to diagnose AD based on DSM-IV criteria and adjusted following the recommendations of Baumeister et al (2009b). Some of these adjusted criteria needed further operationalization. The result was a set of adjusted and operationalized criteria for the diagnosis AD, dealing with recall period, stressor(s), time relations between stressor and complaints, clinical significance, co-occurrence with other DSM-IV disorders and bereavement, see Table 1.

**RECALL PERIOD**

The DSM-IV does not set a recall period for stressors to have occurred. Since the DIAD was to be administered to persons claiming disability benefit after two years of sickness absence, we chose a recall period to capture any stressor that may be related to the onset of sickness absence. Therefore, we set the period of recall at three years.

**FIRST TIME LIMIT CRITERION**

We expected respondents to probably report more than one stressful life event, i.e. a cluster of stressors, to have occurred in this recall period. Each stressor within a cluster may have different dates of onset and termination. We considered the first time limit criterion to be met, if the onset of symptoms occurred within three months of the onset of at least one of the stressors within the cluster.

**CLINICAL SIGNIFICANCE CRITERION**

We revised the DSM-IV clinical significance criterion and followed Baumeister et al. (2009b), requiring that both marked distress and significant impairment are present. To operationalize distress and impairment, the DIAD incorporates two reliable and valid scales: the distress subscale of the Four-Dimensional Symptom Questionnaire (4DSQ) (Terluin et al., 2006) and the Sheehan Disability Scale (SDS) (Leon et al., 1997). Although these two scales are commonly employed as paper-pencil questionnaires, we used them as part of the DIAD. In accordance with existing scoring rules, we defined a sum score  $\geq 10$  on the 4DSQ subscale distress as marked distress and a SDS sum score  $\geq 4$  in at least 2 domains of the SDS as significant impairment.

**SECOND TIME LIMIT CRITERION**

The DIAD does not assess the second time limit criterion stated in the DSM-IV, i.e. the criterion that the symptoms must have resolved within six months once the stressor has terminated.

**DSM-IV EXCLUSION CRITERION**

By definition of DSM-IV, the diagnosis AD cannot be made if the condition meets the criteria of an Axis I mood or anxiety disorder, or is merely an exacerbation of a preexisting Axis I or Axis II disorder. We deleted this exclusion criterion, following the recommendation of Baumeister et al. (2009b).

**BEREAVEMENT EXCLUSION CRITERION**

Normal sadness due to bereavement after the death of a loved one, or similar types of loss should be excluded from the diagnosis AD, while pathological or dysfunctional reactions should be included. We defined similar types of loss as loss of health due to a serious illness or injury. According to the proposed classification of AD in the DSM-5, reactions due to bereavement (or similar types of loss) are pathological or dysfunctional when they persist for more than 12 months after the event. Therefore, we adjusted the DSM-IV bereavement criterion to only include persons with symptoms exclusively representing bereavement after the death of a loved one or similar types of loss and lasting longer than 12 months.

### AD SUBTYPES

We did not expand the DIAD with questions aiming to subtype AD with depressed mood, anxiety, disturbance of conduct or combinations thereof.

### CONTENT OF THE DIAD

We used the DIAD to diagnose AD in the study sample. The DIAD contains 29 questions, see Table 2.

**Table 2**

Content of the Diagnostic Interview Adjustment Disorder (DIAD)

element	item	assessment of
stressor	1-3	identification of stressor(s)
distress	4-6	onset and duration of stressor(s)
distress-stressor	7-22	distress domain (from 4DSQ <sup>a</sup> )
impairment	23	onset of distress
	24	relation distress – stressor(s)
	25-29	impairment (SDS <sup>b</sup> )

a Four Dimensional Symptom Questionnaire

b Sheehan Disability Scale

The DIAD starts with three questions to identify and specify stressful live events that have occurred in the past three years. Respondents were asked to select one or more stressor(s) from a list of stressors, followed by three questions assessing the date at which the stressor(s) occurred for the first time, whether the stressor was still present at the moment of the interview and, if not, when the stressor ceased to exist. The DIAD then assesses levels of distress caused by the reported stressor(s) with 16 questions, i.e. the distress domain of the 4DSQ. The DIAD then asks when distress symptoms have started and whether these symptoms are a reaction to the stressful events mentioned earlier on in the interview. Finally, the last five questions of the DIAD focus on levels of impairment as a consequence of the reported distress symptoms, using the SDS. We have added a full transcript of the DIAD as an appendix to this paper.

### CONTENT VALIDATION

We developed the DIAD within the author group until we felt it to have sufficient face and content validity to be used in the study. After the study started using this initial version of the DIAD, we sought expert opinions on our choices and decisions we had already made in the initial development of the DIAD. This means that our use of the DIAD in the study population and our asking the opinion of selected experts was a parallel process. To assess whether the DIAD captured all essential aspects of AD, we asked eleven experts in relevant fields of psychiatry, psychiatric epidemiology, primary, occupational and insurance health care, and instrument development (see acknowledgements) to review a written transcript of the DIAD (see Appendix) and to complete a 17-item questionnaire (see Table 3).

**Table 3**

Expert opinion (n=11) on content validity of the DIAD for the diagnosis adjustment disorder (AD)

item	What is your opinion on:	disagree	neutral	agree
1	our decision to set the recall period duration at 3 years?	1 (9.1)	5 (45.5)	5 (45.5)
2	our assumption that respondents are unable to attribute complaints to separate stressors with overlapping time frames?	5 (45.5)	2 (18.2)	4 (36.4)
3	our decision to consider stressors with overlapping time frames as a single problem cluster?	1 (9.1)	1 (9.1)	9 (81.8)
4	our assumption that respondents are able to attribute complaints to a cluster of stressors with overlapping time frames?	1 (9.1)	1 (9.1)	9 (81.8)
5	our decision to have the DIAD assess distress complaints only?	3 (27.3)	4 (36.4)	4 (36.4)
6	our choice for the Distress scale of the 4DSQ to assess distress complaints?	1 (9.1)	0 (0.0)	10 (90.1)
7	our decision not to have the DIAD assess depressed mood?	4 (36.4)	4 (36.4)	3 (27.3)
8	our decision not to have the DIAD assess anxiety?	5 (45.5)	3 (27.3)	3 (27.3)
9	our decision not to have the DIAD assess disturbance of conduct?	2 (18.2)	5 (45.5)	4 (36.4)
10	our decision not to have the DIAD assess DSM-IV Axis II disorders?	1 (9.1)	0 (0.0)	10 (90.1)
11	our decision that the first time criterion is met, if at least one stressor started within 3 months preceding the onset of symptoms?	1 (9.1)	0 (0.0)	10 (90.1)
12	our decision not to have the DIAD assess whether the second time criterion is met?	4 (36.4)	1 (9.1)	6 (54.5)
13	our assumption that respondents are well able to self-assess whether their complaints are a reaction to the stressor they experienced?	2 (18.2)	3 (27.3)	6 (54.5)
14	our choice for the Sheehan Disability Scale to assess impairments?	0 (0.0)	5 (45.5)	6 (54.5)
15	our assumption that, in this specific population of persons with long term disability, lay interviewers are well able to assess whether the distress is in excess of what would be expected from exposure to the stressor?	7 (63.6)	3 (27.3)	1 (9.1)
16	the position that the DIAD covers essential aspects of the DSM-IV diagnosis Adjustment Disorder?	0 (0.0)	1 (9.1)	10 (90.1)
17	the position that the DIAD as a supplement to the CIDI has added value for the assessment of adjustment disorder in psychiatric epidemiologic research?	1 (9.1)	1 (9.1)	9 (81.8)

## CONSTRUCT VALIDATION

### Administration

We tested our hypotheses by administering the DIAD to the PREDIS cohort. Twelve lay interviewers were trained by certified trainers from the Dutch CIDI Training Center in Groningen, the Netherlands and by the first author. Respondents were interviewed face-to-face at their home. The DIAD was administered immediately after completion of the CIDI. Interviewing was laptop assisted. Quality of interviewing techniques was evaluated bimonthly in training sessions.

### Measures

To assess distress and impairment, the questionnaire administered to PREDIS respondents included the Kessler Psychological Distress Scale (K10) (Kessler et al., 2002) and the World Health Organization Disability Assessment Schedule version 2.0 (WHODAS 2.0) (World Health Organization, 2010).

The K10 consists of 10 items with each five response categories: 'none of the time' (1), 'a little of the time' (2), 'some of the time' (3), 'most of the time' (4) and 'all of the time' (5). Sum scores range from 10 to 50. The K10 has strong psychometric properties and is widely used as screener for psychological distress (Kessler et al., 2002).

With 36 questions, the WHODAS 2.0 captures levels of functioning in six domains of life: Understanding and Communicating (6 items), Getting around (5 items), Self-care (4 items), Getting along with people (5 items), Life activities (household activities: 4 items; work: 4 items) and Participation in society (8 items). Answering options are 'none' (1), 'mild' (2), 'moderate' (3), 'severe' (4) and 'extreme/cannot do' (5). Sum scores run from 36 to 180. The WHODAS 2.0 has excellent psychometric properties (Buist-Bouwman et al., 2008).

The CIDI was used to assess other 12-month DSM-IV disorders co-occurring with the diagnosis AD. The CIDI is a laptop assisted fully-structured interview to be administered by lay interviewers. The validity of the CIDI in assessing mental disorders is generally good, as compared with structured diagnostic interviews administered by clinicians (Haro et al., 2006).

### DATA ANALYSIS

For content validity, expert agreements greater than 80% were considered good, between 50% and 80% moderate, and lower than 50% poor (slightly adapted from Altman, 1991). DIAD data were merged from the different laptops used for the CIDI/DIAD interviews. With these data, we made the diagnosis AD post-hoc with an algorithm, using the criteria presented in Table 1, dividing the study population in a group with AD and a group without AD. For construct validity, we calculated sum scores of the K10 and the WHODAS. To evaluate our hypotheses on the expected associations of the diagnosis AD with these sum scores, we performed simple linear regression analyses with the diagnosis AD as an independent variable and the sum scores of the K10 and the WHODAS as dependent variables. The standardized coefficients provided by linear regression represent how many standard deviations the scale scores differed, depending on whether AD is present or not. Calculation of the standardized coefficients enables ranking the effect of the presence of

AD on the scores of scales. We used a confidence interval of 95% and a level of significance of .05. Data were statistically analysed with IBM SPSS version 19.0 for Windows.

## RESULTS

### CONTENT VALIDITY

The experts opinion on the content of the DIAD is presented in Table 3. Good agreement (more than 80%) was reached on items 3, 4, 6, 10, 11, 16 and 17. The experts were in moderate agreement (between 50% and 80%) on items 12, 13 and 14. Poor agreement (lower than 50%) was found on items 1, 2, 5, 7, 8, 9 and 15. Lowest agreement was obtained on item 15.

### DESCRIPTION OF STUDY SAMPLE

Table 4 presents the prevalence of AD as measured with the DIAD, demographics (age, gender), DSM-IV comorbidity and number as well as nature of reported stressors for the total study sample, and the distribution of these variables in two subsamples, one sample with AD ( $n=24$ ) and one sample without AD ( $n=299$ ).

**Table 4**

Descriptive statistics (%) for the total sample, and for persons that fulfill (AD+) and not fulfill (AD-) the criteria for adjustment disorder (AD) based on the DIAD<sup>a</sup>

	total ( $n=323$ )	AD+ ( $n=24$ )	AD- ( $n=299$ )
prevalence AD	7.4	100.0	0.0
mean age	49.9	41.6	50.3
gender (female)	50.2	58.3	49.5
12-month DSM-IV comorbidity <sup>b</sup>			
any disorder	42.4	75.0	39.8
mood disorder	25.7	45.8	24.1
anxiety disorder	30.3	66.7	27.4
mood & anxiety disorder	12.2	41.7	12.0
nr. of stressors			
0	31.0	- <sup>c</sup>	33.4
1	22.9	8.3	24.1
2	11.8	20.8	11.0
>2	34.3	70.1	31.5
nature of stressor			
work	41.3	66.7	37.8
own illness	40.4	70.8	36.5
illness of other(s)	9.9	12.5	9.4
psychosocial	28.5	70.8	24.1

a Diagnostic Interview Adjustment Disorder

b Assessed by the CIDI

c By definition

We found 24 respondents (7.4%) to meet all our criteria for AD. In both subsamples with and without AD, we found a high comorbidity of 12-month mood and anxiety disorders: 45.8% and 66.7% respectively (with AD) and 24.1% and 27.4%, respectively (without AD). The prevalence of a mixed mood and anxiety disorder within the group diagnosed with AD was 41.7%, and in the group without AD 12%. More than 90% of respondents with AD reported more than one stressor to have occurred in the three year recall period. In the group without AD, multiple stressors were reported in 42% of cases. In both groups, stressors most often reported were those related to own illness, psychosocial factors and work. We found no respondents with bereavement or injury as single stressor while meeting all other criteria for AD (not in table). Using the DIAD, we classified two respondents with AD that reported sustained distress two years after they were diagnosed with a serious illness (not in table).

### CONSTRUCT VALIDITY

In Table 5, we present the results of linear regression with the K10 and the WHODAS scores as dependent variables to explore associations with the diagnosis AD (AD+), using the absence of the diagnosis AD (AD-) as reference category.

**Table 5**

Associations of adjustment disorder (AD) based on the DIAD<sup>a</sup> with the K10<sup>b</sup> and the WHODAS 2.0<sup>c</sup> sum scores for groups classified with (AD+) and without AD (AD-)

	range	mean $\pm$ SD		B <sup>d</sup> (95% CI)	Beta <sup>e</sup>	p
		AD + (n=24)	AD - (n=299)			
<b>K10</b>	10-50	28.17 $\pm$ 6.18	20.91 $\pm$ 7.37	7.26 (4.14 to 10.37)	0.26	<.001*
<b>WHODAS 2.0</b>						
communication	6-30	14.96 $\pm$ 5.99	11.37 $\pm$ 5.08	3.59 (1.39 to 5.79)	0.18	.001*
getting around	5-25	11.48 $\pm$ 4.65	11.33 $\pm$ 5.03	0.15 (-1.98 to 2.29)	0.01	.888
self-care	4-20	6.09 $\pm$ 2.76	5.53 $\pm$ 2.40	0.56 (-0.48 to 1.59)	0.06	.289
getting along	5-25	11.35 $\pm$ 3.55	9.11 $\pm$ 3.76	2.23 (0.64 to 3.83)	0.16	.006*
household	4-20	12.82 $\pm$ 4.68	10.39 $\pm$ 4.45	2.43 (0.48 to 4.38)	0.14	.015*
work	4-20	13.86 $\pm$ 4.49	11.27 $\pm$ 4.91	2.59 (-0.10 to 5.28)	0.15	.059
participation	8-40	24.39 $\pm$ 6.48	19.26 $\pm$ 6.04	5.13 (2.54 to 7.72)	0.22	<.001*
total	36-180	94.08 $\pm$ 22.32	75.06 $\pm$ 22.27	19.02 (6.29 to 31.74)	0.23	.004*

\*  $p < .05$

a Diagnostic Interview Adjustment Disorder

b Kessler Psychological Distress Scale 10-items

c World Health Organization Disability Assessment Scale version 2.0

d Unstandardized coefficient

e Standardized

The unstandardized regression coefficients (B) showed in Table 5 represent the mean differences in all scores between groups with and without AD. For example, persons with AD scored 7.26 points higher on the K10 than persons without AD. We found AD

associated with statistically significant higher scores on the K10 and the WHODAS subscales Communication, Getting along, Household activities and Participation, and the WHODAS Total. The differences we found in scores of other scales were not statistically significant, although in the expected direction.

## »DISCUSSION«

The experts we consulted on content validity of the DIAD were in moderate to good agreement on most items we used for the concept of AD. With regard to construct validity, our hypothesis was confirmed that persons diagnosed by the DIAD with AD score higher on levels of distress and impairment, than persons not diagnosed with AD.

### CONTENT VALIDITY

#### Good expert agreement

The experts were in good agreement on items 3, 4, 6, 10 and 11 and almost 90% of them felt that the DIAD covers essential aspects of the DSM-IV diagnosis AD.

#### Moderate expert agreement

The experts were in moderate agreement on items 2, 12, 13 and 14. The expert opinion on item 2, i.e. our assumption that respondents would not be able to attribute any distress symptoms to a separate stressor, when in a certain period more than one stressor were present, was inconclusive. However, they strongly agreed (81.1%) with our decision to consider stressors with overlapping time frames as a single problem cluster (item 3) and our assumption that respondents are able to attribute complaints to such a cluster of stressors (item 4) and not to each stressor separately.

Item 12 deals with our elimination of the second time limit criterion, i.e. that the symptoms must have resolved within six months once the stressor has terminated. The possibility that our elimination of this DSM-IV criterion resulted in false-positive or false-negative diagnosis of AD should be discussed. The first section of the DIAD asks whether a stressor has been present in the past 3 years and, if so, at what date it started, if it is still present and, if not, when it ended. The DIAD then asks about present state distress complaints. If distress is still present three possibilities exist - either the person has a chronic AD, or the person has developed a new condition or the diagnosis at the outset was not AD but some other disorder. If distress is absent two possibilities exist - either AD has resolved or some other disorder causing distress has resolved. In our opinion, therefore, the elimination of the second time limit was justified so as to avoid false positive or false negative diagnoses. Strict application of the second time criterion would imply that a diagnosis of present state AD is never possible and that the diagnosis AD can be made in retrospect only, when both stressor and symptoms no longer exist. In our view and in line with that of other authors (van der Klink and Terluin, 2005), application of this second time criterion makes the diagnosis AD clinically less relevant. Furthermore, we found that more than 70% of respondents with AD reported their own illness as one of multiple stressors. It is reasonable to assume that in this specific population of long-

term sick listed workers, the illness underlying the disability, is of a chronic nature with enduring consequences. This implies that most AD found in the study sample can be specified as chronic and that the deletion of the second time criterion had no effect on the prevalence of AD and our validity estimates.

With the moderate expert agreement on item 13, we are fairly confident that the reported symptoms were a reaction to the reported stressor.

Item 14 deals with our choice of the SDS to measure impairment. We included the SDS scale predominantly for practical reasons. The CIDI administered immediately prior to the DIAD, contained the SDS as well. Having the DIAD assessing impairment using yet another scale, would in our view have confused respondents, resulting in biased answers.

### Poor expert agreement

We found the experts in poor agreement on 5 of the 14 items we used: 1, 5, 7, 8, 9 and 15. Item 1 deals with our choice to set the recall period at three years. This particular recall period was chosen to capture any stressor related to the onset of sickness absence, two years before the interview. As any other psychiatric diagnostic interview, the DIAD is an instrument based on self-report. Due to the lengthy recall period, respondents may have been unable to reliably recollect dates of onset and termination of stressing circumstances, resulting in biased assessment of the first time limit criterion for the diagnosis AD. There is a very extensive body of knowledge on the relation between stress and memory. It shows that stressful experiences may produce intense, long-lasting memories of the events themselves, while stress may also impair subsequent attention and memory and can even induce profound amnesia (Kim and Diamond, 2002). In general, with a probing sequence of age-of-onset questions, individuals are well able to recollect how old they were when certain events occurred or when certain symptoms began (Kessler et al., 2007; Knauper et al., 1999). However, reliable assessment of the AD time limit criterion requires precise recollection in terms of days or weeks, making age-of-onset questions useless. This potential recall bias may be two-sided, because respondents may erroneously indicate a date too early or too late. This will therefore most likely not have influenced our estimate of the prevalence of AD, but will have underestimated the associations between the AD diagnosis and the other constructs in our construct validity study.

Item 5 deals with our decision to have the DIAD assess distress complaints only. Consistent with this, expert agreement on our decision not to assess subtypes of AD, i.e. depressed mood (item 7), anxiety (item 8) and disorder of conduct (item 9), were poor as well. We had several reasons for not assessing these subtypes. First, since we expected a relatively high prevalence of mental health problems in our study sample of long-term sick listed workers, resulting in a lengthy CIDI interview time, and since the DIAD was to be administered after completion of the CIDI, it was important to balance interview burden for respondents and DIAD performance. Therefore, we limited the DIAD to assess key symptoms of distress and impairment only. Second, strictly speaking, these subtypes are not in- or exclusion criteria for the diagnosis AD. Third, it is not yet certain how AD will be subtyped in the upcoming DSM-5. Had we included assessment of DSM-IV subtypes, the DIAD would possibly have soon been outdated.

Regarding item 15, as we expected, most experts (9.1%) felt that lay interviewers are

not able to assess whether distress symptoms are in excess. This confirmed our decision earlier in the developing process to assess clinical significance with the distress scale of the 4DSQ, instead of having the interviewer assess clinical significance.

We did not specifically ask the experts opinion about our adoption of the recommendations by Baumeister et al. (2009b). These recommendations are subject to a broader discussion (Baumeister and Kufner, 2009a; Laugharne et al., 2008) about the classification of AD in the DSM-IV and whether criteria for AD should be adjusted in the upcoming DSM-5. The operationalization of the bereavement exclusion criterion in particular is difficult, since it requires a normative discussion about the threshold between normal and pathological reactions to stressing events. Persons with normal symptoms of distress and impairment due to bereavement or other uncommon/severe stressors, should be excluded from the diagnosis AD, while those with pathological or dysfunctional symptoms should not. It seems reasonable to assume that our operationalization of the bereavement criterion, following both Baumeister et al. (2009b) and the proposed classification of AD in the upcoming DSM-5, excluded respondents with normal reactions to a stressing event.

## CONSTRUCT VALIDITY

### Prevalence

The prevalence of AD using the revised criteria was 7.4%. That is much higher than the prevalence of 0.0% to 1.0% found in the ODIN study (Casey et al., 2006). The explanation for this large prevalence difference may be that in the present study mood and anxiety disorders are allowed to be comorbid with AD, while in the ODIN-study using strict ICD-10 criteria, they are not. This confirms the assumption of DSM-IV critics that strict 'cook-book' application of all diagnostic criteria for AD leads to over-diagnosis of mood disorders at the expense of AD (Casey et al., 2001; Baumeister et al., 2009b; Taggart et al., 2006). These mood disorders may in fact be self-limiting periods of low mood triggered by stressful events and be misdiagnosed as depression.

In the present study we used the DIAD in combination with the CIDI and found an AD prevalence of 7.4%. Therefore, we believe that the results of our validation study indicate that the DIAD is able to differentiate between AD and depression.

### Stressors

As we expected, a vast majority of persons diagnosed with AD reported multiple stressors, mostly related to work, own illness and psychosocial factors. However, in the subsample without AD, almost half of respondents also reported multiple stressful life events. A post-hoc analysis of the study sample showed that 15.2% (n=49) of respondents reported one or more stressors in the past three years, without meeting criteria for AD nor for any other lifetime DSM-IV classification. This illustrates that some individuals react to stressors with clinically significant symptoms, while others don't.

### K10 and WHODAS

On a scale of 10 to 50, we found the K10 score to differ 7 points (21 vs. 28) between persons without and with AD, respectively. On a scale of 36 to 180, the sum score of the

total WHODAS 2.0 was found to differ 19 points (75 vs. 94). Meaningful score differences should have not only statistical significance, but clinical relevance as well. To our knowledge, the smallest relevant difference in K10 score is not known. However, based on K10 validity studies (Donker et al., 2010; Furukawa et al., 2003), we believe a 7 point difference in K10 score to be clinically meaningful. As to the clinical significance of the difference we found in WHODAS 2.0 score, also for this questionnaire a meaningful cutoff value is not known. In a group of persons with depression before and after rehabilitation, a decrease of 13 points in WHODAS mean total score was found (Pösl et al., 2007). Therefore, in our view, the difference of 19 points we found in WHODAS 2.0 total sum score between persons with and without AD, is clinically significant as well.

### LIMITATIONS

Some limitations of this study must be taken into account. First, the present study describes the development of a new instrument and is a first effort to validate it. We did not yet assess the reproducibility of the DIAD. Therefore, pending further studies on inter- and intra-rater reliability and on other aspects of validity, the DIAD can only be used with prudence. Second, it has been pointed out by others that mood changes may occur on exposure to reminder of or discussion about the stressor referred to as 'cognitive engagement' (Casey and Bailey, 2011). Although the DIAD questions on distress specifically ask to report symptoms present in the past 7 days, it cannot be excluded that cognitive engagement with stressing events has biased responses. Third, the PREDIS cohort study response rate was only 24.3%. This could have led to selection bias. We found no significant differences between responders and non-responders as to gender and prevalence of certified ICD-10 somatic and mental disorder. However, we found respondents to be significantly older than non-responders. In general, poor mental health is prevalent at all ages with the highest prevalence occurring in the youngest age groups (WHO, 2000). Prevalence rates of mental disorders found in the present study may therefore be an underestimation when compared with non-responders. However, we found no significant difference between the PREDIS cohort and the target population, i.e. the national population of disability claimants as to the prevalence of somatic and mental disorders, certified by the SSI. Therefore, we believe our results as to the construct validity of the DIAD to be externally valid. Fourth, the capability of the DIAD to differentiate between persons with ( $n=24$ ) and without AD may be compromised by the small sample size.

### RECOMMENDATIONS FOR FUTURE RESEARCH

The present study describes the development of a new instrument and is a first effort to validate it. Further reliability and validity studies are clearly needed. Guidance for this validation process is provided by the consensus based standards for the selection of health status measurement instruments, i.e. the COSMIN checklist (Mokkink et al. 2010).

### Content

The content of the DIAD should be further validated, with regard to the inclusion of AD subtypes depressed mood and anxiety, and recall bias. Allowing the DIAD to subtype AD is clinically relevant for treatment purposes. If the DIAD is aimed to be used as stand-alone

instrument, adequate subtyping can be achieved by including not only the 4DSQ subscale distress, but also the subscales depression and anxiety. If the DIAD is used in conjunction with a more comprehensive interview capable of detecting other mental disorders, e.g. the CIDI, then AD can be subtyped based on the diagnosis of subthreshold mood and anxiety disorders, diagnosed by the larger interview. For a clear differentiation between AD and depression the DIAD should be used in combination with a larger structured psychiatric interview, e.g. the CIDI, capable of detecting other DSM-IV classifications.

To minimize recall bias, almost inherent to strict time limits in a diagnosis, in future versions of the DIAD, questions should be included about some other independent dateable events, e.g. related to sick leave, school attendance, employment, marriage, child birth, moving house etc., that can be linked to self-report dates of onset and termination of stressing events and symptoms.

### **Reliability and validity**

Reliability of the DIAD should be assessed through test-retest and inter-rater reliability studies. Concurrent validity should be assessed by comparing DIAD outcome with those of clinical psychiatric interviews that include the diagnosis AD. The use of a clinical interview as gold standard is to be preferred above semi-structured psychiatric interviews, such as the SCAN, SCID or M.I.N.I., since the capability of these schedules to diagnose AD is limited (Casey, 2009). Longitudinal studies are needed to evaluate the predictive validity of the DIAD, i.e. to assess whether the DIAD correlates with some relevant criterion measure. To further investigate the capability of the DIAD to differentiate between persons with and without AD, future studies require clearly larger sample sizes. It is very important that psychometric properties, i.e. internal consistency, sensitivity, specificity, positive and negative predictive value, of the DIAD are assessed in other settings and populations, using appropriate recall periods, e.g. in community samples, primary care patients, psychiatric in- and outpatients, consultation liaison psychiatry and other groups of specific interest, such as those with deliberate self-harm, sick listed or unemployed workers, high risk groups, or other specific age groups.

### **»CONCLUSION«**

The expert consultation group was in moderate to good agreement on the content of AD, although whether the DIAD covers all essential aspects of AD is still not fully clear. Our hypothesis regarding the construct validity of the DIAD, was confirmed. These results are a first indication that the DIAD using adjusted DSM-IV criteria is a valid, stand-alone instrument to diagnose AD, to be administered by lay interviewers. With regard to the bereavement criterion, the DIAD is compatible to the upcoming DSM-5. Further studies on criterion validity and reliability of the DIAD in other samples and settings are clearly needed. With a reliable and valid diagnostic instrument, the epidemiology of AD can be better researched and evidence-based strategies for therapy and intervention can be developed.

**ACKNOWLEDGEMENTS**

We wish to thank Prof. dr F.J. van Dijk (MD; field: occupational health care); Prof. dr P. de Jonge (psychologist, WHO CIDI trainer; field: psychiatric epidemiology); M. Loo (MD; field: occupational care, mental health); F.J. Nienhuis (psychologist, WHO CIDI trainer, designer of the mini-version of the Schedules for Clinical Assessment in Neuropsychiatry (mini-SCAN); field: psychiatric epidemiology); Prof. dr W. van Rhenen (MD; field: occupational care, mental health); Prof. dr A. Schene (MD; field: psychiatry); dr J. Spanjer (MD, designer of the disability assessment structured interview (DASI)); field: insurance medicine); dr B. Terluin (MD, designer 4DSQ; field: primary care, stress-related disorder); Prof. dr P. Verhaak (sociologist; field: primary care, mental disorder); J.H. Wijers (MD; field: insurance medicine, mental disorder) and Prof. dr H. Wind (MD; insurance medicine) for giving their opinion on the content of the DIAD. Also, we wish to thank the reviewers for their valuable comment on an earlier draft of this article.

**COMPETING INTERESTS**

The authors have no competing interests.

**REFERENCES**

- Altman D.G. (1991). *Practical statistics for medical research*. London: Chapman and Hall.
- Baumeister H., Kufner K. (2009a). It is time to adjust the adjustment disorder category. *Curr Opin Psychiatry*, 22, 409-12.
- Baumeister H., Maercker A., Casey P. (2009b). Adjustment disorders with depressed mood: a critique of its DSM-IV and ICD-10 conceptualisation and recommendations for the future. *Psychopathology*, 42, 139-47.
- Bebbington P., Brugha T., Meltzer H., Farrell M., Ceresa C., Jenkins R. (2000). Psychiatric disorder and dysfunction in the UK National Survey of Psychiatric Morbidity. *Soc Psychiatry Psychiatr Epidemiol*, 35(5), 191-7.
- Buist-Bouwman M.A., Ormel J., de Graaf R., Vilagut G., Alonso J., van Sonderen E., Vollebergh A.M. (2008). Psychometric properties of the World Health Organization Disability Assessment Schedule used in the European Study of the Epidemiology of Mental Disorders. *Int. J. Methods Psychiatr. Res*, 17, 185-197.
- Casey P. (2009). Adjustment Disorder. *Epidemiology, Diagnosis and Treatment. CNS Drugs*, 23(11), 927-936.
- Casey P., Bailey S. (2011). Adjustment disorders: the state of the art. *World Psychiatry*, 10, 11-18.
- Casey P., Dowrick C., Wilkinson G. (2001). Adjustment disorders: fault line in the psychiatric glossary. *Br J Psychiatry*, 179, 479-81.
- Casey P., Maracy M., Kelly B.D., Lehtinen V., Ayuso-Mateos J-L., Dalgard O.S., Dowrick C. (2006). Can adjustment disorder and depressive episode be distinguished? Results from ODIN. *J Affect Disord*, 92, 291-7.
- Cohen S., Willis T.A. (1985). Stress, social support and the buffering hypothesis. *Psychol Bull*, 98, 310-357.
- Cornelius LR, van der Klink JJJ, Brouwer S, Groothoff JW. (2012). Under-recognition and under-treatment of DSM-IV classified mood and anxiety disorders among disability claimants. Submitted.
- Creamer M., Burgess P., Pattison P. (1992). Reaction to trauma: a cognitive processing model. *J Abnorm Psychol*, 101, 452-459.

Diagnostic and Statistical Manual of Mental Disorders (4th ed.). 1994. Washington D.C.: American Psychiatric Association.

Diagnostic and Statistical Manual of Mental Disorders, 5th ed. (2011). <http://www.dsm5.org/ProposedRevision/Pages/proposedrevision.aspx?rid=367#> (date: April 14th 2012).

Donker T., Comijs H., Cuijpers P., Terluin B., Nolen W., Zitman F., Penninx B. (2003). The validity of the Dutch K10 and extended K10 screening scales for depressive and anxiety disorders. *Psychiatry Res*, 176, 45-50.

Einsle F, Köllner V, Dannemann S, Maercker A. (2010): Development and validation of a self-report for the assessment of adjustment disorders. *Psychology, Health & Medicine*, 15, 584-595.

Furukawa T.A., Kessler R.C., Slade T., Andrews G. (2003). The performance of the K6 and K10 screening scales for psychological distress in the Australian National Survey of Mental Health and Well-Being. *Psychol Med*, 33, 357-362.

Haro JM, Arbabzadeh-Bouchez S, Brugha TS de Girolamo G, Guyer ME, Jin R, Lepine JP, Mazzi F, Reneses B, Vilagut G, Sampson NA, Kessler RC. (2006) Concordance of the Composite International Diagnostic Interview Version 3.0 (CIDI 3.0) with standardized clinical assessments in the WHO World Mental Health surveys. *Int J Methods Psychiatr Res* 15:167-180.

Health and Safety Executive. (2011). Stress-related and psychological disorders in Great Britain. London: Health and Safety Executive.

Horowitz M.J. (1997). Stress response syndromes (3rd ed.). Northvale: Aronson.

Kessler R.C., Andrews G., Colpe L.J., Hiripi E., Mroczek D.K., Normand S.L., Walters E.E., Zaslavsky A.M. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychol Med*, 32, 959-976.

Kessler R.C., Angermeyer M., Anthony J.C., de Graaf R., Demyttenaere K., Gasquet I. (2007). Lifetime prevalence and age-of-onset distributions of mental disorders in the World Health Organization's World Mental Health Survey Initiative. *World Psychiatry*, 6, 168-176.

Kessler R.C., Chiu W.T., Demler O., Merikangas K.R., Walters E.E. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry*, 62(6), 617-27.

Kessler R.C., Ustun T.B. (2004). The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res*. 13(2), 93-121.

Kim JJ, Diamond DM. The stressed hippocampus, synaptic plasticity and lost memories. (2002). *Nat Rev Neurosci*, 3, 453-62.

Klink van der J.J.L., Blonk R.W., Schene A.H., van Dijk F.J. (2003). Reducing long term sickness absence by an activating intervention in adjustment disorders: a cluster randomised controlled design. *Occup Environ Med*, 60, 429-437.

Klink van der J.J.L., Terluin B. (2005). *Psychische problemen en werk. Handboek voor een activerende begeleiding door huisarts en bedrijfsarts [Mental problems and work. Manual for activating interventions in primary and occupational health care]*. Houten: Bohn Stafleu van Loghum.

Knauper B., Cannell C.F., Schwarz N., Bruce M.L., Kessler R.C. (1999). Improving the accuracy of major depression age of onset reports in the US National Comorbidity Survey. *Int J Methods Psychiatr Res*, 8, 39-48.

Knowledge Center UWV. (2007). *UWV Kwartaalverkenning [UWV Quarterly report]*. Amsterdam: UWV.

