



**THE SICK-LISTED –  
AN UNDER-RECOGNISED RESOURCE IN  
HANDLING SICKNESS ABSENCE**

*Nils Fleten*

*Tromsø 2006*

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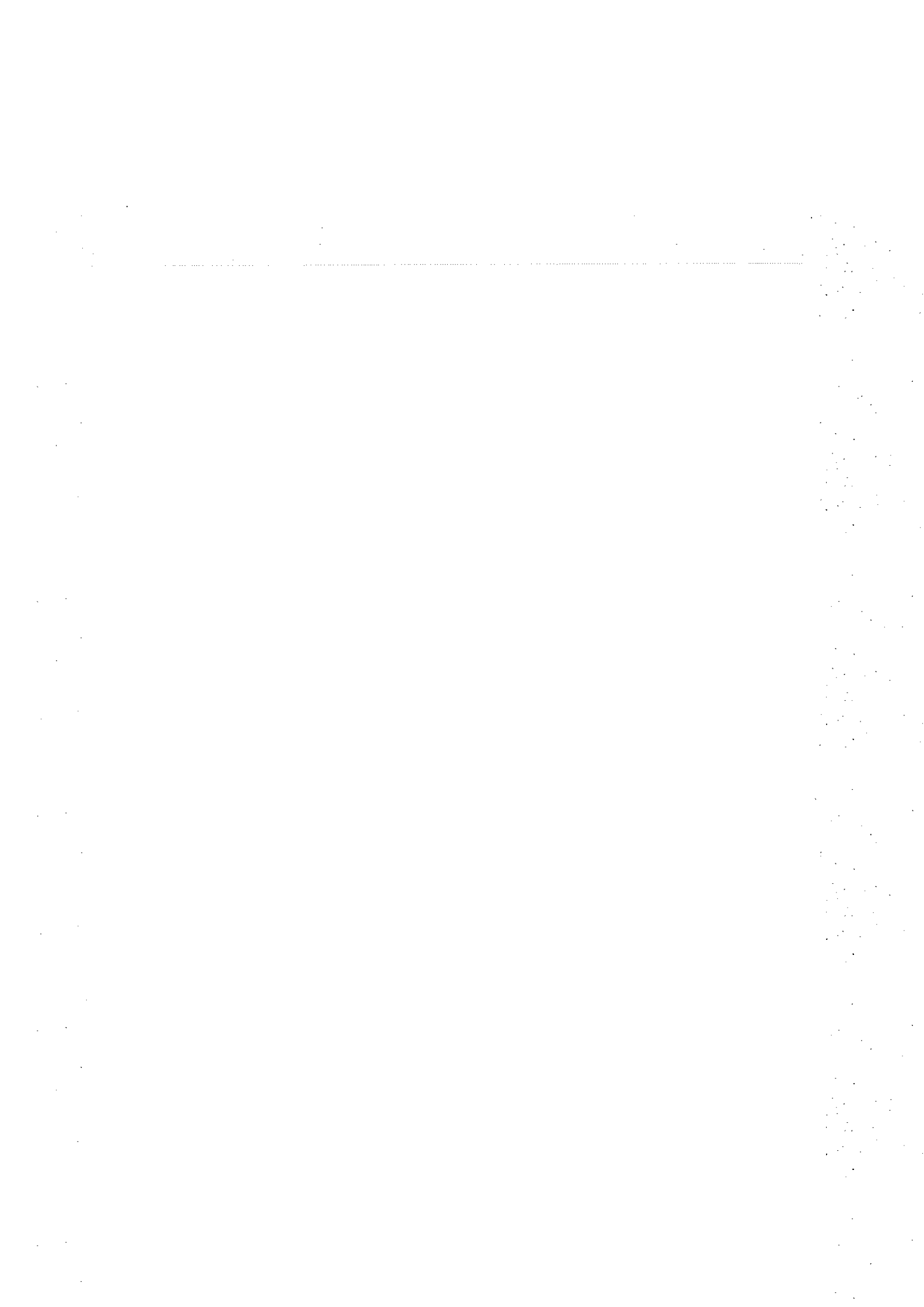
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Tromsø, April 2006

Nils Fleten

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*Er du halt, kan du ride,  
handlaus gjete,  
er du dauv, kan du duga i strid.  
Blind er betre  
enn brend á vera;  
dauð mun ein lita duga."*

Hávamál; den yngre Edda, 1222

## LIST OF PAPERS

The thesis is based on the following papers.

- I. Fleten N, Johnsen R, Skipenes BØ. Sykmeldte tror tiltak på arbeidsplassen kan redusere sykefravær. Tidsskr Nor Lægeforen 1999. 119(25):3730-3734.
- II. Fleten N, Johnsen R, Østrem BS. Reliability of sickness certificates in detecting potential sick leave reduction by modifying working conditions: a clinical epidemiology study. BMC Public Health 2004; 4(1):8.
- III. Fleten N, Johnsen R, Førde 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(1):46.
- IV. Fleten N, Johnsen R. Reducing sick leave by minimal postal intervention: a randomized, controlled study. Accepted April 7<sup>th</sup> 2006: Occupational & Environmental Medicine.

The papers will be referred to by their Roman numerals in the text.

## 1.1 ABSTRACT

**Background:** In July 1993, several measures to stimulate return to work, like Active Sick Listing, formal decisions on sick leave beyond 12 weeks and commitments for employers to consider potential job adjustments were incorporated. The role of sickness as main cause to be entitled sickness benefits was simultaneously emphasised. However, despite an increasing focus on improving the necessary medical certificates required for sickness benefits, and on follow-up of sick-listed within the National Insurance Offices (NIOs), the sickness absence in Norway gradually increased from 1994.

**Aims:** This study inquires:

- The opinions of laymen and professionals on whether work adjustments can reduce sickness absence.
- The ability within National Insurance Offices to select for follow-up, either persons that might profit from work adjustments, or simply the long-lasting sick leaves in early phases.
- How extended medical information and extended medical competence contributes to selection ability.
- And, if introducing challenges among sick listed on possible work adjustments and length of sick leave may have any effect on sickness absence.

