

## Characteristics of Claimants on Long-Term Disability Benefits a Year After Report of an Occupational Injury

Rudbeck, Marianne

*Published in:*  
Journal of Occupational and Environmental Medicine

*DOI (link to publication from Publisher):*  
[10.1097/JOM.0000000000001603](https://doi.org/10.1097/JOM.0000000000001603)

*Publication date:*  
2019

*Document Version*  
Accepted author manuscript, peer reviewed version

[Link to publication from Aalborg University](#)

*Citation for published version (APA):*  
Rudbeck, M. (2019). Characteristics of Claimants on Long-Term Disability Benefits a Year After Report of an Occupational Injury. *Journal of Occupational and Environmental Medicine*, 61(6), 511-517.  
<https://doi.org/10.1097/JOM.0000000000001603>

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

### Take down policy

If you believe that this document breaches copyright please contact us at [vbn@aub.aau.dk](mailto:vbn@aub.aau.dk) providing details, and we will remove access to the work immediately and investigate your claim.



Research article

Title: **Characteristics of claimants on long-term disability benefits a year after report of an occupational injury**

Running title: Compensation claimants and long-term disability benefit

Author: Rudbeck, Marianne, PhD

Department of Social Medicine, Aalborg University Hospital, Aalborg, Denmark

Conflict of interest:

None

Funding:

This research received no special grant from any funding agency in the public, commercial, or non-for-profit sectors.

Corresponding author and guarantor of submission:

Marianne Rudbeck  
Socialmedicinsk Enhed, Aalborg University Hospital  
Havrevangen 1  
DK – 9000 Aalborg  
Denmark  
E-mail: [magrr@rn.dk](mailto:magrr@rn.dk)  
Phone: +45 41174286

## **Abstract**

**Objective:** To describe characteristics of claimants a year after report of an occupational injury associated with long-term disability benefits for income.

**Method:** Univariate and multivariate logistic regression analyses on self-reported data and register data. Primary outcome: long-term disability benefits.

**Results:** Respondent claimants on benefits had a work ability of 2.72 (scale 1-10 – low to high) with slight increase from baseline. The multivariate analysis showed low work ability was the only characteristic associated with benefits. In the analysis of aggravation a year after injury claim benefits were only associated with severity of injury at report, increased daily medication, and aggravated relationships with friends.

**Conclusions:** Low work ability a year after report was the only characteristic of all claimants on benefits. In the present context perceived work ability perhaps reflects both severity of injury and other health or social factors.

**Key words:** Disability benefit; workers compensation; return-to-work; single-item Work Ability Index

## Introduction

Returning to work after an occupational injury is a complex, and involves both personal characteristics and social factors. Health and socio-economic factors can only partly predict who returns to work. Expectations for returning to work also affect return to work, and reporting an occupational injury may influence expectations for returning to work. Reporting an occupational injury is known to influence both recovery, rehabilitation, and return to work.

<sup>1 - 5</sup> An ongoing occupational injury claim may further decrease return rate to work even in societies with separation between the occupational claim system and the system of disability benefits. <sup>6</sup>

The perceived work ability at time of injury generally predict the chance for rehabilitation and the risk of long-term disability benefits and permanent disability pension. <sup>7 - 12</sup> We have previously demonstrated that at time of reporting an occupational injury perceived low work ability was associated to the chance of receiving disability benefits.<sup>13</sup> Whether the association between work ability and disability benefits still persists a year after report of the occupational injury is not known. Occupational inactivity has been shown to have negative consequences for the health, and returning to work is generally associated with health improvements. <sup>14</sup> We therefore expected that the characteristics associated with disability benefits may have changed a year after report with an aggravation of health factors. Therefore, our aim of the present follow-up study was to describe characteristics of claimants on long-term disability benefits a year after reporting an occupational injury. We expected that claimants with prolonged claim might develop further disability and/or health and/or social aggravation a year after report than claimants with recognized or rejected claims.

## Method

### Study design and population

In Denmark, the workers' compensation system is administered by the National Board of Industrial Injuries. The employers have to finance this insurance and all employees are entitled to submit a claim for compensation for either a work-related accident or an occupational disease. Compensations include disability, wage loss, death, and medical expenses. The workers' compensation system in Denmark does not include current sick leave benefits or other similar disability benefits (tab. 1.). The first four weeks of sick-leave are paid by the employer. After the four weeks, regardless of the compensation claim, the municipality grants in accordance with national law current benefits to all the sick-listed and seeks to promote rehabilitation and return to work after four weeks of sick leave.

