

**Medical Predictors of Disability  
Pension in Long-term  
Sickness Absence**

**Results from a population-based  
prospective study in the Norwegian  
county of Hordaland 1994–1999**

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## Preface

This is a report from Programme for Health economics in Bergen, HEB, in cooperation with Department of Public Health and Primary Health Care. The authors are Sturla Gjesdal, Peder R. Ringdal, Kjell Haug and Jon Gunnar Meland, University of Bergen. Gesdal and Haug are affiliated both with HEB and Department of Public Health and Primary Health Care, section for Social Medicine, at the University of Bergen.

HEB is a collaboration between Department of Economics and Department of Public Health and Primary Health Care at the University of Bergen, Norwegian School of Economics and Business Administration (NHH), and Institute for Research in Economics and Business Administration (SNF). Stein Rokkan Centre for Social Studies, the Rokkan Centre, at Bergen University Research Foundation, holds the administrative responsibility. The research programme is financed by the Research Council of Norway (NFR). HEB is a centre for economic research into health and health care. The main objective is to provide knowledge on organisation and governance structures of the health care sector.

HEB has organised its research activities within three areas. This article is part of the topic «Resources and inequalities in health» as project no. 3.5: *Which socio-economic factors give rise to transition from long term sickness absence to permanent social insurance*. The article is one of several papers in connection with Sturla Gjesdal's Ph.D-project at HEB. In other papers at HEB, see HEB reprint 09/02, Gjesdal analyses gender and socio-economic factors' importance for transition to disability pension. For further information on the research activity at HEB, see <http://heb.rokkan.uib.no/>.

The report «*Medical predictors of disability pension in long term sickness absence: Results from a population-based prospective study in the Norwegian county of Hordaland, 1994–1999*» is based on a study of clients' transition from a long term sickness benefit status to disability pension during a period of five years, with data from the county of Hordaland. The authors have investigated the importance of diagnoses and other health variables to be able to predict the transfer.

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## Abstract

*Background:* While several socio-demographic predictors of disability pension have been identified, less is known about the importance of the medical aspects. The aim of this study was to explore the importance of diagnoses, prognoses, level of care and previous sickness absence as predictors for future disability pension status among long-term sickness absentees.

*Methods:* A representative sample of Norwegian long-term sickness absentees, 2043 women and 1585 men, with detailed diagnostic information (based on International Classification of Primary Care), was followed up for 5 years. The date of granting of disability pension was obtained from the Norwegian disability register and was used as the dependent variable in Cox multivariate regression.

*Results:* Kaplan-Meier estimates of the 5-year risk of disability pension (1-survival) were 22.9% for the full sample, 22.5% for men and 23.3% for the women. Men on sick leave for mental health disorders had an increased disability risk. For women a diagnosis of a cardiovascular disorder implied a slightly increased risk, while a pregnancy-related sickness absence carried almost no risk for disability pension during follow-up. Among cases with musculoskeletal disorders (54.5% of the sample), subgroups with significantly different disability risks were identified, with a gender-specific pattern. The prognoses formulated by the certifying doctor significantly predicted the outcome. Previous sickness absence days increased the disability risk, but were significant only for total absence above 20 weeks in the 4 years preceding inclusion. The level of care at the eight-week sickness certification did not affect the disability risk.

*Conclusion:* Medical factors were important in identifying cases with an increased risk of disability pension.

**Keywords:** disability pension medical predictors

# Sammendrag

## **Medisinske prediktorer for overgang fra langtidssykemelding til uførepensjon:**

Resultater fra en befolkningsbasert, prospektiv undersøkelse i Hordaland 1994–99

Det er tidligere påvist en rekke sosio-demografiske prediktorer for å bli uførepensjonert, mens mindre er kjent m.h.t. betydningen av medisinske forhold. Hensikten med undersøkelsen var å klargjøre betydningen av legenes diagnoser, prognostisering, behandlingsnivå og tidligere sykefravær. Alle langtidssykemeldinger i Hordaland (sykemelding > 8 uker) i to perioder i 1994 ble registret. Utvalget besto av 2043 kvinner og 1585 menn alderen 16–62 år, hvor ICPC diagnosen var kjent fra Sykemelding 2-skjemaet. Utvalget ble fulgt opp til utgangen av 1999, dvs. en oppfølging på minst 5 år, for individer som ikke ble sensurert ved død eller emigrasjon. Tidspunkt for innvilget uførepensjon var utfallsvariabel i en Cox regresjonsanalyse.