**Methods:** During October – November 1997 and February – March 1998 the National Insurance Offices in the cities of Harstad and Tromsø included into the study a total of 999 consecutive sick-listed persons, all with a new episode of sick leave exceeding two weeks. The inclusion was restricted to persons with musculoskeletal or mental disorders. Randomly selected a questionnaire on potential sick leave reduction by work adjustment and expected length of the ongoing sick leave was sent to 499 of the included. Two National Insurance officers and two National Insurance medical consultants individually filled in a corresponding questionnaire for all included sick-listed. Their assessments were based on routine medical certificates and randomly selected, previous history of sickness benefits. They reassessed all sick leaves where an extended medical certificate was eventually received. The actual length of the ongoing sick leave, new episodes of sick leaves within one year and any benefits after one year were collected from the Registers of the National Insurance offices. Some 159 sick listed assessed the question on whether work adjustment could reduce the ongoing sick-leave on a VAS scale, and 152 assessed the expected length. Ability to select for

follow-up, based on expected effect of work adjustments, was inquired by agreements analysis between the sick-listed and the NIO assessors, and within and between the groups of NIO assessors. Diagnostic accuracy of identifying long-lasting sick leaves was analysed by ROC area, sensitivity, specificity, likelihood ratio and positive predictive value. Possible intervention effects of the questionnaire were analysed by survival analysis of the probability of returning to work within one year, and logistic regressions with benefits at one year as the dependent variable.

**Results:**

- Both sick- listed, NIO officers and NIO medical consultants assessments showed a considerable potential for reduced sick leaves if adjusted work were offered. The possible reduction-effects of work adjustment, were only rejected in half the cases, and for some 30% of the cases reduced sick leaves by offering work adjustments were expected in all three groups.
- There were no agreements beyond chance, between sick-listed and NIO officers or NIO medical consultants, on sick leaves that might be reduced by work adjustments. Neither was there any shared interpretation of the available information between the NIO assessors, in question of identifying sick leaves suitable for work adjustments.
- Sick-listed significantly, predicted the length of sick leave better than professionals at National Insurance Office did on available information in medical certificates.
- Neither supplementary medical information nor specialised medical knowledge improved the prediction of who would benefit on work adjustments, and only scarcely the ability to identify the long-lasting sick leaves.
- Minor interventions, as inquiries to the sick-listed on expected length of sick leave, seemed to reduce the length of the ongoing sick leaves, and the risk of receiving sickness related benefits after one year. In some subgroups prolongation-effects on sick leaves can not be excluded.

**Recommendations:** The results revealed needs of quality insurance and the establishing of diagnostic accuracies of instruments used in handling sickness absence, and high quality studies on involving sick-listed and the employers. The recent policy of work place dialogue is supported by the results, but the optimal follow-up policies should be established by reproducible research, rather than interchanging good ideas.

## 1.2 NORSK SAMANDRAG

**Bakgrunn:** Frå juli 1993 vart det innført fleire tiltak for å stimulere tilbakevending til arbeid for sjukmeldte. Aktiv sjukmelding, 12-ukersvedtak og plikt for arbeidsgivar å vurdere mogleg tilrettelegging av arbeid og eller arbeidsplass. Samtidig vart sjukdom som årsak framheva i lovverket, skulle ein få rett til sjukepengar. Trass i aukande fokus på oppfylginga i trygdekontora, og på det medisinske innhaldet i sjukmeldingane, auka sjukefråværet jamt og trutt frå 1994.

**Føremål:** Denne avhandlinga ser nærare på:

- Sjukmeldte og trygdemedarbeidarar sine vurderingar av om tilrettelegging av arbeid eller arbeidsplass kan redusera det enkelte fråværet.
- I kva grad trygdetilsette kan plukka ut dei som vil kunne avkorta sjukefråværet ved tilrettelegging, eller plukka ut dei som vil få langvarige fråvær.
- I kva grad meir utfyllande medisinske opplysningar eller formell medisinsk kompetanse gir betre grunnlag for å velje sjukmeldte for oppfølging.
- Om å utfordra dei sjukmeldte på moglege tilretteleggingar og forventa lengde av fråværet, i seg sjølv kan ha noko innverknad på fråværet.

**Metode:** I oktober og november 1997 og mars og april 1998 inkluderte trygdekontora i Harstad og Tromsø 999 sjukmeldte då fråværet hadde vart i 14 dagar. Utvalet var avgrensa til dei med muskelskjelett eller psykiske lidingar.

Eit vilkårleg utval på 499 av dei sjukmeldte fekk tilsendt informasjon og eit spørjeskjema om tilrettelegging kunne ha effekt av på fråværet, og om kor lenge dei forventa vera borte frå arbeid. To trygdefunksjonærar og to rådgivande legar vurderte tilsvarande dei same spørsmåla for alle inkluderte på grunnlag av informasjon i sjukmeldings attestane. I eit vilkårleg utval var og opplysningar om tidligare sjukefråvær med. I dei tilfella sjukmelding II vart tilgjengeleg, gjorde dei trygdetilsette ei ny vurdering. Opplysningar om den verklege lengda av sjukefråværet og eventuelt nye fråvær innafor eit år, vart henta frå trygdekontoret sitt sjukepengeregister.

I alt 159 sjukmeldte vurderte spørsmålet om tiltak kunne redusera dette fråværet på ein kontinuerleg skala, og 152 gav si vurdering av forventa lengde. Analysar på semje mellom sjukmeldte og dei trygdekontortilsette, og semje innan og mellom grupper av dei trygdetilsette vart brukt for å vurdere evna til å plukke ut for nærare oppfølging. ROC areal, sensitivitet,

spesifisitet, likelihood ratio og positiv prediktiv verdi, vart brukt for å sjå på evna til å identifisera dei langvarige fråværa. Overlevings analysar på tid til tilbakevending til arbeid, og logistisk regresjon med trygdestønad etter eit år som avhengig variabel, vart nytta i vurdering av mogleg effekt av utsendinga av spørjeskjemaet.

**Resultat:**

- Både sjukmeldte, trygdefunksjonærar og rådgivande legar meinte at om lag 30 prosent av sjukefråværa kunne reduserast med tilrettelegging av arbeid eller arbeidsplass. I berre halvparten av tilfella avviste dei slik avkorting.
- Det var inga semje ut over den vilkårlege mellom sjukmeldte og trygdefunksjonærar eller rådgivande legar i kva tilfelle tilrettelegging kunne gi redusert fråvær. Heller ikkje mellom dei trygdetilsette var det noko sams forståing av når tilrettelegging kunne forventas ha effekt.
- Dei sjukmeldte stipulerte lengde av fråværet langt betre enn dei trygdetilsette kunne på grunnlag av sjukepengeattestane og opplysningar om tidligare sjukefråvær.
- Korkje utfyllande medisinske opplysningar eller formell medisinsk kompetanse betra evna til å velja ut dei som ville ha effekt av tilrettelegging. Heller ikkje evna til å vurdere lengde vart nemneverdig betre med utfyllande medisinske opplysningar eller kompetanse.
- Undersøkinga taler for at små inngrep som å utfordra dei sjukmeldte på forventa lengde og moglegheiter for tilrettelegging, kan redusera sjukefråvær og mottak av trygdeytingar etter eit år. Ein kan likevel ikkje utelukka at slike inngrep kan forlenga fråvær i enkelte undergrupper.