We conducted a study on claimants who reported an occupational injury to the National Board of Industrial Injuries from 1. Jan. to 31. Dec 2014. Danish employees should report an occupational injury to the National Board of Industrial Injuries within 9 days after the injury was sustained. All occupational injuries, including mental injuries, is to be reported to the National Board. If doctors suspect an occupational injury, they have to report the injury to the National Board of Industrial Injuries. An occupational injury is either an industrial accident or an occupational disease. An accident is an unfortunate incident or exposure that occurs suddenly or within five days. An occupational disease is due to exposures over a relatively long time. An occupational disease can be reported up to a year after sustaining the injury or gaining awareness of the injury.<sup>15</sup> Baseline results from the study was described previously.

13

The National Board of Industrial Injuries provided all their registered injuries, and every claimant received access to an electronic questionnaire within 1-2 weeks after report of a

compensational claim. Claimants who voluntarily agreed to receive another questionnaire in a year got access to another questionnaire a year after report.

The National Board of Industrial Injuries provided all their decisions and compensations one year after the report. The National Board decides if the injury is work-related, if so, a compensation is granted according to the extent of the injury, information from health experts, and rules of extent of harm.

We extracted all data on any disability benefit for income from each patient's personal number in the DREAM registry. The Danish Ministry of Employment manage the DREAM registry, which contains weekly information on all social welfare payments provided to the population since 1991. The DREAM database has proven useable for follow-up analyses of the social and economic consequences of disease.<sup>16</sup>

## Measures

### Outcome variable

We defined the outcome variable long-term disability benefit as claimants who had received disability benefits for personal income more than 80% of the time in the year after report of the occupational injury and still received disability benefits after a year. We defined disability benefit as sick leave benefits, any temporary benefits, and permanent benefits received after report of injury; that is, benefits for abled claimants, i.e., unemployment benefits, and educational support were not included. In Denmark, people usually receive benefits if not at work, and not receiving benefits is therefore a proxy of having returned to work.

### Predictor variable

We used five categories of decisions by the National Board of Industrial Injuries on financial compensation: recognized with financial compensation, recognized without financial

compensation, ongoing (that is claims not finally decided), closed without final decision, and rejected. The National Board of Industrial Injuries can acknowledge the claim with an injury damage of less than 5% of which the person then do not get any financial compensation. An injury damage of 5% or more results in a compensation of the injury and perhaps a compensation of future income loss. Claims closed without final decision are mostly claims that the claimants for some reason do not want to maintain.

The predictor variable expresses the decision by the National Board of Industrial Injuries after one year, and by then some claims have not been finally decided upon, eg. because of a need for further knowledge on the injury or circumstances leading to the injury.

#### Covariates

The covariates were based on self-reported information in the questionnaire at the time of reporting the occupational injury and one year after report. To show changes in the present variables from 2014 to 2015 we did a dichotomization into better/unchanged or aggravated according to each variable on an individual basis.

#### Health

- We described severity of injury by number of therapists, and number of treatments at time of report. We dichotomized the variables into one kind of therapist, one type of treatment and more than one.
- The claimants reported any present treatment (yes/no) of the injury a year after report.
- The claimants reported if the injury somehow bothered them (yes/no) at reporting the claim and after a year.



- The claimants recorded the frequency of perceived pain on a five-point scale from constant pain to pain a couple of times a month or less. We defined a group of daily pain including constant pain and pain one or several times a day (yes/no).
- The claimants reported their use of daily painkillers on a scale from one to four groups of painkillers. The groups were mild painkillers (eg. Paracetamol), arthritis medicine (NSAID), strong painkillers (Morphine), other painkillers (eg. neuropathic painkillers). We dichotomized the responses into one medical drug group and more than one drug group.
- The claimants reported their use of daily medication due to other diseases. The variable measured medication due to number of disease groups (heart diseases, lung diseases, diabetes, any mental disorder, or other diseases). Use of daily painkillers was not included in this variable.
- The claimants' emotional stress was measured by 5 questions on their well-being scored on a 6-point scale from all the time (score 1) to not at all (score 6). The questions were as follows: I have felt relaxed, I have felt energetic, I have woken up fresh and relaxed, my daily life has been filled with things that interest me, and I have been in a good mood. A score of more than 15 points indicated well-being more than half of the time. We defined a score less than 16 as emotionally stressed because they were stressed more than half of the time. Claimants reporting a mental disease or accident were not included in the variable.
- The claimants reported their overall perceived health on a 5-point scale from excellent, very good, good, not so good, or bad. We dichotomized into good (excellent, very good, good) and bad (not so good, bad).
- The claimants reported their recovery or perceived ability to live with their injury or disease on a 5-point scale from excellent, excellent, very good, good, not so good, or

bad. We dichotomized into good (excellent, very good, good) and bad (not so good, bad).