Laugharne J., van der Watt G., Janca A. (2008). It is too early for adjusting the adjustment disorder category. *Curr Opin Psychiatry*, 22, 50-54.

Leon A.C., Olfson M., Portera L., Farber L., Sheehan D.V. (1997). Assessing psychiatric impairment in primary care with the Sheehan Disability Scale. *Int J Psychiatry Med*, 27, 93-105.

Mokkink LB, Terwee CB, Patrick DL, Alonso J, Stratford PW, Knol DL, Bouter LM, de Vet HCW. (2010). The COSMIN checklist for assessing the methodological quality of studies on measurement properties of health status measurement instruments: an international Delphi study. *Qual Life Res*, 19, 539-549.

Maercker A., Einsle F., Köllner V. (2007). Adjustment disorders as stress response syndromes: a new diagnostic concept and its exploration in a medical sample. *Psychopathology*, 40, 135-146.

National Institute for Occupational Safety and Health. (2011). *NIOSH Program Portfolio*. <http://www.cdc.gov/niosh/programs/workorg/risks.html> (date: April 1st 2012).

Pösl M., Cieza A., Stucki G. (2007). Psychometric Properties of the WHODASII in Rehabilitation Patients. *Qual Life Res*, 16, 1521-31.

Taggart C, O'Grady J, Stevenson M, Hand E, Mc Clelland R, Kelly C. (2006). Accuracy of diagnosis at routine psychiatric assessment in patients presenting to an accident and emergency department. *Gen Hosp Psychiatry*, 28, 330-5.

Terluin B., van Marwijk H.W., Ader H.J., de Vet H.C., Penninx B.W., Hermens M.L. (2006). The Four-Dimensional Symptom Questionnaire (4DSQ): a validation study of a multidimensional self-report questionnaire to assess distress, depression, anxiety and somatization. *BMC Psychiatry*, 6, 34.

Vollebergh W.A., Iedema J., Bijl R.V., de Graaf R., Smit F., Ormel J. (2001). The structure and stability of common mental disorders: the NEMESIS study. *Arch Gen Psychiatry*, 58, 597-603.

Üstün T.B., Kostanjsek N., Chatterji S., Rehm J. (2010) *Measuring Health and Disability Manual for WHO Disability Assessment Schedule WHODAS 2.0*. Geneva: World Health Organization.

Wittchen H.U., Jacobi F. (2005). Size and burden of mental disorders in Europe - a critical review and appraisal of 27 studies. *Eur Neuropsychopharmacol*, 15(4), 357-76.

WHO International Consortium in Psychiatric Epidemiology. (2000) Cross-national comparisons of the prevalences and correlates of mental disorders. *Bull World Health Organ*, 78:413-26.



## APPENDIX:

### Diagnostic Interview Adjustment Disorder (DIAD)<sup>1</sup>

(When asking the questions the interviewer emphasizes the underlined words.)

#### TEXT TO READ OUT 1

*In their lives, people may experience events or circumstances that cause stress. I want to ask you now if such problem situations or events exist or have occurred in the past. This refers to the previous three years, including the year prior to your calling in sick. Take your time to reflect.*

#### Question 1

*Did you in these past three years, experienced problems, that caused you stress?*

Answer:

yes -> question 3

no -> DIAD stops

don't know / no answer -> question 2

#### Question 2

*It may be that in the past three years of your life something happened, about which you would rather not speak. Can you tell me if it that is the case, without telling me what exactly happened?*

Answer:

yes -> question 3

no / don't know / no answer -> DIAD stops

#### Question 3

*Now please look at this list of potential problem situations. Please take your time. Which problem situation applies? You may give more than one answer.*

(The interviewer presents the respondent with the following list of potential problems and notes the numbers of the problem situations that apply.)

#### Interviewer observation

(The interviewer him-/herself now answers the question whether the respondent has indicated that there is *only* mention of a reaction to the passing of a loved one.)

Answer:

if so -> DIAD stops

no -> question 4

<sup>1</sup> Disclaimer: this transcript is a translation from the original Dutch version of the DIAD and presented here for the interested reader. For further reliability and validity studies among English-speaking respondents, translation errors should be controlled for by back translating this transcript into Dutch. Reliable administration of the DIAD in any language requires interview training. Use of the DIAD is allowed only with permission from the authors of this paper.

**Question 4**

When did the problem first occur?

Answer:

respondent names date (dd/mm/yyyy) -> question 5  
 don't know / no answer -> question 5

**Question 5**

Does the problem or do the consequences of the problem still exist at the moment?

Answer:

yes -> read out text 2  
 no -> question 6  
 don't know / no answer -> question 6

**Question 6**

When did the problem cease to exist?

Answer:

respondent names date (dd/mm/yyyy) -> read out text 2  
 don't know / no answer -> read out text 2

**TEXT TO READ OUT 2**

I will now ask you some questions about signs and symptoms that you may have experienced during the previous week, that is, these last 7 days including today. For each sign or symptom you experience, I will ask how often they occur.

**Question 7a**

During this past week were you depressed?

Answer:

no -> question 8  
 yes -> question 7a

**Question 7b**

Does this occur: sometimes (1), regularly (2), often (3) or very often/constantly (4)?

(The interviewer asks questions 8a to 22a; following each -yes- response (to an a-question) the interviewer then asks the b-question)

**Question 8a**

During this past week were you worried?

**Question 9a**

During this past week did you sleep restlessly?

**Question 10a**

During this past week did you feel listless or apathetic?

**Question 11a**

*Did you feel tense this past week?*

**Question 12a**

*Did you feel irritable this past week?*

**Question 13a**

*During this past week did you feel you couldn't get anything done?*

**Question 14a**

*During this past week did you have the feeling that you could take no interest in people and things around you?*

**Question 15a**

*During this past week, did you feel that you could no longer cope?*

**Question 16a**

*During this past week did you feel that you (just) can't take it anymore?*

**Question 17a**

*During this past week did you have the feeling that you "don't feel like doing anything anymore"?*

**Question 18a**

*During this past week did you have trouble thinking clearly?*

**Question 19a**

*During this past week did you have trouble falling asleep?*

**Question 20a**

*During this past week did you get over-emotional very rapidly?*

**Question 21a**

*During this past week, did you sometimes have mental images of moving or shocking event(s) you've experienced?*

**Question 22a**

*During this past week, did you sometimes have to try very hard to put thoughts or memories of moving or shocking events out of your mind?*

answer -no- to all a-questions -> DIAD stops

answer -yes- to a-questions -> read out text 3

**TEXT TO READ OUT 3**

*In response to the previous questions, you have indicated that you have experienced stress-inducing events or circumstances. Also, that you have experienced certain signs and symptoms during these past 7 days.*

**Question 23**

*When did the symptoms that you indicated in the preceding questions start?*

Answer:

respondent names date (dd/mm/yyyy) -> question 24

don't know / no answer -> question 24

**Question 24**

*Do you feel that the symptoms you mentioned in the preceding questions are a reaction to the problems/issues that you specified at the beginning of the interview?*

Answer:

yes / no / don't know / no answer -> read out text 4

**TEXT TO READ OUT 4**

*To the previous questions, you answered that you have experienced certain signs and symptoms. On a scale of 0 to 10, where 0 means no impairment and 10 means serious impairment, which mark then indicates to you the impact of those signs and symptoms on each of the following activities?*

**Question 25**

*Housekeeping, e.g. cleaning, shopping, keeping the house in good condition?*

**Question 26**

*Your ability to do your job?*

**Question 27**

*Your ability to study?*

**Question 28**

*Your ability to forge and maintain close friendships with other people?*

**Question 29**

*Your social contacts?*

Stop DIAD



## CHAPTER 7 PROGNOSTIC FACTORS OF LONG TERM DISABILITY DUE TO MENTAL DISORDERS: A SYSTEMATIC REVIEW

JOURNAL OF OCCUPATIONAL REHABILITATION 2011, 21:259-274

L.R. CORNELIUS | J.J.L. VAN DER KLINK | J.W. GROOTHOFF | S. BROUWER

---

### ›ABSTRACT‹

#### INTRODUCTION

In the past few decades, mental health problems have increasingly contributed to sickness absence and long-term disability. However, little is known about prognostic factors of return to work (RTW) and disability of persons already on sick leave due to mental health problems. Understanding these factors may help to develop effective prevention and intervention strategies to shorten the duration of disability and facilitate RTW.

#### METHOD

We reviewed systematically current scientific evidence about prognostic factors for mental health related long term disability, RTW and symptom recovery. Searching PubMed, PsycINFO, Embase, Cinahl and Business Source Premier, we selected articles with a publication date from January 1990 to March 2009, describing longitudinal cohort studies with a follow-up period of at least one year. Participants were persons on sick leave or receiving disability benefit at baseline. We assessed the methodological quality of included studies using an established criteria list. Consistent findings in at least two high quality studies were defined as strong evidence and positive findings in one high quality study were defined as limited evidence.

#### RESULTS

Out of 796 studies, we included seven articles, all of high methodological quality describing a range of prognostic factors, according to the ICF-model categorized as health-related, personal and external factors. We found strong evidence that older age (> 50 years) is associated with continuing disability and longer time to RTW. There is limited evidence for the association of other personal factors (gender, education, history of previous sickness absence, negative recovery expectation, socio-economic status), health related (stress-related and shoulder/back pain, depression/anxiety disorder) and external i.e. job-related factors (unemployment, quality and continuity of occupational care, supervisor behavior) with disability and RTW. We found limited evidence for the association of personal/external factors (education, sole breadwinner, partial/full RTW, changing work tasks) with symptom recovery.

#### CONCLUSION

This systematic review identifies a number of prognostic factors, some more or less consistent with findings in related literature (mental health factors, age, history of previous sickness absence, negative recovery expectation, socio-economic status, unemployment, quality and continuity of occupational care), while other prognostic

factors (gender, level of education, sole breadwinner, supervisor support) conflict with existing evidence. There is still great need for research on modifiable prognostic factors of continuing disability and RTW among benefit claimants with mental health problems. Recommendations are made as to directions and methodological quality of further research, i.e. prognostic cohort studies.

**Keywords** mental health – occupational health – long-term disability – return to work – literature review

## »INTRODUCTION«

Results from psychiatric epidemiologic surveys in Europe and in the USA have shown that mood, anxiety and substance use disorders are highly prevalent in the general population, in primary care settings and among workers [1-3]. In the population of industrialized western countries, lifetime prevalence of any mental disorder range from 37.5 to 48.6, and 12-month prevalence from 19.9 to 29.1 [4].

In the past few decades, mental health problems have increasingly contributed to sickness absence and long-term disability [5, 6]. The Organization for Economic Co-operation and Development (OECD) reports in a recent paper that mental health problems now account for one-third of all new disability benefit claims on average, rising to as high as 40-50% in some member states [7]. In that paper the OECD shows that in the past 10-15 years, the inflow into disability benefits due to mental health conditions has almost doubled in some countries. In the Netherlands in the late 1960s, mental disorders accounted for 11% of all sickness absence with a duration longer than one year. From then on up to the present, this percentage has risen to 30% [8, 9].

Besides huge economic costs at population level [7, 10], long term disability in general and due to mental health conditions in particular, is associated at the individual level with lower socio-economic status, reduced quality of life and higher morbidity/mortality rates [11]. It is therefore of great importance to prevent the transition of short term sickness absence into long term or permanent disability and to rehabilitate those persons already on long term disability benefit by facilitating return to work (RTW). It is widely recognized that causes of sickness absence and disability are multifactorial and not associated with medical conditions alone [12, 13]. Systematic reviews on this topic primarily focused on musculoskeletal and pain-related health conditions [14, 15].

However, research on prognosis of long term disability due to mental disorders is scarce. Blank et al. [16] conducted a systematic review in 2008 of all papers relating to RTW or risk of job loss resulting from long term absence due to mental illness. They found 14 articles of varying methodological quality identifying a range of factors restricting RTW, related to work, family history, health risk behaviours, social status and medical condition. In that review, all study types were included and studies dealing with absences for more than six months were excluded.

In the Dutch social security system, disability benefit assessment takes place after a period of two years of sickness absence [17]. At that moment mental disorders account for 30% of all disability claims [9]. Factors associated with sustained disability and RTW of Dutch benefit claimants after this two year period are not known. Evidence based knowledge about prognostic factors of long term disability and RTW of persons already on sick leave lasting longer than six months due to poor mental health is missing. Understanding these factors, and in particular those which are amenable to change through any intervention program, may help to develop effective prevention and interventions to facilitate RTW for long-term disabled persons. To our knowledge, the literature on long term disability and RTW due to poor mental health has not yet been reviewed systematically, including longitudinal study types only and irrespective of the duration of preceding sickness absence

## ›OBJECTIVES‹

The aim of this review is to investigate systematically current scientific evidence about the prognostic factors for long term disability and RTW of persons sick listed due to mental health problems, and factors for recovery of mental health symptoms.

## ›METHODS‹

The first (LRC) and second reviewer (SB) discussed search strategy, criteria for selecting studies, quality assessment and data extraction to reach consensus. In case of disagreement the third reviewer (JvdK) made the final decision.

### SEARCH STRATEGY

The first author and an experienced medical librarian performed an extensive search in biomedical, psychological and economic databases (PubMed, PsycINFO, Embase, Cinahl, Business Source Premier) to find relevant articles, using MeSH terms, subheadings and free text words, see Table 1. The search was limited to articles with a publication date from January 1990 to March 2009. Additionally, we searched for other relevant articles using the name of the first author and the reference lists of included articles.

**Table 1**

Search terms (\* = truncated)

terms linked to	MeSH	subheading	free text words
<b>diagnosis</b>	Mental Disorders		mental illness mental morbidity mental comorbidity psychiatric disorder* psychiatric diagnos* psychiatric morbidity psychiatric comorbidity mental problems psychiatric problems sick-listed disability pension* sickness benefit*
<b>population</b>	Sick Leave Insurance, Disability Pensions		
<b>study design</b>	Cohort study, Case control study	Epidemiology Economics Statistics and numerical data	

Titles and abstracts were screened independently by two reviewers (LRC, SB). Full papers were retrieved if the abstract provided insufficient data to enable selection. Only papers written in English, German, French and Dutch were considered for inclusion in this review.

### CRITERIA FOR SELECTING STUDIES

To reach overall agreement (LRC, SB) on in- and exclusion criteria, we pilot-tested preliminary criteria in 20 full text articles randomly selected from the initial search. To also

include retrospective cohort studies as type of study, we omitted from the preliminary list the term prognostic. We added the term symptom recovery as type of outcome measure. The final in- and exclusion criteria are presented in box 1.

#### Box 1

In- and exclusion criteria

##### **Types of studies**

Observational studies, i.e. case-control studies, cohort studies, follow-up studies or longitudinal studies with a minimum follow-up period of one year.

##### **Types of participants**

Wholly or partially disabled persons in the age bracket 18–64 years who are on sick leave, who claim disability benefits or who are receiving disability pensions at baseline, because of disability due to mental disorders. Duration of sick leave or disability is not an in- or exclusion criterion in order to include all durations.

##### **Types of outcome measures**

Dependent variables: symptom recovery, improvement of functioning; reduction of disability; expanding of activities; heightening of social participation; return to work. Independent variables: nature and severity of mental disorder focusing on depression, anxiety disorder and substance use disorder; demographics; health service use; adequacy of treatment; coping strategies and social support.

## ASSESSMENT OF METHODOLOGICAL QUALITY

We based the quality assessment of the selected studies on an established criteria list for assessing validity of prognostic studies, as recommended by Altman [18]. This list consists of 16 items, each having yes/no/don't know answer options. Scholten-Peeters et al. operationalized this criteria list for use in a systematic review on prognostic factors of whiplash [19]. With permission of the author, we pilot tested this operationalization on agreement in an assessment of three studies on prognostic factors of whiplash and modified the list for use in the present review. This modified criteria list is presented in Appendix 1.

The quality of all included articles was scored independently by two reviewers (LRC, SB). If sufficient information was available, the item was rated one point. When information was not given or the information given was unclear, the item was rated zero point. For the total quality score we added all points for each study (maximum score 16 points).

Studies with a minimum score of 11 points ( $\geq 70\%$ ) were arbitrarily considered to be of high quality and those with a score lower than 11 points ( $< 70\%$ ) of low quality. We calculated initial interobserver agreement on methodological quality using kappa statistics for dichotomous values.

## DATA EXTRACTION

Using a standardized form, the first reviewer (LRC) extracted data on study design, source population, inclusion and exclusion criteria, numbers of participants, length of follow-up, loss to follow-up, outcome, prognostic factors and statistical analysis.

## LEVELS OF EVIDENCE

Based on Sackett et al. [20] and similar to the approach used by other systematic reviews [21], we defined four levels of evidence to determine the strength of association of prognostic factors with outcome: strong, moderate, limited and inconclusive evidence, see Table 2. Non-significant effects cannot contribute to consistency. Findings of one high quality study opposing consistent findings in one or more low quality studies would result in a situation of inconclusive evidence.

**Table 2**

Levels of evidence for prognostic factors

Level	
Strong	Consistent findings ( $\geq 80\%$ ) in at least two high quality studies
Moderate	One high quality study and consistent findings ( $\geq 80\%$ ) in one or more low quality studies
Limited	Findings of one high quality study or consistent findings ( $\geq 80\%$ ) in one or more low quality studies
Inconclusive	Inconsistent findings irrespective of study quality

## RESULTS

### SELECTION OF STUDIES

The initial search yielded 796 articles (search date: March 9<sup>th</sup> 2009). After selecting 36 references for full text reading, both reviewers (LRC, SB) agreed to include four articles for the present review. Searching the reference lists of those included articles, we found and included one additional article. Based on the name of the first author of the four included articles, we found two other relevant articles. In total we included seven articles for the present review [22-28]. Table 3 shows a flow chart of study selection.

### METHODOLOGICAL QUALITY SCORES

The final overall agreement between the two reviewers (LRC, SB) on quality score was  $\kappa = 0.84$ , which is considered to be very high. Disagreement originated mainly from reading errors and misinterpretation of the criteria list and was readily resolved in a consensus meeting. The methodological quality of all included studies is summarized in table 4. See the appendix for operationalizations of items A-P.

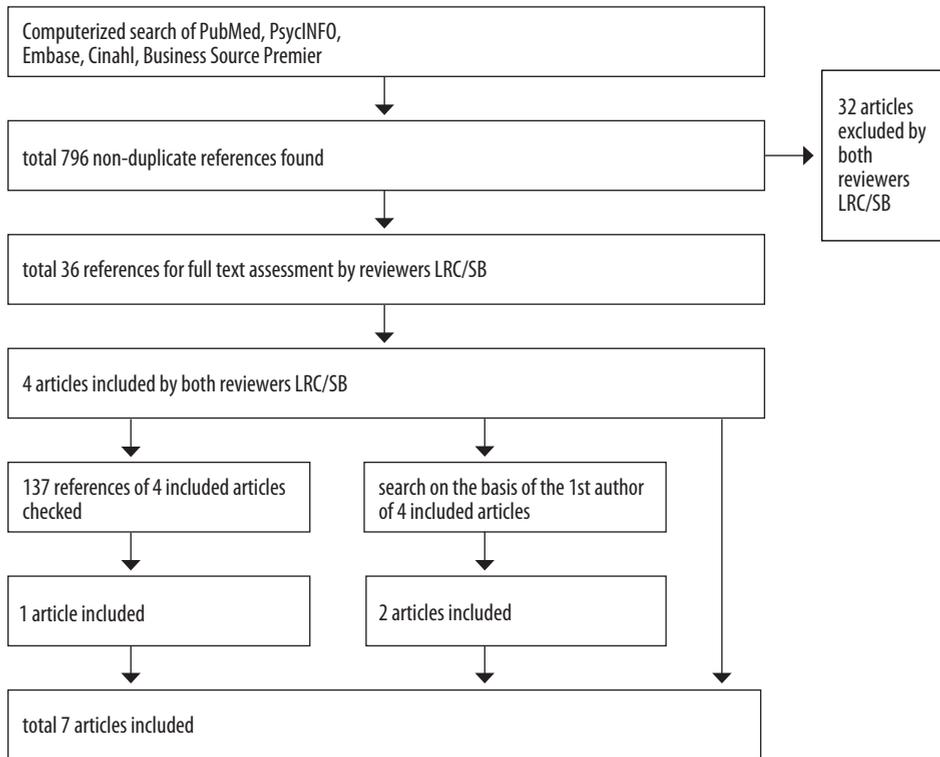
All studies were of high quality with sum scores ranging from 13 to 16 points. Across studies, the maximum score of each item was 7 points. The following items had  $< 7$  points: no inception cohort (item A, 5 points), no information of completers versus loss to follow-up (item F, 5 points), no (or insufficient) description of treatment used in the study population (item H, 3 points) and clinically relevant outcome measures (item L, 6 points).

### STUDY CHARACTERISTICS

The characteristics of each study as to quality score, design, recruitment, source population, case definition, response, numbers enrolled, measurements, follow-up, and loss to follow-up are presented in table 5. Registry data were used in four studies

**Table 3**

Flow diagram of study selection



**Table 4**

Results of methodological assessment

study	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Score (%)
Brenninkmeijer et al., 2008	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	15 (93.7)
Engström and Janson, 2007	0	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	13 (81.3)
Nieuwenhuijsen et al., 2003	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16 (100)
Nieuwenhuijsen et al., 2004	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	15 (93.7)
Nieuwenhuijsen et al., 2006	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16 (100)
Nieuwenhuijsen et al., 2008	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	14 (87.5)
Vaez et al., 2007	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	14 (87.5)
Total	5	7	7	7	7	5	7	3	7	7	7	6	7	7	7	7	

[23, 24, 26, 28]. Only two studies linked registry data to data collected separately by other measurements, e.g. interview or questionnaire [24,26]. Duration of sickness absence at baseline varied from 2-35 days (24) to ≥90 days [28].

Table 5 Study characteristics

Study	Score	Design	Recruitment and source population	Case definition	Response	Numbers enrolled	Measurement	Follow-up	% Lost to follow-up
Brenninkmeijer et al., 2008	15	Prospective cohort study; 2 measurements: T1 after 13 weeks of sickness; T2 after 1 year	Three social insurance companies, Utrecht, The Netherlands; inclusion in 2002; source population: n= 7864	Sick-listed 12-20 weeks; high level of psychological distress (GHQ-12 $\geq$ 5); sickness due to psychological complaints; cause of sickness: work situation and private life	Screening: 42% 1st interview T1: 93% 2nd interview T2: 79%	n=555	(1) Screening: - GHQ-12 <sup>1</sup> (2) telephone interview: - SCL-90 <sup>2</sup> - JICQ <sup>3</sup> - self report	1 year	14%
Engström and Janson, 2007	13	Prospective cohort study; 3 annual measurements after 1, 2 and 3 years of follow-up	Social insurance office Varmland, Sweden; all individuals sick registered one November week 2000; n= 7273	Sickness absence >28 days; stress-related psychiatric disorder	100% (registry data)	n=911	Registry data	3 years	1,9%
Nieuwenhuijsen et al., 2003	16	Retrospective cohort study	35 different occupational physicians (OP)	Medical files of first 100 patients on sick leave due to adjustment disorders visiting OP in 1999 and 2000; first time visit since onset; 100% absent from work; no major psychiatric disorder; no prominent somatic disorder	100% (registry data)	n=100	(1) File: - length of sickness absence (2) OP guideline: - 10 OP performance indicators	1 year	0%
Nieuwenhuijsen et al., 2004	15	Part of longitudinal cohort study; measurements: - employees: at baseline, 3, 6, 12 months - supervisors: 6 months	Consecutive patients reported by 30 occupational physicians of 9 occupational health services; Amsterdam, The Netherlands; inclusion: march 2001 – february 2002; source pop.: n=277	Employees with self reported psychological symptoms; on sick leave <6 weeks	Consent to participate: 76%; baseline questionnaire: 71%; consent to contact supervisor : 48% (of n=198)	Employees: n=198; supervisors: n=85	Employee: - questionnaire <sup>4</sup> Supervisor: - telephone interview <sup>5</sup>	Employee: 1 year; Supervisor: no follow up	Employee: not provided; Supervisor: not applicable

Table 5 continued

Study	Score	Design	Recruitment and source population	Case definition	Response	Numbers enrolled	Measurement	Follow-up	% Lost to follow-up
Nieuwenhuijsen et al., 2006	16	Part of longitudinal cohort study; measurements at baseline, 3, 6, 12 months	Consecutive patients reported by 30 occupational physicians of 9 occupational health services; Amsterdam, The Netherlands; inclusion: march 2001 – february 2002; source population n=277	Employees on sick leave <6 weeks due to mental health problems <sup>6</sup> ; last visit to OP >3 months	Consent to participate: 76%; baseline questionnaire: 71%	n=188	(1) RTW: - questionnaire - register (2) diagnosis: - telephone version of CDI vs. 2.17 - DASS-depression <sup>8</sup> (3) other predictors: - questionnaire	1 year	1,1%
Nieuwenhuijsen et al., 2008	14	Part of longitudinal cohort study; measurements at baseline, 3, 6, 12 months	Consecutive patients reported by 30 occupational physicians of 9 occupational health services; Amsterdam, The Netherlands; inclusion: march 2001 – february 2002; source population n=277	Employees on sick leave <6 weeks due to mental health problems <sup>6</sup> ; last visit to OP >3 months	Consent to participate: 76%; baseline questionnaire: 71%	n=188	(1) irrational belief: - IBI <sup>10</sup> (2) diagnosis: - telephone version of CDI vs. 2.11 <sup>11</sup> (3) psychological symptoms: - DASS <sup>12</sup>	1 year	1,1%
Vaez et al., 2007	14	Retrospective and prospective cohort study	Insurance company, Sweden; inclusion in 1999; random selection (n=5,200) of source population (n=13.318)	Employees; aged 20-65 years; new sick-leave spell ≥90 days in 1999 due to psychiatric diagnosis, burnout or exhaustion	100% (registry data)	Included: n=4,891	Registry data 1996-2002 from: - insurance company - social insurance board	Retrospective: 0% 1996-1999 Prospective: 1999-2002	

1	General Health Questionnaire (12 items).
2	Depression subscale (16 items) of Symptom Check List (90 items).
3	Job Content Questionnaire.
4	Baseline: age, gender, occupation, self reported cause of mental health problem; Depression Anxiety Stress Scale (DASS): severity of psychological symptoms; during follow up: absence data.
5	Standardized, with 19 questions.
6	Psychological symptoms not caused by a somatic disorder.
7	Sections: major depressive disorder, panic disorder, social phobia, somatoform disorder, bipolar disorder, obsessive-compulsive disorder, post-traumatic stress disorder, psychotic disorder.
8	Depression Anxiety Stress Scale; cut-off >12.
9	Psychological symptoms not caused by a somatic disorder.
10	Irrational Beliefs Inventory 50-item.
11	Sections: major depressive disorder, panic disorder, social phobia, somatoform disorder, bipolar disorder, obsessive-compulsive disorder, post-traumatic stress disorder, psychotic disorder.
12	42-item.

Table 6 Outcome, prognostic factors and results

Study	Outcome (dependent variables)	Prognostic factors (independent variables)	Result
Breninkmeijer et al., 2008	Depressive symptoms	(1) Demographics <sup>1</sup> (2) Work characteristics <sup>2</sup> (2) Work resumption <sup>3</sup> (3) Actions by employers <sup>4</sup>	Significant factors ( $P < 0.05$ ) for (1) increased risk: - lower education: $\beta = 0.10$ - sole breadwinner: $\beta = 0.14$ (2) decreased risk: - partial or full work resumption: resp. $\beta = 0.13$ , $\beta = 0.30$ - changing work tasks: $\beta = 0.10$
Engström and Janson, 2007	Dependency on sickness insurance c.q. full/partial (healthy state) or no work resumption (unhealthy state)	(1) Demographics <sup>5</sup> (2) Labour market data <sup>6</sup> (3) History of previous sickness absence	Logistic regression to estimate ORs; significant risk factors healthy vs unhealthy state 3 years after initial sickness absence: (1) healthy: - male gender: OR 1.637 ( $p < 0.05$ ) (2) unhealthy: - age: OR 16.961 (16-29 yrs, $p < 0.01$ ); OR 4.807 (50-59 yrs, $p < 0.01$ ) - unemployment: OR 0.468 ( $p < 0.01$ ) - history of previous sickness absence OR 0.617 ( $p < 0.01$ ) - multiple diagnosis (stress-related and shoulder/back pain) OR 0.576 ( $p < 0.01$ )
Nieuwenhuijsen et al., 2003	Time to full/partial return to work (RTW)	Performance indicator (PI) <sup>7</sup> of occupational physician (OP)	Kaplan-Meier survival analysis to estimate univariate relations: (1) longer time to first RTW: - deviant PI interventions aimed at organization ( $p = 0.02$ ) - deviant PI continuity of care ( $p < 0.0001$ ) (2) longer time to full RTW: - age $> 50$ ( $p = 0.02$ )  Cox proportional hazard ratio (HR, 95% CI) analysis to estimate multivariate associations: (1) longer time to first RTW: - deviant PI interventions aimed at organization: HR 0.5 (0.3-0.9) - deviant PI continuity of care: HR 0.3 (0.2-0.5) (2) longer time to full RTW: - deviant PI continuity of care: HR 0.3 (0.2-0.5)

Table 6 continued

<p>Nieuwenhuijsen et al., 2004</p>	<p>Time to full/partial RTW</p>	<p>(1) Supervisor behaviour<sup>8</sup> (2) Conditional factors<sup>9</sup></p>	<p>Cox regression analysis to estimate hazard ratios (HR, 95% CI) indicating time to RTW: (1) shorter time to full RTW: - communication with employee (non-depressed only): HR 3.5 (1.4-8.9) (2) longer time to full/partial RTW: - consulting with professionals: HR 0.4 (0.2-0.9)</p>
<p>Nieuwenhuijsen et al., 2006</p>	<p>time to full RTW</p>	<p>(1) Disorder related factors<sup>10</sup> (2) Personal factors<sup>11</sup> (3) Environmental factors<sup>12</sup></p>	<p>Cox regression analysis to estimate hazard ratios (HR, 95% CI) indicating time to full RTW: longer time: - age <math>\geq 50</math>: HR 0.5 (0.3-0.8) - expectation of duration &gt;3 months: HR 0.5 (0.3-0.8) - educational level medium/high: HR 0.5 (0.3-0.8) - depression/anxiety disorder: HR 0.7 (0.4-0.9)</p>
<p>Nieuwenhuijsen et al., 2008</p>	<p>Symptom recovery</p>	<p>Change in irrational beliefs</p>	<p>Repeated measurements MANOVAs to describe relation of change in irrational beliefs and symptom recovery: - magnitude/direction of change in irrational beliefs are related to magnitude of recovery of depressive, anxiety, stress symptoms over time - design not suited to assess temporal relationship beliefs/symptoms</p>
<p>Vaez et al., 2007</p>	<p>(1) sickness absence (2) disability pension (DP)</p>	<p>(1) Demographics<sup>13</sup> (2) Previous sickness absence<sup>14</sup></p>	<p>To predict DP: logistic regression to estimate adjusted ORs (95% CI): higher risk: - age 55-61: OR 6.30 (4.80-8.09) - low SES: OR 3.40 (2.28-5.08)</p>
<p>1 Gender, age, education, care for children, breadwinner's role, marital status. 2 Variable work schedule, management function, reorganization, job insecurity, leadership quality, years in organization, years in function, working hours, overtime work, travelling hours, size of organization, physical load/risk, chemical risk, decision latitude, task demands, work atmosphere. 3 Partial or full work resumption. 4 Change of tasks, reduction of tasks, equipment/aids/courses, showing interest, change of position/department 5 Age, gender 6 Occupation, employertype, full- or part-time work, work-related diagnosis. 7 Assessment of symptoms, correct diagnosis, evaluation of curative care, assessment of work related</p>	<p>causes, assessment of impediments, interventions aimed at individual, interventions aimed at organization, interventions aimed at providers of care in the curative sector, timing of first consultation, continuity of care. 8 Communication with the employee, promoting gradual return to work, consulting with professionals. 9 Financial consequences, rehabilitation, responsibility, motivation, work performance, work relationship. 10 Diagnosis, level of depressive symptoms, work-relatedness of the diagnosis, pre-baseline duration of the disorder, pre-baseline sick leave days. 11 Gender, age, marital status, recovery expectations, educational level. 12 Job demands, supervisory support, co-worker support. 13 Gender, age, occupation, socio-economic status. 14 4 levels: &lt;17 days (short); 17-90 days (intermediate); 91-365 days (long term); granted disability pension.</p>		

Table 6 summarizes the study characteristics as to outcomes, prognostic factors and results. Only significant associations and prognostic factors are mentioned. The included studies used two types of outcome measures as dependent variables: disability (including RTW) and symptom recovery. Over 60 different types of prognostic factors were investigated (e.g. gender, age, socio-economic status, diagnosis, beliefs, occupational care, job- and employer-related factors). Statistical pooling of data in a meta-analysis was not possible due to the heterogeneity of study population, type of prognostic factors, outcome measures and study quality.

### EVIDENCE SYNTHESIS

In table 7 we present a qualitative summary of the evidence for all prognostic factors and their associations with disability duration and symptom recovery as outcome variables. In accordance with the International Classification of Functioning, Disability and Health (ICF-model), the prognostic factors are categorized as health-related factors, personal factors and external factors [29]. Only factors that are significantly associated with an increase or decrease of outcomes are mentioned. Table 7 also includes the modifiability of separate factors.

We found strong evidence that older age (>50 years) is associated with continuing disability and longer time to RTW for persons who are sick listed at baseline due to mental health problems. There is limited evidence for the association of health related factors (stress-related and shoulder/back pain, depression/anxiety disorder) with a longer duration of disability. We also found limited evidence that personal factors other than age (male gender, education, previous sickness absence, own expectation of duration of the absence >3 months, low socio-economic status) are related to continuing disability. We found limited evidence that full or partial RTW and changing work tasks is associated with symptom recovery. Furthermore, we found limited evidence for the association of external factors (unemployment, poor quality of interventions by the occupational physician aimed at the organization, poor continuity of occupational care, supervisor consulting with professional) with an increase of disability. There is limited evidence for the association of supervisor communication with the employee with a decrease of disability. There is limited evidence for the association of lower education and the position of sole breadwinner with an increase of poor mental health on a symptom level.