5 års risiko for overgang fra 8 ukers langtidssykemelding til uførepensjon var 22,5% for menn og 23,3% for kvinner. Menn som var langtidssykemeldt for en psykisk lidelse hadde øket risiko for å bli uførepensjonert. For kvinner var en diagnose fra hjerte/karsystemet mer alvorlig, mens kvinner sykemeldt for en svangerskapsrelatert tilstand ikke hadde noen uførerisiko av betydning. 54,5% av utvalget var langtidssykemeldt pga plager fra muskel- og skjelett systemet. Blant disse ble det funnet subgrupper som hadde signifikant ulik uførerisiko, (etter kontroll for andre faktorer). Mønsteret var ulikt for menn og kvinner. Prognosen som var gitt av behandlende lege predikerte utfallet rimelig godt. Tidligere sykefravær økte sannsynligheten for overgang til uførepensjon, men dette var ikke signifikant for samlet fravær over 20 uker I løpet av de fire foregående år. Behandlingsnivå ved 8 uker predikerte ikke utfallet.

Medisinske faktorer er viktig når man skal identifisere langtidssykemeldte med øket uførerisiko, noe som kan være viktig hvis man vil redusere tilgangen til uførepensjon.



## Introduction

Income compensation for those who are permanently unable to work because of illness is a key feature of modern welfare states. The Nordic countries have addressed this by establishing disability pension schemes that cover the entire population of working age (1–5). There are many studies of the incidence (6–8) and predictors of disability pension (9–14). The predictive role of socio-demographic factors for disability pension in general (15) and in disability pension for specific causes such as back disease (16) and osteoarthritis (17) has been well documented.

In Norway the number of people leaving the workforce with a disability pension has increased substantially over the last two decades: in 1980 5.9% of the male population and 6.2% of the female population aged 16–66 had received a disability pension. Ten years later the percentages were 7.3 for men and 9.2 for women (18). Despite the introduction of stricter rules for the disability pension in 1992–94, especially targeted towards female applicants without «objective signs of disease» (19), 8.1% of men and 11.2% of women of working age had become disability pensioners at the turn of the century (20).

It is not easy to assess whether the increased uptake of disability pension is caused by deterioration in the population's health. However, increasing prevalence of musculoskeletal problems has been reported, especially among women, and this is by far the most common reason for long-term sickness absence and disability pension (21, 22). Numerous additional explanations have been suggested, such as an influx of subjects with low health resources into the labour force during periods of economic boom, ageing of the working population, increasing demands at the workplace, generous compensation levels and changes in traditional work ethics (23).

Most cases of disability pension start as a spell of long-term sickness. Long-term sickness absentees are therefore at a high risk of a subsequent transition to disability pension. Surprisingly few studies have assessed possible risk factors for disability pension among long-term sickness absentees (24–26). In a previous registry-based prospective study of long-term sickness absentees in Norway between 1990 and 1995, socio-demographic predictors of disability pension were identified, along with important gender differences (27, 28). That study, however, coincided with the period of stricter rules for the granting of disability pension.

The aim of the present study, conducted between 1994 and 1999, was to retest the importance of socio-demographic factors using more recent data, and to investigate whether medical factors also predict future transition to disability pension among long-term sickness absentees. As detailed diagnostic information was available, a special focus of the study was on the possible predictive value of *subgroups* of musculoskeletal disorders.

## Methods

### ***Sample and data***

During two periods in 1994, March 1 to April 30 and September 1 to December 31, all mandatory «eight weeks» sickness absence certificates' in Hordaland County (n=4156) were collected and reviewed by one of the authors (PR). Eight weeks' sickness absence certificates should contain medical information and plans for treatment and rehabilitation.

Due to duplication, illegibility or lack of relevant information, 155 cases were excluded. Subjects 63 years or older at the start of the study were also excluded as this group had other exit routes from the labour force in addition to disability pension. A small number of cases that already had a partial disability pension also were excluded. The study sample therefore comprised 3628 cases. The descriptive statistics of the sample are shown in *table 1*.