**Tilråding:** Avhandlinga viser at det er naudsynt med kvalitetssikring og fastsetjing av diagnostiske eigenskapar for dei verktøy som blir brukt i oppfølging av sjukmeldte. Vidare vil ein tilrå undersøkingar av god kvalitet som ser på fråværsoppfølging på arbeidsplassen. Resultata støttar noverande retningslinjer i fråværsarbeidet med framheving av arbeidstakar arbeidsgjevar dialogen. Eit fråværsarbeidet basert på granskningar som kan etterprøvast, heller enn skiftande gode idear, vil i lengda venteleg gi betre resultat for alle partar.

## 2. BACKGROUND

The Norwegian Social Security Act of June 17<sup>th</sup> 1966 introduced January 1967, made every Norwegian citizen compulsory members of the National Insurance Scheme. The principle of full salary-compensation when incapacitated for work due to sickness, was introduced July 1978. The first 14 days (16 days from April 1998) paid by employer and then for until one year refunded by the National Insurance Scheme for up to 6 Basic Amounts (NOK 60699 in 2005). If treatment or vocational rehabilitation might improve the work capacities, sickness absence beyond one year might be compensated to about 65% of salary as medical or vocational rehabilitation benefits. Permanent reduced work capacity of at least 50% is compensated as disability pensions between 18 and 67 years of ages.

After the generous establishing period through the ninety sixties and seventies, a growing concern emerged on expenditures to the National Insurance Scheme in Norway as in most Western countries from later seventies (1). Increasing rates of disability pensioning continued through the ninety eighties, accompanied by increasing rates of sickness absence particularly among women. To address the concern the follow-up of sick listed was addressed in public reports in 1996 and 1990 (2;3).

In 1991 the White Paper of vocational rehabilitation, "Attføringsmeldingen" (4), reinforced the focus on the Working Strategy "Arbeidslinjen" in the Norwegian welfare policy. These strategies were further armoured by the White Paper of Welfare in 1994 (5), and The Norwegian Public Report no 27 in 2000 (6). The central partners committed to this policy have been the employer and employee organisations, the medical doctors and the Norwegian National Insurance Service.

The presented aims of the Working Strategy, "Arbeidslinjen", has been to

- increase the average age of retirement,
- reduce sickness absence and the incidence of disability pensioning, through increased flexibility in combining benefits and measures at the workplace, and
- organise vocational and medical rehabilitation activities.

In July 1993, the role of sickness as the main cause to be entitled sickness benefits was emphasised, and the range of instruments applied for reaching the aims, included:

- Extended medical certificate.

Extended medical certificate, the Sickness Certificate II (SC2) was introduced in 1988 as a prerequisite for sickness benefits beyond eight weeks (2;7). The Norwegian Public report no 23 in 1990 focused the need for early follow-up, and to meet the perceived need for further medical information (3). The medical information requested in SC2 included clues on what diagnostics, treatments and rehabilitation measures that had been performed. Further, the medical doctor should highlight additional needs of treatment and rehabilitation, and, eventually, submit a prognostic statement on expected length of the ongoing sick leave and on, if any, prerequisites for returning to work. The SC2 was the main source for the formal decision of sickness benefits beyond 12 weeks within the National Insurance service.

- Formal decision on sickness benefits beyond 12 weeks.

The National Insurance Office (NIO) was obliged, in every case, to decide on further sickness benefits based on the information from SC2, and formally approve a planned strategy for return to work. Vocational measures were especially requested, as evaluation of the follow-up indicated modest use of this measure (8).

- The possibility of receiving sickness benefits under adjusted work activities at the worksite (Active-sick-listing).

For a period up to three months the sick-listed could receive benefits while she was affiliated to her working place, committed to other activities than her usual tasks. The intention was to maintain the communication between the employee and the work place, facilitating return to work (RTW).

- Commitment for sick-listed to undergo rehabilitations to maintain sickness benefits.
- For a period up to three months the long term sick-listed could receive rehabilitation benefits while she underwent a vocational rehabilitation phase within the workplace.
- Commitments for employers to offer measures to support return to work. The employers were expected to address individualized measures, but they were not obliged to do so unless requested.

Both General Practitioners (GP) and the sick-listed themselves had expressed considerable potential for prevention of causes of sick leave within the worksite (9;10), and in a Swedish study the sick-listed emphasised the role of the employer when asked about factors that could promote or hinder return to work (11). The necessity of work intervention in successful



rehabilitation of musculoskeletal disorders was underscored by Ekberg et al (12;13), and physicians in USA rated unavailability of light duty at work place the most frequent barrier for return to work (14).

The national sickness absence strategies reflected an expectation that medical information would enable the National Insurance to select sick-listed for tailored interventions including work adjustments. The new legislation and associated enthusiasm in follow-up of sick-listed within the National Insurance Service, was not accompanied by the expected drop in sickness absence beyond 1994.

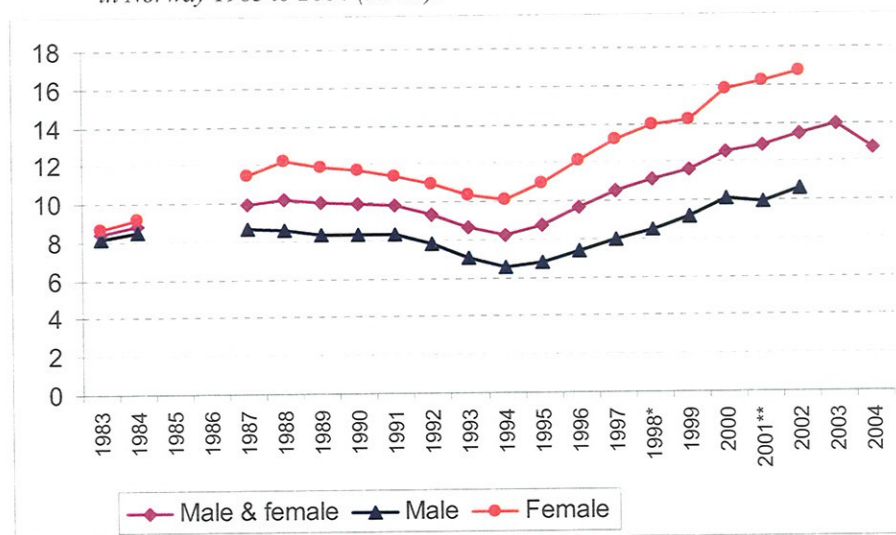
In Norway, a drop in sickness absence was observed from 1990 until 1994, (Figure 1) followed by increasing sickness absence throughout 2003. A marked drop in sickness absence was subsequently observed during 2004 continuing the first months of 2005. The sickness absence in Finland and Denmark were much more stable during the same period. In Sweden increasing sickness absence were marked from 1997 until 2002, and the drop started one year ahead of Norway (15).