Table 7 Overall level of evidence

Category	prognostic factor	outcome	studies	pos. findings (increase)	high quality	neg. findings (decrease)	high quality	level of evidence	modifiable
Health	stress-related and shoulder/back pain	disability	1	1/1 (100%)	1	-	-	limited	+
	depression/anxiety disorder	disability	1	1/1 (100%)	1	-	-	limited	+
	older age	disability	4	4/4 (100%)	4	-	-	strong	-
	gender (male)	disability	1	1/1 (100%)	1	-	-	limited	-
	medium/higher education	disability	1	1/1 (100%)	1	-	-	limited	-
	lower education	symptoms	1	1/1 (100%)	1	-	-	limited	+
	sole breadwinner	symptoms	1	1/1 (100%)	1	-	-	limited	+
	partial/full RTW	symptoms	1	-	-	1/1 (100%)	1	limited	+
	history of previous sickness absence	disability	1	1/1 (100%)	1	-	-	limited	-
	own expectation of duration >3 months	disability	1	1/1 (100%)	1	-	-	limited	+
	low socio-economic status	disability	1	1/1 (100%)	1	-	-	limited	+
	changing work tasks	symptoms	1	-	-	1/1 (100%)	1	limited	+
	unemployment	disability	1	1/1 (100%)	1	-	-	limited	+
External	deviant OP interventions aimed at organization	disability	1	1/1 (100%)	1	-	-	limited	+
	deviant continuity of OP care	disability	1	1/1 (100%)	1	-	-	limited	+
	supervisor communication with employee	disability	1	-	-	1/1 (100%)	1	limited	+
	supervisor consulting with professional	disability	1	1/1 (100%)	1	-	-	limited	+

## DISCUSSION

In this systematic review we identified a total of 17 significant factors: 13 factors associated with disability/RTW, and 4 factors associated with symptom recovery, see Table 7. Of the 13 factors related to disability/RTW, only two factors were directly related to mental health, while the other 11 factors were of a personal or external nature in terms of the ICF-model. This seems to confirm the hypothesis that long term disability is for a large part related to non-medical conditions.

### HEALTH FACTORS

We found limited evidence for the association of stress-related and shoulder/back pain, and depression/anxiety disorder with a longer duration of disability. There is also limited evidence among non-depressed workers that better communication between supervisor and employee shortened time to full RTW. Disability and RTW outcomes may be influenced by a specific health factor, i.e. the prevalence of depressive symptoms. These findings are in line with the results of other research on disorder-related predictors of disability [30,31,32,33]. However, in general, in most studies addressing the relation between mental health and disability, mental health problems are poorly defined or use different diagnostic criteria and associations are not diagnosis-specific [6,16]. Research data show an existing association between specific mental disorders and duration of disability, but nature and direction of this association remains to some extent unclear. It could be that multiple moderating or mediating factors are involved with effect-sizes depending on the severity of the disorder. It seems plausible that less severe mental disorders, such as dysthymia, adjustment disorder or simple phobia, are more susceptible to moderators than more severe disorders, such as major depressive disorder, bipolar disorder or psychotic disorders.

### PERSONAL FACTORS

We found strong evidence that older age (>50 years) is associated with continuing disability and longer time to RTW. This finding corresponds with the results of other systematic reviews [34]. In many western industrialized countries the age of the work force increases, due to demographic developments and government policies. As a result of this ageing process, occupational and insurance physicians and labor experts will encounter an increasing number of older workers unable or having increasing difficulties to perform their work tasks. Older workers and disability claimants are at a higher risk for continuing or even permanent disability and for a longer time to RTW. As age is not modifiable, the attention of professionals in occupational and insurance health care should be directed at other factors that are amenable to change, especially when dealing with older workers.

We found limited evidence for the association of gender with duration of disability and RTW. One included study found that in the third year of follow-up, men are 50-60% more likely to be in a healthy state than women, indicating a shorter duration of long term disability for men [23]. This finding is contrary to other research [35]. In four studies that we included in the present review, no significant effect of gender on disability and

RTW outcome was found, whether analyzed as a potential confounder [24,25,26], or as an independent variable [28], and in one study the effect of gender on outcome was not investigated [27]. One included study found a non-significant effect of gender on the course of depressive symptoms [22]. These opposing results as to the effects of gender differences on duration of disability and time to RTW due to mental health problems are illustrative for the literature on this topic in general [6,36].

One included study found, unexpectedly, that a high level of education predicted a longer time to RTW [27]. To our knowledge, there are no other studies to corroborate this. Another included study reported that a lower education increased the risk of depressive complaints, attributing to a longer time to RTW [22]. This is more in line with the literature on this subject [13,16].

We found limited evidence that being the sole breadwinner increased the risk of prolonged depressive symptoms and contributed to a delayed RTW and disability [22]. However, in a Dutch study being the sole breadwinner significantly predicted RTW after long-term sick leave due to low back pain [37].

There is limited evidence that history of previous sickness absence is related to duration of disability and time to RTW. This is not surprising, since past sickness absence may be related to chronic health problems. This finding is in accordance with other research on this topic [38,39].

There is limited evidence that absentees own expectation of disability duration >3 months is associated with longer time to RTW. This finding corresponds with the results of other studies [40]. In studies investigating the association of own expectation with health outcomes, Bandura's concept of self-efficacy was most commonly accepted as underlying theoretical model [41].

We found limited evidence that low socioeconomic status predicted disability pension [28]. Indeed, many studies have documented the inverse relation between social class and morbidity, mortality, sickness absence and disability [42, 43].

## EXTERNAL FACTORS

We found limited evidence that full or partial RTW and changing work tasks is associated with recovery of depressive symptoms. However, a Cochrane systematic review found little evidence that RTW i.e. supported employment improved symptoms, quality of life or social functioning [44].

One of the studies included in the present review found that the unemployed are less likely to be in a healthy state compared with the employed, indicating lower probabilities of RTW after long-term stress-related sickness absence [23]. This is in line with other studies [13,16,38]. However, due to few number of studies, little is known about underlying causes [45].

In the present review, we found limited evidence for the association of quality of occupational guideline-based care with disability and RTW. This is corroborated by results of other studies. [46,47,48]. However, in a recent Cochrane review it was found impossible to investigate the effectiveness of workplace interventions among workers with mental health problems and other health conditions due to lack of studies [49].

We found limited evidence that continuity of occupational care shortens the

duration of sickness absence of patients with adjustment disorder. Although the criteria for optimal performance in continuity of care differed as to frequency of contacts and number of different physicians, this finding is consistent with other studies on the relation of quality of care and outcome in patients with low back pain and in cancer survivors [50,51]. To our knowledge, there are no other studies investigating this relation in sick listed workers with mental health problems.

We found limited evidence that frequent supervisory communication with workers with mental health problems decreased duration of disability. Sick listed workers may perceive good communication with their supervisor as social support. This finding corresponds with the insight that workplace support play an important role in disability management and enhances RTW [52,53]. However, in one of the studies that we included for this review, it was found that this effect of support is beneficial in persons with low depression scores only [25]. Depressed workers may benefit less from communication with their supervisor. This is in line with the results of a recent study showing that more perceived social support is actually a barrier to RTW [54]. This is suggestive for a moderating effect of social support on the effects of mental health factors on RTW.

We found limited evidence that supervisor consulting with other professionals is more often associated with a longer duration of sickness absence. It is plausible that this relation is confounded by the severity of depressive symptoms: supervisors may consult occupational physicians more often if a problematic future RTW is foreseen in workers with more depressive symptoms, resulting in a later RTW.

#### **METHODOLOGICAL CONSIDERATIONS**

From a total of 796 articles, we only could find seven articles that fulfilled all our inclusion criteria. Moreover, four articles described results from the same cohort. Observational studies with non-significant results are less likely to be published [55]. Therefore, the few number of studies found for the present review could have resulted from publication bias. Also, the possibility that relevant articles remained undiscovered in databases that are difficult to locate cannot be excluded. Nevertheless, we believe that the small number of studies found was mainly the result of the strict definition of our inclusion criteria.

Our search strategy was to conduct a broad search using the search terms stated in Table 1, combined with specific criteria for in- and exclusion as to types of studies, participants and outcome measures, stated in Box 1. We did not include terms for minor mental health problems since we were interested in more severe mental disorders only and their association with long term disability. These major mental disorders, such as depressive disorder, anxiety disorder and adjustment disorder, are covered by the MeSH term Mental Disorders. We formulated strict in- and exclusion criteria: we selected studies among persons already receiving disability benefit at baseline only. Furthermore, in order to include all durations, we decided not to use the duration of sick leave or disability as an in- or exclusion criterion. By doing so, we prevented our search being biased by the fact that in research on disability the term long-term disability is not uniformly defined. We were interested in RTW as outcome. In general, studies on RTW focus on short term disability, while the interest of the present review lies primarily with long term disability. Therefore, we did not include RTW as a search term, but instead used it as an inclusion criterion.

To assess prognostic factors in a reliable way, prognostic studies need well defined inception cohorts of participants all at the same stage of their medical condition. Of the seven included studies, two studies did not use such an inception cohort, i.e. the duration of preceding sickness absence varied at baseline. This could have biased the assessment of prognostic factors. In four studies, treatment was not fully described or standardized. In these studies, unknown treatment could have confounded the assessment of prognostic factors. In two studies little or no information was presented of completers versus loss to follow-up. This also could have caused a biased assessment of prognostic factors. In the studies we included for this review, both the duration of disability at baseline and the time of follow-up varied. A relatively short follow-up time of one year was used in five studies. It cannot be excluded that effects of the prognostic factors found in these studies change over time, or that new factors arise, after the follow-up period ended.

To enhance the quality of future cohort studies on long term disability, we recommend (i) the use of an inception cohort at baseline; (ii) to describe or standardize treatment or at least analyze the confounding effect on the prognostic factors studied; (iii) a cohort large enough to allow diagnose-specific subgroup-analyses.

## ►CONCLUSION◀

Factors that cannot be modified by any intervention program are useful in predicting disability/RTW outcome and identifying persons, groups or places at risk, but only modifiable factors can provide a sound basis for interventions. We identified four non-modifiable risk factors (older age, male gender, medium/higher education, history of previous sickness absence). We considered 13 factors to be amenable to change: two health related factors (stress-related and shoulder/back pain, depression/anxiety disorder), five personal factors (lower education, sole breadwinner, partial/full RTW, absentees own expectation of duration >3 months, socioeconomic status) and six external factors, all job-related (changing work tasks, unemployment, deviant occupational interventions aimed at organization, deviant continuity of occupational care, supervisor communication with employee, supervisor consulting with professional).

Some results of this systematic review are more or less consistent with findings in other studies, i.e. mental health factors [30,31,32,33], age [16,34], history of previous sickness absence [38,39], negative recovery expectation [40], socio-economic status [42,43], unemployment [13,16,38], quality and continuity of occupational care [46,47,48,50,51], while other oppose existing evidence i.e. gender [6,35,36], level of education [13,16], sole breadwinner [37], supervisor support [54].

Nature and severity of specific mental disorders remain strong predictors of disability and RTW due to poor mental health. Therefore, monitoring, assessing and contributing to optimize medical treatment is an important tool for occupational and insurance physicians to reduce duration of sickness absence and to prevent permanent disability.

There is consistent evidence that older age is significantly associated with the risk

of continued disability. Confronted with an ageing work force, occupational health care should be targeted at prevention of long-term sickness absence among older workers at risk for continuing disability due to mental health problems. Interventions aimed at RTW of older absentees should be based on modifiable factors and effectuated without unnecessary delay. Such interventions should not a priori be omitted because of undue pessimism about chances based on age alone. Since older age is so clearly an important prognostic factor of continuing disability, policies at governmental and employer level should be directed at effective strategies to prevent sickness absences among older workers. To the benefit of workers already on sick leave, future research could be aimed at the development of age-specific interventions.

The finding that past sickness absence is related to duration of future disability and time to RTW is confirmed by related literature [38,39]. Optimal managing of frequent short term sickness absence prevents long term disability.

Negative recovery expectations predict a longer time to RTW. Occupational care can help turning negative into positive expectancies by a cognitive-behavioral approach. The effectiveness of such interventions remain to be investigated.

In epidemiologic research, socio-economic status is often measured including level of education and unemployment. There is ample evidence in the literature that lower socio-economic status is a high risk factor of long term disability [28,42,43]. However, the role of education level in the disability process of persons suffering from poor mental health needs further clarifying.

The evidence found in the present review and related literature suggest that good quality and continuity of occupational guideline-based care is associated with a shorter duration of disability and time to RTW.

The gender-effect on disability and RTW remains unclear. More studies are needed to clarify mechanisms underlying the effect of gender on duration of long term disability and RTW. With the ICF-model as a guideline, future research can identify personal, job- and health-related factors that moderate and mediate the gender-effect.

It is hypothesized that being the sole breadwinner is a financial incentive to RTW, but whether or not employees with a bigger financial need return more often back to work, irrespective of their health, remains unclear.

Social support in the work place in general has a beneficial effect on RTW, but may be an unexpected barrier for persons in poor mental health. This warrants further research.

To conclude, there is still great need for high quality cohort studies to find relevant prognostic factors of long term disability among benefit claimants with mental health problems who are sick listed at baseline. Understanding these factors, and in particular those which are amenable to change through any intervention program, may help to develop effective prevention and intervention strategies to shorten the duration of disability and facilitate RTW.

**REFERENCES**

- 1 Kessler RC, Chiu WT, Demler O et al. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry* 2005 Jun;62(6):617-27.
- 2 Kessler RC The global burden of anxiety and mood disorders: putting the European Study of the Epidemiology of Mental Disorders (ESEMeD) findings into perspective. *J Clin Psychiatry* 2007;68 Suppl 2:10-9.
- 3 Bijl RV, Ravelli A, van ZG Prevalence of psychiatric disorder in the general population: results of The Netherlands Mental Health Survey and Incidence Study (NEMESIS). *Soc Psychiatry Psychiatr Epidemiol* 1998 Dec;33(12):587-95.
- 4 Cross-national comparisons of the prevalences and correlates of mental disorders. WHO International Consortium in Psychiatric Epidemiology. *Bull World Health Organ* 2000;78(4):413-26.
- 5 Stansfeld S, Feeney A, Head J et al. Sickness absence for psychiatric illness: the Whitehall II Study. *Soc Sci Med* 1995 Jan;40(2):189-97.
- 6 Hensing G, Wahlstrom R. Swedish Council on Technology Assessment in Health Care (SBU). Chapter 7. Sickness absence and psychiatric disorders. *Scand J Public Health Suppl* 2004;63:152- 80.
- 7 OECD. Sickness, Disability and Work: keeping on track in the economic downturn - background paper; see: <http://www.oecd.org/dataoecd/42/15/42699911.pdf>. 2009.
- 8 Klerk de JM, van der Zouwe N. Mental disorders and the WAO, 10 years later (in Dutch: Psychische stoornissen en de WAO, tien jaar later). *Tijdschrift voor Bedrijfs en Verzekeringsgeneeskunde* 1993;5:162-7.
- 9 Knowledge Center UWV Quarterly Report 2007-III (in Dutch: Kenniscentrum UWV Kwartaalverkenning 2007 - III); see: [http://www.uwv.nl/Images/UKV%202007-III\\_tcm26-147000.pdf](http://www.uwv.nl/Images/UKV%202007-III_tcm26-147000.pdf). 2007.
- 10 Smit F, Cuijpers P, Oostenbrink J et al. Costs of nine common mental disorders: implications for curative and preventive psychiatry. *J Ment Health Policy Econ* 2006 Dec;9(4):193-200.
- 11 Alonso J, Angermeyer MC, Bernert S et al. Disability and quality of life impact of mental disorders in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatr Scand Suppl* 2004;(420):38-46.

- 12 Beemsterboer W, Stewart R, Groothoff J, Nijhuis F. A literature review on sick leave determinants (1984-2004). *Int J Occup Med Environ Health* 2009;22(2):169-79.
- 13 Krause N, Frank JW, Dasinger LK et al. Determinants of duration of disability and return-to-work after work-related injury and illness: challenges for future research. *Am J Ind Med* 2001 Oct;40(4):464-84.
- 14 Franche RL, Cullen K, Clarke J et al. Workplace-based return-to-work interventions: a systematic review of the quantitative literature. *J Occup Rehabil* 2005 Dec;15(4):607-31.
- 15 MacEachen E, Clarke J, Franche RL, Irvin E Systematic review of the qualitative literature on return to work after injury. *Scand J Work Environ Health* 2006 Aug;32(4):257-69.
- 16 Blank L, Peters J, Pickvance S et al. A systematic review of the factors which predict return to work for people suffering episodes of poor mental health. *J Occup Rehabil* 2008 Mar;18(1):27-34.
- 17 de Boer WEL, Besseling JJM, Willems JHBM Organisation of disability evaluation in 15 countries. *Prat Organ Soins* 2007;38(3):205-17.
- 18 Altman DG Systematic reviews of evaluations of prognostic variables. *BMJ* 2001 Jul 28;323(7306):224-8.
- 19 Scholten-Peeters GG, Verhagen AP, Bekkering GE et al. Prognostic factors of whiplash-associated disorders: a systematic review of prospective cohort studies. *Pain* 2003 Jul;104(1-2):303-22.
- 20 Sackett DL, Straus SE, Richardson WS. Evidence-based medicine. How to practice and teach EBM. Guidelines. Edinburgh: Churchill Livingstone; 2000.
- 21 Willemse-van Son AH, Ribbers GM, Verhagen AP, Stam HJ. Prognostic factors of long-term functioning and productivity after traumatic brain injury: a systematic review of prospective cohort studies. *Clin Rehabil* 2007 Nov;21(11):1024-37.
- 22 Brennkmeijer V, Houtman I, Blonk R. Depressed and absent from work: predicting prolonged depressive symptomatology among employees. *Occup Med (Lond)* 2008 Jun;58(4):295-301.
- 23 Engström L, Janson S. Stress-related sickness absence and return to labour market in Sweden. *Disability & Rehabilitation* 2007 Mar 15;29(5):411-6.

- 24 Nieuwenhuijsen K, Verbeek JH, Siemerink JC, Tummers-Nijssen D. Quality of rehabilitation among workers with adjustment disorders according to practice guidelines; a retrospective cohort study. *Occup Environ Med* 2003 Jun;60 Suppl 1:i21-i25.
- 25 Nieuwenhuijsen K, Verbeek JHA, de Boer AGE et al. Supervisory behaviour as a predictor of return to work in employees absent from work due to mental health problems. *Occupational & Environmental Medicine* 2004 Oct;61(10):817-23.
- 26 Nieuwenhuijsen K, Verbeek JH, de Boer AG et al. Predicting the duration of sickness absence for patients with common mental disorders in occupational health care. *Scand J Work Environ Health* 2006 Feb;32(1):67-74.
- 27 Nieuwenhuijsen K, Verbeek JHA, de Boer AGE et al. Irrational Beliefs in Employees with an Adjustment, a Depressive, or an Anxiety Disorder: a Prospective Cohort Study. *J Rat-Emo Cognitive-Behav Ther* 2008.
- 28 Vaez M, Rylander G, Nygren A et al. Sickness absence and disability pension in a cohort of employees initially on long-term sick leave due to psychiatric disorders in Sweden. *Soc Psychiatry Psychiatr Epidemiol* 2007 May;42(5):381-8.
- 29 Ustun TB, Chatterji S, Bickenbach J et al. The International Classification of Functioning, Disability and Health: a new tool for understanding disability and health. *Disabil Rehabil* 2003 Jun 3;25(11-12):565-71.
- 30 Hensing G, Spak F. Psychiatric disorders as a factor in sick-leave due to other diagnoses. A general population-based study. *Br J Psychiatry* 1998 Mar;172:250-6.
- 31 Nystuen P, Hagen KB, Herrin J. Mental health problems as a cause of long-term sick leave in the Norwegian workforce. *Scand J Public Health* 2001 Sep;29(3):175-82.
- 32 Sanderson K, Andrews G. Prevalence and severity of mental health-related disability and relationship to diagnosis. *Psychiatr Serv* 2002 Jan;53(1):80-6.
- 33 Ormel J, von Korff KM, Van den Brink BW et al. Depression, anxiety, and social disability show synchrony of change in primary care patients. *Am J Public Health* 1993 Mar;83(3):385-90.
- 34 Dekkers-Sanchez PM, Hoving JL, Sluiter JK, Frings-Dresen MH Factors associated with long-term sick leave in sick-listed employees: a systematic review. *Occup Environ Med* 2008 Mar;65(3):153-7.
- 35 Hensing G, Brage S, Nygard JF et al. Sickness absence with psychiatric disorders--an increased risk for marginalisation among men? *Soc Psychiatry Psychiatr Epidemiol* 2000 Aug;35(8):335-40.

- 36 De Rijk A, Janssen N, Alexanderson K, Nijhuis F. Gender differences in return to work patterns among sickness absentees and their associations with health: a prospective cohort study in The Netherlands. *Int J Rehabil Res* 2008 Dec;31(4):327-36.
- 37 van der Giezen AM, Bouter LM, Nijhuis FJ. Prediction of return-to-work of low back pain patients sicklisted for 3-4 months. *Pain* 2000 Sep;87(3):285-94.
- 38 Gjesdal S, Ringdal PR, Haug K, Maeland JG. Predictors of disability pension in long-term sickness absence: results from a population-based and prospective study in Norway 1994-1999. *Eur J Public Health* 2004 Dec;14(4):398-405.
- 39 Koopmans PC, Roelen CA, Groothoff JW. Frequent and long-term absence as a risk factor for work disability and job termination among employees in the private sector. *Occup Environ Med* 2008 Jul;65(7):494-9.
- 40 Mondloch MV, Cole DC, Frank JW. Does how you do depend on how you think you'll do? A systematic review of the evidence for a relation between patients' recovery expectations and health outcomes. *CMAJ* 2001 Jul 24;165(2):174-9.
- 41 Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev* 1977 Mar;84(2):191-215.
- 42 North F, Syme SL, Feeney A et al. Explaining socioeconomic differences in sickness absence: the Whitehall II Study. *BMJ* 1993 Feb 6;306(6874):361-6.
- 43 Feeney A, North F, Head J et al. Socioeconomic and sex differentials in reason for sickness absence from the Whitehall II Study. *Occup Environ Med* 1998 Feb;55(2):91-8.
- 44 Crowther R, Marshall M, Bond G, Huxley P. Vocational rehabilitation for people with severe mental illness. *Cochrane Database Syst Rev* 2001;(2):CD003080.
- 45 Allebeck P, Mastekaasa A. Swedish Council on Technology Assessment in Health Care (SBU). Chapter 5. Risk factors for sick leave - general studies. *Scand J Public Health Suppl* 2004;63:49-108.
- 46 Anema JR, Jettinghoff K, Houtman I et al. Medical care of employees long-term sick listed due to mental health problems: a cohort study to describe and compare the care of the occupational physician and the general practitioner. *J Occup Rehabil* 2006 Mar;16(1):41-52.
- 47 Rebergen DS, Bruinvels DJ, Bezemer PD et al. Guideline-based care of common mental disorders by occupational physicians (CO-OP study): a randomized controlled trial. *J Occup Environ Med* 2009 Mar;51(3):305-12.

- 48 van der Klink JJ, Blonk RW, Schene AH, van Dijk FJ. Reducing long term sickness absence by an activating intervention in adjustment disorders: a cluster randomised controlled design. *Occup Environ Med* 2003 Jun;60(6):429-37.
- 49 van Oostrom SH, Driessen MT, de Vet HC et al. Workplace interventions for preventing work disability. *Cochrane Database Syst Rev* 2009;(2):CD006955.
- 50 van der Weide WE, Verbeek JH, van Dijk FJ. Relation between indicators for quality of occupational rehabilitation of employees with low back pain. *Occup Environ Med* 1999 Jul;56(7):488-93.
- 51 Verbeek J, Spelten E, Kammeijer M, Sprangers M. Return to work of cancer survivors: a prospective cohort study into the quality of rehabilitation by occupational physicians. *Occup Environ Med* 2003 May;60(5):352-7.
- 52 Lysaght RM, Larmour-Trode S. An exploration of social support as a factor in the return-to-work process. *Work* 2008;30(3):255-66.
- 53 Brouwer S, Krol B, Reneman MF, Bultmann U et al. Behavioral determinants as predictors of return to work after long-term sickness absence: an application of the theory of planned behavior. *J Occup Rehabil* 2009 Jun;19(2):166-74.
- 54 Brouwer S, Reneman MF, Bultmann U et al. A Prospective Study of Return to Work Across Health Conditions: Perceived Work Attitude, Self-efficacy and Perceived Social Support. *J Occup Rehabil* 2009 Nov 6.
- 55 Easterbrook PJ, Berlin JA, Gopalan R, Matthews DR. Publication bias in clinical research. *Lancet* 1991 Apr 13;337(8746):867-72.



**APPENDIX**

## Operationalization of criteria list for quality assessment

**STUDY POPULATION A Inception cohort**

- One point if patients are identified at an early uniform point in the course of their disability e.g. uniform period after first day of sick leave.
- Zero point if it is not clear if an inception cohort was used.

**B Description of source population**

- One point if the source population is described in terms of place of recruitment (for example: Groningen, the Netherlands), time-period of recruitment and sampling frame of source population (for example: occupational health service, organization for social security).
- Zero point if  $\leq 2$  features of source population are given.

**C Description of relevant inclusion and exclusion criteria**

- One point if  $> 2$  criteria are formulated.
- Zero point if  $\leq 2$  criteria are formulated.

**FOLLOW-UP****D Follow-up at least 12 months**

- One point if the follow-up period is at least 12 month and data are provided for this moment in time.

**E Drop-outs/loss to follow-up  $< 20\%$** 

- One point if total number of drop-outs/loss to follow up  $< 20\%$  at 12 months.

**F Information completers versus loss to follow-up/drop-outs**

- One point if sociodemographic information is presented for completers and those lost to follow-up/drop outs at baseline, or no loss to follow-up/drop outs. Reasons for loss to follow-up/drop outs have to be unrelated to the outcome. Loss to follow-up/drop outs: all patients of the assembled cohort minus the number of patients at the main moment of measurement for the main outcome measure, divided by the total number of patients of the assembled cohort.

**G Prospective data collection**

- One point if a prospective design is used, or a historical cohort when the prognostic factors are measured before the outcome is determined.
- Zero point if a historical cohort is used, considering prognostic factors at time zero which are not related to the primary research question for which the cohort is created, or in case of an ambispective design.

**TREATMENT****H Treatment in cohort is fully described/standardized**

- One point if treatment subsequent to inclusion into cohort, is fully described and standardized, or in case of no treatment is given, or if multi-variate correction for treatment is performed in analysis.
- Zero point if different treatment is given and if it is not clear how outcome is influenced by it, or if it is not clear whether any treatment is given.

**PROGNOSTIC FACTORS****I Clinically relevant potential prognostic factors**

- One point if besides socio-demographic factors (age, gender) at least one other factor of the following is described at baseline:
  - *health related factors*  
(congenital or acquired vulnerability, psychiatric diagnosis, comorbidity, psychotrauma, physical condition)
  - *personal factors*  
(cognition, attitude, beliefs, efficacy, activity, avoidance behavior, coping, therapy compliance, employment, education, income, marital status, residence)
  - *external factors*  
(physical or psychosocial job characteristics, employer characteristics, social support, health care system, social security system, social benefit).

**J Standardized or valid measurements**

- One point if at least one of the factors of I, excluding age and gender, are reported in a standardized or valid way (for example: questionnaire, structured interview, register, patient-status of occupational/insurance physician).

**K Data presentation of most important prognostic factors**

- One point if frequencies, or percentages, or mean (and standard deviation/confidence interval), or median (and Inter Quartile Range) are reported for the three most important factors of I, namely age, gender and at least one other factor, for the most important follow-up measurements.

**OUTCOME****L Clinically relevant outcome measures**

- One point if at least one of the following outcome criteria for change is reported: symptom, functioning, daily life activities, disability, return to work.

**M Standardized or valid measurements**

- One point if one or more of the main outcome measures of L are reported in a standardized or valid way (for example:

questionnaire, structured interview, registration, patient-status of occupational/insurance physician).

**N Data presentation of most important outcome measures**

- One point if frequencies, or percentages, or mean (and standard deviation/confidence interval), or median (and Inter Quartile Range) are reported for one or more of the main outcome for the most important follow-up measurements.

**ANALYSIS**

**O Appropriate univariate crude estimates**

- One point if univariate crude estimates (RR, OR, HRR) between prognostic factors separately and outcome are presented.
- Zero point if only p-values or wrong association values (Spearman, Pearson, sensitivity) are given, or if no tests are performed at all.

**P Appropriate multivariate analysis techniques**

- One point if logistic regression analysis is used, or survival analysis for dichotomous outcomes, or linear regression analysis for continuous outcomes.
- Zero point if no multivariate techniques are performed at all.



## CHAPTER 8 PREDICTING IMPROVEMENT OF FUNCTIONING IN DISABILITY CLAIMANTS

JOURNAL OF OCCUPATIONAL REHABILITATION, 2013, DOI: 10.1007/s10926-013-9469-2

K. NIEUWENHUIJSEN | L.R. CORNELIUS | M.R. DE BOER | J.W. GROOTHOFF  
M.H.W. FRINGS-DRESEN | J.J.L. VAN DER KLINK | S. BROUWER

---

### ►ABSTRACT◀

#### PURPOSE

In the Netherlands, disability claimants are assessed after two years of sick leave, but their functioning may still improve. An accurate prognosis of functioning is difficult. Self predictions may be more accurate than those of professionals. The aim of this study, is to assess and compare the accuracy of predictions by disability claimants and insurance physicians (IP's) working at the Social Security Institute. It is further studied whether the accuracy differs between subgroups of claimants with mental or somatic health conditions.

#### METHODS

We used data from the PREDIS cohort study. Following the assessment of the disability claim (n=375) and after one year follow up (T1, n=276) data on functioning were obtained from respondents by self-report questionnaire (WHODAS 2.0). Both claimants and IP's were asked to predict improvement of functioning. Accuracy of their predictions were assessed by sensitivity, specificity, and Area Under the receiver operating Curves (AUC). Mixed logistic regression was conducted to explore differences in accuracy between claimants with mental and somatic conditions.

#### RESULTS

One third (32%) of disability claimants improved beyond the standard error of measurement. Disability claimants' and IP's were able to predict this improvement of functioning, but to a limited extent, with an AUC of 0.61 for IP's and 0.62 for disability claimants. We found no statistically significant differences in the accuracy of the predictions in claimants with mental or somatic health conditions.

#### CONCLUSIONS

Improvements of functioning were not uncommon. However, both IP's and disability claimants were unable to predict improvement with high levels of accuracy in both mental and somatic health conditions.

**Keywords** disability evaluation, sick leave, occupational health, insurance claim review

## ►INTRODUCTION◀

Long term sickness absence and work disability have a major impact on most industrialized societies. In 2007 the Organization for Economic Co-operation and Development (OECD) calculated that in OECD countries an average of 5.8% of the working population received sickness absence or disability benefits. These benefits amounted to an average of 1,2 % of their gross domestic product [1]. These numbers stem from before the economic downfall. Therefore, based on past experiences, the OECD expects an increase of disability beneficiaries in these economic circumstances [2].

Apart from societal costs, long term sickness absence and work disability have negative consequences for affected workers. Workers with various mental and somatic disorders emphasize the importance of work to their wellbeing [3-5]. Consequences of not being able to work include lower mental health and quality of life [6, 7]. Sickness absence and work disability in workers with various specific or any health conditions have even been shown to increase the risk of mortality compared to those able to stay at work despite having these conditions [8-10].

Disability benefits serve the important purpose of providing financial security for persons unable to work for an extended period of time. Many of the health conditions for which disability benefits are granted may show improvements or deteriorations over time. Such changes have been observed in for instance depressive disorders [11] and low back pain [12]. While being granted disability benefit may meet the recipients' need to be financially secure, ongoing disability while improvements may occur may have negative consequences. In some countries disability benefits do not require reassessments [13]. A lack of resources affects the possibility to regularly re-assess eligibility in other countries [14]. Therefore, it is vital to identify those disability claimants whose functioning may still improve in the future. These benefit recipients may be more closely monitored in order to appropriately time return-to-work interventions.

To this aim, an accurate prognosis of health status and functioning of disability claimants is needed. However, predicting future improvement of functioning is difficult. In workers on sick leave for any diagnosis, general physicians were able to predict the absence status only four weeks later accurately in 53% of the cases with sick leave durations of 3-20 weeks [15]. One of the reasons for this may be that health-related disability appears to be a bio-psycho-social phenomenon [16]. Other factors than the medical status also influence the prognosis of disability [17]. Several studies have shown that the return-to-work perceptions of workers on sick leave are related to the actual return to work. In studies of workers with common mental disorders it was found that return-to-work perceptions, i.e. predicted duration of sickness absence or likelihood of return to work, is a predictor of future actual return to work [18-21]. Similar results were found in studies in workers with back pain with regard to return-to-work perceptions, in this case the perceived ability of the worker to meet work demands after returning [22, 23] and the duration of sickness absence benefits predicted by the worker [24, 25]. Moreover, in workers on sick leave due to musculoskeletal or mental disorders, self-predictions more accurately predicted the length of sick leave than professionals who based the prediction on information in the medical certificates [26]. Finally, Wind et al. [27] concluded that

disability claimants were able to predict the outcome of their application for a disability benefit.

Perceptions of disability claimants about the likelihood and time of future improvements may be a valuable source of information for the disability assessment. Perceptions about improvements of functioning may be predictive of actual improvements. If so, the workers' perspective may be an essential part of the disability benefit assessment. In the Netherlands, social insurance physicians (IP's) are responsible for the disability benefit assessment in co-operation with labor experts. The assessment takes place if the employee has not fully returned to work after two years of sickness absence. Disability benefits are granted when a worker has a substantial loss of his or her earning capacity due to health reasons. The benefit is granted regardless of the work-relatedness of the health condition. Benefit reassessments are scheduled according to the expected improvements in a recipients health or functioning.

Self-perceptions have been hypothesized to be associated with future work outcomes but studies have yielded inconsistent results for workers with somatic and mental health conditions. Workers on sick leave with somatic health conditions did report higher levels of self-efficacy to return to work compared to those with mental health problems [28]. Also, differential associations between self-efficacy and actual return to work were observed over health conditions. Moreover, self-efficacy was associated with impairment and disability in welfare claimants with mental health conditions only [29]. In contrast, perceived time to return to work was related to actual return to work across health conditions in another study of workers on non-work-related sick leave [30]. With regard to the perceptions of professionals, one study found that the probability of doctors making accurate predictions differed across health conditions [15].

The objective of this study is therefore to assess the diagnostic accuracy of the prediction of improvement of functioning by disability claimants and to compare it with that of the IP's assessing their disability claim. Furthermore, this study aims to investigate whether the diagnostic accuracy differs between subgroups of claimants with mental or somatic health conditions.

## ►METHODS◄

### PARTICIPANTS AND PROCEDURES

In the Dutch social security system disability claims are assessed by IP's and labour experts employed by the Dutch Social Security Institute (SSI). For the present study, data were drawn from a prospective cohort study (PREDIS) with one year follow-up among persons claiming disability benefit after two years of sickness absence. All diagnoses were included, both mental and somatic. Eligible participants were recruited using registry data from the local SSI office in the city of Groningen, servicing Groningen and Drenthe, two northern provinces of the Netherlands. Recruitment started at October 1<sup>st</sup> 2008 and ended at 31<sup>st</sup> December 2009. Follow up was conducted independently from outcome of the disability claim. Follow up ended at April 1<sup>st</sup> 2011. The Medical Ethics Committee of the University Medical Center Groningen, the Netherlands, approved recruitment,

consent and field procedures. Out of a total of 1544 eligible disability claimants, 375 persons consented to participate, adding up to a response rate of 24.3%, see Fig. 2 in the introductory chapter for a flow chart of participants.