The following *socio-demographic information* on each case could be extracted from sickness certificates: age, sex and municipality of residence. Information on income (before tax) in 1993 was found in the National Insurance Service (NIS) case records. The municipalities were divided into four groups:

- Urban (the city of Bergen comprising half of the population of Hordaland)
- Intermediate urban/rural (the municipalities surrounding Bergen)
- Rural centres (larger rural municipalities, of which three had their own hospitals)
- Small rural municipalities

The following *medical information* was collected from sickness certificates:

- The *type of doctor* responsible for the eight weeks' sickness certification (GPs, occupational physicians, private specialists or hospital doctors).
- The main *diagnosis*, and in some cases a second diagnosis, formulated by the doctors. Nearly 20% of the certificates did not include a diagnosis. For these cases one of the authors (PR) defined a main diagnosis based on the medical information given on the certificates. Most of the diagnoses were based on the Norwegian short version of the International Classification of Primary Care (ICPC) from 1991 (29–31). Diagnoses based on ICD9 (from hospitals) were recoded into ICPC by means of a special recoding manual used in the NIA. A total of 54.5% of the cases had a main diagnosis indicating problems of the musculoskeletal system (L diagnoses in ICPC), which were distributed

among 44 different ICPC codes. Therefore, a new subdivision was made into seven groups of musculoskeletal diagnoses (see *table 2*).

- The *prognosis* assessed by the certifying doctor was defined according to one of the following three categories: (A) the patient requires only further medical treatment in order to return to work, (B) unclear condition at eight weeks, (C) the patient requires comprehensive rehabilitation. In 15% of the certificates the doctor had not indicated a prognostic group.
- The NIS case records contained information on the patient's *sickness absence history*. The number of days on sickness benefit (only periods of more than 14 days) between 1990 and 1993 was calculated for each case and used as an independent variable in the analysis.

### ***Follow-up***

The sample was followed up from eight weeks' sickness absence until 31 December 1999. Hence the follow-up time varied between 1825 days (5 years) and 2080 days for cases not censored by death or emigration. Data on disability pension status were obtained from the Norwegian disability register, which is considered to be complete. The date of obtaining disability pension, of death or emigration was known for all cases. One hundred subjects died or emigrated during the follow-up period without obtaining a disability pension, while 40 patients died after they had received a disability pension.

### ***Statistical analysis***

Survival analysis was performed based on Kaplan-Meier plots (stratification) and Cox multivariate regression with time to granting of disability pension, full or partial, as the dependent variable (32). In order to identify predictors for disability pension, socio-demographic and medical factors were used as explanatory variables. The relative disability rates for each variable were identified holding the effect of other variables constant. In the regressions the variables were grouped and treated as categorical because of no obvious linearity. The analyses were carried out using the software program SPSS version 9.0 (33).

## **Results**

Kaplan-Meier estimates for the 5-year risk of obtaining a disability pension were 22.9% for the full sample, 22.5% for men and 23.3% for women. At the end of the follow-up, 491 women (24.0%) and 358 men (22.6%) had received a disability pension.

*Figure 1* shows the cumulative disability rates during follow-up, according to gender and three age segments: 16–39, 40–49 and 50–62. Disability risk increased

strongly with age for both genders. Only in age group 40–49 was the risk for disability pension higher for women than for men. The disability rate in this age group was 27% (95% C.I. 23–31%) for women versus 17% (95% C.I. 13–20%) for men (*table 1*). No overall gender difference in disability rates was present. Higher income levels were associated with somewhat lower disability rates. However, the relationship between income and disability rates was not linear and 95% confidence intervals overlapped for most income groups. No urban–rural differences in disability rates were observed.

An increasing number of days of sickness absence (periods of over 14 days) in the four years before the inclusion period (1990–93) was related to elevated disability risk for both genders. There were no differences in disability rates according to the type of doctor responsible for sickness certification at eight weeks' absence.

The prognostic assessment given by doctors on the eight weeks' sickness certificate was clearly related to subsequent disability pension risk. Of the total sample 16% were assessed by their doctors to have an unclear condition at eight weeks, and in this group 39% obtained a disability pension during follow-up. Among the 6% of sickness absentees assessed to be in need of comprehensive rehabilitation, 48% were granted a disability pension during follow-up. Patients assessed to be in need of medical treatment only had a disability rate of 18%.

More than half of the sample was unable to work because of a musculoskeletal disorder. Among these women clearly had a higher disability rate than men. Mental disorders accounted for 14% of the sickness absentees, and in this group men tended to have a higher disability rate than women. Of the 239 women on long-term sick leave for pregnancy-related problems, only one was granted a (partial) disability pension in the follow-up period. Cardiovascular diseases were more common among the men on sick leave (11% versus 3% among the women) and in this group slightly more women than men were granted a disability pension.

### ***Multivariate analysis***

Cox's multivariate regression analysis including medical and socio-demographic explanatory variables was performed in three models (*table 3*). First only the medical variables diagnosis, prognosis and previous sickness absence were included (model 1). Secondly, age and gender were added (model 2), resulting in a significantly elevated disability risk for women ( $p=0.008$ ). However, the gender effect again «disappeared» when controlled for income in the final model (model 3). The diagnostic groups «mental», «cardiovascular» and «other» all had an elevated disability risk compared to musculoskeletal disorders, while pregnancy-related cases had a negligible disability risk.