### Disabilities

- Disabilities at home and during leisure time were recorded as the number of tasks that were difficult to manage due to the injury (certain cleaning tasks, shopping, cooking, other tasks at home, certain work tasks, certain sports, certain hobbies other than sports, or other tasks outside home).
- Current work ability was scored on a 10-point scale from 1, indicating “no work ability”, to 10, indicating “best work ability” (single-item WAI).<sup>17 11</sup>
- Future work ability was described by the statement “My injury is going to affect my ability to do my usual job in the future” to be answered with completely right, mostly right, mostly wrong, or completely wrong.

### Socio-economy

Relationships with one’s family, and friends were both coded on each ten-point scale from 1, indicating “no relationship”, to 10, indicating “best relationship”, with the possibility of answering “have no family, etc.”.

### Statistics

We used Stata, StataCorp LP, Texas, USA/IC 13.1 for the univariate analyses ( $\chi^2$ ) and multivariate logistic regression analyses with  $P < 0.05$ . Multivariate logistic regression analyses with odds ratios (ORs) and 95% CIs were conducted in three subsequent analyses of health factors, disability, and social factors; severity of injury at time of report, gender and age were adjusted for in all the analyses. All variables with  $P < 0.2$  were included in the final multivariate logistic regression analyses.

The Data Protection Agency approved the study (J-nr. 2012-41-09589).

## Results

In total, 39,961 claimants reported an industrial injury; 30,732 met the inclusion criteria, which we have described previously.<sup>13</sup> Altogether, 5782 at age 18-60 years (18.82%) answered the questionnaire at the time of reporting the injury; they received a questionnaire a year after report, and 3985 (68.92%) answered.

In total, 3408 (11.09%) of the population of 30,732 received disability benefits after a year, 1632 women (10.63% of females) and 1776 men (11.55% of males) ( $P=0.01$ ). In our study population of 3985, 418 (10.49%) received disability benefits, 232 (9.88%) females and 186 (11.37%) males. In the total population 117 (0.38%) of these had achieved permanent disability benefit after a year and 12 (0.30%) in our study population.

Claimants who had received disability benefits 80% of the subsequent year and still received benefits (long-term benefits) after a year had the same likelihood of completing the questionnaire at the time of reporting the injury and after a year as claimants receiving less disability benefits when stratified by the later decision of the National Board of Industrial Injuries (tab. 2).

In the univariate analyses we found that the claimants were limited in many ways; even though claimants on long-term benefits were limited the most (tab. 3). In general, the proportions in the groups from report to a year after demonstrate that conditions improved after a year for both groups. We found no differences in number of painkillers according to receiving long-term benefit or not receiving long-term benefit. Table 3 shows proportions in the groups at report and after a year not analyses between these groups except for the CI analyses. Work ability improved after a year for both groups, but the most and only

significant for claimants not on benefits (tab. 3, CI). Relationships with family and friends deteriorated significantly for both groups, but the most for claimants on long-term benefits (tab. 3, CI).

The final multivariate logistic regression analysis according to long-term benefits after a year demonstrated that perceived work ability a year after report was the only factor of importance to long-term benefits after a year (tab. 4.A). We did analyses on the variables according to changes after a year (better/unchanged or aggravated). This final multivariate logistic regression analysis concerning aggravation of health, disabilities, and social factors demonstrated that increase in daily medication and worsen relationship with friends were associated to long-term benefits after a year, and in this analysis severity of injury at time of report were also associated with long-term benefits after a year (tab. 4.B). There were no significant change in work ability in this analysis.

We analyzed separately the significant variable from the final multivariate aggravation analysis according to decision group (tab. 5) to find out if there were any tendencies in relation to decision. We included the group medication with more than one painkillers because daily medication was significant. Severity of injury was only measured at time of report and were therefore not included in tab. 5. Qui square analyses (tab. 5) of changes in relevant variables (tab. 3.B) from time of report to a year after according to long-term benefits and decision by the National Board of Industrial Injury showed sparse numbers when looking at decision groups. However, all claimants on long-term benefits seem to use more daily medication, more painkillers, and to have deteriorated relationships with friends a year after report; this applies especially for claimants with ongoing or rejected claims according to painkillers and relationship with friends (tab 5.).

Final aggravation multivariate analyses on claimants with only ongoing claims demonstrated no other associations to long-term benefits (data not shown). Decisions by the National Board of Industrial Injuries on financial compensation were not associated to long-term benefits (tab. 4).

## Discussion

Perceived work ability a year after report were the only factor of importance to long-term disability benefits a year after report of an occupational injury. Health were not directly associated with long-term benefits. Multivariate analyses to demonstrate if there were factors of aggravation during the first year of injury claim related to long-term benefits showed that health at time of report were related to long-term benefits, as was increased daily medication and aggravated relationships with friends during the year. Claimant with ongoing claims had no further aggravations in the multivariate analyses.