To assess the representativeness of the study sample ( $n=375$ ) for the national population of persons claiming disability benefit in the Netherlands, we used data from the SSI on demographic characteristics [31] and diagnostics [32]. We found the sample slightly different to the national population as to the prevalence of mental disorders (study sample 22% and national population 34% as certified by the SSI as primary cause of disability in 2009).

## DESIGN

At baseline following the assessment of the disability claim ( $T_0$ ), and after one year follow up ( $T_1$ ) data on functioning were obtained from respondents by self-report questionnaire. Diagnostic data certified as cause of disability at  $T_0$  were obtained from IP's after their assessment of the disability claim. Both respondents and the IP's assessing their disability benefit claims were asked to predict improvement of functioning.

## MEASURES

### Demographic characteristics

Data on age and gender were obtained during a structured clinical interview for classifying mental disorders (CIDI [33]) that was part of the PREDIS study. Data on educational level were obtained from the SSI labor experts assessing the disability claim and data on work status were provided by the SSI register.

### Diagnosis

To classify medical diagnoses, IP's use a classification system (Dutch Classification for Occupational Health and Social Insurance: CAS) derived from the ICD-10 [34] and developed for use in occupational health and social security in the Netherlands [35]. From the IP's we obtained the ICD-10 codes of the somatic and mental disorders certified as the primary cause for the claimants disability.

### Prediction of functioning by social insurance physician

At baseline, the prediction of improvement in functioning by IP's was assessed by asking whether they expected improvements in functioning (yes, no, unsure) and if so, at what time they expected this improvement to occur (in months). Answers were dichotomized as expecting an improvement of functioning within 1 year vs. expecting an improvement later than 1 year or not at all. Being unsure about improvement was not included in this dichotomous variable. The IP's answered these questions following their disability assessment interview with the claimant and after studying the information obtained from treating and/or occupational physician [36].

### Prediction of functioning by disability claimant

At baseline, the prediction of improvement in functioning was assessed in claimants with a single question: "Do you expect improvement of your ability to function any time soon?".

Response categories were no or yes within 4 weeks, yes in between 4 weeks and three months, yes in between 3 and 6 months, yes in between 6 months and 1 year, and yes after 1 year. Answers were dichotomized into predicting improvements in functioning within 1 year vs. after 1 year.

### Improvement of functioning

Functioning was measured at To and T1 with the 36-item self-reported version of the World Health Organization Disability Schedule 2.0 (WHODAS 2.0) [37]. The WHODAS 2.0 is a generic instrument that assesses levels of functioning during the previous 30 days in six domains of life: Understanding and Communicating (6 items), Getting around (5 items), Self-care (4 items), Getting along with people (5 items), Life activities (household activities: 4 items; work: 4 items) and Participation in society (8 items) [1]. Answering options are 'none' (1), 'mild' (2), 'moderate' (3), 'severe' (4) and 'extreme/cannot do' (5). The WHODAS 2.0 has high internal consistency (Cronbach's alpha 0.86), a stable factor structure, high test-retest reliability (ICC: 0.98), good concurrent validity and good sensitivity to change [36]. For this study, the WHODAS scores excluding the work items were used as most disability claimants did not work. Scores were recoded and standardized using a SPSS syntax available on request from the WHO. Standardized total score and subscale scores range from 0 to 100 with higher scores representing increased difficulties in functioning. Standardized total scores were imputed by the mean if less than 10 percent of the total scores were missing.

### ANALYSIS

Agreement between the predictions of IP's and claimants was calculated using the Kappa statistic. A kappa of <0.20 represents low agreement and a kappa of >0.60 is interpreted as high agreement [38]. Diagnostic accuracy of the predictions of IP's and disability claimants was assessed by calculating the sensitivity, specificity, and Area Under the receiver operating Curves (AUC) with 95% confidence intervals. The Receiver Operating Curve represents plots of the sensitivity and 1-specificity of the prediction of the improvements of functioning after 1 year. Moreover, Negative and Positive Predictive values (NPV and PPV) and Likelihood Ratios for positive and negative predictions (LR+ and LR-) were computed.

The prediction of improvement of functioning within one year (yes/no) was compared to the actual occurrence of relevant improvement of functioning one year later (yes/no). Improvement of functioning was defined as lower WHODAS 2.0 scores at T1 compared to To. Only differences greater than the Standard Error of Measurement (SEM) were considered relevant improvements as this provides a first indication of meaningful change [39]. The SEM agreement statistic was calculated using the following formula [40]:

$$\text{SEM}_{\text{agreement}} = \sigma * \sqrt{(1 - \text{ICC}_{\text{agreement}})}$$

The variance and ICC\_agreement were generated using the SPSS Reliability command, after which the standard deviation was also calculated as the square root of the variance. The ICC\_agreement was derived from the "ICC single measures" in the SPSS output.

A Generalized Linear Mixed Model (GLMM) was constructed to calculate the probability of improvement as predicted by either IP's or disability claimants while accounting for the multilevel structure of the data (disability claimants within IP's). This predicted probability was used for calculating the AUC. Differences in overall accuracy of the predictions between IP's and disability claimants will be examined by comparing the Area Under the Curve and confidence intervals. An AUC of 0.50 to 0.70 is usually considered poor for any diagnostic test [41, 42]. Sensitivity, specificity, NPV, PPV, LR+, and LR- of the predictions of the IP and the claimant will be presented but not statistically tested as these characteristics do not take the multilevel structure of the data into account.

Differences in the accuracy of predictions in claimants with mental or somatic health conditions were tested by conducting a mixed logistic regression with correctness of the prediction (yes/no) as the dependent and primary medical diagnosis (mental vs. somatic) as the independent variable.

Analyses were performed using the statistical package IBM SPSS Statistics 19.

## ►RESULTS◀

The characteristics of the disability claimants at baseline are presented in Table 1.

**Table 1**

Baseline characteristics of disability claimants at T0, N=375

Characteristic of disability claimants	n (%)
Gender, male, N (%)	190 (51)
Age in years, mean (SD)	50 (9)
<b>Educational level</b>	
Low, N (%)	66 (18)
Middle, N (%)	255 (68)
High, N (%)	45 (12)
Missing, N (%)	9 (2)
<b>Diagnosis</b>	
Mental, N (%)	84 (22)
Somatic, N (%)	282 (75)
Missing, N (%)	9 (2)
<b>Employed in paid work</b>	
Yes, N (%)	37 (10)
No, N (%)	338 (90)
<b>Claimant expectation improvement of functioning</b>	
≤ 1 year, N (%)	248 (66)
> 1 year, N (%)	70 (19)
Missing, N (%)	57 (15)
<b>IP expects improvement</b>	
≤ 1 year, N (%)	125 (33)
> 1 year, N (%)	106 (28)
Unsure, N (%)	51 (14)
Missing, N (%)	93 (25)

Sixteen IP's reported data on the disability claimants included in the study, with a range from three to 37 claimants. Half of the disability claimants were male, the average age was 50 years and the majority had a medium-level education. Three quarters of the study population had received a primary somatic diagnosis and ten percent was still in some form of paid employment.

### PREDICTION OF FUNCTIONING

A greater proportion of the disability claimants (66%) expected an improvement of functioning within one year, as compared to the expectation of IP's (33%). A similar difference in proportions was seen when the missings and unsure categories were disregarded. After excluding these categories, 78% of the claimants and 54% of the IP's expected an improvement in the next year. Agreement between claimants and IP's was low, as indicated by a kappa of  $-.324$ .

### IMPROVEMENT OF FUNCTIONING

At baseline, the disability claimants reported a mean total score of 34 (SD 18). One year later (T1) the mean total score was 30 (SD 19). All subscales showed lower means at T1 compared to T0. These improvements in the mean scores were lowest in self care (1.0; SD 15.7) and highest in life activities (7.4; SD 31.1). The SEM\_agreement for the standardized total scores at baseline and T1 was found to be 9.3, based on a  $\sqrt{(1-ICC\_agreement)}$  of 0.55 and a standard deviation of 17.06. The number of claimants that showed an improvement on overall functioning that exceeded the SEM was 84 (32% of the 263 disability claimants included in this analysis).

### ACCURACY OF PREDICTIONS DISABILITY CLAIMANTS AND IP'S

Table 2 presents the accuracy of the predictions of improvement in functioning by claimants and their IP's. The predictions of the claimants had a sensitivity of 0.72 and a specificity of 0.21. The predictions of their IP's showed a lower sensitivity (0.52), but a higher specificity (0.47). With fairly similar NPV values for claimants and IP's (0.61 and 0.62 respectively), IP's showed a slightly higher PPV (0.37) compared to claimants (0.30). The LR+ was low for both but slightly higher for IP's (0.99) compared to claimants (0.91). The LR- was 1.34 for claimants and 1.01 for IP's. The AUC were fairly similar between IP's and claimants (0.61 and 0.62 respectively). Both AUC were significantly higher than 0.5, pointing to a better prediction than one would have based on chance alone. The confidence intervals of the AUC of IP's and claimants showed great overlap.

### DIFFERENCES IN CLAIMANTS WITH SOMATIC OR MENTAL CONDITIONS

Two separate logistic regressions were performed to examine differences in the accuracy of the predictions when claimants with mental or with somatic diagnoses were concerned. One model tested the relationship of diagnosis with correctness of the prediction of IP's. Of the 163 cases with full data, IP's predicted 80 correct (49%) and a 83 cases incorrect (51%). These 163 cases did not show statistically significant differences with regard to gender (45% male), mean age (50.5; SD 8.7), and diagnosis (23% mental) compared to cases with missing data (55% male; mean age 49.2 (SD 9.1), and diagnosis (23 % mental).

**Table 2** Accuracy of predictions of improvement of functioning by social insurance physicians (IPs) and disability claimants

Prediction	Functioning		Sensitivity	Specificity	AUC (95% CI)	PPV	NPV	LR+	LR-
	Improved	Not improved							
<b>by claimant</b>									
(data for N= 251)									
Improved	58	134	0.72	0.21	0.62# (0.54-0.70)	0.30	0.61	0.91	1.34
Not improved	23	36							
<b>by IP</b>									
(full data for N= 163)*									
Improved	32	54	0.52	0.47	0.61 (0.53-0.69)	0.37	0.62	0.99	1.01
Not improved	29	48							

\* Excluding the unsure category; AUC= Area Under the Curve; PPV= Positive Predictive Value; NPV=Negative Predictive Value; LR+= Likelihood ratio for a positive prediction; LR-= Likelihood ratio for a negative prediction.

# The N for calculating the AUC was 220 as 31 claimants did not have participating IPs. These cases were excluded in the multilevel analysis as they could not be assigned to an IP.

Predictions on claimants with a somatic diagnosis were not statistically better than predictions on claimants with mental diagnoses (OR 1.7; CI 0.8-3.6). The second model concerned the self predictions of 249 claimants. A hundred and fifty-five of these claimants provided incorrect predictions and 94 predicted their future status correctly. Claimants with a somatic diagnosis were not statistically better in predicting their status than claimants with mental diagnoses (OR 1.2; CI 0.63-2.1).

## DISCUSSION

This study showed that a substantial proportion of those claiming disability benefit after two years of sick leave show improvements of functioning the next year. Disability claimants' own prediction of future functioning was not more accurate than the predictions of the IP. Both were only able to predict future functioning with low levels of accuracy; an AUC of 0.61 for IP's and 0.62 for disability claimants. While differences were not statistically tested, claimants predicted improvements in a higher proportion of those who turned out to improve (higher sensitivity) and IP's predicted a lack of improvement in a higher proportions of those turning out not to improve (higher specificity). In the context of disability benefits, high sensitivity may prevent unnecessary long durations of disability benefits, while high specificity will be useful in preventing unnecessary re-assessments. IP's and claimants did not seem to differ in the overall accuracy of their predictions. We further found that the accuracy of the predictions did not show a statistically significant relationship with the diagnosis of the claimant (mental or somatic health conditions).

The proportion of accurate predictions by IP's found in our study was 49%. That is fairly comparable to the 53% of accurate predictions of absence status in workers on sick

leave found in a study with general practitioners [15]. The general practitioners were asked to predict a status four weeks later, while the IP's in our study were asked to predict a status one year later. When evaluating the diagnostic value of predictions by IP's, one should preferably look at the AUC outcomes as these take the multilevel structure of the data into account. The AUC of the IP predictions did show that they predicted better compared to chance (AUC 0.50), but should still be considered poor diagnostic accuracy. However, usually diagnostic accuracy refers to the ability of a test to detect a health condition in the present time. In our study, changes over one year were the object of the predictions, which are harder to predict.

In contrast to what was found in earlier studies comparing professionals to self-predictions[26], the self predictions of disability claimants were not more accurate than the IP's assessments. As our measure of functioning is based on self-report, higher accuracy of self-predictions was expected. It should further be noted that IP's conducting the disability assessment had a face-to-face interview with the claimants which in theory may have led to more agreement in the predictions of IP and claimant due to discussing the health condition and functional limitations. Whether IP's discussed their expectations about future improvements in functioning with the claimant during the disability assessment is not known.

There are some aspects of our study that deserve further discussion. As our study examines the accuracy of predictions of future functioning, the definition of improvement of functioning deserves some consideration. First, the instrument used as a gold standard of functioning was the WHODAS 2.0 which measures functioning in six domains of life. An advantage of this instrument is that it can be used in disability claimants with various health conditions as it does not measure disease-specific limitations in functioning. The instrument is also suitable for claimants who are no longer in paid employment as only a small part refers to work activities or participation while the subscales reflect preconditions for being able to work. The downside of such a broad instrument may be that it may not reflect what disability claimants have in mind when asked about their functioning. Disability claimants and IP's may take the context of the specific health condition and of work opportunities into account when making their predictions, leading to less accurate predictions when compared to the WHODAS 2.0 total scale. Posthoc analyses revealed that the accuracy for predictions based on improvements on the life activities subscale alone, the one subscale most closely related to work functioning, was similar as for the total scale (AUC of 0.62 for claimants and IP's).

Also the assessments of IP and claimant predictions were conducted with slightly different answer categories (ordinal versus ratio scale, both dichotomized in the analysis). Studies assessing predictions from professionals or self-predictions have used different answer categories, see e.g. [15, 19, 26]. How the answer category is linked to the accuracy of the predictions has, to our knowledge, not yet been studied.

A further discussion point related to our gold standard is the definition of improvement as an improvement greater than the SEM (9.3 points). This criterion reflects some level of relevancy, since improvements that are likely to be due to measurement error are disregarded. However, we do not know whether the improvements observed in our sample reflect important changes. It would be preferable to compare changes in

functioning to a value of the minimal important change (MIC)[43]. The MIC value refers to the smallest difference between two scores on a measurement scale that can be regarded as relevant or important[44]. Future studies are needed to define what disability claimants and IP's consider an important change in functioning in order to calculate the MIC of instruments of overall functioning.

The PREDIS cohort study had a low response rate, which may have been caused by the burden of the clinical interview that was part of this study and lasted approximately 2 to 4 hours, depending on the mental health status. The representativeness of the participants could only be tested in relation to the primary cause for disability. No statistical differences were found between participants and the overall SSI population. Moreover, full data were available in a lower number of cases, especially concerning the accuracy of IP predictions. This is partly due to IP's answering "unsure" or not at all in 40% of the cases. It is unlikely that IP's being unsure or not wanting to answer who would have predicted future functioning accurately. The diagnostic accuracy found in this study should therefore probably be considered an upper limit of accuracy.

A further limitation of this study was that it used the primary ICD-10 diagnosis to distinguish between claimants with mental or with somatic diagnoses. These diagnoses are certified by the IP's based on information in the medical files and their disability assessment. Prior studies with the PREDIS cohort have shown that many claimants classified as having a somatic diagnosis also have mental disorders according to a structured clinical interview based on the DSM-IV classification [Cornelius et al., submitted]. We have therefore conducted a post-hoc analysis to check whether the accuracy of the IP prediction was worse in claimants who had a mental co-morbidity. A logistic regression revealed that the prediction in this group was not less often correct compared to claimants with primary mental disorders or somatic disorders without mental co-morbidity (OR 0.86; CI 0.41-1.8).

The accuracy of predictions of improvement of functioning by both IP's and claimants was not high. It appears that selecting claimants eligible for re-assessments should not be based on these predictions alone. One may argue that the time period between the predictions and the predicted improvements one year later may be too long to allow for high levels of accuracy. However, regular re-assessments by IP's may not be feasible. An alternative that may be considered is to ask claimants to periodically fill out self-report instruments such as the WHODAS 2.0 to monitor functioning over time in the period after the first disability assessment. However, before one can use self report instruments to monitor improvements, the minimal important change values need to be established. In the context of disability assessment, additional requirements need to be met. In that context important improvements should not only be the claimant's view, but should also reflect an improvement likely to affect the outcome of a disability assessment by an IP.

Predicting future functioning of disability claimants remains a challenge. The IP's in this study were provided with information obtained from treating and/or occupational physicians and conducted disability assessment interviews with each of the patients. Nevertheless, predictability of functioning may be enhanced by more emphasis on non-medical aspects of the prognosis. A recent Delphi study among insurance physicians

concluded that non-medical personal and environmental factors must be considered in the assessment of the work ability of long-term sick-listed employees<sup>[45]</sup>. Moreover, future studies on the PREDIS cohort will be conducted aiming to identify other predictors of functional improvement and work status after the disability claim assessment. These predictors, if identified, can be used in a prognostic tool to assess eligibility for re-assessment.

In conclusion, we found that improvements of functioning are not uncommon in a group of disability claimants with various diagnoses. Both IP's and disability claimants themselves were only able to predict improvements with low levels of accuracy. Alternative ways to screen for eligibility for re-assessments, such as the use of self report instruments over time, should be considered.

### **ACKNOWLEDGEMENTS**

This research project was funded by the Social Security Institute, the Netherlands. The funding institute had no role in the design, collection, analysis, and interpretation of data; in the writing of the manuscript; and in the decision to submit the manuscript for publication.

**REFERENCES**

- 1 Organisation for Economic Co-operation and Development (OECD). Sickness, disability and work: keeping on track in the economic downturn. Background paper. <http://www.oecd.org/employment/employmentpoliciesanddata/42699911.pdf> Accessed at 10-8-2012
- 2 Organisation for Economic Co-operation and Development (OECD). Sickness, disability and work: Braking the Barriers. [http://www.nho.no/getfile.php/bilder/RootNY/filer\\_og\\_vedlegg1/Synthesis%20OECD%20Sickness.pdf](http://www.nho.no/getfile.php/bilder/RootNY/filer_og_vedlegg1/Synthesis%20OECD%20Sickness.pdf) Accessed at 20-12-2012
- 3 Chorus AM, Miedema HS, Boonen A et al. Quality of life and work in patients with rheumatoid arthritis and ankylosing spondylitis of working age. *Ann Rheum Dis* 2003;62 (12):1178-84.
- 4 Main DS, Nowels CT, Cavender TA et al. A qualitative study of work and work return in cancer survivors. *Psychooncology* 2005;14 (11):992-1004.
- 5 Dunn EC, Wewiorski NJ, Rogers ES. The meaning and importance of employment to people in recovery from serious mental illness: results of a qualitative study. *Psychiatr Rehabil J* 2008;32 (1):59-62.
- 6 Gronning K, Rodevand E, Steinsbekk A. Paid work is associated with improved health-related quality of life in patients with rheumatoid arthritis. *Clin Rheumatol* 2010;29 (11):1317-22.
- 7 Bernklev T, Jahnsen J, Henriksen M et al. Relationship between sick leave, unemployment, disability, and health-related quality of life in patients with inflammatory bowel disease. *Inflamm Bowel Dis* 2006;12 (5):402-12.
- 8 Melchior M, Ferrie JE, Alexanderson K et al. Does sickness absence due to psychiatric disorder predict cause-specific mortality? A 16-year follow-up of the GAZEL occupational cohort study. *Am J Epidemiol* 2010;172 (6):700-7.
- 9 Ferrie JE, Vahtera J, Kivimaki M et al. Diagnosis-specific sickness absence and all-cause mortality in the GAZEL study. *J Epidemiol Community Health* 2009;63 (1):50-5.
- 10 Lund T, Kivimaki M, Christensen KB et al. Socio-economic differences in the association between sickness absence and mortality: the prospective DREAM study of Danish private sector employees. *Occup Environ Med* 2009;66 (3):150-3.
- 11 Richards D. Prevalence and clinical course of depression: a review. *Clin Psychol Rev* 2011;31 (7):1117-25.

- 12 Waxman R, Tennant A, Helliwell P. A prospective follow-up study of low back pain in the community. *Spine (Phila Pa 1976)* 2000;25 (16):2085-90.
- 13 De Boer WEL, Besseling JJM, Willems JHBM. Organisation of disability evaluation in 15 countries. *Pratiques et organisation des soins* 2007;38 (3):205-17.
- 14 Stattin M. Retirement on grounds of ill health. *Occup Environ Med* 2005;62 (2):135-40.
- 15 Reiso H, Gulbrandsen P, Brage S. Doctors' prediction of certified sickness absence. *Fam Pract* 2004;21 (2):192-8.
- 16 Waddell, G. and Burton AK. Concepts of rehabilitation for the management of common health problems. Norwich: TSO (The Stationery Office); 2004. <http://www.dwp.gov.uk/docs/hwwb-concepts-of-rehabilitation.pdf> Accessed at 14-8-2012
- 17 Dekkers-Sanchez PM, Wind H, Sluiter JK et al. A qualitative study of perpetuating factors for long term sick leave and promoting factors for return to work: chronic work disabled patients in their own words. *J Rehabil Med* 2010;42 (6):544-52.
- 18 Audhoo SS, Hoving JL, Nieuwenhuijsen K et al. Prognostic Factors for the Work Participation of Sick-Listed Unemployed and Temporary Agency Workers with Psychological Problems. *J Occup Rehabil* 2012, 22:437-446.
- 19 Nielsen MB, Madsen IE, Bultmann U et al. Predictors of return to work in employees sick-listed with mental health problems: findings from a longitudinal study. *Eur J Public Health* 2011;21 (6):806-11.
- 20 Nieuwenhuijsen K, Verbeek JH, De Boer AG et al. Predicting the duration of sickness absence for patients with common mental disorders in occupational health care. *Scand J Work Environ Health* 2006;32 (1):67-74.
- 21 Lagerveld SE, Blonk RWB, Brenninkmeijer V et al. Return to work among employees with mental health problems: Development and validation of a self-efficacy questionnaire. *Work Stress Vol* 24(4), Oct 2010, pp 359-375 2010;24 (4):359-75.
- 22 Richard S, Dionne CE, Nouwen A. Self-efficacy and health locus of control: relationship to occupational disability among workers with back pain. *J Occup Rehabil* 2011;21 (3):421-30.
- 23 Shaw WS, Reme SE, Linton SJ et al. 3rd place, PREMUS best paper competition: development of the return-to-work self-efficacy (RTWSE-19) questionnaire-- psychometric properties and predictive validity. *Scand J Work Environ Health* 2011;37 (2):109-19.

- 24 Gross DP, Battie MC. Recovery expectations predict recovery in workers with back pain but not other musculoskeletal conditions. *J Spinal Disord Tech* 2010;23 (7):451-6.
- 25 Cole DC, Mondloch MV, Hogg-Johnson S. Listening to injured workers: how recovery expectations predict outcomes--a prospective study. *Can Med Assoc J* 2002;166 (6):749-54.
- 26 Fleten N, Johnsen R, Forde OH. Length of sick leave - why not ask the sick-listed? Sick-listed individuals predict their length of sick leave more accurately than professionals. *BMC Public Health* 2004;4:46.
- 27 Wind H, Samoocha D, van der Beek AJ et al. Prevention of disability: the opinion of claimants applying for a disability benefit. *Work* 2013, epub ahead of print.
- 28 Brouwer S, Reneman MF, Bultmann U et al. A Prospective Study of Return to Work Across Health Conditions: Perceived Work Attitude, Self-efficacy and Perceived Social Support. *J Occup Rehabil.* 2010 Mar;20(1):104-12.
- 29 Purdie F, Kellett S, Bickerstaffe D. Predictors of Functional Disability in Disability Welfare Claimants. *J Occup Rehabil.* 2012 Dec;22(4):447-55.
- 30 Sampere M, Gimeno D, Serra C et al. Return to Work Expectations of Workers on Long-Term Non-Work-Related Sick Leave. *J Occup Rehabil.* 2012 Mar;22(1):15-26.
- 31 Knowledge Center UWV. Quarterly Report 2007-III (in Dutch: Kenniscentrum UWV Kwartaalverkenning 2007-III). <http://www.uwv.nl> Accessed at 15-1-2009
- 32 UWV. Quantitative Information 2010 (in Dutch: Kwantitatieve Informatie 2010). [http://www.uwv.nl/overuwv/Images/Kwantitatieve\\_informatie\\_2010.pdf](http://www.uwv.nl/overuwv/Images/Kwantitatieve_informatie_2010.pdf) Accessed at 11-7-2013
- 33 Kessler RC, Ustun TB. The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res* 2004;13 (2):93-121.
- 34 World Health Organization. International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10). <http://apps.who.int/classifications/icd10/browse/2010/en> Accessed at 19-4-2012
- 35 Ouwehand P and Wouters PHM. CAS, Classificaties voor Arbo en SV (CAS, Classification for Occupational Health and Social Security). Amsterdam: UWV; 2002. <http://www.debus.nl/images/PDF/cas-code%20boekje.pdf> . Accessed at 15-1-2009

- 36 Spanjer J, Krol B, Popping R et al. Disability assessment interview: the role of detailed information on functioning in addition to medical history-taking. *J Rehabil Med* 2009;41 (4):267-72.
- 37 World Health Organization. Measuring Health and Disability: Manual for WHO Disability Assessment Schedule (WHODAS 2.0) . 2010. Üstün TB, Ostanjsek N, Hatterji S, and Rehm J (Eds.). [http://whqlibdoc.who.int/publications/2010/9789241547598\\_eng.pdf](http://whqlibdoc.who.int/publications/2010/9789241547598_eng.pdf) Accessed at 19-4-2012
- 38 Altman D. *Practical Statistics for Medical Research*. London: Chapman & Hall; 1991.
- 39 McLeod LD, Coon CD, Martin SA et al. Interpreting patient-reported outcome results: US FDA guidance and emerging methods. *Expert Rev Pharmacoecon Outcomes Res* 2011;11 (2):163-9.
- 40 de Vet HC, Terwee CB, Knol DL et al. When to use agreement versus reliability measures. *J Clin Epidemiol* 2006;59 (10):1033-9.
- 41 Swets JA. Measuring the accuracy of diagnostic systems. *Science* 1988;240 (4857):1285-93.
- 42 Fischer JE, Bachmann LM, Jaeschke R. A readers' guide to the interpretation of diagnostic test properties: clinical example of sepsis. *Intensive Care Med* 2003;29 (7):1043-51.
- 43 Terwee CB, Roorda LD, Dekker J et al. Mind the MIC: large variation among populations and methods. *J Clin Epidemiol* 2010;63 (5):524-34.
- 44 Beaton DE, Boers M, Wells GA. Many faces of the minimal clinically important difference (MCID): a literature review and directions for future research. *Curr Opin Rheumatol* 2002;14 (2):109-14.
- 45 Dekkers-Sanchez PM, Wind H, Sluiter JK et al. What factors are most relevant to the assessment of work ability of employees on long-term sick leave? The physicians' perspective. *Int Arch Occup Environ Health* 2013;86 (5):509-18.



## CHAPTER 9 PREDICTORS OF FUNCTIONAL IMPROVEMENT AND FUTURE WORK STATUS AFTER THE DISABILITY BENEFIT CLAIM: A PROSPECTIVE COHORT STUDY

ACCEPTED PENDING REVISION

L.R. CORNELIUS | J.J.L. VAN DER KLINK | M.R. DE BOER | J.W. GROOTHOFF | S. BROUWER

---

### ›ABSTRACT‹

#### OBJECTIVE

In most industrialized countries, disability benefit rates have increased substantially in the past decade. Few beneficiaries return into employment once disability benefit is awarded. The present study aims to investigate which factors predict functional improvement and future work status among persons claiming disability benefit after having been on long-term sickness leave.

#### METHODS

Prospective cohort study with one year follow-up among disability claimants (n=375; response rate: 24.3%) conducted in the Netherlands (October 2008 to April 2011). Logistic regression was used to analyze associations between predictors (demographics; outcomes of the 12-item *General Health Questionnaire* (GHQ-12); 10-item *Kessler Psychological Distress scale*; *Alcohol Use Disorders Identification Test*; *Trimbos/iMTA questionnaire for Costs associated with Psychiatric Illness*; *Utrecht Coping List*; *Social Support Questionnaire for Transactions and Satisfaction*; certified ICD-10 diagnosis; Loss of Earning Capacity (LEC)) and outcomes (functional improvement on the *World Health Organization Disability Schedule 2.0* (WHODAS 2.0) exceeding the standard error of measurement; work status at follow-up).

#### RESULTS

Functional improvement on total WHODAS was reported by 84 (31.9% of 263 claimants included in analysis). Of those not having work at baseline (n=338), 34 (9.1%) respondents had paid work one year later. Predictors of functional improvement: GHQ-12 sum score >20 (OR 2.9; 95% CI 1.54-5.34;  $p < 0.01$ ); of future work status: work status at baseline (OR 16.8; 95% CI 6.55-43.14), LEC <80% (OR 4.6; 95% CI 1.87-11.42), contact with a medical specialist (OR 0.4; 95% CI 0.19-0.87).

#### CONCLUSIONS

Only a limited number of factors were found to significantly predict functional improvement and return to paid work after the disability benefit claim, having paid work at baseline being by far the most important factor.

**Keywords** disability – functional improvement – future work status – prognostic factors

## ›INTRODUCTION‹

In more than half of the Organization for Economic Co-operation and Development (OECD) member states, disability benefit rates have increased substantially in the past decade, with about 6% of the working-age population receiving disability benefit [1]. For instance, in the Netherlands, after a 70% decrease from 2001 to 2006 due to legislature changes, disability benefit rates have again increased with 35% between 2006 and 2010 [2]. The costs of long-term disability, i.e. personal costs in terms of pain, suffering and reduced quality of life, direct and indirect costs of payment of cash benefits, productivity losses and employee substitution, are enormous. To illustrate, OECD countries on average spend 2% of their gross domestic product on sickness and disability benefits [1]. Sickness absence and disability with long durations contribute disproportionately to the economic costs: a small proportion of disability episodes comprise up to 75% of absence costs [3,4]. Once disability benefit is awarded, only around 1-2% of all beneficiaries return into employment [1].

In an effort to reduce inflow into disability benefit schemes, several European countries have changed disability benefit policies in recent years, emphasizing re-entry into the workforce and participation of the disabled worker, rather than financial compensation by cash benefit [5]. These policy changes are aimed to prevent long-term sickness absence and disability by promoting return-to-work (RTW) of workers on sick leave as early as possible [6].

The RTW process of sick listed workers is influenced by many health-related, personal and environmental factors, as shown by sickness absence and work disability research in the past decades (7-12). Most of these studies have examined prognostic factors for duration of sickness absence and RTW with the onset of sickness absence at baseline *before* disability benefit is eventually claimed and awarded. Studies specifically focusing on the period *after* disability benefit has been claimed are very scarce. Moreover, these studies have used health status in terms of diagnosis and symptoms, and mortality as primary outcomes of interest [13,14]. However, to improve participation and to promote RTW after the disability benefit claim, prognostic studies are needed that examine potential predictors at the time of the disability claim for functional improvement and RTW in the period thereafter.

The present study aims to investigate which factors predict functional improvement and future work status among persons claiming disability benefit after having been on long-term sickness leave. Data were used from PREDIS, a prospective cohort study with one year follow-up among disability claimants conducted in the province of Groningen in the Netherlands from October 2008 to April 2011 [15].

## ›METHOD‹

### PARTICIPANTS AND PROCEDURES

The PREDIS study is a prospective cohort study with one year follow-up among persons claiming disability benefit (after two years of continued sickness absence) at the local

office of the Social Security Institute (SSI) in Groningen, the Netherlands. For information on the Dutch social security system for work disability assessment, see Box 1.

**Box 1**

Dutch social security system for work disability assessment.

In the Dutch social security system, disability benefit assessment takes place after two years of sickness absence. Disability is assessed by insurance physicians (IPs) and labour experts (LEs) of the Social Security Institute (SSI). IP's focus on the evaluation of the medical condition (disease, symptoms, impairments), the functional status (limitation of activities) and rehabilitation efforts [5]. To classify somatic and mental disorders as cause of disability, IPs use a classification system (Dutch Classification for Occupational Health and Social Insurance: CAS) derived from the ICD-10 and developed for use in occupational health and social security in the Netherlands [27,28]. The registry of the SSI allows one diagnosis code for any (somatic or mental) disorder as primary cause of disability, and two additional codes for any comorbid disorders as secondary or tertiary cause of disability.

After the assessment by IP's of the claimants work limitations, the LE's determine the loss of earning capacity (LEC) resulting from functional impairments caused by illness. The final outcome of the disability assessment by IP and LE is expressed in four categories: no disability (LEC<35%), partial disability (LEC=35-80%), full disability (LEC>80%) with either favorable or poor prognosis of recovery according to the IP assessing the claim.

All diagnoses were included in the PREDIS study, both somatic and mental. Detailed information on participants, recruitment procedure and flow of participants have been published elsewhere [14]. In short, the source population for the PREDIS cohort study consisted of 1544 eligible disability claimants, of whom n=375 consented to participate (response rate = 24.3%). The present study uses data from two measurements in the in the PREDIS cohort study, at baseline after disability benefit was claimed (T<sub>0</sub>) and one year later (T<sub>1</sub>). Data from self-report questionnaires and structured psychiatric interviews were linked to data from the SSI registry. The Medical Ethics committee of the University Medical Center Groningen, the Netherlands, approved recruitment, consent and field procedures.

**REPRESENTATIVENESS**

To assess representativeness for the target population as to gender, age category and educational level, we compared the study sample (n=375) with the national population of all persons claiming disability benefit in the Netherlands in the years 2006-2010 (n=166,581) [16]. To assess representativeness for the target population as to prevalence of certified mental and somatic disorders, we compared the study sample (n=375) with the population of disability benefit claimants in the Netherlands from January 1st 2006 to July 31st 2007 (n=56,267) [16]. In these comparisons, we found no significant differences as to gender (p=0.850) and prevalence of certified mental (p=0.457) and physical (p=0.850) disorders. However, the study sample was significantly older (p<0.001) and higher educated (p<0.001) than the target population.

## MEASURES

From the data collected in the PREDIS cohort study, only data collected by self-report questionnaires and registry data were used.