The gender-specific analysis (not shown in the tables) revealed the following pattern: for men a diagnosis of a mental disorder implied an increased risk of disability pension compared to musculoskeletal disorders (RR=1.6, 95% C.I. 1.2–2.1, p=0.004). For women, a slightly elevated risk was present for those diagnosed with cardiovascular disorders (RR=1.5, 95% C.I. 1.0–2.4, p=0.076). Except for pregnancy-related cases, the remaining diagnostic groups had the same prognosis as musculoskeletal disorders in the gender-specific analyses.

Previous sickness absence of more than 100 days was associated with an increased disability risk both in the full sample and for women. An unclear or complicated prognosis, assessed by the certifying doctor, implied a significantly elevated risk both in full sample and for men and women separately.

### ***Musculoskeletal subgroups***

The 1,978 musculoskeletal cases were organised in seven subgroups according to ICPD diagnosis (*table 2*). The three largest groups were «back problems» (35%), «tendinitis and other conditions mainly affecting the extremities» (22%) and «fractures and other injuries of the musculoskeletal system» (15%). In *figure 2*, the cumulative disability rates for the musculoskeletal subgroups, adjusted for age, are displayed for both genders. Compared to back problems disability rates were low for «fractures and other injuries» and for «tendinitis and other conditions mainly affecting the extremities». In multivariate analysis cases with «rheumatoid disorders» and «osteoarthritis» had increased disability rates when controlling for previous sickness absence, age and income (*table 4*). Among women, «neck problems» and «fibromyalgia and unspecified» were also subgroups with significantly elevated disability risk compared to reference («back problems»).

## **Discussion**

### **Main findings**

It was confirmed that long-term sickness absentees have a high risk of future disability pension status: 23% of people on sick leave for at least eight weeks were granted disability pension within five years. The study showed that in addition to socio-demographic factors, medical information predicts subsequent transition to disability pension. This applies to diagnoses and prognoses assessed by the certifying doctor as well as previous sickness absence. The implications of diagnostic labels varied significantly between women and men.

### ***Strengths and limitations of the study***

This study is one of very few attempts to identify predictors for transition to permanent disability pension among long-term sickness absentees. The study was based on recent data, which may be important in the field of social insurance research where shifts are frequent and often far-reaching. The study was prospective and covered approximately 10% of long-term sickness absentees in Norway in the inclusion period. Both women and men, the full diagnostic spectrum and all age groups were represented, except for those over 62 who were due to reach retirement pension age during follow-up. It was possible to follow all subjects to end point or censoring by means of public registers (disability register and census data). Lastly, detailed medical information was available, in contrast to previous register-based studies where diagnostic information has often been missing or limited.

However, some important socio-demographic information was missing: data on level of educational, occupations, working conditions, weekly working hours, number of children and household incomes would have made the analyses more complete. On the other hand, the effects of these variables have already been shown in other studies (9, 14–17, 27). Hordaland County is a relatively affluent part of Norway, and this may imply that the overall risk for disability pension is underestimated by the study. The causal mechanisms and the identified predictors may, however, be representative.

### ***The role of medical predictors in long-term sickness absence***

In the Nordic welfare states, and particularly in Norway, benefits for those with a medically verified disease are generally more generous than other benefits, such as temporary income support and unemployment benefits (5). More than twenty years ago, disability pension was described as «a yardstick of the population's health» (4). Therefore, due attention should be given to the medical aspects involved in long-term sickness absence and in the process leading to permanent disability status.

Some previous studies have been based on health surveys in different population groups and have identified medical predictors for disability pension status such as psychosocial factors, subjective health, body mass index, musculoskeletal or mental disorders and abuse of drugs or alcohol. (11, 12, 25, 26, 34). The present study used routine medical information available from the NIS, covering the past (previous sickness absence), the present (the diagnosis of the index disease) and the future (prognostic assessments by the certifying doctor).

### ***Previous absence***

Previous sickness absence may reflect an individual's health status and could be viewed as a proxy for long-standing health problems. Both total absence, and the

length of previous periods of absence are regarded as predictors of long-term absence, and possibly also for disability pension in Sweden (25, 26, 35). In Norway, it has been suggested that long-term sickness absence largely is caused by a small group of vulnerable individuals who after some years eventually receive a disability pension (23). However, in the present study the effect of previous sickness absence was less than expected. Thirty-seven per cent of the sample had no recorded sickness absence lasting more than 14 days in the previous 4 years. In this group, 19% obtained disability pension during follow-up compared to 23% in the full sample. In the multivariate analysis, only previous sickness absence of over 100 days was significantly related to increased disability risk. Thus, characteristics of the index disease may be of greater importance than previously assumed.