### Work ability

Claimants on long-term benefits after a year had a low perceived work ability with mean 2.72; that is about a 15% increase from time of report. Claimants not on long-term benefits had a much higher work ability at baseline and a higher increase (22%) in work ability after a year. The very low work ability at baseline and the low increase may explain why we did not see an effect of work ability in our aggravation analyses. Perceived work ability seems to include other important factors as medication and severity of injury as we only showed these factors relevance in the aggravation analyses without aggravation in work ability.

Northern European studies have shown that self-reported work ability may predict risk of disability pension or sickness absence in limited populations.<sup>7 - 12</sup> We have used the single-item WAI to express self-reported or perceived work ability, which has been shown to be a

reasonable tool to predict risk of disability pension among Finnish municipal employees, though only poor association between single-item WAI and sickness absence has also reported.<sup>11 8</sup> Our present results indicate that single-item WAI may predict risk of long-term disability benefits and not just disability pension in respondent claimants with an occupational injury. Our previously reported baseline results may indicate that single-item WAI perhaps also at time of report may predict risk of long-term disability benefits.<sup>13</sup>

### Health and social factors

The studies on perceived work ability (WAI) have mostly only taken the health variables included in WAI into account. The Finnish study on single-item WAI did not include any covariates except age and education level.<sup>11</sup> Other studies have shown that both health, social factors, expectation and coping are associated to both rehabilitation and return to work, however, these studies did not include perceived work ability.<sup>18 19 3 20 21 22</sup> We did not find that health or social factors influenced the risk of long-term benefits a year after report. At baseline perceived work ability and perceived low health increased risk of long-term benefits.<sup>13</sup> We found only little aggravation in health (increased medication) associated with long-term benefits, and we cannot conclude if the aggravation caused the long-term benefit or perhaps the other way around. We may hypothesize, that perceived work ability also expressed health, and health thereby were without separate association to benefits.

### Prolonged work claims

Literature on occupational injuries have demonstrated opposing results according to association between having an occupational claim and rehabilitation/return to work/disability benefits.<sup>2 4 1 23 24</sup> In our present study, we found that decision on the occupational claim in general had no influence on long-term disability benefits in the multivariate analyses. We do not know if this could be because of small numbers in the decisions groups. The univariate

analyses demonstrated that aggravated relationships with friends were associated to long-term benefits in ongoing claims after a year and increased use of painkillers were associated to long-term benefits in claimants with rejected and ongoing claims, but note the small numbers in the decision groups. In the present study, we did not specific look at the duration of the claims, and we do not know if this could influence the results. Studies have demonstrated that claims management and adjudication times could affect return-to-work outcomes.<sup>25 6</sup>

### Strength and weaknesses

The strength of this follow-up study is the uniform data collection at baseline and the complete follow-up according to claim, long-term disability benefits, and decision by the National Board of Industrial Injuries due to data from the registers. However, we do not know if the claimants were on disability benefits for other diseases or reasons other than what they had reported to the National Board of Industrial Injuries.

We assume that not receiving long-term benefits is a proxy for return to work. In Denmark, hardly any are without income due to eg. living on spouse's income, other family income, or fortune. Therefore, not receiving long-term benefits is usually equal to return to work or unemployment benefits indicating capability of working. However, some may be living on spouse's income or fortune and thereby affect our results without certainty of direction.

The definition of severity of injury has some limitations. We described severity of injury by number of therapists and number of treatments at time of report that tell us about treatability and persistence of the claimants to seek treatment, that is this definition describes more the claimants' view on the injury than the actual severity of the injury. However, we did not have information on the actual severity of the injury.

The univariate analyses were used to show numbers (tab. 2) and to stress certain aspects according to decision by the National Board of Industrial Injuries (tab.4), however, due to low numbers in tab.4 we have to note the use of the results.

Our response rate after a year was 68.92%. We found no differences between responders and non-responders in receiving long-term benefits, neither at report nor after a year, in association to decision by the National Board of Industrial Injuries. Therefore, our data were not biased regarding long-term benefits or decisions by The National Board of Industrial Injuries. However, the findings should only be generalized with care, as our data at time of report only included 18.82% of the claimants reporting an injury and provide only minor information about the non-responders.<sup>13</sup> However, the data provide valuable knowledge about the respondent claimants' work ability and association to long-term benefits.

## **Conclusion**

A year after report of an occupational injury, respondent claimants on long-term disability benefits only differed from claimants not on long-term benefits in work ability. Perceived work ability may be a variable that covers almost all aspects of claimants' impairments according to disability benefits/return to work a year after reporting an occupational injury. Analyses of aggravation after a year demonstrated no association in exacerbated work ability and long-term disability benefits, and only very few other aggravations according to long-term benefits, and in general no association to decision by the National Board of industrial Injuries.