### INDEPENDENT VARIABLES

#### Demographic factors

Data on demographic factors, i.e. age, gender, marital status and urbanization were obtained by self-report questionnaire. At To, labour experts (LE's) provided data on educational level. Marital status was dichotomized into living with or without partner. Urbanization was categorized into rural (<10.000 inhabitants), midsize urban (10.000-100.000 inhabitants) and urban (>100.000 inhabitants). Educational level was categorized into low (elementary, preparatory middle-level), intermediate (middle-level applied; higher general continued) and high (university).

#### Health factors

General mental health complaints were assessed with the 12-item *General Health Questionnaire* (GHQ-12). The GHQ-12 measures general health complaints and is used in the community and in primary care settings [15,17,18]. For the GHQ-12 we used the 0-1-2-3 scoring method with 'not at all' (for questions 1, 3, 4, 7, 8 and 12: 'better than usual') (0), 'same as usual' (1), 'rather more than usual' (2), 'much more than usual' (3). The reference period is the last few weeks. Sum scores range from 0 to 36. Higher scores signify more complaints.

Psychological distress was assessed with the 10-item *Kessler Psychological Distress scale* (K10). The K10 has strong psychometric properties (Cronbach's  $\alpha=0.919$ ) and is able to discriminate present state psychiatric cases from non-cases with an Area Under the receiver operating characteristic Curve (AUC) of 0.806 [15,19-21]. The K10 consists of 10 items with five Likert-type response categories: 'none of the time' (1), 'a little of the time' (2), 'some of the time' (3), 'most of the time' (4) and 'all of the time' (5). The reference period of the K10 is 30 days. Sum scores range from 10 to 50. Higher scores on the K10 signify more complaints.

Alcohol dependence and less severe alcohol problems were assessed with the *Alcohol Use Disorders Identification Test* (AUDIT) [22]. The AUDIT is widely used as a means of screening for the spectrum of alcohol use disorders in various settings and populations. It consists of a total of 10 items with a five point response scale distributed over 4 subscales (alcohol consumption, drinking behaviour, adverse reactions and alcohol-related problems). Sum scores range from 0 to 40. Higher scores reflect more problems.

At To, we obtained from the SSI the ICD-10 diagnosis codes of the somatic and mental disorders certified as cause of disability. Somatic-mental comorbidity was defined as the co-occurrence of both a physical and mental disorder.

We assessed health care utilization with the *Trimbos/iMTA questionnaire for Costs associated with Psychiatric Illness* (TiC-P) [23], a self-report questionnaire assessing health care consumption. For the present study we used questions whether or not in the past three months respondents had contacted a general practitioner, a psychologist or a

psychiatrist, mental health care professional, mental health clinic as out-patient, medical specialist, paramedic, i.e. physiotherapists, logopedists, Cesar therapists, ergotherapists and manual therapists, and whether they were hospitalized. For the present study, using the TiC-P operationalization, we added a question whether respondents had contact with a rehabilitation professional in the past three months. The TiC-P does not aggregate to a total sum score and therefore TiC-P variables were analyzed separately.

### Personal factors

We used the *Utrecht Coping List* (UCL) to measure coping with stress [24,25]. For the present study, a shortened 15-item version of the UCL was used with 2 subscales *Confronting problems* (7 items) and *Avoiding problems* (8 items). Answer options are 'seldom /never' (1), 'sometimes' (2), 'often' (3) and 'very often' (4). Sum scores range from 7 to 28 (Confronting) and from 8 to 32 (Avoiding). Higher UCL scores reflect more confronting or avoiding coping.

We used the *Social Support Questionnaire for Transactions* (SSQT) to measure perceived social support, assessing supportive transactions (SSQT) and satisfaction with supportive transactions (SSQS) [26]. The SSQT consists of 23 items with response categories 'seldom or never' (1), 'now and then' (2), 'regularly' (3) and 'often' (4). Sum scores of SSQT range from 23 to 92. Higher SSQT scores signify more social support.

To assess satisfaction with supportive transactions, we used the *Social Support Questionnaire for Satisfaction* (SSQS). The SSQS runs parallel with the SSQT and consists of 23 items with options 'much less than I like' (1), 'less than I like' (2), 'just as much as I like' (3), 'more than I like' (4). In order to get higher scores on the SSQS to represent less satisfaction with received social support, we recoded SSQS scores at To 1 to 4, 2 to 3, 3 to 2 and 4 to 1. Sum scores of the SSQS range from 23 to 92.

From the SSI register, we obtained the disability assessment outcome for all respondents in terms of loss of earning capacity (LEC, see Box 1). For analysis in the present study, we dichotomized the LEC variable in full disability (LEC  $\geq$  80%) (o) and no/partial disability (LEC < 80%) (1). All gainful employment in the Netherlands (work status) is registered in the POLIS registry. Using respondents unique social security number, we obtained from the SSI registry the POLIS data on work status of respondents at To. Work status was operationalized as yes (1)/no (o) having paid work.

## DEPENDENT VARIABLES

### Functional status

At both To and at T1, functional status was assessed by the *World Health Organization Disability Schedule 2.0* (WHODAS 2.0) [29]. The full WHODAS is a generic instrument asking respondents to indicate whether physical or mental health problems have caused difficulties in seven activity domains in the past thirty days: *Understanding and Communicating* (6 items), *Getting around* (5 items), *Self-care* (4 items), *Getting along with people* (5 items), *Household activities* (4 items); *Work/school* (4 items) and *Participation* (8 items). The questions asked in the WHODAS subscale *Participation* focus on participation in society and the impact of health problems on the respondent and his or her family. The WHODAS asks respondents to skip the domain *School/work* when they do not work or

do not go to school. All items of the WHODAS have a five-point rating scale with answer options ranging from 'no difficulty'(1) to 'extreme difficulty or inability to perform the activity'(5). Scores of the WHODAS were recoded and standardized to a 0-100 range according to the WHODAS manual [29]. Higher scores signify worse functioning. Domain scores aggregate to a total score (also standardized to 0-100). The WHODAS has high internal consistency (Cronbach's alpha 0.86), a stable factor structure, high test-retest reliability (ICC: 0.98), good concurrent validity in patient classification when compared with other recognized instruments assessing functional status and good sensitivity to change [29].

For the present study, we used the aggregated score of the WHODAS. We excluded from analysis the subscale WHODAS *Work/school*, since we expected only a limited number of participants to have paid work or go to school. We analyzed the score on the WHODAS subscale *Participation* separately, since in our view this subscale reflects best the ability to participate and to work.

### Future work status

From the POLIS registry we also obtained data on work status of respondents at T1. Work status was operationalized as yes (1)/no (0) having paid work.

### Statistical analysis

For each respondent, missing values on the GHQ-12, K10, AUDIT, SSQT/SSQS and the subscales of the UCL and the WHODAS were imputed with the mean scores, if less than 10% of answers on (sub)scale items were missing. For subscales with less than 10 items, we imputed missing values with the mean of the other items only if not more than one item was missing. For analysis, sum scores at To of the GHQ-12, K10, AUDIT, UCL and SSQT/SSQS were standardized to a 0-100 range. We calculated Cronbach's alpha for the WHODAS both at To and T1 to assess internal consistency. Functional improvement was defined as a positive difference, i.e. greater than the Standard Error of Measurement (SEM), between WHODAS sum scores at To and T1 [30]. The SEM agreement statistic was calculated using the following formula [31]:

$$\text{SEM}_{\text{agreement}} = \sigma * \sqrt{(1 - \text{ICC}_{\text{agreement}})}$$

The variance and the standard deviation ( $\sigma = \sqrt{\text{variance}}$ ) were calculated. The ICC<sub>agreement</sub> was derived from the 'ICC single measures' in the SPSS output. We checked continuous variables (age, sum scores of the GHQ-12, K10, AUDIT, UCL and SSQT/SSQS) for linearity by visually assessing the result of ranking into quartiles. The quartiles of variables for age, K10, GHQ-12 and AUDIT sum scores were not linear related and we dichotomized these variables on the cut-off scores reported in the literature: age at >50 [12], K10 at >24 [15], GHQ-12 at >20 [15] and AUDIT at >8 [32].

We used binomial logistic regression to analyze associations between predictors and functional improvement >SEM in total WHODAS and in WHODAS subscale *Participation*, and associations between predictors and future work status. The latter analysis was adjusted for work status at To. For this, we obtained registry POLIS data on work status at To.

We first performed univariable analyses with all independent variables to select variables for multivariable models using an alpha of 0.20. A backward method was used in the multivariable models to select the predictors for the outcomes using an alpha of 0.05. The Hosmer-Lemeshow test was used to assess the goodness of fit. Non-significant variables ( $p > 0.05$ ) were removed manually, starting with the variable with the highest P-value. All analyses were carried out using IBM SPSS 20.

## RESULTS

### SAMPLE DESCRIPTION

The source population for the PREDIS cohort study consisted of 1544 eligible disability claimants, of whom  $n=375$  consented to participate. After inclusion in the study, 337 participants (89.9%) returned the baseline questionnaire. Of these, 284 participants (75.8%) returned the follow up questionnaire at T1, 48 (12.8%) participants were lost to questionnaire follow up for reasons unknown and five (1.4%) respondents died during follow up. Due to loss to follow-up and the imputation rule we used, the number of participants included in our analyses differ, see Table 1.

**Table 1**

Samples (n, (%)) included and excluded in the analyses of predictor associations with functional improvement in WHODAS Participation, total WHODAS (without Work/school) and future work status.

	Functional improvement		Future work status
	Participation	Total WHODAS	
<b>included</b>	243 (64.8)	220 (58.7)	310 (82.7)
<b>excluded</b>			
loss to follow-up	67 (17.9)	85 (22.7)	0
missing values	65 (17.3)	70 (18.6)	65 (17.3)
<b>total</b>	375 (100)	375 (100)	375 (100)

Demographic, health and personal factors are presented for the sample ( $n=310$ ) included in the analysis of associations between predictors and future work status. These factors are presented in Table 2.

**Table 2**

Demographic factors, health factors and personal factors at baseline for the sample (n=310) included in the analysis of associations between predictors and future work status

	n (%)
<b>Demographic factors</b>	
Female gender	157 (50.6)
Age, mean (SD)	50.2 (8.72)
Living with partner	218 (70.3)
Educational level <sup>a</sup>	
low	53 (17.1)
intermediate	213 (68.7)
high	39 (12.6)
Urbanization <sup>b</sup>	
rural	101 (32.6)
midsize urban	151 (48.7)
urban	58 (18.7)
<b>Health factors</b>	
GHQ-12 sum score (SD)	16.1 (7.12)
K10 sum score (SD)	22.3 (8.31)
AUDIT sum score (SD)	3.2 (3.60)
TiC-P contact with	
general practitioner	213 (68.7)
psychologist/psychiatrist	71 (22.9)
mental health care professional	65 (21.0)
out patient mental health clinic	10 (3.2)
medical specialist	180 (58.1)
paramedic	120 (38.7)
hospitalization	29 (9.4)
rehabilitation professional	102 (32.9)
<b>ICD-10 classifications</b>	
Musculoskeletal	128 (41.3)
Cardiovascular	31 (10.0)
Respiratory	6 (1.9)
Nervous system	17 (5.5)
Gastro-intestinal	12 (3.9)
Genito-urinal	16 (5.2)
Mood	25 (8.1)
Anxiety	12 (3.9)
Stress-related	21 (6.8)
Somatic-mental comorbidity	44 (14.2)
<b>Personal factors</b>	
UCL Confronting sum score (SD)	17.6 (4.16)
UCL Avoiding sum score (SD)	16.5 (3.98)
SSQT sum score (SD)	52.9 (9.98)
SSQS sum score (SD)	51.1 (8.59)
LEC < 80%	157 (50.6)
Having paid work at T0	31 (10)

Footnotes next page

- a Low: elementary, preparatory middle-level; intermediate: middle-level applied; higher general continued; high: university applied sciences; research university.
- b Rural: <10.000 inhabitants; midsize urban: 10.000-100.000 inhabitants; urban:>100.000 inhabitants.
- Abbreviations: GHQ-12: General Health Questionnaire with 12 items, K10: Kessler Psychological Distress Scale with 10 items, AUDIT: Alcohol Use Disorders Identification Test, TiC- p: Trimbos/iMTA questionnaire for Costs associated with Psychiatric Illness, UCL: Utrecht Coping list, SSQT: Social Support Questionnaire Transactions, SSQS: Social Support Questionnaire Satisfaction, ICD-10: International Classification of Diseases, 10th edition, LEC: Loss of Earning Capacity.

This sample comprised 157 females (50.6%). The mean age was 50.2 (SD 8.72). Most respondents lived with a partner (70.3%), had intermediate education (68.7%) and lived in rural to midsize urban areas (81.3%). The prevalence of any ICD-10 somatic disorder was 78.7%, musculoskeletal disorders being the most prevalent (41.3%). The prevalence of any ICD-10 mental disorder was 21.3%, mood disorders being the most prevalent (8.1%). The prevalence of ICD-10 somatic-mental comorbidity was 14.2%. In this sample, 157 (50.6%) respondents were granted no disability benefit (LEC<35%) or partial (LEC 35-80%) disability benefit.

### NON-RESPONSE ANALYSIS

Non-response was analyzed in three different ways. First, we compared samples of participants (n=375) and non-participants (n=1169). Between these samples, we found no significant differences as to gender (p=0.850), and ICD-10 classifications of somatic and mental disorder (p=0.682). We found participants to be significantly older than non-participants (p<0.001). Second, we compared samples included (n=220) and excluded (n=155) in the analysis of predictor associations with functional improvement in total WHODAS (without Work/school). Between these samples, we found no significant differences in education (p=0.326), urbanization (p=0.725), age categories (p=0.219) and ICD-10 classifications (p=0.827). In the sample included in this analysis, we found a significantly higher proportion of females (p=0.013). Third, we compared samples included (n=310) and excluded (n=65) in the analysis of predictor associations with future work status. Between these samples, we found no significant differences as to gender (p=0.222), education (p=0.617) and urbanization (p=0.756). The sample included in this analysis, was significantly older (p=0.023) with a significantly higher prevalence of ICD-10 classifications of mental disorders (p=0.047).

### FUNCTIONAL IMPROVEMENT AND FUTURE WORK STATUS

Cronbach's alpha's for the WHODAS were 0.866 (T<sub>0</sub>) and 0.878 (T<sub>1</sub>). At baseline on the total WHODAS, respondents reported a mean total score of 34 (SD 18) and at T<sub>1</sub> a mean total score of 30 (SD 19). The SEM\_agreement for the standardized total scores at baseline and T<sub>1</sub> was found to be 9.3, based on a  $\sqrt{(1-ICC\_agreement)}$  of 0.55 and a variance of 290.9. In the total sample (n=375), the number of claimants that showed an improvement on overall functioning that exceeded the SEM was 84 (31.9% of the 263 respondents included in this analysis).

At baseline on WHODAS domain *Participation*, respondents reported a mean score of 42 (SD 21) and at T<sub>1</sub> a mean score of 35 (SD 21). The SEM\_agreement for the standardized scores at baseline and T<sub>1</sub> was found to be 4.9 based on a  $\sqrt{(1-ICC\_agreement)}$  of 0.61 and

a variance of 63.7. In the total sample (n=375), the number of claimants that showed an improvement on WHODAS *Participation* that exceeded the SEM was 121 (45.7% of the 265 respondents included in this analysis).

Work status in the study population is presented in Table 3. Of all 375 respondents, 338 (90.1%) had no paid work at T<sub>0</sub>. Of these, 34 (9.1%) had paid work at T<sub>1</sub>. Of respondents having no paid work at T<sub>0</sub> and reporting substantial functional improvement, i.e. exceeding SEM, on either total WHODAS or on subscale *Participation* (n=117), 12 respondents (10.6%) had no paid work at T<sub>1</sub>.

**Table 3**

Work status at T<sub>0</sub> and at T<sub>1</sub> (n=375)

	no work T <sub>1</sub>	work T <sub>1</sub>	total
no work T <sub>0</sub>	304 (81.1)	34 (9.1)	338 (90.1)
work T <sub>0</sub>	12 (3.2)	25 (6.7)	37 (9.9)
total	316 (84.3)	59 (15.7)	375 (100)

### UNIVARIABLE ANALYSIS

The results of the univariable analysis of associations of independent variables at T<sub>0</sub> with functional improvement on WHODAS *Participation* and total WHODAS, and on future work status are shown in Table 4.

For WHODAS *Participation*, the following variables met the inclusion criterion for the multivariable analysis ( $p < 0.20$ ): gender, living with partner, general mental health (GHQ-12 sum score  $> 20$ ), confronting coping (UCL Confronting sum score), satisfaction with social

**Table 4**

Odds ratios (OR) with 95% Confidence Intervals (95% CI) of univariable associations between independent variables and functional improvement in WHODAS *Participation*, total WHODAS (without the domain Work/school), and future work status (n=375)

	Functional improvement <sup>a</sup>				Future work status	
	Participation		Total		OR	95% CI
	OR	95% CI	OR	95% CI	OR	95% CI
<b>Demographic factors</b>						
Gender (male)	1.5	0.89-2.38*	1.4	0.83-2.42	1.6	0.84-3.02*
Age >50 years	0.8	0.51-1.39	0.8	0.48-1.40	0.6	0.34-1.21*
Living with partner	1.5	0.85-2.54*	1.6	0.86-2.03*	1.4	0.64-2.95
Education <sup>b</sup>						
low	0.8	0.33-2.01	1.0	0.38-2.57	1.0	0.30-3.36
intermediate	1.0	0.50-2.15	0.8	0.38-1.77	1.0	0.36-2.59
high <sup>c</sup>	-	-	-	-	-	-
Urbanization <sup>d</sup>						
rural	0.8	0.40-1.63	1.1	0.50-2.49	0.7	0.29-1.88
midsize urban	0.7	0.44-1.67	1.4	0.67-2.94	0.9	0.41-2.23
urban <sup>c</sup>	-	-	-	-	-	-

Table 4 continued

	Functional improvement <sup>a</sup>				Future work status	
	Participation		Total		OR	95% CI
	OR	95% CI	OR	95% C	OR	95% CI
<b>Health factors</b>						
General mental health (GHQ-12)	1.6	0.93-2.78*	3.0	1.69-5.50*	0.5	0.24-1.20*
Psychological distress (K10)	1.6	0.81-2.28	1.9	1.09-3.35*	0.7	0.34-1.46
Alcohol use (AUDIT)	0.7	0.29-1.53	1.0	0.45-2.45	1.8	0.65-4.78
<b>ICD-10 classifications</b>						
musculoskeletal	1.0	0.62-1.68	0.9	0.50-1.48	1.7	0.90-3.20*
cardiovascular	0.8	0.34-1.68	0.9	0.39-2.26	0.4	0.08-1.79
respiratory	1.2	0.17-8.67	1.1	0.09-11.90	4.0	0.80-19.60*
nervous system	0.5	0.18-1.56	0.7	0.22-2.22	0.7	0.13-3.24
gastro-intestinal	1.5	0.39-0.58	1.3	0.30-5.52	0.9	0.34-3.56
genito-urinal	1.4	0.49-3.97	3.0	1.02-9.07*	0.3	0.03-2.46
mood	1.1	0.45-2.69	0.6	0.23-1.83	0.4	0.07-1.80
anxiety	1.0	0.25-3.66	2.8	0.73-10.68*	1.3	0.33-5.17
stress-related	1.1	0.43-2.78	0.9	0.30-2.60	2.1	0.71-6.40*
somatic-mental comorbidity	1.2	0.58-2.33	1.0	0.45-2.11	0.6	0.22-1.60
<b>Contact with (TiC-P)</b>						
general practitioner	1.1	0.63-1.80	0.9	0.49-1.51	0.9	0.42-1.79
psychologist/psychiatrist	1.3	0.71-2.35	1.2	0.60-2.22	0.5	0.20-1.30*
mental health care professional	1.4	0.77-2.58	1.2	0.65-2.38	0.7	0.29-1.76
outpatient mental health clinic	10.1	1.24-81.72*	1.7	0.45-6.57	1.0	0.97-1.03
medical specialist	1.1	0.65-1.79	0.6	0.38-1.12*	0.3	0.15-0.64*
paramedic	1.4	0.84-2.32*	1,2	0.70-2.09	0.8	0.40-1.66
hospitalization	0.9	0.39-2.16	0.8	0.31-2,22	0.6	0.15-2.34
rehabilitation professional	1.0	0.58-1.67	1,2	0.70-2.21	1.7	0.84-3.35*
<b>Personal factors</b>						
Confronting coping (UCL)	1.0	0.97-1.00*	1.0	0.96-0.99*	1.0	0.98-1.03
Avoiding coping (UCL)	1.0	0.98-1.02	1.0	0.98-1.02	1.0	0.99-1.04
Social support transactions (SSQT)	1.0	0.98-1.03	1.0	0.97-1.02	1.0	0.97-1.03
Social support satisfaction (SSQS)	1.0	0.99-1.05*	1.0	1.01-1.07*	1.0	0.96-1.04
LEC < 80%	1.1	0.68-1.78	1.3	0.75-2.18	6.2	2.74-14.08*
Having paid work at T0	1.7	0.77-3.73*	1.3	0.56-2.95	18.6	8.59-40.40*

\* Variables with p<0.20 included in multivariate analysis. OR > 1 indicates a higher and OR < 1 indicates a lower association of predictors with functional improvement and future work status.

a Difference>Standard Error of Measurement (SEM), for WHODAS participation: 4.9; for total WHODAS: 9.3.

b Low: elementary, preparatory middle-level; intermediate: middle-level applied; higher general continued; high: university applied sciences; research university.

c Reference category.

d Rural: <10.000 inhabitants; midsize urban: 10.000-100.000 inhabitants; urban:>100.000 inhabitants. Abbreviations: GHQ-12: General Health Questionnaire with 12 items, K10: Kessler Psychological Distress Scale with 10 items, AUDIT: Alcohol Use Disorders Identification Test, TiC- p: Trimbos/iMTA questionnaire for Costs associated with Psychiatric Illness, UCL: Utrecht Coping List, SSQT: Social Support Questionnaire Transactions, SSQS: Social Support Questionnaire Satisfaction, ICD-10: International Classification of Diseases, 10th edition, LEC: Loss of Earning Capacity.

support (SSQS sum score), treatment in out-patient mental health clinic, contact with a paramedic and having paid work at To. For the total WHODAS (without domain Work/school) the following variables showed a  $p < 0.20$ : living with partner, general mental health, psychological distress, certified ICD-10 genito-urinal disorder, certified ICD-10 anxiety disorder, contact with a medical specialist, confronting coping and satisfaction with social support. For future work status, we included ( $p < 0.20$ ) gender, age older than 50 years, general mental health, certified ICD-10 classifications of musculoskeletal, respiratory and stress-related disorders, contact with a psychologist/psychiatrist, contact with a medical specialist and contact with a rehabilitation professional in the multivariable analysis, being assessed as not or partially disabled with LEC  $< 80\%$  and having paid work at To.

### MULTIVARIABLE ANALYSIS

For the total WHODAS, we found a GHQ-12 sum score  $> 20$  to be a statistically significant predictor of functional improvement (OR 2.9; 95% CI 1.54-5.34;  $p < 0.01$ ). We found no significant factors to predict functional improvement in WHODAS *Participation*. For future work status, we found that having paid work at baseline predicted a positive work status after one year (OR 16.8; 95% CI 6.55-43.14;  $p < 0.001$ ). Being assessed as not or partially disabled with LEC  $< 80\%$  also predicted a positive work status after one year (OR 4.6; 95% CI 1.87-11.42;  $p < 0.001$ ). Having had contact with a medical specialist in the three months preceding To was found to be a statistically significant predictor of a negative work status after one year (OR 0.4; 95% CI 0.19-0.87;  $p = 0.02$ ). The Hosmer-Lemeshow test showed good fit for all three prediction models ( $p = 0.64$  for the WHODAS *Participation* prediction model,  $p = 0.14$  for the total WHODAS prediction model and  $p = 0.4$  for the work status prediction model).

## DISCUSSION

### FUNCTIONAL IMPROVEMENT

Of the 31 independent variables included in the present study, we found only one significant factor to predict functional improvement (GHQ-12 sum score  $> 20$ ) and three significant factors to predict future work status (positive: having paid work at baseline and LEC  $< 80\%$ ; negative: contact with a medical specialist). Other prognostic studies in all-cause disability research have been conducted in populations of workers on sickness absence with a much shorter duration, identifying older age, history of sickness absence, severity of symptoms, high job demands, contact with medical specialists, perceived work attitude, self-efficacy and perceived social support to predict long-term sickness absence [10,33,35]. Some of these factors were also included in the present study, but were found not to be significant predictors. Prognostic factors to predict future improvement, participation and RTW may very well be disability-phase specific and are likely to change over time [36].

We found claimants with poor general health at baseline to have 2.9 times higher odds of substantial functional improvement one year after the disability benefit claim. This association may be explained by assuming that initial poor general health improves

over time, in turn leading to better functioning. A Norwegian study that examined health status before, during and after disability benefit award found an increase in symptoms around the time of the disability benefit award, with an improvement towards pre-benefit levels in the period thereafter [14]. In that study, two possible explanations were given based on models of stress and disease: temporary adverse health effects may arise from the process of the disability benefit assessment itself, and being removed from harmful work conditions may have beneficial effects and increasing health problems leading up to the disability benefit may recover after disability benefit is awarded [14]. These factors may also play a role in the present study. Claimants may feel relieved not having to return to work they are no longer capable of performing, resulting in improvement of functioning after the assessment of their claim. For those claimants not returning to paid employment after having been denied disability benefit, general mental health is likely to stay at a low level. Relative financial security after disability benefit has been awarded, might also have contributed to improvement of general mental health complaints and functioning during the one year follow-up. If these unintended negative effects of the disability assessment process really exist, then it is conceivable that they not only play a role at the first disability assessment, but also at re-assessments once benefit is awarded.

In the design phase of this study it was hypothesized that psychological factors would be important in predicting functional improvement and a positive work status. Measures focusing on psychological constructs were chosen accordingly. However, only one psychological factor, i.e. a high GHQ-12 sum score at baseline, was found to be significantly associated with functional improvement. System related factors, i.e. having paid work at baseline and being assessed with no/partial disability benefit, were found to be very strong predictors of work status outcome. Apparently, it seems that once a disability claimant enters the system without having a paid job and being assessed with full disability (based on a loss of earning capacity  $\geq 80\%$ ), the 'risk' of having paid work one year later becomes very low. This mechanism might contribute to keeping disability beneficiaries trapped in permanent disability.

### **FUTURE WORK STATUS**

We found claimants having paid work at baseline to have very high odds (OR=16.8) of having paid work one year later. This finding is in line with the results of another study that also found work status to be a strong prognostic factor for future work participation of sick listed unemployed and temporary agency workers with psychological problems [37]. It illustrates the importance to return to work as early as possible, preferably before disability benefit is claimed.

Claimants not having been awarded full benefit were found to have 4.6 higher odds of having paid work one year later. An obvious explanation is that symptoms and related impairments are less severe in this group, improving their chances of RTW. Another possible explanation is related to the social security legislature in the Netherlands that defines disability in terms of loss of earning capacity (LEC). LEC not only depends on disease severity, but also on the height of the income earned before the onset of sickness absence. Claimants without paid work at baseline might experience financial strain after being denied full disability benefit. For them this outlook may be an incentive to seek

re-employment and return to work. This is in line with results of studies on the effects of financial compensation, that found that higher benefit rates are associated with lower rates of return to work [36].

We found that claimants who contacted a medical specialist at baseline, had a 60% reduced odds of having paid work one year later than claimants who did not. In our view, the negative association we found between contact with a medical specialist and future positive work status can for the most part be explained by the assumption that among those likely to visit medical specialists more often, severe and disabling somatic medical conditions are more prevalent. Another explanation might be that medical specialist care is an obstacle for RTW, as was found in a prognostic cohort study on RTW in workers with all-cause sickness absence greater than four weeks [33]. In the opinion of occupational physicians, medical management of treating physicians is often an obstacle for RTW of low back pain patients sick listed due to low back pain for 3–4 months [34].

### CHANGES IN FUNCTIONAL IMPROVEMENT AND FUTURE WORK STATUS

This study showed that 32–46% of persons claiming disability benefit after two years of sick leave show functional improvement the next year, either in participation in societal activities, and in total functioning, including communication, mobility, self-care, getting along with others and household activities. Despite this substantial functional improvement, only 12 respondents (10.6% of those not having paid work at T<sub>0</sub>) were reported to have paid work after one year follow-up. This illustrates that the probability of RTW not only depends on functional improvement, but also on other factors.

The discrepancy we found between functional improvement and future work status may be explained in different ways. First, functional improvement exceeding SEM may not be clinically meaningful in a disability setting, e.g. result in RTW or increased participation. Second, persons claiming disability benefit after two years of sickness absence, may have lost work-related contacts, e.g. with colleagues or the employer. Alienation from work may impede return to work, despite substantial functional improvement. This process may have been reinforced by the economic crisis, which deepened in the period the study was conducted and in the Netherlands has led to more than doubling of unemployment rates from 3.2% in 2008 to 7.7% in 2012 [38].

Dutch social security legislature commits those being awarded disability benefit to report any future functional improvement to the SSI in order to enable labour experts to support rehabilitation. In post-hoc analysis we examined a subsample of respondents having been awarded partial disability benefit (LEC 35–80%) or full disability benefit with a favorable prognosis of recovery (LEC > 80%) (n=174). In that subsample, 59 (33.9%) respondents showed functional improvement exceeding SEM\_agreement in WHODAS *Participation* or total WHODAS. Of these 59 respondents, only 9 (15.3%) had contact with a SSI labour expert and only 4 (6.8%) with a rehabilitation professional in the three months prior to T<sub>1</sub>.

### STRENGTHS AND LIMITATIONS

To our knowledge, our study is the first to examine predictors of functional improvement and future work status in a cohort of disability claimants after two years of continued sickness absence. A strong point is its use of registry data, i.e. certified ICD-10 diagnosis,

disability assessment outcome in terms of loss of earning capacity and work status.

A potential limitation is the low response rate of 24.3%. This may be due to the stepped procedure necessary to require informed consent from eligible disability claimants [15] and the comprehensiveness of the measures in the PREDIS cohort study. This low response rate may have led to selection bias, since the study sample was not fully representative for the target population as to age and educational level. Also, the missing values in the different analyses of associations of predictors and functional improvement and future work status may have biased the results. In the non-response analysis, we found a significant difference as to age, ICD-10 classifications of mental disorders and gender between samples in- or excluded in the regression analyses. It is difficult to predict whether and how this selection of the samples used in the analyses might have influenced the results we found. In an earlier study on the properties of the GHQ-12 and the K10 to screen for present state mental disorder (15), no significant differences between these scales were found. We have post-hoc calculated Pearson correlation coefficients for the GHQ-12 and the K10 and found  $r=0.74$  ( $p<0.001$ ), indicating a strong correlation. Therefore, in future surveys in comparable populations, researchers may decide to use only one of these scales. This may help to achieve a higher response rate.

By including work status at To in the analysis of associations between predictors and work status at T1, other important predictors may have been forced to the background. However, the present study aims to identify prognostic factors of functional improvement and work status, relevant for the everyday practice of insurance physicians assessing disability claims. Therefore, the statistical analysis of associations between predictors and outcome was primarily driven by practical relevance. It was assumed at forehand that having paid work at baseline was important in predicting having paid work one year later. As a consequence, work status at baseline was included in the analysis of associations between predictors and future work status. This factor showed to be the most significant predictor of having paid work at T1, with a very high OR. This relevant outcome would have been missed had work status at To been left out of the regression analysis.

For the present study sample size was not calculated. For the PREDIS cohort study, a low response rate was expected and as many disability claimants as possible were recruited. Sample size depended primarily on feasibility at the local SSI office, i.e. the availability of the many SSI employees involved in study procedures and measures.

### IMPLICATIONS FOR PRACTICE

IP's should be aware that poor general mental health reported by claimants at disability assessments is associated with functional improvement in the period thereafter. They should consider that poor self-reported mental health may be an artifact resulting from the disability assessment process itself and that it may improve after the claim assessment. IP's should discriminate between impairments that may be related to temporary self-reported health problems caused by the disability assessment process and impairments more likely to be related to the underlying medical condition. In disability assessment interviews, insurance physicians might consider to include questions about mental health complaints increase in the period leading up to the assessment and discuss the distress the claimant might have as a result.

Work status at baseline is strongly predictive of having paid work one year later. This finding illustrates the importance of optimal rehabilitation efforts in the period before disability benefit is claimed to prevent continued work disability thereafter.

Receiving partial or no disability benefit was found to predict having paid work one year after the disability claim assessment. IP's and LE's should be aware of possible adverse effects on future RTW after the awarding of full disability benefit with a favorable prognosis of recovery. When re-assessing these claims, they should be aware that failure to return to work may be related to the disability assessment process, rather than to the underlying medical disorder(s).

### IMPLICATIONS FOR FURTHER RESEARCH

In the present study, except for poor mental health as assessed by the GHQ-12, none of the other psychological and psychosocial factors, i.e. distress by the K10, coping by the UCL, social support by the combined SSQT/SSQS and mental health care use by the TIC-P, were associated with outcome. Since the low response rate in the present study might be due to the comprehensiveness of our measures, it would be interesting to identify factors can be excluded in future research, i.e. factors that show a high correlation. In a follow-up study we will report on such correlations, aiming to help future researchers to achieve a higher response rate.

The present study did not aim to investigate differences between subgroups of respondents with a somatic or a mental diagnosis. However, persons with a somatic condition may score differently on the constructs used in the present study than persons with a mental condition or somatic-mental comorbidity. For future research it might be interesting to analyze associations of predictors with functional improvement and future work status in such subgroups.

More prognostic studies are needed on predictors of functional improvement and RTW after the disability benefit claim. These may aim at replicating findings of the present study, but also at identifying other factors, that may influence the course of disability after the claim. For example, under-diagnosis and under-treatment of mental disorder seem to be substantial in disability settings [39,40]. Future studies are needed to investigate whether this impedes future RTW. Other potential predictors of RTW in this population may be identified by in-depth interviewing claimants who were able to return to work after the assessment of their disability benefit claim.

Studies are needed to investigate whether disability benefit assessments at an earlier moment, when a sick listed worker has not yet lost contact with work, are more effective in supporting claimants to return to work.

The discrepancy we found between functional improvement and future work status may be an indication that possibilities for rehabilitation have been missed for beneficiaries with substantial functional improvement. Ways should be considered to better monitor functioning over time in the period after the first disability assessment, e.g. to ask claimants to periodically fill out self-report instruments such as the WHODAS. If improvement is reported, disability re-assessments can be planned. For use of the WHODAS as a monitoring instrument to assess functional improvement after the claim

and to plan effective disability re-assessments, the minimal important change values in WHODAS sum scores need to be established. This warrants further study.

### »CONCLUSION«

We only found a limited number of factors to significantly predict functional improvement and return to paid work after the disability benefit claim, having paid work at baseline being by far the most important factor.