At the same time as sickness absence started increasing, Bjørndal (16) could not demonstrate any effect of follow-up in Moss, and questioned the predictive value of SC2. In Bergen, Ringdal et al (17) could not reveal any reduced consumption of social security benefits after follow-up based on systematic evaluation of SC2. They concluded that the eight-week medical certificate, SC2, usually contains enough medical information, but the information was of limited use in assessing the need for active intervention by the NIOs (18). Simultaneously several Norwegian projects involving the National Insurance Service (NIS) indicated that follow-up activities might reduce sickness absence (19).

In Troms, the "Sør-Troms prosjektet" (19;20) showed promising results of a structured dialog between employees and employers on possible measures on the workplace. Sickness absence was reduced most markedly when local authorities (employers) identified suitable tasks for persons with reduced work ability, and when the chief officer coached the project. Within the local National Insurance office they experienced the uncertainty in selecting sick-listed persons that would profit from work adjustments. Some active-sick-listing were established for some one third of the sick-listed the National Insurance officers had dialogued with. All the

sick-listed on active-sick-listing welcomed the contact with the workplace, and only 6 out of 105 sick-listed described the dialogue with the NIO officer as unpleasant or negative.

Figure 1. Mean days of sickness benefits paid by the National Insurance Service per employee in Norway 1983 to 2004 (21-24).



\* The first of April 1998 the benefits paid by employee expanded from 14 to 16 days.

\*\* Government employees are included from 2001. (Source: National insurance Statistics for the year 1994, 1998, and 2003 and 2005)

Positive effect on sickness absence of National insurance initiated intervention focusing on work adjustment at the workplace, were also suggested by a randomised controlled trial (RCT) performed in Sweden (25). The experience from “Sør-Troms” and my work as National Insurance medical consultants through several years, generated following questions:

1. What is the opinion and expectations among sick-listed on possible effects of work related interventions? A positive attitude of such interventions would be essential for initiating work related measures.
2. Is it possible within the National Insurance office to identify those sick listed that might profit from work adjustments based on routine information? Experience from the “Sør-Troms” project and quality insurance of the formal decision on sickness benefits beyond

12 weeks, indicated uncertainty in the selection of persons for intervention, consistent with the dilemmas described by Hensing et al (26).

3. Is it possible within the National Insurance office to identify, in the early stage of sick leave, the long lasting sick leaves, using the existing routine information? The increasing attention on early intervention is based on the presumption that it is possible for NIO officers and consultants to identify those sick-listed that would benefit from early intervention. During the course of sick-leave, there is sooner or later a perceived expulsion from work and a reorientation to the role related as being unemployed (27). The intention of early intervention is to avoid the perceived expulsion and postpone the reorientation. The high numbers of sick-listed at this stage underscore the necessity of selective intervention, if National Insurance should play an important role.
4. Would extended medical information or use of National Insurance medical consultants improve the selection ability substantially? The basic assumption for extended medical information is that the main and often only reason for sickness absence is medical conditions.
5. Might minor interventions, as initiating challenges on possible work adjustments and length of sick leave when sick-listed, influence length of sick leave?

## **2.1 Summary of research questions**

- 1. Laymen's and professionals opinions on whether work adjustments can reduce sickness absence.**
- 2. The ability within National Insurance Offices to identify sick listed persons that might profit from work adjustments.**
- 3. The ability within National Insurance Offices and sick-listed persons to identify the long lasting sick leaves.**
- 4. The effect of extended medical information and extended medical competence on selection ability.**
- 5. If any effect on sickness absence of introducing challenges among sick listed on possible work adjustments and length of sick leave.**

### **3. STUDY POPULATION AND METHODS**

#### **3.1 Included sick listed**

During October – November 1997 and February – March 1998 the National Insurance Offices in the cities of Harstad and Tromsø included into the study a total of 1000 consecutive sick-listed persons, all with a new episode of sick leave exceeding two weeks. The inclusion was restricted to persons with musculoskeletal or mental disorders, L- and P-diagnoses, according to the International Classification of Primary Health Care, ICPC (28).