## References

1. Harris, I., Mulford, J., Solomon, M., van Gelder, J. M. & Young, J. Association between compensation status and outcome after surgery: a meta-analysis. *Jama* 2005; 293: 1644–1652.
2. Kolstad, H. a et al. Notification of occupational disease and the risk of work disability: a two-year follow-up study. *Scand. J. Work. Environ. Health* 2013; 39: 411–9.
3. Young, A. E., Choi, Y. S. & Besen, E. An exploration of the factors considered when forming expectations for returning to work following sickness absence due to a musculoskeletal condition. *PLoS One* 2015; 10: 1–17.
4. Leary, P. O., Boden, L. I., Seabury, S. A., Ozonoff, A. & Scherer, E. Workplace Injuries and the Take -Up of Social Security Disability Benefits. 2012; 72.
5. Bach, H. B. Skadelidtes reaktion på en verserende arbejdsskadesag. (Danish) 2014; e-ISBN: 978-87-7119- 249-0
6. Rudbeck, M., Johansen, J. P. & Omland, Ø. A Follow-up Study on Return to Work in the Year After Reporting an Occupational Injury Stratified by Outcome of the Workers' Compensational System. *J. Occup. Environ Med.* 2017; doi: 10.1097/JOM.0000000000001274. [Epub ahead of print]
7. Reeuwijk, K. G. et al. The prognostic value of the work ability index for sickness absence among office workers. *PLoS One* 2015; 10: 1–13.
8. Roelen, C. A. M. et al. Work ability as prognostic risk marker of disability pension: Single-item work ability score versus multi-item work ability index. *Scand. J. Work. Environ. Heal.* 2014; 40: 428–431 .

9. Schouten, L. S. et al. Screening manual and office workers for risk of long-term sickness absence: cut-off points for the Work Ability Index. *Scand. J. Work. Environ. Health* 2015; 41: 36–42.
10. Lundin, A., Kjellberg, K., Leijon, O., Punnett, L. & Hemmingsson, T. The Association Between Self-Assessed Future Work Ability and Long-Term Sickness Absence, Disability Pension and Unemployment in a General Working Population: A 7-Year Follow-Up Study. *J. Occup. Rehabil.* 2016; 26: 195–203.
11. Jääskeläinen, A. et al. Work ability index and perceived work ability as predictors of disability pension: A prospective study among Finnish municipal employees. *Scand. J. Work. Environ. Heal.* 2016; 42: 490–499.
12. Bethge, M., Spanier, K., Peters, E., Michel, E. & Radoschewski, M. Self-Reported Work Ability Predicts Rehabilitation Measures, Disability Pensions, Other Welfare Benefits, and Work Participation: Longitudinal Findings from a Sample of German Employees. *J. Occup. Rehabil.* 2017; 0: 1–9.
13. Rudbeck, M., Johansen, J. P. & Omland, Ø. Characteristics of Compensation Claimants Reporting an Occupational Injury Associated with Disability Benefits in the Subsequent Year. *J. Occup. Environ. Med.* 2018; 60: 279–285.
14. Norström, F., Virtanen, P., Hammarström, A., Gustafsson, P. E. & Janlert, U. How does unemployment affect self-Assessed health? A systematic review focusing on subgroup effects. *BMC Public Health* 2014; 14.
15. The National Board of Industrial Injuries[cited 2016, Dec. 1]. Available from: <http://www.aes.dk/>
16. Hjollund NH, Larsen FB, A. J. Register-based follow-up of social benefits and other

transfer payments: accuracy and degree of completeness in a Danish interdepartmental administrative database compared with a population-based survey. 2007; 35(5):497-502.. doi:10.1080/14034940701271882

17. Ilmarinen, J. Work ability—a comprehensive concept for occupational health research and prevention. *Scand. J. Work. Environ. Health* 2009; 35: 1–5.
18. Iles, R. a., Davidson, M., Taylor, N. F. & O’Halloran, P. Systematic review of the ability of recovery expectations to predict outcomes in non-chronic non-specific low back pain. *J. Occup. Rehabil.* 2009; 19: 25–40.
19. Cole, D. C., Mondloch, M. V. & Hogg-Johnson, S. Listening to injured workers: How recovery expectations predict outcomes - A prospective study. *Cmaj* 2002; 166: 749–754.
20. Cancelliere, C. et al. Factors affecting return to work after injury or illness: best evidence synthesis of systematic reviews. *Chiropr. Man. Therap.* 2016; 24: 32.
21. Louwerse, I., Huysmans, M. A., Van Rijssen, H. J., Van Der Beek, A. J. & Anema, J. R. Characteristics of individuals receiving disability benefits in the Netherlands and predictors of leaving the disability benefit scheme: A retrospective cohort study with five-year follow-up. *BMC Public Health* 2018; 18: 1–12.
22. Ferrari, R. & Louw, D. Coping style as a predictor of compliance with referral to active rehabilitation in whiplash patients. *Clin. Rheumatol.* 2011; 30: 1221–1225.
23. Gruson, K. I., Huang, K., Wanich, T. & DePalma, A. a. Workers’ Compensation and Outcomes of Upper Extremity Surgery. *J. Am. Acad. Orthop. Surg.* 2013; 21: 67–77.
24. Gum, J. L., Glassman, S. D. & Carreon, L. Y. Is type of compensation a predictor of