### ACKNOWLEDGEMENTS

This research project was funded by the Social Security Institute, the Netherlands. The funding institute had no role in the design, collection, analysis, and interpretation of data; in the writing of the manuscript; and in the decision to submit the manuscript for publication.

**REFERENCES**

- 1 OECD. *Sickness, Disability and Work: keeping on track in the economic downturn - background paper*. 2009. Accessed 5<sup>th</sup> Jan 2012: <http://www.oecd.org/dataoecd/42/15/42699911.pdf>.
- 2 UWV factsheet (in Dutch). Amsterdam, 2011. Accessed 5<sup>th</sup> Jan 2012. <http://www.uwv.nl/overuwv/Images/111031%20Factsheet.pdf>.
- 3 Henderson M, Glozier N, Holland EK. Long term sickness absence. *BMJ*. 2005;330:802-3.
- 4 Hashemi L, Webster BS, Clancy EA. Trends in Disability Duration and Cost of Workers' Compensation Low Back Pain Claims (1988-1996). *J Occup Environ Med*. 1998;40:1110-9.
- 5 de Boer WEL, Besseling JJM, Willems JHBM. Organisation of disability evaluation in 15 countries. *Pratiques et organisation des soins*. 2007;38:205-217.
- 6 Muijzer A, Groothoff JW, de Boer WE, Geertzen JH, Brouwer S. The assessment of efforts to return to work in the European Union. *Eur J Public Health*. 2010;20:689-94.
- 7 Krause N, Frank JW, Dasinger LK, Sullivan TJ, Sinclair SJ. Determinants of duration of disability and return-to-work after work-related injury and illness: challenges for future research. *Am J Ind Med*. 2001;40:464-84.
- 8 Steenstra IA, Verbeek JH, Heymans MW, Bongers PM. Prognostic factors for duration of sick leave in patients sick listed with acute low back pain: a systematic review of the literature. *Occup Environ Med*. 2005;62:851-60.
- 9 Duijts SF, Kant I, Swaen GM, van den Brandt PA, Zeegers MP. A meta-analysis of observational studies identifies predictors of sickness absence. *J Clin Epidemiol*. 2007;60:1105-15.
- 10 Dekkers-Sanchez PM, Hoving JL, Sluiter JK, Frings-Dresen MH. Factors associated with long-term sick leave in sick-listed employees: a systematic review. *Occup Environ Med*. 2008; 65:153-7.
- 11 Blank L, Peters J, Pickvance S, Wilford J, Macdonald E A systematic review of the factors which predict return to work for people suffering episodes of poor mental health. *J Occup Rehabil*. 2008;18:27-34.
- 12 Cornelius LR, van der Klink JJ, Groothoff JW, Brouwer S. Prognostic factors of long term disability due to mental disorders: a systematic review. *J Occup Rehabil*. 2011;21:259-74.

- 13 Wallman T, Wedel H, Johansson S, et al. The prognosis for individuals on disability retirement. An 18-year mortality follow-up study of 6887 men and women sampled from the general population. *BMC Public Health*. 2006;6:103.
- 14 Øverland S, Glozier N, Henderson M, Mæland JG, Hotopf M, Mykletun A. Health status before, during and after disability pension award: the Hordaland Health Study (HUSK). *Occup Environ Med*. 2008;65:769–773.
- 15 Cornelius LR, Groothoff JW, van der Klink JJJ, Brouwer S. The performance of the K10, K6 and GHQ-12 to screen for present state DSM-IV disorders among disability claimants. *BMC Public Health*. 2013;13:128.
- 16 UWV Quarterly Report 2006-IV (in Dutch: Kwartaalverkenning 2006 – IV). Amsterdam; 2007. Accessed 10th Jan 2012: <http://www.rwi.nl/CmsData/File/UWV%20Kwartaal%202006-IV.pdf>.
- 17 Goldberg D, Williams P: A user's guide to the General Health Questionnaire. Windsor: NFER-NELSON; 1998.
- 18 Schmitz N, Kruse J, Tress W: Psychometric properties of the General Health Questionnaire (GHQ-12) in a German primary care sample. *Acta Psychiatr Scand*. 1999;100:462-8.
- 19 Donker T, Comijs H, Cuijpers P, Terluin B, Nolen W, Zitman F, Penninx B. The validity of the Dutch K10 and extended K10 screening scales for depressive and anxiety disorders. *Psychiatry Res*. 2010;176:45-50.
- 20 Kessler RC, Andrews G, Colpe LJ, Hiripi E, Mroczek DK, Normand SL, Walters EE, Zaslavsky, AM: Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychol Med*. 2002;32:959-76.
- 21 Kessler RC, Barker PR, Colpe LJ, Epstein JF, Gfroerer JC, Hiripi E, Howes MJ, Normand SL, Manderscheid RW, Walters EE, Zaslavsky AM: Screening for serious mental illness in the general population. *Arch Gen Psychiatry*. 2003;60:184-9.
- 22 Reinert DF, Allen JP. The Alcohol Use Disorders Identification Test: An Update of Research Findings. *Alcohol Clin Exp Res*. 2007;31:185–199.
- 23 Hakkaart-van Roijen L. Handleiding Trimbos/iMTA questionnaire for Costs associated with Psychiatric Illness (TiC-P). Rotterdam: Institute for Medical Technology Assessment; 2002.
- 24 Schreurs KM, van den Willige G, Brosschot JF. De Utrechtse Coping Lijst [Utrecht Coping Questionnaire]. Lisse: Swets and Zeitlinger;1993.

- 25 Sanderman R, Ormel H. The Utrecht Coping list: Validity and reliability (in Dutch: De Utrechtse Coping Lijst (UCL): Validiteit en Betrouwbaarheid). *Gedrag en Gezondheid*. 1992; 20:32–37.
- 26 Doeglas D., Suurmeijer T., Briancon S., Moum T., Krol B., Bjelle A. (1996). An international study on measuring social support: interactions and satisfaction. *Soc Sci Med*. 1996;43:1389-97.
- 27 World Health Organization. International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10). See: <http://apps.who.int/classifications/icd10/browse/2010/en>. Accessed April 19th 2012.
- 28 Ouwehand P, Wouters PHM. CAS, Classificaties voor Arbo en SV (CAS, Classification for Occupational Health and Social Security). Amsterdam: UWV; 2002.
- 29 Üstün TB, Kostanjsek N, Chatterji S, Rehm J. *Measuring Health and Disability Manual for WHO Disability Assessment Schedule WHODAS 2.0*. Geneva: World Health Organization; 2010.
- 30 McLeod LD, Coon CD, Martin SA, et al. Interpreting patient-reported outcome results: US FDA guidance and emerging methods. *Expert Rev Pharmacoecon Outcomes Res*. 2011;11:163-9.
- 31 de Vet HC, Terwee CB, Knol DL, et al. When to use agreement versus reliability measures. *J Clin Epidemiol*. 2006;59:1033-9.
- 32 Saunders JB, Aasland OG, Babor TF, de la Fuente JR, Grant M Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption–II. *Addict*. 1993;88:791–804.
- 33 Vlasveld MC, van der Feltz-Cornelis CM, Bültmann U, Beekman ATF, van Mechelen W, R. Hoedeman R, Anema JR. Predicting Return to Work in Workers with All-Cause Sickness Absence Greater than 4 Weeks: A Prospective Cohort Study *J Occup Rehabil*. 2012;22:118-26.
- 34 Anema JR, Van Der Giezen AM, Buijs PC, van MW. Ineffective disability management by doctors is an obstacle for return-to-work: a cohort study on low back pain patients sicklisted for 3–4 months. *Occup Environ Med*. 2002;59:729–33.
- 35 Brouwer S, Krol B, Reneman MF, Bultmann U, Franche RL, van der Klink JJ, et al. Behavioral determinants as predictors of return to work after long-term sickness absence: an application of the theory of planned behavior. *J Occup Rehabil*. 2009;19:166–74.

- 36 Franche RL, Krause N. Readiness for return to work following injury or illness: conceptualizing the interpersonal impact of health care, workplace, and insurance factors. *J Occup Rehabil.* 2002;12:233-256.
- 37 Selwin S, Audhoe SS, Hoving JL, Nieuwenhuijsen K, Friperon R, de Jong PR, Sluiter JK, Frings-Dresen MHW. Prognostic Factors for the Work Participation of Sick-Listed Unemployed and Temporary Agency Workers with Psychological Problems. *J Occup Rehabil.* 2012;22:437-446.
- 38 Statistics Netherlands (in Dutch: Centraal Bureau voor de Statistiek). The Hague, the Netherlands, 2013. Accessed March 27 2013. <http://www.cbs.nl/NR/rdonlyres/D88D873A-C69B-46E0-AD7D-444F5C56F5B8/o/pb13no21.pdf> .
- 39 Langerak W, Langeland W, Draijer N, Draisma S, van Balkom T. Diagnostics and classification of psychiatric disorders in a cohort of long-term work disabled persons due to mental health problems (in Dutch: Diagnostiek en classificatie van psychiatrische aandoeningen bij een steekproef van langdurig psychisch arbeidsongeschikten ). *Tijdschr Bedrijfs Verzekeringsgeneeskd.* 2011;19:14-21.
- 40 Cornelius LR, van der Klink JJL, Brouwer S, Groothof JW. Under-recognition and under-treatment of DSM-IV classified mood and anxiety disorders among disability claimants. *Disabil Rehabil.* 2013; DOI: 10.3109/09638288.2013.833310.



## CHAPTER 10 GENERAL DISCUSSION

---

This thesis addresses diagnosis and treatment of mental disorders among disability benefit claimants, focusing on the prognosis of functioning and return to work (RTW) in the period after the assessment of their disability benefit claim. The prognostic cohort study described in this thesis aims to generate more knowledge on these issues to help improve the diagnostic, therapeutic and prognostic skills of IP's involved in disability benefit claim assessments. In this chapter, the main findings are summarized and discussed. In addition, we discuss the methodology used in this thesis and present practical implications of our research findings for insurance, occupational and treating physicians, and policy makers. We conclude this chapter by presenting recommendations for further research.

### ›MAIN FINDINGS‹

The PREDIS prospective cohort study identifies persons claiming disability benefit after two years of sickness absence as a vulnerable group. We found a high prevalence of single and comorbid mental disorders that start in early working careers, are for a large part serious, are substantially undetected by IP's assessing the disability benefit claim. Moreover, mental disorders were found to be substantially undertreated in the years preceding the disability assessment. To aid adequate diagnosis by IP's, the K10, K6 and the GHQ-12 were shown to be reliably screeners for poor mental health. To diagnose adjustment disorder, a new interview schedule, the Diagnostic Interview Adjustment Disorders (DIAD), was developed for use in epidemiological disability research, which was shown to have good initial validity. In our systematic review of the literature we could include only few prognostic cohort studies and found older age to be a strong predictor of longer duration of disability. In our own cohort study, we found one factor to predict substantial functional improvement after one year: poorer mental health at baseline. Two factors were found to predict a positive work status after one year: having work at baseline and being assessed with no or partial work disability. We found one predictor that was negatively associated with work status: contact with a medical specialist. Despite substantial functional improvement in about one third of disability claimants, only few of them returned to work during follow up. Predictions of this functional improvement either by claimants or by IP's, were hardly better than chance.

### MENTAL HEALTH STATUS

#### High prevalence

The prevalence rates we found in this study are much higher than found in the general [1] and in the working population [2]. Furthermore, we found the proportion of serious disorders to be two to three times higher than in the general population [3]. By far the most prevalent categories of mental disorders in our cohort are mood and anxiety disorders. These disorders are frequently referred to as common mental disorders

(CMD), in contrast to severe mental disorders (SMD), such as schizophrenia and bipolar disorder. In general, CMDs are considered to be mild or moderate in terms of disability, with lower personal and societal costs. However, we found the CMDs in the cohort to be largely serious in terms of impairment and disability. This suggests that under certain circumstances, CMDs may become so severe that they would be more adequately classified as SMD. The process of CMDs evolving into SMDs may be related to under-diagnosis and under-treatment of CMD, common in primary and occupational health care [2,4]. In a way, the high prevalence of serious CMD was to be expected. In the two years preceding the baseline measure of our study, i.e. the moment of the disability benefit claim, many workers with milder mental disorders are likely to have recovered and returned to work, leaving those with worsening mental disorders in continued sickness absence and eventually to claim disability benefit.

### Early age-of-onset

We found DSM-IV classified mood and most anxiety disorders to have onsets in early working careers, with a mean age of respondents of 49.8 years. This suggests a long-lasting prior history. It could be that some respondents confronted with accumulating problems over time, including poor mental and/or physical health, eventually have crossed a critical threshold, called in sick, did not return to work and eventually claimed disability benefit. This is hypothetical, since the cross-sectional analysis of this part of our study does not allow any conclusions on causal relationships between current findings and events that may have occurred in the past. However, the hypothetical process suggested by our findings supports a well known model in psychiatry, the *Liability threshold model in a developmental perspective*, reflecting the view that at any moment during a lifetime development, human beings are the result of a complex interplay between genetic determinants and experiences [5,6]. In this model, mental illness, and consequent impairment and disability, arise (or disappear) when problems accumulate (or diminish) and a critical threshold is crossed on a latent risk dimension [7]. The insight that the endurance of any human being is limited and that everyone has a breaking point, is not new. The proverb *'The straw that broke the donkey's back'* (in Dutch: *'De druppel die de emmer doet overlopen'*) was first used by the British physician and preacher Thomas Fuller in 1732 in his *Gnomologia: Adagies and Proverbs* [8].

### High comorbidity

Our study shows that mental-mental and somatic-mental comorbidity are common among disability claimants. The prevalence of more than one 12-month and 30-day DSM-IV classified mental disorder was 33.7% and 15.8%, respectively, and we found moderate to strong pairwise associations between different DSM-IV classified mental disorders. To add, we found that one in every two lifetime and one in every four 12-month DSM-IV classifications co-occurred with a somatic disorder certified in the SSI registry as primary cause of disability.

With respect to mental-mental comorbidity in general, it is important to assess any time lapse between the onset of the primary and of the secondary mental disorder, since any difference in onset times provides a 'window of opportunity' for primary prevention

of secondary disorders [9]. In the Nemesis I study conducted in the Netherlands, it was found that any time lapse is likely to be short [10]. Moreover, the results of that study suggest that functional disability may predict the rapid onset of comorbidity [10]. We did not examine whether there is any time lapse between primary and secondary mental disorders of persons with mental-mental comorbidity. However, the high mental-mental comorbidity found in our study, suggest that the narrow 'window of opportunity' for timely treatment and interventions may have been missed for those with a disabling primary mental disorder, resulting in the rapid development of a secondary disorder and in time in long-term disability.

The somatic disorders included in our assessment of somatic-mental comorbidity, are the primary causes for work disability, as certified by the IP's assessing the disability benefit claim. These somatic disorders are likely to be associated with the onset of sickness absence, two years prior to the baseline measure of the cohort study. Since many mental disorders among participants have early ages-of-onset, mental disorders are likely to have preceded the co-occurring somatic disorders that resulted in sickness absence and, after two years, were certified as cause of disability.

In general, in a bio-psycho-social model, body-mind-environment interactions play an important role in the pathogenesis and clinical expression of physical and mental disorders [11-14]. The combined effect on disability of mental and somatic illness exceeds the summed effects of either condition alone [12]. Whether primary mental disorders with early onset are risk factors for later emergence of secondary somatic disorders, remains to be investigated. If so, it adds to the importance of early detection and intervention in those reporting poor mental health, whether they are still working or already on sick leave.

### **Under-diagnosis of mental disorders**

We found indications of substantial under-diagnosis of mental disorders by IP's assessing the disability claim. In reporting the results of our assessment of their diagnostics of mood and anxiety disorders among disability claimants, we have presented false diagnostic outcomes only. To complete the diagnostic quality of IP's, we here give the true-positive and true-negative outcomes also. These are for mood disorder 33.3% and 91.6%, respectively, and for anxiety disorder 21.4% and 97.8%, respectively. Taken together, these findings indicate that IP's far better recognize the absence of DSM-IV classified mood and anxiety disorders (high specificity) than their presence (low sensitivity). In the latter, the disability assessment by IP's is likely to be suboptimal.

We did not investigate possible consequences of under-diagnosis by IP's of mental disorder. It could be that they adequately recognized functional limitations and impairments associated with unspecified poor mental health, without diagnosing the underlying mental disorder itself. Then the disability assessment may have been adequate, but the claimants possible need for treatment was not seen, possibly diminishing their chances of health recovery and functional improvement. This may have led to prolonged disability duration and a decreased chance to RTW. If both the mental disorder and related impairments were not recognized, then the disability assessment by the IP's has obviously been suboptimal. In general, assessments with false negative outcomes may result in

claimants returning to work that is mentally (or physically) too demanding, developing more symptoms and impairments and renewed sick leave. Professional training to improve diagnostic abilities of IP's may result in fewer false-negative diagnoses. In a Danish study it was found that better recognition of undetected psychiatric disorder in long-term sickness absence lengthened the duration of sickness absence [15]. Nevertheless, although better recognition of treatable mental disorders and related impairments may initially result in a temporary increase of disability benefit allowance and possible delayed RTW, in the end through effective monitoring of treatment results and re-evaluations by IP's, it may prevent permanent disability.

### Screening for mental disorders

A valid mental health screening as an initial step in the disability assessment process may help to prevent under-recognition of mental disorders. Our study on the screening quality of three short scales provides a reliable screening tool, the *10-item Kessler Psychological Distress Scale* (K10) [16]. After a positive screen, the in-depth disability assessment interview that follows the screening, might reveal an actual and under-treated mental disorder. If so, psychiatric consultation by a psychiatrist or a specialized insurance physician trained in psychiatric diagnostics and treatment, may provide a tailor-made plan for treatment and rehabilitation. Such an intervention might be effective to shorten duration of disability and to promote RTW in this vulnerable group. Psychiatric consultation has been proven effective in occupational health care. Research in that setting showed early psychiatric consultation to improve time to RTW in sick listed employees with common mental disorders as compared to referral to specialist mental health care professionals [17].

The primary goal of the screening procedure we introduced within the study design was practical: we wanted to limit respondent burden by administering the comprehensive CIDI at T1 after a positive mental health screen only. The outcomes of our validity study on the psychometric properties of the screeners raise the question whether these scales and the K10 in particular, should be implemented on a large-scale basis by the Social Security Institute (SSI) to be used in every disability assessment as screener for mental health problems. A useful guide to answer this question is provided by a landmark paper by Wilson and Jungner published in 1968. In that paper, the authors formulated ten criteria for screening for disease [18]. Two central criteria are the availability of an accepted treatment for patients with recognized disease and of facilities for diagnosis and treatment. Many therapeutic strategies and interventions have been proven to be reasonably effective in treating mental disorders [19]. However, meeting the Wilson and Jungner criteria with respect to screening with the K10 for mental disorders to be used in disability assessments, is problematic. Although work directed interventions combined with cognitive behavioral therapy seem to have a positive effect on RTW for absentees with common mental health problems [20-22], up until now, there are no specific interventions with proven (cost) effectiveness for RTW after two years of sickness absence of persons with a previously undetected mental disorder. Detecting a hitherto concealed mental health problem by screening may result in adequate evaluation of related impairments and limitations, and may contribute to the quality of the disability

assessment. Therefore, the unavailability of effective treatment notwithstanding, we propose to employ the K10 as a standard screening instrument in every disability assessment by the SSI. Answers of claimants on separate items of the K10 may guide the following disability assessment interview, aiming to either identify or exclude an actual mental health disorder.

### Diagnosis of adjustment disorder

The prevalence of adjustment disorder (AD) in the cohort of disability claimants was assessed with the *Diagnostic Interview Adjustment Disorder* (DIAD), a newly developed and validated instrument to make up for a diagnostic deficiency of the CIDI. Since the criteria in the DSM-IV for the diagnosis AD are vague and a-specific, we operationalized criteria based on the literature and through iterative discussion in the research group. Initial content and construct validation shows the DIAD to be of potential value for the diagnosis of AD.

The DIAD was developed as a research instrument and in its present form is not suitable for use in the daily practice of IP's. Initially, we considered the DIAD to be a secondary product of our study. However, soon we recognized the development and the subsequent validation of the DIAD as a starting point of interesting further research. Our study on the validity of the DIAD is a first initial step in a more comprehensive future validation process. Further studies on reliability and validity of the DIAD are clearly needed. Therefore, we did not include AD diagnosed by the DIAD in our study on under-diagnosis and under-treatment of mental disorders, nor did we include AD as independent variable in our study on predictors of functional improvement and RTW. It can not be excluded that this has influenced the results of the studies that used the CIDI, by diagnosing depression or anxiety disorders, while in fact adjustment disorders are present. By not using the DIAD in these studies, the prevalence of DSM-IV classifications may have been overestimated.

### UNDER-TREATMENT OF MENTAL DISORDERS

We found almost 50% of 12-month DSM-IV classifications of either a major depression or a general anxiety disorder, and 80% of social phobia to be undertreated. Large general population surveys have shown a dose-response relationship between mental disorder severity and probability of treatment: the proportion in treatment is much higher among serious cases than among moderate cases [23]. Results from other studies imply that most primary care patients adequately estimate their need for care: untreated patients without a self-perceived need had relatively mild mental health symptoms and were probably able to solve their problem themselves [24].

However, our study identifies a large subgroup of disability claimants reporting severe impairment and disability without ever having received adequate treatment. We defined treatment as being adequate had it started within three years after the onset of symptoms. This period includes the two years between the first day of sickness absence and the moment disability benefit was claimed. In this period, claimants are likely to have been in the care of several medical doctors, i.e. general practitioners, medical specialists, occupational physicians (for sick listed workers with an employment contract) and IP's (for sick listed temporary agency and unemployed workers). It seems that in these contacts,

respondents with an under-treated mental disorders, did not present mental health symptoms. As a consequence, need for treatment was likely not to have been discussed, despite the severity of symptoms. Our study does not give information as to the reasons why these respondents did not disclose their mental health problem and need for treatment in prior contacts. In general, in studies on depression and anxiety, many patient-centered barriers to treatment were identified: a preference to self-manage mental health problems, inability to afford treatment, lack of health insurance, shame, stigma and perceived lack of effectiveness of treatment [24-26]. However, barriers to treatment may also be physician-centered. Since adequate recognition of a mental health problem is a prerequisite for adequate treatment, under-recognition is likely to be an important physician-centered barrier to treatment.

IP's assessing disability benefit claims focus on the evaluation of the medical condition (disease, symptoms, impairments), the functional status (limitation of activities) and rehabilitation efforts [27]. For their assessment of diagnosis and treatment of the disorder(s) as cause of disability, IP's rely in part on historic and actual medical data provided by occupational and treating physicians. When barriers to treatment, whether patient- or physician-centered, have not been overcome in the preceding period of sickness absence, disability claimants may have a mental health problem that has never been recognized nor adequately treated.

## **PROGNOSIS**

### **Predicting disability in other studies**

In our systematic review of the literature, we could only include seven articles, of which four used the same cohort. From these few studies, age older than 50 years was found to be a strong predictor of continuing disability and longer time to RTW. For a number of other prognostic factors we found limited evidence, some more or less consistent with findings in related literature, i.e. mental health factors, history of previous sickness absence, negative recovery expectation, socio-economic status, unemployment, quality and continuity of occupational care. Some other prognostic factors conflict with existing evidence, i.e. gender, level of education, sole breadwinner and supervisor support.

In the studies included for this review, the duration of disability at baseline varied from two to more than 90 days. Prognostic factors to predict future improvement and work status may be disability-phase specific and are likely to change over time [28]. This entails that the predictors we found in the studies included in our systematic review, may very well differ from factors in a population of persons claiming disability benefit after two years of sickness absence. We concluded our review by stating that there is still great need for high quality cohort studies to find relevant prognostic factors of long term disability among benefit claimants with mental health problems.

### **Predicting disability in the present study**

The prognostic cohort study presented in this thesis was designed to describe positive changes in functioning and work status in the period after the disability benefit claim and to examine associated factors. For analysis, we defined change as substantial functional improvement and a positive work status after one year follow-up. In this analysis, all

diagnoses certified as cause of disability were included, both somatic and mental. We did not use CIDI outcomes, i.e. DSM-IV classifications of mental disorder, but among others included other factors related to mental health, i.e. psychological distress, alcohol use, coping and mental health care use, as independent variables.

In a separate study, we investigated whether substantial functional improvement could be predicted by both claimant and insurance physician. Both were found to be able to predict improvement of functioning hardly better than chance. In our study that included more potential predictors, we found a discrepancy between functional improvement and a positive change in work status: of those not having paid work at baseline and reporting substantial functional improvement, only few returned to work during follow up. Although substantial functional improvement was common in the cohort, we found only one significant factor to predict it, i.e. poorer general mental health at baseline. Apparently, other unknown factors not included in our study, were also associated with functional improvement. Although RTW after one year follow-up was rare, we found for claimants having paid work at baseline a more than sixteen fold increased odds of having paid work one year later. We only found one other significant, albeit weak predictor associated with work status after one year follow-up. Contact with a medical specialist in the three months preceding baseline, was negatively associated with having paid work one year later.

### **Interpretation of results**

Few claimants returned to work after the claim assessment, although many reported substantial functional improvement. Effective re-assessments of disability benefit, followed by rehabilitation support for those able to work, might prevent claimants to remain in permanent disability benefit. Theoretically, expectations of claimants themselves and of the IP's assessing the claim may target such re-assessments. However, neither prediction can be used to plan effective re-assessments due to their limited accuracy. A screening procedure with a reliable and valid screening measure preceding such re-assessments might be able to select those showing clinically significant functional improvement. However, such a screening tool is not available as yet.

The finding that poorer mental health at baseline predicts functional improvement one year later, seems counter-intuitive. This unexpected association may be explained by assuming that initial poor mental health resulting from stress surrounding the assessment by the SSI, improves over time and in turn leads to better functioning. We found confirmation for this process by a Norwegian study that examined health status before, during and after disability benefit award. That study found symptom improvement towards pre-benefit levels after the claim [29]. In our study, it seems that some health complaints in disability claimants are temporary and might be associated with the disability assessment process itself. Claimants may experience relative financial security after the definitive assessment of their disability benefit claim after having been on sick leave for two years, improving self-perceived mental health and functioning. If so, re-assessments may nourish feelings of insecurity anew, possibly resulting in more distress, worsening of functioning and increased disability. This mechanism might contribute to keeping disability beneficiaries trapped in permanent disability.

The very strong association between work status at baseline and after one year follow-up clearly illustrates the importance of RTW as early as possible, preferably during the sickness absence preceding the disability benefit claim. Finally, we only found one other significant, albeit weak predictor associated with work status after one year follow-up: contact with a medical specialist in the three months preceding baseline, was negatively associated with having paid work one year later. In our view, this weak association can be totally explained by the assumption that among those likely to visit medical specialists more often, severe and disabling somatic medical conditions are more prevalent. No other medical factors were found.

### ►METHODOLOGICAL CONSIDERATIONS◀

With regard to methodology, the studies included in this thesis have strengths and limitations. They have been discussed in the chapters describing the separate studies. Three methodological issues need to be examined more closely since they may affect all studies described in this thesis (except the systematic review). The first concerns the study design. The second methodological issue concerns validity, related to our use of the DSM-IV classification system and the CIDI, matching the DSM-IV. The third issue is whether the results can be generalized to larger populations of disability claimants.

#### STUDY DESIGN

The study design has several important strengths. To our knowledge, it is the first prognostic study investigating long-term disability and (mental) health in a population of disability claimants. It was designed as an inception cohort study conform methodological standards [30]. Participants were identified at a uniform time point, i.e. the moment disability was claimed after two years of sickness absence. The study population was recruited at only one regional SSI office, facilitating optimal management of the PREDIS project with the researcher on site. The cohort was followed up for a sufficient period of time for the outcomes to occur. Data were collected prospectively. Apart from the DIAD, the study used existing measures with proven reliability and validity. Relevant domains of the International Classification of Functioning, Disability and Health (ICF) model [31] were covered, including the assessment of disorder related factors, impairments, activities, work status, and personal and environmental factors. The study covered diagnosis of almost all potential DSM-IV classifications of mental disorders. A further strong point is the linkage of questionnaire and interview data to reliable registry data, i.e. certified ICD-10 classifications of somatic and mental disorders, loss of earning capacity (LEC) and work status.

The aim of our cohort study was to obtain information about the target population, i.e. all persons claiming disability benefit after two years sickness absence at the SSI in the Netherlands. Ideally, participants should have been recruited from the target population using a random selection procedure. However, we considered random selection not feasible, since we expected it to result in unacceptable logistic complexities and high project costs. Instead, we organized the study at only one regional SSI office, servicing

only the northern region of the Netherlands. By doing this, we tried to balance a less complicated project management and lower costs with possible selection bias by sampling error. We could not base our expectations about the response rate on literature, so we were prepared for a low response rate. Therefore, to guarantee adequate estimation of any selection bias resulting from a low response rate, we made certain that relevant and reliable data on demography and certified diagnosis of the target population and of non-responders were available to us from the SSI registry. Although, in our opinion, we have done our utmost to achieve the optimum, eventually the response rate turned out to be low at 24.3%. There may have been several reasons for this low response. It may be due to the stepped informed consent procedure. The same consent procedure was used in another Dutch study on mental health problems among long term work disabled persons with a response rate that was comparably low [32]. The low response rate in the present study may also be related to the comprehensiveness of our measures, i.e. a lengthy psychiatric interview (CIDI). This may have kept eligible participants from giving consent.

## **VALIDITY OF THE DSM-IV AND THE CIDI**

### **DSM-IV classification system**

Throughout this thesis, we have used the DSM-IV classification system as gold standard for the diagnosis of mental disorders. However, the use of the DSM-IV may be questioned, since there is no gold standard in the field of psychiatry for the diagnosis of mental disorders and it is very unlikely that there will ever be one. Although the DSM-IV is widely accepted and used by clinicians and researchers in diverse contexts for the classification of mental disorders, it is subject to criticism relating to its supposed lack of reliability and validity. Different studies on inter-rater reliability of different DSM-IV classifications using a structured clinical interview for DSM-IV (SCID) [33], show considerable ranges of rater agreement [34,35]. Opponents question whether the DSM-IV classifications are valid, i.e. describe discrete disease entities that really exist. Theoretically, the validity of the DSM-IV could be assessed by comparing the outcomes of clinical interviews assessing mental disorder conform the DSM-IV, with an infallible gold standard, e.g. a biochemical or genetic etiological marker, or findings from neuro-imaging techniques. However, such gold standards do not exist.

The American Psychiatric Association (APA) published the first edition of the DSM in 1952. Since then, the DSM have included an increasing number of categories of mental disorder, from 106 disorders in the DSM-I with 119 pages to the DSM-IV published in 1994, listing 297 disorders in 911 pages. The proliferation of classifications from the DSM-I to the DSM-IV may have led to increasing rates of psychiatric comorbidity. Indeed, many studies found high rates of co-occurring DSM-IV diagnostic categories [36], suggesting that the DSM-IV defines boundaries that do not actually exist in real nature and that categories represent different aspects of larger underlying complexes, rather than discrete diseases,

For the diagnosis of mental disorders, the DSM-IV uses polythetic criteria sets in a categorical system. For example, a minimum of five criteria out of ten are sufficient to classify for borderline personality disorder. Thus, 256 different combinations of criteria for this disorder are possible. Clearly, this diagnostic heterogeneity also affects the validity of the DSM-IV.

The DSM-IV claims to be a-theoretical. However, since it represents consensus among a group of psychiatrists involved in the development of the DSM-IV, the system obviously reflects current views on mental health, on how normal can be delineated from abnormal, and on how mental illness is classified. Furthermore, another important aspect of the a-theoretical approach of the DSM-IV is the disregarding of any environmental factor related to the mental health complaints. Many critics argue that this has led to substantial over-diagnosis of mental disorders, both in research and in clinical practice [36].

Given the limited validity of the DSM-IV, it cannot be excluded that in some cases, the DSM-IV used in this thesis has labeled normal life problems with a mental disorder. In general, a false-positive psychiatric label is harmful for the individual and may hinder future participation. In this thesis, the DSM-IV may have classified depressive symptoms in a disability claimant, naturally occurring after stressing events, e.g. unemployment and financial mishap after job loss, as meeting criteria for a full major depressive disorder in need of treatment. Such claimant might benefit more from empathetic support, i.e. adequate rehabilitation aimed at RTW, than from any psychiatric treatment. In fact, wrongfully indicated psychiatric treatment is likely to have an adverse effect on return to work and participation. However, in our study described in Chapter 3, we show that the DSM-IV classifications of mental disorders were predominantly serious in terms of disability and days out of working role. So, even if these mental disorders were misclassified, claimants were recognized as having serious problems with invalidating consequences likely to be in need of adequate intervention aimed at return to work.

The developers of the DSM-IV forewarn not to use the system in a cook book fashion and require that specific diagnostic criteria serve as mere guidelines to be additionally informed by clinical judgment [37]. Therefore, in the studies described in this thesis, any misclassification by the DSM-IV might have been prevented only if the CIDI was followed up by sound clinical judgment through specialist consultation. This is clearly beyond the scope of this thesis.

### **Composite International Diagnostic Interview**

The validity of the CIDI used in this thesis, may be limited due to factors related to the DSM-IV. These factors are discussed in the previous section. The validity of the CIDI may also be limited due to methodological problems within the CIDI itself, resulting in biased responses. According to the developers of the CIDI, these methodological problems may arise when respondents are unable to comprehend questions and tasks in the CIDI, and are not motivated and unable to answer accurately [38].

First, in the PREDIS cohort, that consisted of relatively higher educated respondents, bias due to decreased question comprehension and task understanding is not likely. Second, claimants might be less motivated to answer accurately, since many CIDI questions deal with potentially embarrassing and stigmatizing experiences. Since we found substantial under-diagnosis and under-treatment among respondents, it cannot be excluded that shame and stigma have resulted in inaccurate responses. If so, the prevalence of DSM-IV classifications of mental disorders in this thesis may have been underestimated. Third, in theory, persons claiming disability benefit might be less motivated to give accurate responses and might have overstated their mental complaints

hoping to be considered for higher benefit. This may have overestimated the prevalence of DSM-IV classifications of mental disorders. However, in the information letter we sent to all eligible disability claimants, we stated explicitly that participation in the PREDIS cohort study would not influence the disability assessment by the SSI nor its outcome. Fourth, the ability of claimants to answer accurately might also have been influenced by fatigue and loss of concentration due to the lengthy CIDI interview time. The entire CIDI takes an average of approximately two hours to administer in most general population samples [38]. However, in the PREDIS cohort of claimants, in many cases the interview lasted up until three to four hours, depending on the number of diagnostic sections for lifetime classifications for which respondents screened positive. The high prevalence of DSM-IV comorbidity we found among CIDI completers ( $n=346$ ), is an indication of interview time: the prevalence of more than one lifetime mental disorder was 58%. So, more than half of the CIDI's administered are likely to have lasted more than two hours. To minimize response bias, interviewers were instructed to be alert and if respondents showed any signs of fatigue, to ask them whether they felt able to complete the CIDI in one session. If not, the remaining interview was administered at a later moment within one week. Administering the CIDI in two separate sessions was only necessary in very few cases. Therefore, it is unlikely that fatigue and loss of concentration have biased CIDI responses.