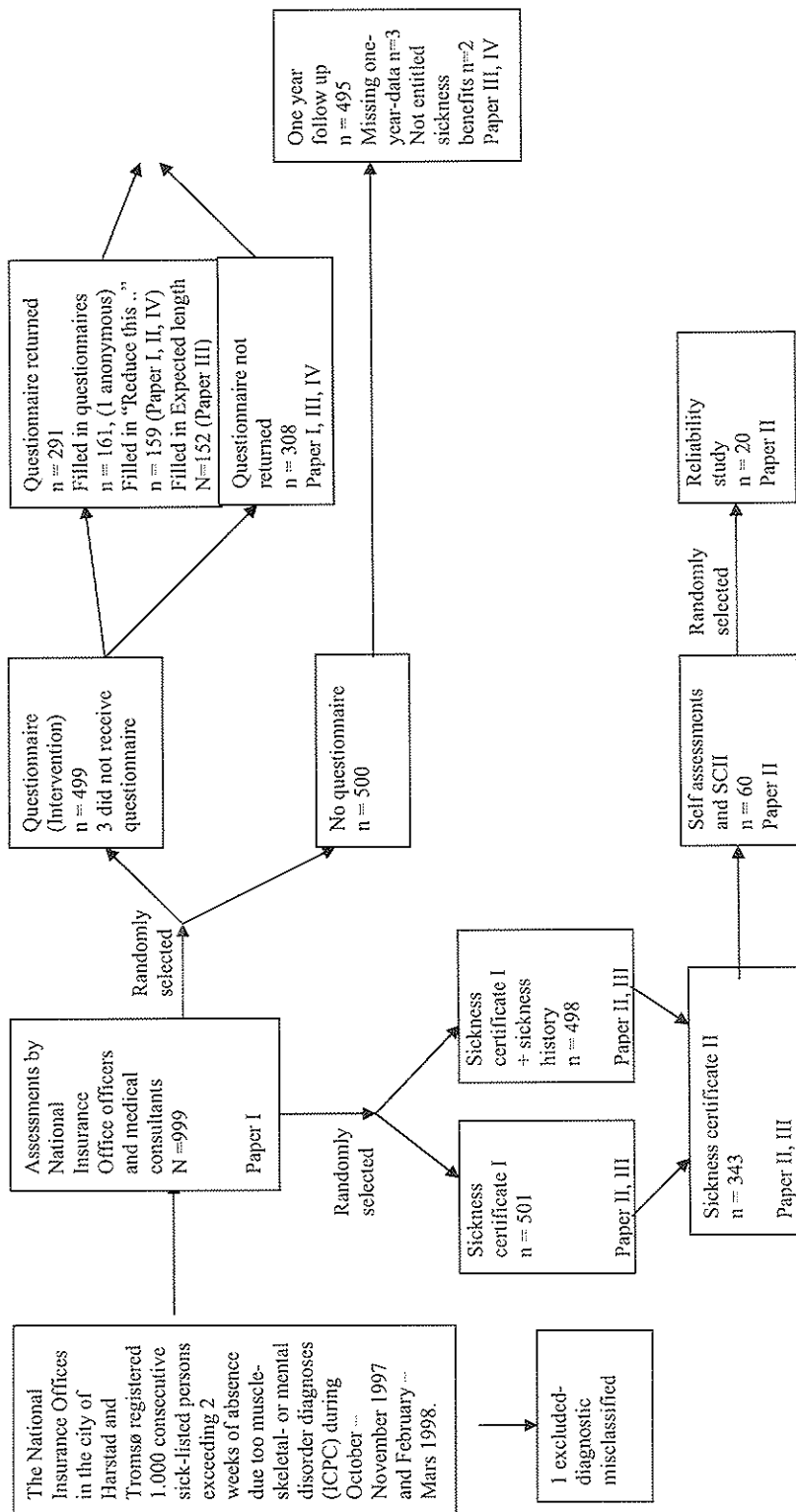
Harstad and Tromsø are the two largest cities in the county of Troms. Harstad is a local capitol for the region of southern Troms, with a stable number of inhabitants, 23 000 in 1998 (29). Besides public services they host mechanical industries and a 123 beds hospital for the region of 37.000 inhabitants (30). Tromsø, the capitol and administration centre of Northern Norway is expanding, 57500 inhabitants in 1998 and 62 500 in 2005 (29). The University of Tromsø has some 6500 students and a staff of some 1800 employees. The University Hospital has some 4000 employees and delivers specialised health services for a population of 465.000 people. The vast majority of people are employed within trade, business commerce and service industries.

The included sick-listed were consecutively registered with increasing id number into Epi-info (31). At the end of each day they were randomised to intervention or not, and into assessments with history of previous sickness benefits or not (Figure 2). The randomisation was performed by help of two separate lists of random numbers produced by Epi-info.

#### **3.2 The intervention and the assessments**

The intervention consisted of a questionnaire on the sick-listens' opinion of whether work measures could reduce the current and/or future sick leaves, on their expectations on the length of the current sick leave, and on expected new incidents of sick leave within a year, summarised in table 1. (Appendix)

Figure 2 Distribution of the study population into different study groups, and the papers where they appear.



In the absence of a reference standard for whether modified work could reduce the actual sick leaves, the study was designed to examine agreement within National Insurance Office officers (NIO officers) and between NIO officers and the sick-listed. The assessments of possible effect of work adjustments, and assessment of length of sick leave potentials, were explored on two levels of medical competence within NIOs.

Table 1 *Summary of the assessment form (Appendix A).*

Do you think that modified work measures could reduce your/this actual sick leave?	Visual Analogue Scale (VAS) Continuous from 0 (certainly not) to 80 mm (certainly yes)
Do you think that modified work measures could reduce future sick leave?	Visual Analogue Scale (VAS) Continuous
Do you think you/he or her could return to work immediately if modified work measures were offered?	Visual Analogue Scale (VAS) Continuous
Which measures do you think could reduce the duration of this or future sick leave(s)?	Categorical (8 categories including adoption of work place, - tasks, and -latitudes)
How long do you expect this sick leave episode to last?	Categorical (7 categories, < 4 weeks to > 1 year)
Are you anticipating new episodes of sick leave within the next year?	Categorical (none, one, two or three, and at least four)

### 3.3 The sick-listed

Basic characteristics of the included subjects are presented in Table 2. The mean age was 41.5 years (SD 12.1) for the 392 included sick-listed men and 39.7 years (SD 11.4) for the 607 women. The corresponding median male and female ages were 42 and 39 years, respectively. Minimum age was 17 years, maximum age 66 years. The musculoskeletal disorders dominated and were classified as the main reason for the ongoing sickness absence in 82.9 % of the included persons, Table 2. Extended medical certificate, SC2, became subsequently accessible in 343 of the included sick leaves.

An assessments form (Appendix), was posted when the actual sick leave period exceeded two weeks to a random selection (N=499) of the included sick-listed. All together, 161 (32.5 %) of the sick listed filled in the questionnaire, and 159 had marked their assessment on whether work adjustment might reduce this sick leave period, and 152 had assessed the expected length of their sick leave.