outcome after lumbar fusion? Spine (Phila. Pa. 1976). 2013; 38: 443–448.

25. Cocker F<sup>1</sup>, Sim MR, Kelsall H, Smith P. The Association Between Time Taken to Report, Lodge and Start Wage Replacement and Return-to-work Outcomes. J Occup Environ Med. 2018; doi: 10.1097/JOM.0000000000001294. [Epub ahead of print]

ACCEPTED

Table 1 Characteristics of compensations payments by the Workers compensation system and the municipality in Denmark

	<b>Wage replacement</b>	<b>Medical costs**</b>	<b>Disability</b>
<b>Occupational injury *</b>	Employer (first four weeks) Municipality pays sick leave benefits	Free (Public paid) E.g. Physiotherapy or psychological treatment may be paid by the Workers' compensation.	Workers' compensation pays compensation. The municipality pays disability benefits.
<b>Non-occupational injury</b>	Employer (first four weeks) Municipality pays sick leave benefits	Free (Public paid)	Municipality pays disability benefits

Note: \*) Occupational injury includes occupational accident and occupational disease; \*\*) Some costs as physiotherapy or psychological treatment are only partly free

Table 2. Long-term disability benefits after report of an occupational injury stratified by decision of the National Board of Industrial Injuries

	At report					After a year				
	Non-responders on questionnaire		Responders on questionnaire		P	Non-responders on questionnaire		Responders on questionnaire		P
	No long-term benefits	Long-term benefits	No long-term benefits	Long-term benefits		No long-term benefits	Long-term benefits	No long-term benefits	Long-term benefits	
Recognized with financial compensation	2330	248	568	66	0.5484	2500	275	398	39	0.5191
Recognized without financial compensation	2655	116	525	22	0.8604	2818	122	362	16	0.9392
Ongoing	4967	1046	1181	246	0.8883	5334	1143	814	149	0.0965
Closed without final decision	751	47	109	7	0.9507	783	50	77	4	0.6982
Rejected	11485	1305	2753	305	0.7060	12322	1400	1916	210	0.6445
Total	22188	2762	5136	646	0.8231	23757	2990	3567	418	0.1960

Note: Long-term disability benefit: Disability benefits more than 80% of the time in the subsequent year and still disability benefits after a year; Chi Square with  $P < 0.05$ .

**Table 3. Basic characteristics (number, %) after report of an occupational injury according to long-term disability benefits after a year**