### GENERALIZABILITY

The low response rate (24.3%) of the PREDIS study requires careful assessment of generalizability of the results. The study population was sampled at two levels: from all persons claiming disability benefit at a local SSI office (level 1), servicing three northern provinces of the Netherlands (level 2). To assess generalizability at level 1, we compared responders with non-responders. To assess generalizability at level 2, we compared the study sample with the target population of all persons claiming disability benefit in the Netherlands. At both levels, we found no significant differences as to gender and prevalence of ICD-10 classifications of somatic and mental disorder certified by the IP as cause of disability. However, at level 1 we found responders to be significantly older than non-responders, and at level 2 we found the study sample to be significantly older and higher educated than the target population.

The difference in age and educational level may have resulted in biased prevalence rates of mental disorder by selection. In general, poor mental health is prevalent at all ages with the highest prevalence occurring in the youngest age groups [39]. Prevalence rates of mental disorders found in the present study may therefore be an underestimation. It is difficult to estimate whether over-inclusion of respondents with higher education in the study sample has led to selection bias as to prevalence of mental disorder, since the association of level of education with prevalence rate of mental disorder is not clear [40]. It is generally assumed that higher prevalence is found among lower educated persons [39]. Therefore, the prevalence of mental disorder in the study sample may also have been underestimated due to the over-inclusion of higher educated respondents. Caution is needed generalizing our research findings to populations in countries outside the Netherlands with different legislations and social security systems.

## ›IMPLICATIONS FOR PRACTICE‹

The results of the PREDIS cohort study may have practical implications for stakeholders, in the first place for IP's involved in disability benefit assessments, but also for occupational physicians and IP's in occupational care, for treating physicians, whether general practitioners or medical specialists, and for policy makers at government and employer level. Some of the implications listed below may apply to more than one of the mentioned stakeholders.

### Insurance physicians should ...

- be aware of a possible long prior history of poor mental health in claimants. In disability assessment interviews, they should carefully take claimants medical history to identify factors related to impaired past work performance and reporting sick.
- improve skills to diagnose mental disorders among disability claimants. In disability assessment interviews, they should more closely adhere to their professional guidelines and explicitly inquire about any mental health problems, even if a somatic disorder seems to be the only cause for the disability claimed. They should use the scores on separate items of the K10 as an agenda for the follow-up disability assessment interview to ascertain the presence or absence of a present state mental disorder.
- be aware of substantial under-treatment of serious mood and anxiety disorder among disability claimants and patients. They should explicitly ask whether claimants or patients have been adequately treated in the past. Since most IP's do not have much treatment experience, they may need professional training to be able to assess whether treatment was adequate. Once under-treatment has been ascertained, IP's should closely collaborate with professionals in primary, secondary and occupational mental health care to promote effective treatment and multidisciplinary interventions aimed at health improvement, occupational rehabilitation, return to work and prevention of permanent disability.
- be aware that poor mental health reported by claimants at the disability assessment interview may be associated with distress resulting from the disability assessment process itself and that it may improve after the claim assessment. They should be able to discriminate between impairments that may be related to temporary self-reported health problems caused by the disability assessment process and impairments more likely to be related to the underlying medical condition.
- be aware of possible adverse effects on future RTW after the awarding of full disability benefit with a favorable prognosis of recovery. When re-assessing these claims, they should be aware that failure to return to work of beneficiaries may be related to the disability assessment process, rather than to the underlying medical disorder(s).
- more communicate and cooperate with treating physicians to harmonize policies on diagnostics, treatment and disability management for claimants with less disabling conditions who continue to receive specialist care after the disability benefit claim.

**Occupational physicians should ...**

- be aware that many mental health problems have onsets in early working careers, often co-occur with other mental and somatic disorders and may lead to future long-term sickness absence and disability if undetected and not adequately treated.
- not only focus on sick leave assessment once an employee has called in sick, but also on prevention of sickness absence and disability. They should include counseling and treatment of workers at risk, while at the same time being careful not to medicalize normal life problems.
- target prevention of long-term sickness absence especially at older workers who run a higher risk of continuing disability due to mental health problems.
- optimally contribute to return to work of sick listed workers in the period before disability benefit is claimed to prevent continued or permanent work disability thereafter.

**Treating physicians should ...**

- be aware that many mental health problems have early onsets and high comorbidity, and may lead to future long-term sickness absence and disability if undetected and not adequately treated in primary or secondary care.
- seek more communication and cooperation with occupational physicians and IP's on diagnostic, treatment and workability issues of sickness absentees and disability claimants.

**Policy makers should ...**

- support development and implementation of effective strategies to prevent sickness absence among older workers.
- consider to implement the first disability benefit assessment at an earlier moment than after two years of sickness absence.
- facilitate effective re-assessments of claimants disability with partial or full disability benefit with a favorable prognosis, while providing financial security after benefit-loss by tailor-made interventions aimed at swift return to paid employment.

**►RECOMMENDATIONS FOR FURTHER RESEARCH◀****RESEARCH IN PREDIS**

For this thesis, we used not all the data available in the PREDIS dataset. First, we did not use the data collected with the self-report questionnaire at the intermediate measurement Tvar. In further research, we plan to examine the agreement between IP prognosis of functional improvement and actual functional improvement as reported in the WHODAS section of the Tvar questionnaire, and to analyze the associations between these two outcomes and independent variables, i.e. demographics, diagnosis of mental disorder, coping, social support and health care use. Second, we also did not use the diagnostic data collected after one year follow-up with the shortened version of the CIDI, generating

12-month DSM-IV classifications of mental disorders. In further research in the PREDIS cohort, it would be interesting to assess the incidence rate of DSM-IV classifications of mental disorders, and to examine factors associated with the development (or termination) of mental disorders during follow-up. Third, we plan to examine associations of under-diagnosis by IP's and under-treatment of DSM-IV mood and anxiety disorders with functional improvement and work status of disability claimants.

### RESEARCH RELATED TO PREDIS

First, we recommend to study the effect of introducing the K10 as tool to screen for mental disorders in disability assessments by IP's of the SSI. In such a study, important research questions are whether K10-screening results in higher prevalence of undertreated mental disorders and initial increased disability benefit inflow. Second, the content of the DIAD should be further validated and its reliability should be assessed through test-retest and inter-rater reliability studies. Concurrent validity should be assessed by comparing DIAD outcome with those of clinical psychiatric interviews that include the diagnosis AD.

### OTHER DISABILITY RESEARCH

Of the 31 independent variables we included in the study investigating prognostic factors, we found only one factor to predict functional improvement and three significant factors to predict future work status. Other prognostic studies in all-cause disability research have identified older age, history of sickness absence, severity of symptoms, high job demands, contact with medical specialists, perceived work attitude, self-efficacy and perceived social support to predict long-term sickness absence [9,33,34]. Some of these factors were also included in our study, but we found them not to be significant predictors. This may be due to population differences: those studies were conducted in populations of workers on sickness absence with a duration much shorter than two years. As stated before, prognostic factors of future improvement and work status may very well be disability-phase specific, likely to change over time [27]. Other factors may play a role that were not included in the present study. Therefore, there is still need for prognostic cohort studies focusing on mental health, including claimants on long-term disability benefit using recovery of health and functioning, and RTW as primary outcome measures. These may aim at replicating findings of the present study, but also at identifying other factors, that may influence the course of disability after the claim.

The results of our study show that if one loses one's job in the period leading up to the claim, the probability of returning to some form of employment in the year after the claim becomes very low. It might be hypothesized that a disability benefit assessment at an earlier moment, when a sick listed worker has not yet lost contact with work, may be more effective in supporting claimants to return to work. Further study should inform whether this hypothesis holds. Our finding that poorer mental health at baseline predicts functional improvement one year later, might be an unintended effect of the disability process itself. It is recommended to conduct studies to explore whether such effects actually exist and whether they keep claimants off work and, if so, how this may be prevented. We recommend to assess and compare the validity of functional status

rating scales to screen for re-assessment eligibility, e.g. by the WHODAS, and of other instruments that are potentially suitable to assess functioning in this population.

IP's and treating physicians need to improve their communication and should cooperate to prevent negative consequences of under-diagnosis and under-treatment, and to promote participation of those able to work, despite limitations. They need to find common goals to enable bilateral cooperation, e.g. by joint professional training, taking part in joint meetings to discuss patients/claimants or brief mutual internships. More multidisciplinary professional guidelines can be developed, integral addressing issues of work and health. Whether these activities contribute to improve diagnosis, treatment and participation of claimants with poor mental health warrants further study.

Longitudinal general population studies are required to prospectively assess the long-term effect of under-diagnosis and under-treatment of mental disorders on work ability, sickness absence and disability, and return to work at any moment before or after the disability claim assessment. For such studies large populations must be included. Also, behavioral characteristics, e.g. motivation and self-efficacy, should be included as secondary outcomes. A possible negative effect on RTW of the disability benefit system needs clarifying. Preferably, such future cohort studies should be preceded by pilot studies in which methods are designed to improve response rates. In some countries large population based cohorts and biobanks are being built with follow-up time of many years to investigate universal risk factors and their modifiers for multifactorial diseases. Such cohort studies primarily target risk factors for single and multiple diseases. Additionally, risk factors for decreased work ability, sickness absence and disability should be included in these large multidimensional cohort studies.

**REFERENCES**

- 1 ESEMeD/MHEDEA 2000 Investigators, European Study of the Epidemiology of Mental Disorders (ESEMeD) Project. Prevalence of mental disorders in Europe: results from the ESEMeD project. *Acta Psychiatr Scand Suppl* 2004;420:21-27.
- 2 Laitinen-Krispijn S, Bijl RV. Mental disorders and employee sickness absence: the NEMESIS study. *Netherlands Mental Health Survey and Incidence Study. Soc Psychiatry Psychiatr Epidemiol* 2000;35:71-77.
- 3 Kessler RC, Chiu WT, Demler O et al. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry* 2005;62:617-627.
- 4 Lecrubier Y. Widespread underrecognition and undertreatment of anxiety and mood disorders: results from 3 European studies. *J Clin Psychiatry* 2007; 68(Suppl 2):36-41.
- 5 Eisenberg L. Development as a unifying concept in psychiatry. *Br J Psychiatry* 1977;131:225-37.
- 6 Rutter M, Dunn J, Plomin R et al. Integrating nature and nurture: Implications of person-environment correlations and interactions for developmental psychopathology. *Development and Psychopathology* 1997;9 ; 335-364.
- 7 Kluiters H, Ormel J. *Psychiatric Epidemiology: Background, Methods and Techniques*. In: *Handbook Psychiatric Epidemiology* (in Dutch: *Handboek Psychiatrische Epidemiology*). 1999, Elsevier/De Tijdstroom, Maarsse.
- 8 Fuller T. *Gnomologia: Adagies and Proverbs; Wise Sentences and Witty Sayings, Ancient and Modern, Foreign and British*. 1732, Barker, Bettesworth and Hitch, London.
- 9 ESEMeD /MHEDEA 2000 investigators. 12-Month comorbidity patterns and associated factors in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatr Scand* 2004; 109(Suppl. 420): 28-37.
- 10 de Graaf R, Bijl RV, ten Have M et al. Rapid onset of comorbidity of common mental disorders: findings from the Netherlands Mental Health Survey and Incidence Study (NEMESIS). *Acta Psychiatr Scand* 2004; 109: 55-63.
- 11 Scott KM, Bruffaerts R, Tsang A et al. Depression-anxiety relationships with chronic physical conditions : results from the World Mental Health surveys. *Journal of Affective Disorders* 2007; 103:113-120.

- 12 Scott KM, Von Korff M, Alonso J et al. Mental–physical co-morbidity and its relationship with disability: results from the World Mental Health Surveys. *Psychological Medicine* 2009; 39:33–43.
- 13 Geerlings SW, Beekman ATF, Deeg DJH et al. Physical health and the onset and persistence of depression in older adults: an eight-wave prospective community-based study. *Psychological Medicine* 2000;30:369–380.
- 14 Katon W, Ciechanowski P. Impact of major depression on chronic medical illness. *Journal of Psychosomatic Research* 2002; 53:859–863.
- 15 Soegaard HJ, Bech P. The effect on length of sickness absence by recognition of undetected psychiatric disorder in long-term sickness absence. A randomized controlled. *Scand J Public Health* 2009;37: 864–871
- 16 Kessler RC, Andrews G, Colpe LJ et al. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychol Med.* 2002;32:959–76.
- 17 van der Feltz-Cornelis CM, Hoedeman R, de Jong FJ et al. Faster return to work after psychiatric consultation for sicklisted employees with common mental disorders compared to care as usual. A randomized clinical trial. *Neuropsychiatr Dis Treat* 2010;6:375–85.
- 18 Wilson JMG, Jungner G. Principles and practice of screening for disease. Geneva: WHO; 1968.
- 19 Kaplan HI, Sadock BJ. *Comprehensive Textbook of Psychiatry*. Lippincott, Williams and Wilkins. 2009, Philadelphia, USA.
- 20 Rebergen DS. Effectiveness of guideline-based care of workers with mental health problems (Dissertation). 2009. Free University Amsterdam, The Netherlands.
- 21 Nieuwenhuijsen K, Bultmann U, Neumeyer-Gromen A et al. Interventions to improve occupational health in depressed people. *Cochrane Database Systematic Reviews*, 2, CD006237.
- 22 Arends I, Bruinvels DJ, Rebergen DS et al. Interventions to facilitate return to work in adults with adjustment disorders. *Cochrane Database Systematic Reviews*, 10, CD006389.
- 23 WHO World Mental Health Survey Consortium. Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *JAMA* 2004;291:2581–90.

- 24 van Beljouw I, Verhaak P, Prins M et al. Reasons and determinants for not receiving treatment for common mental disorders. *Psychiatr Serv* 2010;61:250-7.
- 25 Nutting PA, Rost K, Dickinson M et al: Barriers to initiating depression treatment in primary care practice. *Journal of General Internal Medicine* 2002; 17:103-111.
- 26 Olfson M, Guardino M, Struening E et al. Barriers to the treatment of social anxiety. *Am J Psychiatry* 2000;157:521-7.
- 27 de Boer WEL, Besseling JJM, Willems JHBM. Organisation of disability evaluation in 15 countries. *Pratiques et organisation des soins*. 2007, 38:205-217.
- 28 Franche RL, Krause N. Readiness for return to work following injury or illness: conceptualizing the interpersonal impact of health care, workplace, and insurance factors. *J Occup Rehabil*. 2002;12(4):233-256.
- 29 Øverland S, Glozier N, Henderson M et al. Health status before, during and after disability pension award: the Hordaland Health Study (HUSK). *Occup Environ Med* 2008;65:769-773.
- 30 Altman DG Systematic reviews of evaluations of prognostic variables. *BMJ*. 2001;323(7306):224-8.
- 31 World Health Organization. International classification of functioning, disability and health (ICF). Geneva, World Health Organization, 2001.
- 32 Langerak W, Langeland W, Draijer N et al. Diagnostics and classification of psychiatric disorders in a cohort of long-term work disabled persons due to mental health problems (in Dutch: Diagnostiek en classificatie van psychiatrische aandoeningen bij een steekproef van langdurig psychisch arbeidsongeschikten) *Tijdschr Bedrijfs Verzekeringsgeneeskd*. 2011;19:14-21.
- 33 First MB, Spitzer RL, Williams JW et al. Structured Clinical Interview for DSM-IV (SCID 1). New York: New York Biometric Research Department, 1995.
- 34 See: [http://www.scid4.org/psychometric/scidII\\_reliability.html](http://www.scid4.org/psychometric/scidII_reliability.html). Accessed May 3rd 2013.
- 35 See: [http://www.scid4.org/psychometric/scidII\\_validity.html](http://www.scid4.org/psychometric/scidII_validity.html). Accessed May 3rd 2013.
- 36 Maj M. 'Psychiatric comorbidity': an artefact of current diagnostic systems? *British Journal of Psychiatry* 2005, 186:182-184.
- 37 Diagnostic and Statistical Manual of Mental Disorders. 4th ed. (DSM-IV), 1994. Washington D.C.: American Psychiatric Association; 1994. Introduction xxiii.

- 
- 38 Kessler, RC, Ustun TB. The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *The International Journal of Methods in Psychiatric Research*, 2004;13(2), 93-121.
  - 39 WHO International Consortium in Psychiatric Epidemiology. Cross-national comparisons of the prevalences and correlates of mental disorders. *Bull World Health Organ* 2000;78:413-26
  - 40 ESEMeD/MHEDEA 2000 Investigators. Prevalence of mental disorders in Europe: results from the ESEMeD project. *Acta Psychiatr Scand* 2004;420:21-7.



## X SUMMARY

---

The general aim of this thesis is to generate knowledge on socio-demographic characteristics, diagnosis and treatment of mental disorders in a population of persons claiming disability benefit after two years of sickness absence, and to identify factors that predict functional improvement and return to work (RTW) in the period after disability benefit has been claimed and assessed.

**Chapter 1** introduces the topic of this thesis by providing background data on the epidemiology of mental health and disability. To prevent permanent disability, knowledge is needed on socio-demography, diagnosis and treatment of claimants with mental disorders, and to identify factors that predict improvement of functioning and RTW after disability benefit has been claimed. In this thesis the *International Classification of Functioning, Disability and Health* (ICF) is used, a bio-psycho-social classification system that defines disability as an umbrella term for impairments, activity limitations, and participation restrictions. This introductory chapter provides general information on how mental disorders are classified and assessed in this thesis. For the classification of mental disorders, we used the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). For assessment, we used the *Composite International Diagnostic Interview* (CIDI). A new structured interview especially developed for this thesis to make up for a diagnostic deficiency in the CIDI, is introduced: the *Diagnostic Interview Adjustment Disorder* (DIAD).

**Chapter 2** describes setting, design and methods of PREDIS (PREdicting DISability), a prospective cohort study with one year follow-up on mental disorders and long-term work disability among persons claiming disability benefit after two years of sickness absence. Participants were recruited from October 1, 2008 to March 31, 2010 at a regional office of the Dutch Social Security Institute (SSI), servicing the northern region of the Netherlands. The response rate was 24.3%. All diagnoses certified as cause of disability were included, both mental and somatic. Participants (n=375) were measured at two time points, at baseline after the assessment of their disability benefit claim (To) and after one year (T1). Participants with a favorable prognosis of functional improvement according to the SSI insurance physician assessing the disability claim, were measured at an intermediate time point during follow-up (Tvar), i.e. in the month their functioning was predicted to have been improved. At these time points, a self-report questionnaire was used to assess socio-demographic characteristics, mental health (*General Health Questionnaire* with 12 items, GHQ-12), psychological distress (*Kessler Psychological Distress Scale* with 10 items, K10), alcohol use (*Alcohol Use Disorder Identification Test*, AUDIT), functioning (*World Health Organization Disability Assessment Schedule*, WHODAS), health care utilization (*Trimbos/iMTA questionnaire for Costs associated with Psychiatric Illness*, TiC-P), coping (*Utrecht Coping List* with 15 items, UCL) and social support (*Social Support Questionnaire for Transactions and Satisfaction*, SSQT/SSQS). At To and at T1, respondents were interviewed at their home by trained lay interviewers with the CIDI and the DIAD to provide diagnostic data on DSM-IV classifications of mental disorders. Not all participants

were re-interviewed at T1. Eligibility was determined by a screening procedure to identify participants at risk for a mental disorder. Data obtained with the questionnaires and the CIDI were linked to registry data obtained from the SSI on ICD-10 classifications of somatic and mental disorders certified as cause of disability, disability assessment outcomes and work status.

**Chapter 3** provides information on prevalence, comorbidity, age-of-onset and severity of mental disorders among persons in the PREDIS cohort. We performed a cross-sectional analysis at baseline (T0) of data provided by CIDI completers (n=346) within the cohort. CIDI data on DSM-IV classifications of mental disorders, age-of-onset and severity were linked to SSI registry data on demographics and ICD-10 classifications of somatic disorders certified as primary cause of disability.

The mean age of respondents was 49.8. The prevalence of DSM-IV classifications was 69.9% for lifetime, 44.5% for 12-month and 25.4% for 30-day mental disorders. The most prevalent categories of mental disorders were mood and anxiety disorders with a prevalence of 28.6% and 32.9%, respectively. Mood and most anxiety disorders had onsets in adolescence and early adulthood. Social and specific phobias started at school age. Of all respondents, 33.7% had more than one 12-month mental disorder. Chronic somatic disorders often coincided with 12-month mental disorder. More than two out of three specific mental disorders were serious in terms of disability and number of days out of working role. It was concluded that disability claimants constitute a vulnerable population with a high prevalence of serious mental disorders, substantial comorbidity and ages-of-onset in early working careers.

**Chapter 4** aims to examine under-recognition, under-treatment and severity of DSM-IV classifications of mood and anxiety disorders in the PREDIS cohort. In CIDI completers (n=346), registry codes certified according to the ICD-10 by SSI insurance physicians (IP's) assessing the disability benefit claim, were compared with DSM-IV classifications based on the CIDI. Levels of ICD-10/DSM-IV agreement were assessed for mood and anxiety disorders in the total sample, and prevalence of recent DSM-IV mood and anxiety disorders in a pure ICD-10 somatic subgroup. Under-treatment was defined as a treatment delay of more than 3 years or no treatment at all. Treatment and severity of undertreated DSM-IV mood and anxiety disorders were assessed in two subgroups of disability claimants with either a ICD-10 somatic or mental disorder as primary cause of disability, irrespective of any ICD-10 comorbidity.

Levels of ICD-10/DSM-IV agreement were found to be poor ( $\kappa$ 's: 0.237 for mood and 0.260 for anxiety disorders). In the pure ICD-10 somatic subgroup, the prevalence of DSM-IV mood and anxiety disorders was 3.8% and 11.4%, respectively. In the ICD-10 somatic subgroup irrespective of any ICD-10 comorbidity, 45.2% (major depressive disorder), 80.0% (social phobia) and 53.3% (general anxiety disorder) were undertreated. In the ICD-10 mental subgroup, these percentages were 44.7%, 80.9% and 33.3%, respectively. In both of these subgroups, undertreated DSM-IV mood and anxiety disorders were predominantly serious in terms of impairment and disability. It was concluded that serious mental disorders were substantially underdiagnosed and undertreated among disability

claimants. To optimize diagnosis and treatment of disabling mental disorder, medical professionals in insurance, occupational and in the health care sector should closely collaborate.

**Chapter 5** aims to evaluate the psychometric properties of three short screening scales, the 10- and 6-item *Kessler Psychological Distress Scale* (K10, K6) and the 12-item *General Health Questionnaire* (GHQ-12). These scales were included in the respondent questionnaire, to predict present state mental disorders, classified according to the DSM-IV among disability claimants and were completed by a representative sample from the PREDIS cohort (n=293). The gold standard was the CIDI to diagnose 30-day DSM-IV classifications of mental disorders. Cronbach's alpha's, sensitivity, specificity, positive (PPV) and negative predictive values (NPV), and the Areas Under the receiver operating characteristic Curve (AUC's) were calculated.

Cronbach's alpha's were found to be 0.919 (K10), 0.882 (K6) and 0.906 (GHQ-12). The optimal cut-off scores were 24 (K10), 14 (K6) and 20 (GHQ-12). The PPV and the NPV for the optimal cut point of the K10 was 0.53 and 0.89, for the K6 0.51 and 0.87, and for the GHQ-12 0.50 and 0.82. The AUC's for 30-day cases were 0.806 (K10; 95% CI 0.749-0.862), 0.796 (K6; 95% CI 0.737-0.854) and 0.695 (GHQ-12; 95% CI 0.626-0.765). We concluded that the K10, the K6 and the GHQ-12 are valid scales to screen for present state DSM-IV mental disorder. The GHQ-12 is outperformed by the K10 and K6, which are to be preferred above the GHQ-12. The scores on separate items of the K10 and K6 can be used in disability assessment settings as an agenda for an in-depth follow-up interview to ascertain the presence of present state mental disorder and to assess associated impairments.

**Chapter 6** describes the development and content/construct validation of a fully structured interview for the diagnosis of adjustment disorder (AD), the *Diagnostic Interview Adjustment Disorder* (DIAD). We developed the DIAD by partly adjusting and operationalizing DSM-IV criteria for AD. Eleven experts were consulted on the content of the DIAD. The DIAD was tested in the PREDIS cohort by administering it in combination with the CIDI to a representative sample of respondents (n=323). To assess construct validity of the DIAD, we explored the associations between the AD classification by the DIAD and summary scores of the K10 and the *World Health Organization Disability Assessment Schedule* (WHODAS) by linear regression.

Expert agreement on content of the DIAD was moderate to good. The prevalence of AD in the PREDIS cohort using the DIAD was 7.4%. The associations of AD by the DIAD with average sum scores on the K10 and the WHODAS supported construct validity of the DIAD. It was concluded that the results provide a first indication of the DIAD being a valid instrument to diagnose AD. Further studies on reliability and on other aspects of validity are clearly needed.

**Chapter 7** presents the results of a systematic literature review of current scientific evidence about prognostic factors for mental health related long term disability, RTW and symptom recovery. Searching PubMed, PsycINFO, Embase, Cinahl and Business Source Premier, we selected articles with a publication date from January 1990 to March

2009, describing longitudinal cohort studies with a follow-up period of at least one year. Participants were persons on sick leave or receiving disability benefit at baseline. The methodological quality of included studies was assessed with an established criteria list.

Out of 796 studies, seven articles were included, all of high methodological quality, describing a range of prognostic factors, according to the ICF-model categorized as health-related, personal and external factors. We found strong evidence that older age (> 50 years) is associated with continuing disability and longer time to RTW. There is limited evidence for the association of other personal factors (gender, education, history of previous sickness absence, negative recovery expectation, socio-economic status), health related (stress-related and shoulder/back pain, depression/anxiety disorder) and external i.e. job-related factors (unemployment, quality and continuity of occupational care, supervisor behavior) with disability and RTW. We found limited evidence for the association of personal/external factors (education, sole breadwinner, partial/full RTW, changing work tasks) with symptom recovery.

**Chapter 8** investigates the accuracy of predictions by disability claimants and insurance physicians with regard to improvement of functioning. It is further studied whether the accuracy differs between subgroups of claimants with mental or somatic health conditions. In the PREDIS cohort, data on functioning were obtained at T<sub>0</sub> and at T<sub>1</sub> from respondents by the WHODAS. Both claimants and IPs were asked to predict improvement of functioning. Accuracy of their predictions was assessed by sensitivity, specificity, and Areas Under the receiver operating Curve (AUC's). Mixed logistic regression was conducted to explore differences in accuracy between claimants with mental and somatic conditions.

One third (32%) of disability claimants were found to improve beyond the standard error of measurement. Disability claimants and insurance physicians were able to predict this improvement of functioning, but to a limited extent, with an AUC of 0.61 for insurance physicians and 0.62 for disability claimants. We found no statistically significant differences in the accuracy of the predictions in claimants with mental or somatic health conditions. It was concluded that both insurance physicians and disability claimants were unable to predict improvement with high levels of accuracy, although claimants showed substantial functional improvement during follow up. Alternative ways to screen for eligibility for re-assessments, such as the use of self report instruments over time, should be considered.

**Chapter 9** provides more knowledge on factors that predict functional improvement and work status after the disability benefit claim. In the PREDIS cohort (n=375), logistic regression was used to analyze associations between predictors (demographics, mental health, psychological distress, alcohol use, health care utilization, coping, social support, certified ICD-10 diagnosis, Loss of Earning Capacity, having paid work at T<sub>0</sub>) and outcomes (functional improvement on the WHODAS exceeding the standard error of measurement and work status at follow-up).

Functional improvement on total WHODAS was reported by 32% of claimants. Of those not having work at baseline and whose functioning improved during follow-up

( $n=117$ ), only 10.6% had paid work one year later. We found one predictor of functional improvement: a GHQ-12 sum score  $>20$  (OR 2.9; 95% CI 1.54-5.34;  $p<0.01$ ). We found two factors to positively predict having paid work at T1: having paid work at baseline (OR 16.8; 95% CI 6.55-43.14) and Loss of Earning Capacity  $<80\%$  (OR 4.6; 95% CI 1.87-11.42). One factor was found to negatively predict having paid work at T1: contact with a medical specialist (OR 0.4; 95% CI 0.19-0.87). Only a limited number of factors was found to significantly predict functional improvement and return to paid work after the disability benefit claim, having paid work at baseline being by far the most important factor.

**Chapter 10** presents a general conclusion and discussion focusing on the main findings as to diagnosis, treatment and prognosis of mental disorders. Methodology, i.e. study design, validity of the DSM-IV and the CID-I, and generalizability are discussed and implications for practice and future research are given.

The studies in this thesis show that disability claimants constitute a vulnerable population with a high prevalence of serious mental disorders with early onset that are substantially underrecognized and undertreated. The brief *Kessler Psychological Distress Scale* was found to be a valid screener of poor mental health in a population of disability claimants. Furthermore, the initial validity of a newly developed interview schedule to diagnose adjustment disorder among disability claimants, the *Diagnostic Interview Adjustment Disorders* (DIAD), was shown to be good. Systematically reviewing the literature, only age older than 50 years was found to be a strong predictor of longer duration of disability. Both insurance physicians and disability claimants were not able to predict functional improvement accurately. Many disability claimants were shown to improve in functioning without returning to paid work. Poor mental health was found to predict future functional improvement. Being assessed with no or partial work disability and having paid work at baseline strongly predicted having paid work one year later. Finally, contact with a medical specialist predicted work loss one year later.

The high prevalence of serious mental disorders with onsets in early working careers suggests a long lasting prior history of mental health problems in the period the PREDIS participants were still at work. Moreover, the PREDIS study identifies a substantial number of disability claimants reporting severe disability and days out of the working role without ever having received adequate treatment. It seems that in prior contacts with medical professionals, i.e. treating physicians, occupational physicians and insurance physician in occupational care, many respondents with an undertreated mental disorders, did not present mental health symptoms and need for treatment was not discussed. These findings implicate that these medical professionals should collaborate more closely aiming to optimize diagnostic and treatment of mental disorders, to help prevent long-term disability and to promote return to work in the period preceding the disability benefit claim.

Indications were found of substantial under-diagnosis of mental disorders by insurance physicians assessing the disability claim. This implicates these insurance physicians need to be more aware of diagnosis and treatment of mental disorders among disability claimants. To improve diagnostics, the K10 is recommended as a standard screening instrument in every disability assessment to guide the disability assessment interview.

Substantial functional improvement was found to be common among disability claimants, but both insurance physicians and disability claimants were unable to accurately predict it. Other valid methods to evaluate functional improvement are needed, enabling effective re-assessments of eligible disability beneficiaries.

Of the 31 prognostic factors studied, only one factor, i.e. poor mental health at baseline, was found to be significantly associated with functional improvement. This unexpected finding may be explained by a temporary increase of mental health complaints as a result of insecurity associated with the disability assessment process itself. Despite functional improvement only about 10% of claimants succeeded in returning to paid work after one year follow-up. The very strong association between having paid work at baseline and after one year follow-up clearly illustrates the importance of return to work as early as possible, preferably during the sickness absence preceding the disability benefit claim, even when serious health problems are present.

Recommendations are given for further research. Using the PREDIS data set, associations of under-diagnosis by IP's and under-treatment of mood and anxiety disorders with certified disability, functional improvement and work status of disability claimants are worth investigating. Reliable and valid scales to rate functional status should be developed to screen for re-assessment eligibility. Collaboration between insurance, occupational and treating physicians should be promoted and its effectiveness evaluated. There is still great need for research on modifiable prognostic factors of continuing disability and RTW among benefit claimants with mental health problems.

## X SAMENVATTING

---

Het doel van dit proefschrift is het genereren van kennis over socio-demografische gegevens, diagnose en behandeling van psychische aandoeningen in een populatie van personen die een arbeidsongeschiktheidsuitkering aanvragen na twee jaar ziekteverzuim, en om factoren te identificeren die functionele verbetering en werkhervatting voorspellen na de aanvraag van een arbeidsongeschiktheidsuitkering.

**Hoofdstuk 1** introduceert het onderwerp van dit proefschrift met achtergrondgegevens over het vóórkomen van psychische aandoeningen en daaraan gerelateerde arbeidsongeschiktheid. Psychische aandoeningen komen veel voor in de beroepsbevolking en leiden vaak tot langdurige arbeidsongeschiktheid. Om blijvende arbeidsongeschiktheid te voorkomen is kennis nodig over socio-demografische kenmerken, diagnose en behandeling van psychische aandoeningen onder arbeidsongeschikten, en over factoren die herstel van functioneren en werkhervatting kunnen voorspellen in de periode nadat de claim is ingediend. Om het samenspel tussen psychische aandoeningen, persoonlijke en omgevingsfactoren en psychische arbeidsongeschiktheid beter te begrijpen, wordt de *International Classification of Functioning, Disability and Health* (ICF) als raamwerk gekozen. In dit proefschrift zijn psychische aandoeningen geclassificeerd volgens de *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) en gediagnosticeerd met de *Composite International Diagnostic Interview* (CIDI). Het *Diagnostic Interview Adjustment Disorder* (DIAD) werd speciaal voor dit proefschrift ontwikkeld om aanpassingsstoornissen, die met de CIDI niet kunnen worden vastgesteld, te diagnosticeren.

**Hoofdstuk 2** beschrijft de studieopzet en de methode van PREDIS (PREdicting DISability), een prospectieve cohortstudie met een follow-up van één jaar gericht op op psychische aandoeningen en langdurige arbeidsongeschiktheid. De studiepopulatie bestaat uit personen die na twee jaar ziekteverzuim in het kader van de Wet werk en Inkomen naar Arbeidsvermogen (WIA) een aanvraag indienden voor een uitkering bij de Uitvoeringsinstelling Werknemersverzekeringen (UWV). De inclusieperiode liep van 1 oktober 2008 tot 31 maart 2010 en vond plaats bij het UWV in Groningen, dat de gehele provincie Groningen en een deel van Drenthe bedient. Uiteindelijk waren 375 personen bereid om deel te nemen. De respons was 24.3%. De deelnemende WIA-aanvragers werden op twee momenten onderzocht: vlak na de WIA-claimbeoordeling (To) en één jaar later (T1). WIA-aanvragers bij wie de verzekeringsarts een functionele verbetering voorzag in het jaar na de WIA-claimbeoordeling, werden tussentijds onderzocht op een variabel meetmoment (Tvar) in de maand waarin van verbetering sprake zou zijn. Om vast te stellen of deelnemers voldeden aan de DSM-IV criteria voor een psychische aandoening, werden zij op To en op T1 thuis geïnterviewd met de CIDI en de DIAD door getrainde lekeninterviewers. Niet alle deelnemers werden op T1 geïnterviewd. Na een screeningsprocedure kwamen alleen deelnemers met een verhoogd risico op het hebben van een psychische aandoening voor het interview op T1 in aanmerking. De CIDI-gegevens werden gekoppeld aan gegevens van het UWV over persoonskenmerken,

hoofd- en nevendiagnosen (CAS-code) die door de verzekeringsartsen werden gesteld bij de claimbeoordeling (To), de mate van arbeidsongeschiktheid (To) en werkstatus (To en T1). Daarnaast vulden de deelnemers op To, Tvar (op indicatie) en T1 een uitgebreide vragenlijst in met vragen over demografie, psychische gezondheid (*General Health Questionnaire* met 12 items, GHQ-12), distress (*Kessler Psychological Distress Scale* met 10 items, K10), alcoholgebruik (*Alcohol Use Disorder Identification Test*, AUDIT), functioneren (*World Health Organization Disability Assessment Schedule*, WHODAS), zorggebruik (*Trimbos/iMTA questionnaire for Costs associated with Psychiatric Illness*, TiC-P), coping (*Utrecht Coping List* met 15 items, UCL) en sociale steun (*Social Support Questionnaire for Transactions and Satisfaction*, SSQT/SSQS).