### ***Diagnoses matters***

In this study, a gender-specific analysis showed that a diagnosis of mental disorder implied a high disability risk for men. This agrees with previous research that has identified an elevated risk of marginalisation among men unable to work because of mental disorder (35–39). Among women there was no difference in disability risk for the main diagnostic groups «musculoskeletal», «mental» and «others». However, the small group with a cardiovascular diagnosis (3% of female cases) had a slightly increased disability risk after controlling for age and other relevant confounders. In contrast, the relatively large number of women on sick leave for pregnancy-related conditions showed almost no disability risk.

### ***Musculoskeletal subgroups***

The results of the present study clearly contradict the hypothesis of a generally increased disability risk with long-term sickness absence caused by musculoskeletal disorders (26). This was especially the case for men. Moreover, musculoskeletal disorders (chapter L in ICPC) cover a wide range of conditions with different aetiologies and prognoses. Therefore, the prognostic implications of a number of musculoskeletal subgroups were explored. As in previous studies, «back problems» emerged as the largest subgroup. In fact, «back problems» constituted the most frequent diagnosis in the whole sample, 18% of the women and 21% of men. The rate of transition to disability pension was slightly below the average for male back patients (17%) and close to average for women (21%). «Fractures and other injuries» also constituted a relatively large group, 8% of the full sample and had a favourable prognosis with respect to future disability pension status. The same applied to «tendinitis and other conditions». This group (12% of the full sample) included conditions such as non-traumatic knee problems (e.g. L15, L97) and conditions often labelled as «work-related upper limb disorders» (e.g. L09, L92, L93). In contrast,

other disorders with «objective findings», osteoarthritis and rheumatoid disease, had significantly increased disability rates even after controlling for age, gender and income. Women on sick leave for «neck problems» and «fibromyalgia and unspecified» also had a significantly increased disability. These diagnoses were common among women and contributed to the overall higher disability risk for women compared to men within the musculoskeletal group. The poor understanding of these conditions and the lack of effective treatment may explain these findings.

### ***Doctors' prognoses***

In a quarter of the cases the doctors reported to the NIS that the problems were complex or that further investigations or interventions should be considered. Even after controlling for age, income and diagnosis the relative disability rates for these subjects were two to four times higher than for those considered to be in need of medical treatment only. This demonstrates that the doctor's prognostic assessment should be given considerable weight when selecting patients on sickness benefit for special rehabilitation measures.

### ***Socio-demographic predictors***

The present study confirmed previous findings from Norway of no overall gender difference in risk for transition from long-term sickness absence to disability pension (27). The favourable long-term prognosis for women on sick leave for pregnancy-related conditions obviously contributed to this result. However, the uneven income distribution between the genders (*table 1*) is an important confounder. Controlling for income tends to remove the gender difference completely, and the disability risk may even be higher for men. A similar mechanism has been found previously with respect to the «gender gap» in long-term sickness absence in Norway (21).

Not surprisingly, the strongest predictor of transition from long-term sickness absence to disability pension is consistently found to be age. This might be caused by several factors: increasing somatic morbidity, a difficult labour market for the oldest age group and more lenient treatment of disability applications with increasing age. In a Dutch study based on survey data from more than 7000 long-term sickness absentees, their employers, doctors and social insurance personnel, it was found that age seemed to be a «proxy» for labour market difficulties. Negative expectations of future work abilities increased progressively after age 40 among all involved parties, regardless of the medical condition (24).

No difference in disability risk according to municipality of residence (urban/rural) was observed in this county-wide study, even though substantial geographical differences (between counties) are known to be present in Norway (20).

### ***Implications and further research***

Research on the predictors for disability pension is at an early stage. Partly due to the lack of meaningful medical information, socio-demographic factors have often been the only variables of interest. If possible, further studies should be based on subdivision of musculoskeletal disorders, as in this. With sufficient available data, a similar subdivision of «mental health problems» might also be feasible, leading perhaps to a greater understanding of the adverse prognosis among men in this group.

Interventions aimed at preventing unnecessary transitions from long-term sickness absence to permanent disability status should be based on findings from this and future studies. Such interventions should be targeted towards groups with high risk for disability as assessed by routine medical and socio-demographic information.

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