	At report			After a year		
	No benefit after a year (100%)	Benefit after a year (100%)	P	No benefit after a year (100%)	Benefit after a year (100%)	P
<b>Health</b>						
Seen more than one therapist	2475 (71.35)	338 (82.44)	<b>0.000</b>	-	-	
More than one treatment	2006 (59.61)	296 (72.55)	<b>0.000</b>	373 (48.57)	128 (73.56)	<b>0.000</b>
Getting any treatment for the injury after a year	-	-		762 (37.10)	174 (71.02)	<b>0.000</b>
Bothered by the injury	3360 (94.22)	415 (99.52)	<b>0.000</b>	1759 (85.31)	241 (97.97)	<b>0.000</b>
Daily pain	2335 (69.93)	339 (82.28)	<b>0.000</b>	1200 (68.69)	188 (78.66)	<b>0.002</b>
Use of more than one kind of painkillers	565 (67.66)	145 (64.73)	0.407	281 (67.71)	93 (67.88)	0.970
Emotionally stressed	1235 (47.87)	250 (86.51)	<b>0.000</b>	1775 (48.47)	359 (85.89)	<b>0.000</b>
Daily medication (without painkillers)	114 (37.42)	210 (68.85)	<b>0.000</b>	689 (36.65)	146 (70.19)	<b>0.000</b>
Bad perceived health	718 (20.13)	223 (53.48)	<b>0.000</b>	504 (24.68)	163 (66.53)	<b>0.000</b>
Bad recovery or adaptation to disease	1438 (40.77)	314 (75.48)	<b>0.000</b>	517 (25.42)	151 (61.89)	<b>0.000</b>
<b>Disabilities</b>						
Disability of more than one task at home/during leisure	1916 (75.26)	340 (87.18)	<b>0.000</b>	822 (69.54)	196 (86.73)	<b>0.000</b>
Work ability (mean)	5.64 [5.54-5.74]	2.37 [2.16-2.59]	s.	6.89 [6.77-7.02]	2.72 [2.43-3.00]	s.
Expected future work disability	1566 (71.51)	263 (97.05)	<b>0.000</b>	1175 (67.68)	212 (95.50)	<b>0.000</b>
<b>Socio-economy</b>						
Relationship with family (mean)	9.00 [8.95-9.05]	8.69 [8.50-8.86]	s.	8.72 [8.65-8.79]	8.18 [7.90-8.46]	s.
Relationship with friends (mean)	8.92 [8.87-8.96]	8.43 [8.25-8.63]	s.	8.55 [8.48-8.62]	7.76 [7.47-8.06]	s.
Living alone	847 (23.79)	110 (26.51)	0.221	476 (23.63)	55 (22.82)	0.779
BMI >30	723 (20.39)	106 (25.48)	<b>0.016</b>	455 (22.97)	62 (26.16)	0.272
Current smoking	766 (21.49)	123 (29.43)	<b>0.000</b>	393 (19.26)	67 (27.35)	<b>0.003</b>
Risky alcohol consumption	303 (8.56)	47 (11.44)	0.053	197 (9.65)	22 (9.02)	0.750
Short education (10-12 years)	787 (22.20)	117 (28.40)	<b>0.005</b>	-	-	
Mean age	44.20 [44.07-44.33]	45.83 [45.50-46.17]	s.	-	-	
Gender respondents (women/men)	2117 (59.35) / 1450 (40.65)	232 (55.50) / 186 (44.50)	0.130	-	-	
<b>Acknowledgement with compensation</b>						
Received financial compensation from the National Board	-	-		207 (87.71)	11 (91.67)	0.682

Note: We used Chi Square. Bold font shows  $P < 0.05$ , significance (s), or no significance (ns) according to CI 95%. Benefit: Disability benefits more than 80% of the time in the subsequent year and still disability benefits after a year

Table 4 Multivariate logistic regression models according to disability benefits after a year

A. Health, disabilities, social factors a year after report

	<b>Models</b>			
	<b>Health</b>	<b>Disabilities</b>	<b>Social factors</b>	<b>Final</b>
Decision by The National Board of Injuries	1.16 [0.92-1.46]	0.98 [0.87-1.11]	1.02 [0.92-1.14]	0.95 [0.83-1.08]
<b>Health</b>				
Seen more than one therapist at report	1.18 [0.82-1.70]	1.14 [0.93-1.39]	<b>1.44 [1.21-1.71]</b>	1.16 [0.94-1.43]
More than one treatment at report	1.06 [0.81-1.39]	1.02 [0.88-1.18]	<b>1.18 [1.05-1.33]</b>	1.03 [0.89-1.20]
Getting any treatment for the injury after a year	0.54 [0.27-1.08]	-	-	-
Bothered by the injury	Omitted	-	-	-
Daily pain	Omitted	-	-	-
Use of more than one kind of painkillers	1.05 [0.68-1.64]	-	-	-
Emotionally stressed	1.06 [0.98 -1.15]	-	-	-
Daily medication (without painkillers)	0.92 [0.56-1.50]	-	-	-
Bad perceived health	1.23 [0.76-2.00]	-	-	1.20 [0.97-1.50]
Bad recovery or adaptation to disease	1.28 [0.75-2.19]	-	-	-
<b>Disabilities</b>				
Disability of more than one task at home/during leisure	-	1.09 [0.99-1.19]	-	1.07 [0.97-1.18]
Work ability	-	<b>0.63 [0.58-0.69]</b>	-	<b>0.63 [0.58-0.69]</b>
Expected future work disability	-	0.92 [0.77-1.10]	-	-
<b>Social factors</b>				
Relationship with family	-	-	0.97 [0.89-1.06]	-
Relationship with friends	-	-	<b>0.83 [0.76-0.91]</b>	0.93 [0.85-1.01]
Living alone	-	-	0.90 [0.70-1.17]	-