Table 2 *Basic characteristics of included sick-listed persons randomised to receive a questionnaire or not.*

	Intervention group N= 502	Control group N= 497	P value	All included subjects	Subjects with extended sickness certificate SCII N=343
Female n %	307 (61.2%)	300 (60.4%)	0.80	60.8%	228 (66.5%)
Mean age (years)	40.9	39.9	0.19	40.4	41.6
Median age (years)	41	39	0.18	40	41
Education <= 12 years	273 (54.4%)	280 (56.3%)	0.77	55.4%	202 (58.9%)
Mean days on sickness benefits the last 3 years	39.1	44.5	0.21	41.8	47.4
Arthritis and rheumatic disorders n (%)	53 (10.6%)	46 (9.3%)	0.49	9.9%	37 (10.8%)
Injuries	40 (8.0%)	33 (6.6%)	0.42	7.3%	20 (5.8%)
Neck disorders	85 (16.9%)	69 (13.9%)	0.18	15.4%	57 (16.6%)
Back disorders	113 (22.5%)	123 (24.7%)	0.40	23.6%	79 (23.0%)
Shoulder and arm disorders	78 (15.5%)	79 (15.9%)	0.88	15.7%	41 (12.0%)
Unspecified L99	52 (10.4%)	57 (11.5%)	0.57	10.9%	51 (14.9%)
Mental disorders	81 (16.1%)	90 (18.1%)	0.41	17.1%	58 (16.9%)
Occupation not registered	112 (22.3 %)	110 (22.1%)	0.95	22.2%	73 (21.3%)
Health and teaching work	127 (25.3%)	128 (25.8%)	0.87	25.5%	94 (27.4%)
Administrative and sales work	91 (18.1%)	72 (14.5%)	0.12	16.3%	62 (18.1%)
Transport work	36 (7.2%)	28 (5.6%)	0.32	6.4%	15 (4.4%)
Industrial work	48 (9.6%)	67 (13.5%)	0.05	11.5%	44 (12.8%)
Service work	78 (15.5%)	73 (14.7%)	0.71	15.1%	48 (14.0%)
Agriculture and fishery	10 (2.0%)	19 (3.8%)	0.08	2.9%	7 (2.0%)



There were no significant differences between the 161 responders and the non-responders regarding sex, age, length of sick leaves during the last three years, or the distribution of diagnoses or occupation (Paper I). Randomisation into assessment by NIO assessors with or without prior sickness history, showed overrepresentation of transport workers,  $p=0.02$ , in the sickness history group. The other characteristics in Table 2 did not show any significant differences between the groups.

### 3.4 The NIO assessors

Two NIO officers and two NIO medical consultants individually assessed each sick-listed subject. Four NIO officers were recruited from three different National Insurance Offices. They were all experienced in the follow-up activities of sick-listed. For each 20 consecutive included sick-listed subjects, the pairs of officers were drawn in blocks of ten, to distribute the assessments of sick leaves randomly on the four different officers. Two National Insurance medical consultants, experienced in family medicine and social security medicine, were recruited for assessments to explore the effect of medical competence on assessments. They separately assessed all 999 included subjects.

Both the NIO officers and the NIO medical consultants assessed the sick leaves with three different levels of information.

- A. SC1(s) at two weeks of sick leave, and reports of past sick leave history from the National Sickness Benefits Register. (Randomisation, Figure 2).
- B. SC1(s) at two weeks of sick leave, without reports of past sick leave history from the National Sickness Benefits Register. (Randomisation, Figure 2).
- C. SC1(s), SC2 and reports of past sick leave history from the National Sickness Benefits Register.

The point of time for assessments, was chosen to correspond to the two-week assessments of available information, when responsibility of refunding sickness benefits was undertaken by NIS, and the assessments on SC2, corresponded to medical information available for formal decisions of sickness benefits beyond 12 weeks.

All SC1 were posted, along with an assessment form, to the two NIO medical consultants and to the current pair of NIO officers. In 498 sick leaves, randomly selected, the history of sickness benefits was attached to the SCI (Fig 2).

Due to some missing assessments, there were 983 sick leaves with two assessments by NIO medical consultants, and 985 sick leaves with two assessments by NIO officers, on the question if work adjustments might reduce the actual sick leave. Out of the 343 sickness spells with SC2, the two NIO consultants assessed both 340, and 337 spells were assessed by two NIO officers. A minimum of two months delay was required between the initial SC1 assessments and the SC2 assessments.

### **3.5 Reproducibility**

Participants at annual meetings for NIO medical consultants in Northern Norway were recruited for reliability studies (Paper II). In addition to the two main assessors, another 8 NIO medical consultants assessed 20 sick leaves on SC1 prior to a meeting. On the meeting 7 medical consultants assessed the 20 sick leaves on SCI and SCII, and 9 medical consultants assessed them with additional access to the self-assessment of the sick-listed.

In another study on self-assessed function among sick-listed after 6 weeks on sick leave the questions "Do you think that modified work measures could reduce your actual sick leave", and "Do you think you could return to work immediately if modified work measures were offered", were reused (32). Nearly 50 %, 386 of 798 invited sick listed subjects, responded to the actual questionnaire in the counties of Aust-Agder, Vestfold, Hedemark and Troms. The results from this study are discussed on page 40, Table 7.

### **3.6 One year follow-up**

The total length of the actual sick leave, and new episodes on sickness benefits within one year from start of the inclusion sick leave, were collected from the National Sickness Benefit Register during April and May 1999. Information on actual sick leave was not available in four cases, and the report revealed that two of the included were not entitled to sickness benefits, receiving full time disability pension at time of inclusions.

Therefore, in a total of 993 cases, length of actual sick leave, new episodes on sickness benefits and other benefits due to sickness or maternity were registered.

If the sickness benefits continued as rehabilitation benefits, occupational rehabilitation benefits or disability pension, these periods, within one year from the start, were included in length of sick leave. Sickness benefits were registered as ended at transition to maternity benefits. Sick leaves interrupted by only 1–2 days without sickness benefits, typically on weekends, were registered as a continuous period. The observed length of sick leave thus comprised the total period of continuous full-time or part-time benefits due to sickness within 1 year.

### **3.7 Analyses and data management.**

#### *3.7.1 Applied methods on the current questions*

Laymen's and professionals' opinion on whether work adjustments can reduce sickness absence were explored mainly by two-sided chi-square and t-tests, and the sampling distributions were visualised by 95 % Confidence Intervals.

The ability within National Insurance Offices to identify sick listed persons that might benefit from work adjustments, were analysed with agreement analysis in the absence of a golden reference standard (33;34). We considered agreement between and within NIO officers and medical consultants, and agreement between sick-listed subjects and the NIO collaborators, to be appropriate estimates of the ability to identify the sick-listed subjects who might reduce their ongoing sick leave period by working under modified conditions. In order to attend the variance, the possibility for reduction – either by shortening the length or by starting part-time work – was assessed on an 80-mm visual analogue scale (VAS), from *certainly no* (0 mm) to *certainly yes* (80 mm). Differences in assessments on the VAS between sick-listed subjects and NIO officers or NIO medical consultants were analysed using a differences-against-mean (Bland-Altman) diagram (35).

Related to practical use, categorical agreement on whether modified working conditions could, might, or could not reduce the actual sick leave, was analysed with kappa, observed agreement, and specific proportional agreement (36).