**Hoofdstuk 3** presenteert prevalentie, comorbiditeit, aanvang en ernst van psychische aandoeningen die op het eerste meetmoment To met de CIDI werden gevonden onder geïnterviewde deelnemers (n=346). DSM-IV classificaties vastgesteld met de CIDI werden gekoppeld aan de CAS-codes van lichamelijke aandoeningen uit de registratie van het UWV.

De gemiddelde leeftijd van de deelnemers was 49.8 jaar. De prevalentie van psychische aandoeningen geclassificeerd volgens de DSM-IV was 69.9% (ooit in het leven), 44.5% (laatste jaar) en 25.4% (laatste maand). Stemmingsstoornissen en angststoornissen kwamen het vaakst voor met prevalenties van resp. 28.6% en 32.9%. De stemmingsstoornissen en de meeste angststoornissen begonnen in de adolescentie en de vroeg-volwassenheid. Sociale en specifieke fobieën begonnen al op de schoolleeftijd. Er bleek sprake van uitgebreide psychische en somatische comorbiditeit. Ruim een derde van alle respondenten had meer dan één 12-maands DSM-IV classificatie. Chronische lichamelijke aandoeningen bleken in veel gevallen samen te gaan met een 12-maands DSM-IV classificatie. Meer dan tweederde van de DSM-IV classificaties waren ernstig ten aanzien van ervaren arbeidsongeschiktheid. Uit dit onderzoek komt de groep WIA-aanvragers naar voren als een psychisch kwetsbare populatie, met een hoge prevalentie van ernstige psychische aandoeningen, die nogal eens samengaan met lichamelijke aandoeningen en die vroeg in de arbeidscarrière beginnen

**Hoofdstuk 4** beschrijft de resultaten van het onderzoek naar onderherkenning, onderbehandeling en de ernst van stemmings- en angststoornissen in het PREDIS cohort. Hiervoor werden op To in de groep die met de CIDI konden worden geïnterviewd (n=346), de CAS-codes voor hoofd- en nevendiagnosen vergeleken met de DSM-IV classificaties die met de CIDI werden gevonden. Onderherkenning van psychische aandoeningen werd onderzocht door na te gaan in hoeverre de CAS en de DSM-IV classificaties met elkaar overeenstemden. We gingen tevens na of in een subgroep met alleen een lichamelijke CAS-code (hoofd- of nevendiagnose) ook DSM-IV classificaties voorkwamen. Onderbehandeling en de ernst van onderbehandelde DSM-IV classificaties voor stemmingsstoornissen en angststoornissen werden onderzocht in twee subgroepen: een groep met een lichamelijke en een groep met een psychische aandoening als CAS-hoofddiagnose. Daarbij gold dat er sprake was van onderbehandeling wanneer het eerste behandelcontact pas plaatsvond drie jaar na de eerste symptomen of wanneer er nog nooit behandeling was geweest.

De mate van overeenstemming tussen CAS en DSM-IV bleek erg laag te zijn, met een Cohen's kappa van 0.237 voor stemmings- en van 0.260 voor angststoornissen. In de puur somatische groep bleek de prevalentie van stemmingsstoornissen (DSM-IV) 3.8% en van angststoornissen (DSM-IV) 11.4% te zijn. In de groep met een lichamelijke hoofddiagnose bleek 45.2% van de DSM-IV classificaties voor depressie te zijn onderbehandeld, 80.0% van de sociale fobieën en 53.3% van de gegeneraliseerde angststoornissen. In de groep met een psychische hoofddiagnose waren deze percentages respectievelijk 44.7%, 80.9% en 33.3%. In beide subgroepen bleken de onderbehandelde DSM-IV classificaties ernstig ten aanzien van ervaren arbeidsongeschiktheid. Op basis van de resultaten luidt de conclusie dat ernstige psychische aandoeningen veelal worden onderbehandeld in de periode voorafgaand aan de WIA-aanvraag en dat verzekeringsartsen bij de WIA-aanvraag psychische aandoeningen substantieel onderherkennen. Betere samenwerking tussen verzekeringsartsen, bedrijfsartsen en behandelend artsen kan diagnostiek en behandeling van psychische aandoeningen onder arbeidsongeschikten mogelijk belangrijk verbeteren.

**Hoofdstuk 5** presenteert de resultaten van het onderzoek naar de psychometrische eigenschappen van drie korte vragenlijsten, de *Kessler Psychological Distress Scale* met tien en zes vragen (K10, K6), en de *General Health Questionnaire* met 12 vragen (GHQ-12). We onderzochten in hoeverre deze lijsten in staat zijn om het cohort te screenen op DSM-IV classificaties die aanwezig zijn in de maand voorafgaand aan de afname van de CIDI bij een representatieve groep respondenten (n=293) met volledige dataopbrengst. Met de CIDI als gouden standaard werden de interne consistentie (Cronbach's alpha's), sensitiviteit, specificiteit, positief (PVW) en negatief voorspellende waarde (NVW), en de *Area Under the receiver operating characteristic Curves* (AUCs) met 95% betrouwbaarheidsintervallen (95% BI) berekend.

Cronbach's alpha's waren 0.919 (K10), 0.882 (K6) en 0.906 (GHQ-12). De optimale afkapscores waren 24 (K10), 14 (K6) en 20 (GHQ-12). De PVW en de NVW voor deze afkapscores waren 0.53 en 0.89 voor de K10, 0.51 en 0.87 voor de K6, en 0.50 and 0.82 voor de GHQ-12. De AUC's waren 0.806 (K10; 95% BI 0.749-0.862), 0.796 (K6; 95% BI 0.737-0.854) en 0.695 (GHQ-12; 95% BI 0.626-0.765). Op basis van de resultaten is geconcludeerd dat met de K10 en in iets mindere mate met de K6 en de GHQ-12, WIA-aanvragers snel en betrouwbaar kunnen worden gescreend op actuele psychische stoornissen geclassificeerd volgens de DSM-IV, met optimale afkappunten van resp. 24, 14 en 20. Verzekeringsartsen kunnen de K10 bij het WIA-claimbeoordelingsgesprek gebruiken als hulpmiddel om na te gaan of er sprake is van een echte psychische stoornis, zoals een angststoornis of een depressie. In het beoordelingsgesprek kan de verzekeringsarts op basis van de antwoorden op de afzonderlijke items van de K10 expliciet doorvragen naar psychische klachten en samenhangende beperkingen.

**Hoofdstuk 6** beschrijft de ontwikkeling en de initiële inhouds- en constructvalidering van een nieuw instrument om een aanpassingsstoornis (AD) vast te stellen, de *Diagnostic Interview Adjustment Disorder* (DIAD). Op basis van de literatuur operationaliseerden we de criteria voor de DSM-IV classificatie van AD. Sommige criteria werden aangepast. Voor de inhoudsvalidering raadpleegden we elf experts. De DIAD werd bij een

representatieve groep respondenten (n=323) afgenomen in aansluiting op de CIDI. Om de constructvaliditeit van de DIAD te beoordelen, werd onderzocht of de diagnose AD op To significant geassocieerd was met distress en functioneren, i.c. de gemiddelde somscores van de K10 en de *World Health Organization Disability Assessment Schedule* (WHODAS).

De elf experts waren het overwegend eens over de inhoud van de DIAD: tien van hen waren van mening dat met de DIAD essentiële aspecten van AD konden worden vastgesteld. De prevalentie van AD in het PREDIS cohort was 7.4%. Hogere gemiddelde somscores op de K10 en WHODAS bleken significant geassocieerd te zijn met de diagnose AD zoals werd vastgesteld met de DIAD. Deze resultaten zijn een eerste aanwijzing dat de DIAD een valide instrument is om de diagnose AD vast te stellen.

**Hoofdstuk 7** presenteert een systematische review over prognostische factoren van langdurige arbeidsongeschiktheid door psychische stoornissen, werkhervatting en symptoomherstel. In de belangrijkste elektronische databases (PubMed, PsychINFO, Embase, Cinahl, Business Source Premier) zochten wij systematisch naar artikelen met een publicatiedatum tussen januari 1990 en maart 2009, waarin de resultaten worden beschreven van longitudinale cohortstudies met een follow-up periode van ten minste één jaar. Respondenten waren personen die bij aanvang van de studie arbeidsongeschikt waren, c.q. een arbeidsongeschiktheidsuitkering hadden in verband met psychische problemen. Als uitkomstmaten kozen we langdurige arbeidsongeschiktheid, de tijdsduur tot werkhervatting en symptoomherstel. De methodologische kwaliteit van geïnccludeerde studies werd beoordeeld met een veelgebruikte criteriumlijst.

De zoekstrategie leverde 796 artikelen op. Zeven artikelen voldeden aan de inclusiecriteria en alle waren van hoge methodologische kwaliteit. In de geselecteerde artikelen werd een groot aantal prognostische factoren onderzocht en beschreven. Er werd sterk bewijs gevonden dat leeftijd ouder dan 50 jaar een belangrijke risicofactor is voor langdurige arbeidsongeschiktheid door psychische problemen. Voor andere factoren (psychische gezondheid, voorgeschiedenis van eerder ziekteverzuim, negatieve verwachting van herstel, socio-economische status, werkloosheid, kwaliteit en continuïteit van de bedrijfsgezondheidszorg, geslacht, opleidingsniveau, kostwinnerschap, support van de leidinggevende) werd beperkt bewijs gevonden.

**Hoofdstuk 8** beschrijft de resultaten van het onderzoek naar de mate waarin respondenten en verzekeringsartsen ten tijde van de WIA-claimbeoordeling (To) accuraat kunnen voorspellen of er sprake zal zijn van een functionele verbetering één jaar na de WIA-claimbeoordeling (T1) en of deze accuratesse verschilt in groepen respondenten met een lichamelijke of een psychische aandoening als CAS-hoofddiagnose. Met de *World Health Organization Disability Assessment Schedule* (WHODAS) verkregen we gegevens over het functioneren op To en op T1. Op To werden zowel de respondenten als de verzekeringsartsen die de WIA-claim beoordeelden, gevraagd om de mate van functionele verbetering van de cliënt te voorspellen over één jaar. Om de kwaliteit van de voorspelling te kunnen beoordelen werden sensitiviteit, specificiteit en de *Area Under the receiver operating Curves* (AUCs) berekend. Met logistische regressie gingen we na of er verschillen bestonden in accuratesse van de voorspellingen in een groep met een lichamelijke en een

groep met een psychische CAS-hoofddiagnose.

In 32% van de gevallen bleek er sprake te zijn functionele verbetering (op T1) die groter was dan de standaardmeetfout. WIA-aanvragers en verzekeringsartsen bleken beiden niet in staat om deze functionele verbetering accuraat te voorspellen. Er bleek geen verschil in accuratesse te bestaan tussen de twee groepen WIA-aanvragers met een lichamelijke en met een psychische hoofddiagnose. Hoewel veel WIA-aanvragers functioneel verbeterden in het jaar na de WIA-aanvraag, zijn zowel zij als de verzekeringsartsen die hun claim beoordeelden niet in staat om een functionele verbetering accuraat te voorspellen. Voor de selectie van personen die in aanmerking komen voor een herbeoordeling door de verzekeringsarts moeten andere methoden worden ontwikkeld.

**Hoofdstuk 9** geeft een beschrijving van de resultaten van longitudinaal onderzoek naar de associatie van prognostische factoren met functionele verbetering en werkstatus in de periode na de WIA-claimbeoordeling. In het cohort (n=375) onderzochten we met logistische regressie in hoeverre demografische kenmerken, psychische gezondheid (GHQ-12), distress (K10), alcoholgebruik (AUDIT), zorggebruik (TiC-P), coping (UCL), sociale steun (SSQS/SSQT), CAS-code, verlies aan verdien capaciteit en het hebben van betaald werk op To, konden voorspellen of respondenten functioneel verbeterden op basis van de WHODAS en of ze betaald werk hadden op T1.

Eén jaar na de WIA-keuring bleek 32% van de respondenten functioneel verbeterd te zijn op basis van de WHODAS. Van hen die geen betaald werk hadden op To en functioneel verbeterden in het jaar na de WIA-aanvraag (n=117), bleek slechts 10.6% betaald werk te hebben op T1. Functionele verbetering bleek significant te worden voorspeld door een GHQ-12 somscore >20 (OR 2.9; 95% CI 1.54-5.34;  $p < 0.01$ ). Het hebben van betaald werk op To (OR 16.8; 95% CI 6.55-43.14) en een verlies van verdien capaciteit kleiner dan 80%, i.c. WIA-categorieën 35min en WGA 35-80% (OR 4.6; 95% CI 1.87-11.42) voorspelden significant het hebben van betaald werk op T1. Contact met een medisch specialist in de drie maanden vóór To bleek negatief geassocieerd te zijn met het hebben van betaald werk op T1 (OR 0.4; 95% CI 0.19-0.87). Geconcludeerd werd dat van de 31 prognostische factoren die werden onderzocht, slechts vier significant geassocieerd waren met functionele verbetering en het hebben van betaald werk één jaar na de WIA-claimbeoordeling. Met name het hebben van betaald werk ten tijde van de WIA-claimbeoordeling bleek sterk voorspellend te zijn voor het hebben van betaald werk één jaar later.

**Hoofdstuk 10** omvat de algemene conclusie, discussie en reflectie op de belangrijkste bevindingen van dit proefschrift. De methodologische aspecten worden besproken en aanbevelingen gegeven voor de praktijk en voor toekomstig onderzoek.

De studies in dit proefschrift laten zien dat de groep WIA-aanvragers een kwetsbare populatie is, met een hoge prevalentie van ernstige, veelal onderherkende en onderbehandelde psychische aandoeningen met een begin vroeg in de levensloop. De korte *Kessler Psychological Distress Scale* bleek een valide screeningsinstrument te zijn om verborgen psychische problemen boven tafel te krijgen bij de WIA-claimbeoordeling.

Een nieuw interview, de *Diagnostic Interview Adjustment Disorder*, bleek een goede initiële validiteit te hebben om een aanpassingsstoornis te diagnosticeren onder arbeidsongeschikten. In de wetenschappelijke literatuur werd alleen een leeftijd boven 50 jaar gevonden als sterke voorspeller van langdurige arbeidsongeschiktheid. Verzekeringsartsen noch WIA-aanvragers bleken een functionele verbetering goed te kunnen voorspellen. WIA-aanvragers bleken in veel gevallen beter te functioneren één jaar na de WIA-claimbeoordeling zonder dat zij het werk hervatten. Een slechte algemene psychische gezondheid bleek voorspellend te zijn voor een toekomstige functionele verbetering. De uitkomst van de WIA-claimbeoordeling -minder dan 80% arbeidsongeschikt- en het hebben van betaald werk ten tijde van de WIA-claimbeoordeling bleken toekomstig behoud van betaald werk te voorspellen. Contact met een medisch specialist in de maanden vóór de WIA-claimbeoordeling bleek voorspellend te zijn voor verlies van betaald werk.

De hoge prevalentie van ernstige psychische aandoeningen met een vroeg begin suggereert een lange voorgeschiedenis. Kennelijk waren psychische problemen al aanwezig ver vóór de initiële ziekmelding, toen de WIA-aanvragers nog werkten. Bovendien blijken deze psychische aandoeningen substantieel onderbehandeld te zijn in de periode vóór de WIA-claimbeoordeling. Deze bevindingen hebben implicaties voor artsen die betrokken zijn bij de behandeling, begeleiding en beoordeling vóór de WIA-aanvraag, c.q. behandelend artsen, bedrijfsartsen en verzekeringsartsen werkzaam voor de vangnet-populatie. In nauwe samenwerking, gericht op optimale diagnostiek en behandeling van psychische aandoeningen bij kwetsbare werkers en bij werkverzuimers, kunnen zij belangrijk bijdragen aan preventie van langdurige arbeidsongeschiktheid en aan werkhervatting voordat de WIA-poort in zicht komt.

Psychische problemen blijken vervolgens door verzekeringsartsen veelal niet herkend te worden bij de WIA-claimbeoordeling. Deze bevinding laat zien dat verzekeringsartsen bij de WIA-claimbeoordeling méér aandacht dienen te hebben voor diagnostiek en behandeling van psychische problemen. Bij de WIA-claimbeoordeling kunnen verzekeringsartsen de K10 gebruiken als screeningsinstrument, c.q. diagnostisch hulpmiddel om psychische aandoeningen op te sporen die niet eerder zijn onderkend.

Hoewel het functioneren bij veel WIA-aanvragers lijkt te verbeteren in het jaar ná de WIA-beoordeling, blijken zij zelf, noch de verzekeringsartsen deze verbetering accuraat te kunnen voorspellen. Dat impliceert dat andere methoden nodig zijn om functionele verbetering te evalueren. In de periode ná de WIA-aanvraag kunnen herbeoordelingen door verzekeringsartsen effectief zijn, mits zij met een valide instrument kunnen vaststellen wie voor een dergelijke herbeoordeling in aanmerking komt.

Van de 31 onderzochte prognostische factoren bleek slechts één factor, namelijk een slechtere psychische gezondheid ten tijde van de WIA-aanvraag, een functionele verbetering significant te kunnen voorspellen. Een mogelijke verklaring voor deze onverwachte associatie zou kunnen zijn dat psychische klachten ten tijde van de WIA-claimbeoordeling samenhangen met tijdelijke onzekerheid als gevolg van het beoordelingsproces zelf. Ondanks functionele verbetering heeft slechts ongeveer 1 op de 10 WIA-aanvragers betaald werk één jaar na de WIA-aanvraag (T1). Vooral het hebben van betaald werk op T0 bleek zeer sterk geassocieerd te zijn met het hebben van werk op T1.

Dat impliceert dat in de periode van ziekteverzuim voorafgaand aan de WIA-aanvraag al het mogelijke moet worden gedaan om het werk te hervatten en te behouden, ook bij aanzienlijke gezondheidsproblemen.

Vervolgonderzoek binnen PREDIS is nodig om de vraag te beantwoorden of en hoe de mate van arbeidsongeschiktheid, functionele verbetering en werkhervatting ná de claimbeoordeling samenhangen met onderherkenning en onderbehandeling van psychische aandoeningen. Voor effectieve WIA-herbeoordelingen door de verzekeringsarts dient een valide screeningsinstrument te worden ontwikkeld. Onderzocht moet worden of een betere communicatie en samenwerking tussen verzekeringsartsen, bedrijfsartsen en behandelend artsen effectief bijdragen aan preventie van langdurige arbeidsongeschiktheid en bevordering van werkhervatting. Er bestaat nog steeds grote behoefte aan prognostische cohortstudies waarin beïnvloedbare prognostische factoren van langdurige arbeidsongeschiktheid en werkhervatting van werknemers die verzuimen door psychische problemen, kunnen worden onderzocht.



## **X** DANKWOORD

---

Promoveren is hard werken. De kale plekken op de vloer onder mijn werktafel thuis doen vermoeden dat ik het werk de meeste tijd alleen heb gedaan. Niets is minder waar. Zonder de hulp van velen was dit onderzoek niet mogelijk geweest.

Een speciaal woord van grote dank geldt allereerst de driehondervijfenzeventig mannen en vrouwen die aan het onderzoek hebben deelgenomen. Zij hebben dat gedaan in een periode waarin behoud van hun gezondheid, werk en inkomen op het spel stond en ze toch waarachtig wel wat anders aan het hoofd hadden dan het ondergaan van een uitgebreid psychiatrisch interview en het twee, soms wel drie keer invullen van een ellenlange vragenlijst. Een statistisch databestand, waarin hun persoonlijke verhalen gereduceerd worden tot cijfers en getallen, doet hen geen recht. Dat maakt hun medewerking extra bijzonder.

Ik dank mijn promotoren Prof. dr. Jac van der Klink en Prof. dr. Johan Groothoff, en copromotor dr. Sandra Brouwer die mij op het smalle pad der wetenschap hebben begeleid, gesteund, bijgestuurd en mij voor ernstig struikelen hebben behoed. Beste Jac, ik heb veel gehad aan je vriendelijke rust, je inzicht en je weloverwogen standpunten, ook op middernachtelijke tijdstippen. Beste Johan, dank voor je humor, je vasthoudendheid, je bevologenheid en je puntjes op de i. Beste Sandra, ik dank je voor je vriendelijke, maar resolute terechtwijzingen wanneer ik er in de Introduction van artikelen weer eens de hele wereld bij wilde halen. Je scherppte, je precisie en je voortdurende gehamer op structuur hebben me op het rechte wetenschappelijke pad gehouden. Ik verheug me op de komende jaren, waarin ik als senioronderzoeker met jullie kan blijven samenwerken en nog een aantal projecten kan helpen uitvoeren. Last but not least dank ik dr. Boudien Krol, die copromotor was in de beginfase van het onderzoek. Beste Boudien, toen het onderzoek op de tekentafel lag en belangrijke beslissingen moesten worden genomen over de onderzoeksopzet en het instrumentarium, was jouw deskundigheid onmisbaar.

Ik dank de leden van leescommissie Prof. dr. Aard Schene, Prof. dr. Peter Verhaak en mijn collega-verzekeringsarts Prof. dr. Haije Wind voor het kritisch lezen, beoordelen en goedkeuren van dit proefschrift.

Prof. Dr. Allard van der Beek, dr. Paul Smits en dr. Jos Verbeek waren mijn startmotoren. Beste Allard, Paul en Jos, in 2005, voordat ik met het onderzoek begon, hebben jullie als docenten van de mooie NSPOH-cursus 'Onderzoeksvaardigheden voor de bedrijfs- en verzekeringsarts' de onderzoeker in mij wakker geschud. Daar dank ik jullie heel hartelijk voor.

Ik ben alle teamondersteuners, procesbegeleiders, verzekeringsartsen, arbeidsdeskundigen en het management van UWV kantoor Groningen dankbaar voor hun

inspanningen om het onderzoek te doen slagen. In het bijzonder dank ik Jaap van de Gevel, Henk Nieboer, Godelief van Lieshout en Vincent Wilbers voor hun inzet en betrokkenheid. Ik dank ook Herman Kroneman en Diederike Holtkamp van het UWV hoofdkantoor. Gedurende het hele project, maar vooral in de periode waarin het onderzoek nog niet was ingebed in het Kenniscentrum Verzekeringsgeneeskunde, was hun bereidwillige medewerking en facilitering van grote betekenis voor de voortgang en welslagen van het project.

Ronald Koops van 't Jagt, Frank Anakotta, Roelof Oosting, Erik Heling, Jacqueline van der Ploeg, Astrid Schlimbach, Ineke Duut, Manja Alink, Margriet Bus, Petra Vos, Trijnie Ploeger, Edgar Klei, Charda Falli en Janet Wind van het UWV kantoor in Groningen, dank ik voor hun onmisbare inzet bij de recruitering van deelnemers en de invoer van data.

Het Composite International Diagnostic Interview (CIDI) is de ziel van dit onderzoek. Een speciaal woord van dank is daarom op zijn plaats voor de CIDI-interviewers. Dankzij de inzet van Jackeline Bakker, Tina Buurman, Anna Dijkhoff, Nic Erkamp, Klaasje de Groot, Rianne Kasper, Joke Kiers, Gerda Leeraar, Maaïke Oostra, Henk Talman, Lex van de Ven, Lidi Vredeveld, Pieter Walstock en Tjerk Zweers konden in totaal 538 CIDI's worden afgenomen. Samen hebben de CIDI-interviewers een ware schat aan informatie ingebracht. Zij hebben de deelnemers indringend gevraagd om ziel en zaligheid op tafel te leggen. Dat was ook voor de interviewers zelf niet altijd even gemakkelijk. Hun inzet is van grote betekenis. Ik dank daarom ook Prof. dr. Peter de Jonge en dr. Fokko Nienhuis van het Universitair Centrum Psychiatrie UMCG, die als CIDI-trainers van het WHO CIDI Training Center de interviewers de vaardigheid hebben bijgebracht om dit belangrijke werk te doen. Bedrijfsarts Peter Flach en huisarts Frank Baarveld waren als onafhankelijke artsen beschikbaar om vragen van deelnemers over het onderzoek of naar aanleiding van het CIDI te beantwoorden. Daarvoor dank ik hen hartelijk.

Ik dank alle jongens en meisjes van de afdeling Sociale Geneeskunde op de 6e verdieping van de Brug. Allemaal veel jonger en slimmer dan ik. Ik heb veel van ze geleerd. Speciaal dank ik dr. Michiel de Boer. Beste Michiel, dank voor je heldere uitleg van lastige statistiek en voor je medeauteurschap bij de meeste artikelen in dit proefschrift. Ik dank ook Prof. dr. Ute Bültmann, die mij terzijde stond in de periode dat het met publiceren even niet lukte. Beste Ute, jij hebt ervoor gezorgd dat het proefschrift geen zes, maar zeven artikelen bevat.

De junior- en senioronderzoekers en de hoogleraren van het KCVG hielden mij scherp tijdens de werkoverleggen en de jaarlijkse werkconferenties in Amersfoort. Daarvoor ben ik hen zeer dankbaar. In het bijzonder dank ik dr. Karen Nieuwenhuijsen en Prof. dr. Monique Frings-Dresen dat zij hoofd- en medeauteur wilden zijn van één van de artikelen in dit proefschrift, de eerste interfacultaire coproductie van het KCVG. Daar ben ik behoorlijk trots op.

Ik dank mijn paranimf en sparring partner, collega-verzekeringsarts Lex van de Ven. Beste Lex, hoewel wij even oud zijn, op dezelfde dag onze verjaardag vieren, op dezelfde dag in dienst kwamen bij de onvolprezen Gemeenschappelijke Medische Dienst en waarschijnlijk ook op dezelfde dag met pensioen moeten, vertonen wij gelukkig ook verschillen. Die verlevendigen onze discussies zeer. Ik dank je voor je adviezen. Ik dank je nog meer voor je begrip dat ik ze niet altijd opvolg. Ik dank ook collega-verzekeringsarts Elise Michel dat zij mijn andere paranimf wil zijn.

Een laatste woord is voor de mensen die mij het liefste zijn. Als zij er niet waren was er van dit proefschrift helemaal niets terecht gekomen.



## **X ABOUT THE AUTHOR**

---

Bert Cornelius is an insurance physician at the Social Security Institute (UWV) office in Groningen, the Netherlands, and a senior researcher at the Dutch Research Center for Social Insurance Medicine, Department of Health Sciences, Community and Occupational Medicine of the University Medical Center Groningen, the Netherlands. He combined his medical training with an education at the Minerva Art Academy in Groningen. After receiving his medical degree, he briefly considered a career as a medical illustrator. Instead, he decided to specialize in general practice and later in insurance medicine, but kept on working as an illustrator and cartoonist. To avoid spending his whole life sitting down behind a desk or a drawing table, he enjoys long-distance running and long unsupported hikes through mountainous terrain. He is married and has three children.



## X RESEARCH INSTITUTE FOR HEALTH RESEARCH SHARE

---

This thesis is published within the **Research Institute SHARE** of the Graduate School of Medical Sciences (embedded in the University Medical Center Groningen/University of Groningen). More recent theses can be found in the list below. Supervisors and co-supervisors are between brackets.

Further information regarding the institute and its research can be obtained from our internetsite: **www.rug.nl/share**

### 2013

**Piening S.** *Communicating risk effectively*

(prof FM Haaijer-Ruskamp, prof PA de Graeff, dr PGM Mol, dr SMJM Straus)

**Siebelink MJ.** *The child as a donor; a multidisciplinary approach*

(prof HBM van de Wiel, prof PF Roodbol)

**Sidorenkov G.** *Predictive value of treatment quality indicators on outcomes in patients with diabetes* (prof FM Haaijer-Ruskamp, prof D de Zeeuw)

**Vu DH.** *Clinical pharmacology of tuberculosis drugs and tuberculosis control in developing world; the involvement of private pharmacy and the individualization of treatment using dried blood spot*

(prof JRB Brouwers, prof DRA Uges, prof VH Le, prof DH Nguyen, dr JWC Alffenaar)

**Sijtsma A.** *Physical activity and overweight in young children*

(prof PJJ Sauer, prof RP Stolk, dr E Corpeleijn)

**Rosicova K.** *Regional mortality in Slovakia: socioeconomic indicators and ethnicity*

(prof JW Groothoff, dr JP van Dijk, dr A Madarasova-Geckova)

**Bobakova D.** *Youth subcultures and problem behaviours in Slovakia: hip-hop, techno-scene, metal, punk, skinheads and Roma*

(prof SA Reijneveld, dr JP van Dijk, dr A Madarasova-Geckova)

**Arends I.** *Prevention of recurrent sickness absence in workers with common mental disorders*

(prof JJJ van der Klink, prof U Bültmann)

**Theunissen MHC.** *The early detection of psychosocial problems in children aged 0 to 6 years by Dutch preventive child healthcare; professionals and their tools*

(prof SA Reijneveld, dr AGC Vogels)

**Bragaru M.** *Sports and amputation*  
(prof JHB Geertzen, prof PU Dijkstra, dr R Dekker)

**Broesamle TC.** *Designing health care services using systems thinking; a theory, a method and their application in the Dutch community pharmacy*  
(prof JJ de Gier, prof JJ van der Werf)

**Jong J de.** *Antibiotics use in children; pharmacoepidemiological, practical and environmental perspectives in the Netherlands*  
(prof LTW de Jong-van den Berg, dr TW de Vries)

**Rettke HG & Geschwinder HM.** *Long-term outcomes in stroke rehabilitation patients and informal caregivers*  
(prof WJA van den Heuvel)

**Fortington LV.** *Enabling the elderly person with lower limb amputation through surgery, rehabilitation and long term care*  
(prof JHB Geertzen, prof PU Dijkstra, dr GM Rommers)

**Lako IM.** *Depressive symptoms in patients with schizophrenia; count symptoms that count*  
(prof K Taxis, prof D Wiersma)

**Arnardottir AH.** *Regulatory benefit-risk assessment; different perspectives*  
(prof FM Haaijer-Ruskamp, prof PA de Graeff, dr PGM Mol, SMJM Straus)

**Meijer A.** *The forest through the trees; investigating depression in patients with cancer and patients with myocardial infarction using systematic reviews and meta-analytic techniques*  
(prof P de Jonge, dr HJ Conradi, dr BD Thombs)

**Kuchenbecker WKH.** *Obesity and female infertility*  
(prof JA Land, prof BHR Wolffenbuttel, dr A Hoek, dr H Groen)

**Rozenbaum MH.** *Costs and effectiveness of extended vaccination strategies against pertussis and pneumococcal disease*  
(prof MJ Postma, prof E Hak)

**Kingma EM.** *Intelligence and functional somatic symptoms and syndromes*  
(prof JGM Rosmalen, prof J Ormel, prof P de Jonge)

**Kedde JH.** *Sexual health of people with disability and chronic illness*  
(prof HBM van de Wiel, prof WCM Weijmar Schultz)

**Horst PGJ ter.** *Clinical pharmacology of antidepressants during pregnancy*  
(prof B Wilffert, prof LTW de Jong-van den Berg)

**Sinha R.** *Adjustment to amputation and artificial limb, and quality of life in lower limb amputees*  
(prof WJA van den Heuvel, prof P Arokiasamy, dr JP van Dijk)

## 2012

**Pechlivanoglou P.** *Applying and extending mixed-effects models in health in health economics and outcomes research*  
(prof MP Postma, prof JE Wieringa, dr HH Le)

**Verboom CE.** *Depression and role functioning; their relation during adolescence and adulthood*  
(prof J Ormel, prof WA Nolen, prof BWJH Penninx, dr JJ Sijtsema)

**Benka J.** *Living with rheumatoid arthritis: do personal and social resources make a difference?*  
(prof JW Groothoff, prof JLL van der Klink, dr JP van Dijk, dr I Rajnicova- Nagyova)

**Kalina O.** *Sexual risky behaviour among Slovak adolescents and young adults; social and psychological factors*  
(prof SA Reijneveld, dr JP van Dijk, dr A Madarasova-Geckova)

**Crijns HJMJ.** *Drug related safety issues affecting pregnancy outcome and concerning risk minimisation measures; emphasis on pregnancy prevention programmes*  
(prof LTW de Jong-van den Berg, dr SMJM Straus)

**Vries HJ de.** *Working with pain; sustainable work participation of workers with chronic non-specific musculoskeletal pain*  
(prof JHB Geertzen, prof JW Groothoff, prof MF Reneman, dr S Brouwer)

**Karsten J.** *On the threshold of disorder; definition and course of subthreshold depression and subthreshold anxiety*  
(prof WA Nolen, prof BWJH Penninx, dr CA Hartman)

**Abma FI.** *Work functioning: development and evaluation of a measurement tool*  
(prof JLL van der Klink, prof U Bültmann)

**Rodrigues HCML.** *Who's the patient? Ethics in and around maternal-fetal surgery*  
(prof PP van den Berg, prof M. Düwell)

**Munster JM.** *Q fever during pregnancy; lessons from the Dutch epidemic*  
(prof E Hak, prof JG Aarnoudse, dr ACAP Leenders)

**Holwerda N.** *Adaptation to cancer from an attachment theoretical perspective*  
(prof R Sanderma, prof MAG Sprangers, dr G Pool)

**Salonna F.** *Health inequalities among Slovak adolescents over time*  
(prof SA Reijneveld, prof JW Groothoff, dr JP van Dijk, dr A Madarasova-Geckova)

**Kolarčík P.** *Self-reported health and health risky behaviour of Roma adolescents in Slovakia*  
(prof SA Reijneveld, dr JP van Dijk, dr A Madarasova-Geckova)

**Schreuder JAH.** *Managing sickness absence; leadership and sickness absence behavior in hospital care*  
(prof JW Groothoff, prof JJL van der Klink, dr CAM Roelen)

**Hoën PW.** *New perspectives on depression and heart disease*  
(prof P de Jonge, prof J Denollet)

For more 2012 and earlier SHARE-theses see our website.