BMI >30	-	-	1.17 [0.99-1.39]	1.07 [0.87-1.30]
Current smoking	-	-	0.62 [0.44-0.86]	0.78 [0.53-1.16]
Risky alcohol consumption	-	-	0.70 [0.42-1.18]	0.61 [0.33-1.12]
Short education (10-12 years)	-	-	0.90 [0.78-1.02]	1.06 [0.90-1.25]
Mean age	1.00 [0.96-1.04]	1.01 [0.99-1.03]	1.01 [0.99-1.02]	1.00 [0.99-1.02]
Gender respondents (women/men))	1.35 [0.70-2.60]	0.84 [0.59-1.20]	0.74 [0.54-1.02]	0.77 [0.53-1.12]

## B Aggravation in health, disability, and social factors from time of report to a year after report

	Health	Disabilities	Social factors	Final
Decision by The National Board of Injuries	1.18 [0.96-1.44]	1.12 [1.02-1.23]	1.03 [0.93-1.14]	1.12 [0.99-1.28]
<b>Health</b>				
Seen more than one therapist at report	1.23 [0.86-1.76]	<b>1.43 [1.22-1.67]</b>	<b>1.43 [1.20-1.70]</b>	<b>1.35 [1.10-1.67]</b>
More than one treatment at report	1.26 [0.97-1.65]	<b>1.12 [1.00-1.24]</b>	<b>1.18 [1.05-1.34]</b>	<b>1.19 [1.03-1.38]</b>
Getting any treatment for the injury after a year	Omitted	-	-	-
Bothered by the injury	Omitted	-	-	-
Daily pain	0.76 [0.16-3.49]	-	-	-
Use of more than one kind of painkillers	2.72 [0.79-9.40]	-	-	1.97 [0.92-4.20]
Emotionally stressed	1.23 [0.67-2.26]	-	-	-
Daily medication (without painkillers)	2.54 [1.31-4.94]	-	-	<b>2.45 [1.67-3.59]</b>
Bad perceived health	2.38 [1.30-4.36]	-	-	-
Bad recovery or adaptation to disease	1.07 [0.49-2.37]	-	-	-
<b>Disabilities</b>				

Disability of more than one task at home/during leisure	-	0.94 [0.70-1.26]	-	-
Work ability	-	0.78 [0.51-1.20]	-	-
Expected future work disability	-	0.84 [0.58-1.21]	-	-
<b>Social factors</b>				
Relationship with family	-	-	1.03 [0.75-1.42]	-
Relationship with friends	-	-	<b>1.51 [1.10-2.05]</b>	<b>1.54 [1.09-2.16]</b>
Living alone	-	-	0.34 [0.08-1.43]	0.31 [0.04-2.29]
BMI >30	-	-	1.30 [0.98-1.74]	0.99 [0.70-1.39]
Current smoking	-	-	2.03 [0.86-4.82]	2.42 [0.93-6.32]
Risky alcohol consumption	-	-	1.18 [0.62-2.26]	-
Short education (10-12 years)	-	-	-	-
Mean age	1.02 [0.99-1.06]	1.01 [0.99-1.02]	1.00 [0.99-1.02]	1.00 [0.98-1.02]
Gender respondents (women/men))	2.16 [1.19-3.95]	1.00 [0.76-1.30]	0.88 [0.65-1.19]	1.06 [0.74-1.52]

Note: OR; 95% CI; variable with P<0.2 were include in the final model

Table 5. Qui square analyses of changes in relevant variables with most significant changes from time of report to a year after report according to disability benefits after a year and decision by the National Board of Industrial Injury

	No long-term benefit		Long-term benefit		
	Better/unchanged	Aggravated	Better/unchanged	Aggravated	P
<b>Daily medication without painkillers</b>					
Recognized with financial compensation	158	32	6	7	<b>0.001</b>
Recognized without financial compensation	167	11	5	22	<b>0.023</b>
Ongoing	306	83	35	25	<b>0.001</b>
Closed without final decision	34	8	2	0	0.495
Rejected	766	123	65	25	<b>0.000</b>
Total	1431	257	113	59	<b>0.000</b>
<b>Use of more than one group of painkillers</b>					
Recognized with financial compensation	181	9	11	2	0.101
Recognized without financial compensation	178	0	7	0	-
Ongoing	377	12	55	5	<b>0.047</b>
Closed without final decision	42	0	2	0	-
Rejected	877	12	85	5	<b>0.004</b>
Total	1655	33	160	12	<b>0.000</b>
<b>Relationships with friends</b>					
Recognized with financial	314	84	33	6	0.339

compensation					
Recognized without financial compensation	294	68	14	2	0.527
Ongoing	635	179	103	46	<b>0.018</b>
Closed without final decision	64	13	4	0	0.370
Rejected	1558	358	159	51	0.051
Total	2865	702	313	105	<b>0.009</b>

Note: We used Chi Square with  $P < 0.05$ . Long-term benefit: Disability benefits more than 80% of the time in the subsequent year and still disability benefits after a year.

ACCEPTED