The ability within National Insurance Offices and sick-listed persons to identify the long lasting sick leaves, was compared on the basis of sensitivity, specificity, likelihood ratio, and the area under the receiver operating characteristics curves (ROC area)(37;38). The non-parametric standard error and 95% CI for the ROC area were calculated in SPSS®-11. The ROC curve represents plots of the true-positive rate (sensitivity), and the false positive rate (1 – specificity), at the average of two consecutive categories of the assessments ( $\geq 0$  weeks,  $\geq 4$  weeks,  $\geq 8$  weeks etc). The ROC curves of the mean assessment by NIO officers and medical consultants include even intermediate points representing half categories.

The diagnostic accuracy was explored as sensitivity, specificity, positive predictive value (PPV), and likelihood ratio at different thresholds, cut-offs, in predicted length (39). Reliability of predicted length was analysed with agreement between assessors, the kappa value (33;34).

The effect of extended medical information was explored by comparing the 95% Confidence Intervals of agreement, and by diagnostic accuracies of assessment done with and without extended medical information. Effect of extended medical competence was explored by comparing agreement and diagnostic accuracy of NIO medical consultants to corresponding agreement and diagnostic accuracy of NIO officers without formal medical competence.

Any effect on sickness absence of introducing reflection on possible work adjustments to the sick listed, was explored by cross-sectional analysis after 1-year, using chi-square tests, and binary logistic regression with defined variables and with backward conditional removal at  $p=0.10$ . Differences in the length of sick leaves – as a continuous but not normally distributed variable – were analysed with Mann-Whitney two-sample test and Kaplan-Meier analyses. Cox proportional-hazards models were used to calculate the Hazard ratio of return to work (RTW), with 95 % CI. Hazard ratio greater than one, indicated increased chance of RTW according to the actual coding. All tests were two-sided and required  $p<0.05$  to be considered significant. The analyses were performed with SPSS®-11 software.

### 3.7.2 Categorisation of VAS

Categorisations of the VAS scale in order to analyse observer agreement by the categories yes, uncertain, and no, were performed individually. Each officer and consultant, marked their interval for uncertainty on six different VAS scales, and gave their interpretation of ten example scales in the categories of no, uncertain and yes. The upper limit of no varied from 34 to 38 mm, and the lower limit of yes varied from 43 to 50 mm after this procedure. The means of these limits, together with the assessments of three other officers, were used to categorise the assessments of the sick-listed. All reproducibility assessments were performed according to these three categories.

### 3.7.3 Diagnostic groups

According to the ICPC Diagnose on the sickness certificate, the sick listed were grouped into 7 diagnostic groups for stratified analysis, Table 3.

Table 3 *Diagnostic groups for stratified analysis, the included diagnose codes and the most frequent diagnose code within each group.*

	N	ICPC Diagnoses	Most frequent diagnosis, % of group
Injuries	73	L72-L81	L79, 30.1%
Neck- disorders	154	L01, L83	L83, 93.5%
Back- disorders	236	L02-03, L84-86	L84, 53.4%
Shoulder and arm disorders	157	L08-12, L92-93.	L92, 61.1%
Unspecified	109	L99, L991	L99, 57.8%
Other L-diagnosis - Rheumatic disorders and arthritis (RDA)	99	L04 (n=4), L13-20 (n=32), L29 (n=2), L70 (n=1), L82 (n=4), L87-91 (n=33), L94 (n=3), L96-98 (n=20)	L88, 20.2%
Mental disorders	171	P01-03, P06, P15, P19, P29, P74, P78-79, P99	P76, 41.0%

Occupations were classified according to the Nordic Classifications of Occupations (NCO) (37) into health and teaching work (NCO 0–99), administrative, clerical and sales work (NCO 100–399), agriculture and fisheries work (NCO 400–499), transport and communication work (NCO 600–699), manufacturing work (NCO 700–899), service work (NCO 900–999), and unknown occupation. In multivariate models the subgroups were coded (“no” or “yes”), with unknown, agriculture and fisheries as the reference occupation.

Education level was estimated according to professional titles in sickness certificates, and grouped into not more than 12 years of formal education and more than 12 years of education. Indeterminable education level (n= 310) was included in more than 12 years education in dichotomous analysis.

Ages were recoded into 10-year groups, with the first expanded to 17–29 years.

### **3.8 Ethical aspects**

The Regional Ethical Committee approved the protocol (56/97), and the Norwegian Data Inspectorate licensed the necessary register of sick-listed subjects (no.3795)

## 4. RESULTS

### 4.1 Potential sick leave reduction by work adjustment.

Nearly 30 % of the sick-listed replied that work-adjustments would reduce the actual sick leave, and 40 % considered that work-adjustments might reduce future sick-leaves. One fourth claimed that they could return to job immediately if work was adjusted. There were no significant differences in estimated potential by age, sex, diagnose or occupation. Another 20 % of the sick-listed expressed uncertainty on possible reduction of sick leaves by work adjustments.

Figure 3 illustrates a characteristic distribution of the sick-listen's assessments of possible work adjustments. The yes and no assessments were generally very clear with clusters of assessments at the extremes of the scale. The corresponding histogram of the NIO medical assessors in Figure 4 illustrates much more normally distributed assessments, and apparently some discrepancy in attitude to possible effect of work adjustments between the two assessors. This discrepancy was not reproduced in categorical agreement analysis, neither between the NIO medical consultants and sick-listed, nor between the NIO medical consultants and the NIO officers.

Figure 3 *Histogram of sick-listens' assessments of whether work adjustments might reduce this or future sick leaves. Normal curves are interpolated.*

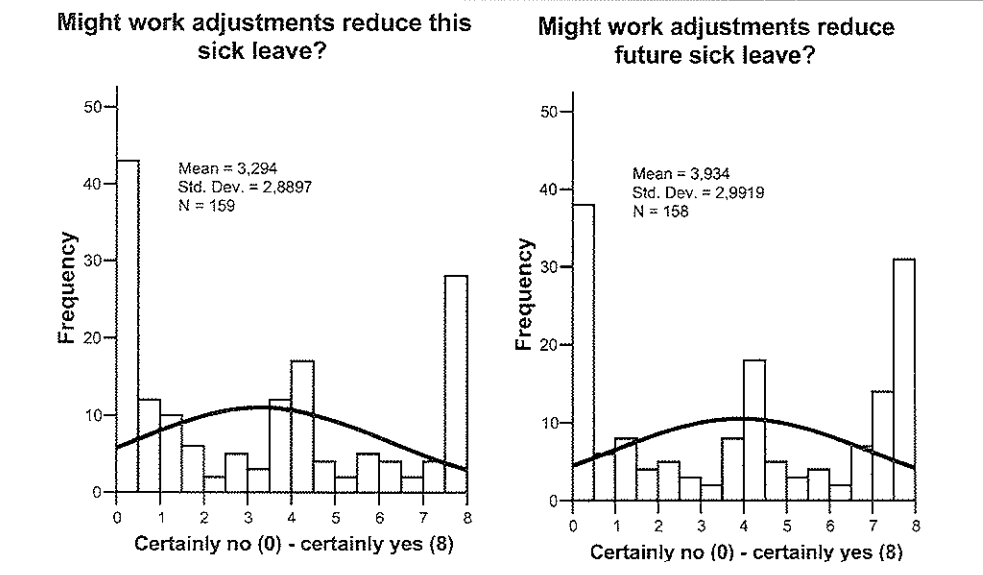
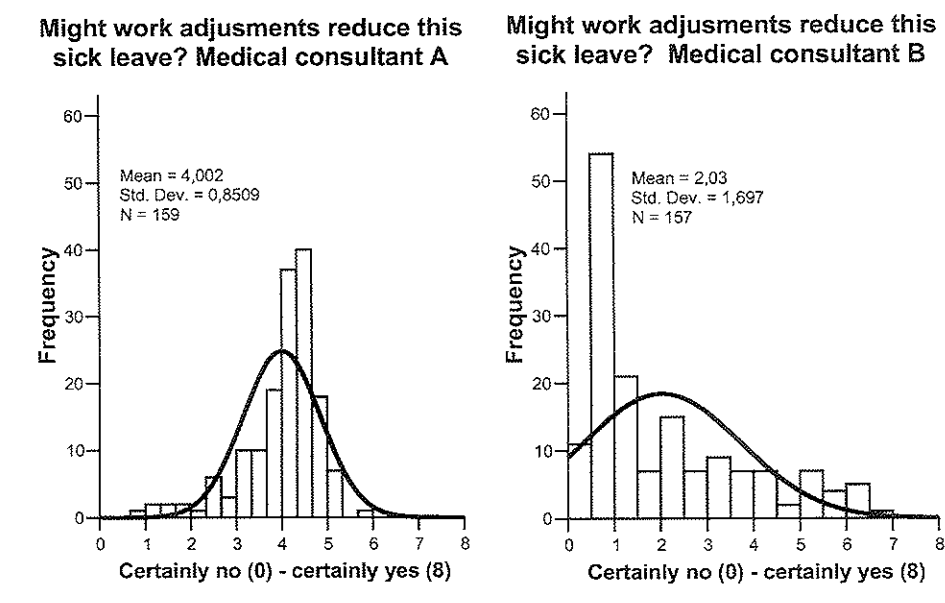


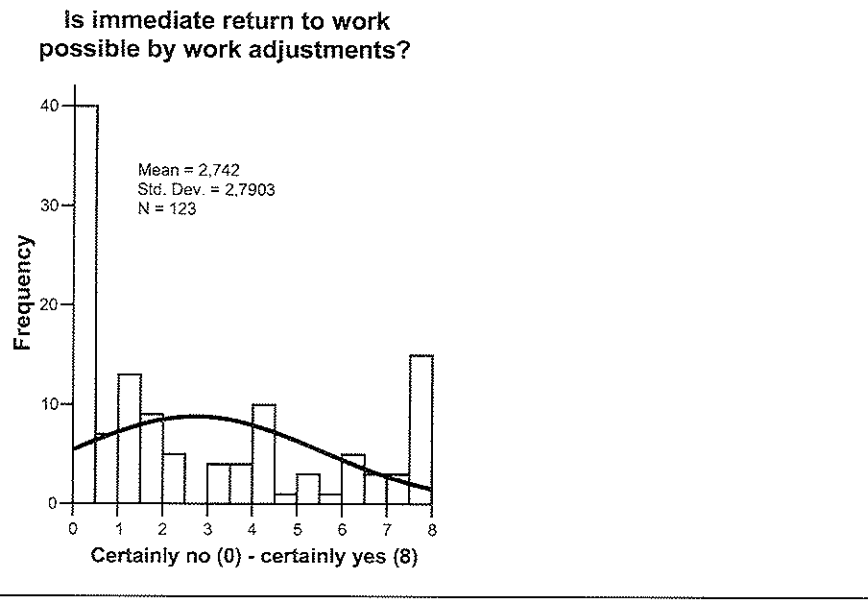
Figure 4 Histogram of NIO medical consultant A and B assessments of whether work adjustments might reduce the actual sick leave for sick-listed that had assessed the question. Normal curves are interpolated.



The majority (85 %) of sick-listed assessing potential reduction of sick leave by work adjustments, indicated job related measures consistent with the offer of keeping sickness benefits up to 12 weeks (“active sick-leave”) in adjusted jobs (Paper I). Some 60 % pointed at adaptation of work task, and some 40 to 50 % pointed at organisation of physical work environments, latitude, and psychosocial work environments. The significant potential for sick leave reductions was confirmed by one of four sick-listed assessing possible immediate returns to work if adjusted work was offered, Figure 5. The NIO assessors expected possible immediate RTW by offering work adjustments, in a corresponding proportion of the sick leaves.



Figure 5 Histogram of sick-listens' assessments on whether they could return to work immediately if adjusted work was offered. Normal curve is interpolated.



*Summary*

Both sick- listed, NIO officers and NIO medical consultants assessments showed a considerable potential for reduced sick leaves if adjusted work were offered. The possible reduction-effects of work adjustment were only rejected in half the cases, and for some 30% of the cases, reduced sick leaves by offering work adjustments were expected in all three groups.

**4.2 Ability to identify sick-listed for work adjustments**

The assessed proportion of sick leaves where work adjustments might reduce length of absence by enabling part-time working, was remarkable consistent between sick-listed and the NIO assessors in this study. However, in correlation analyses the correlation between assessments by sick-listed and the NIO assessors' assessments were low and statistically insignificant. Difference against mean analyses revealed that even when sick-listed strongly expected reduced sickness absence by work adjustments, these subjects would generally not be identified by assessments based on medical certificates (Paper II).

The two NIO medical consultants differed noticeably in their proportion of expected sick leave reduction. This difference in assessed possibilities for reduced sick leaves was not reflected in chance corrected agreement between the NIO medical consultants and the sick-listed, nor between the NIO medical consultants and the NIO officers, Table 4. However, the proportional agreement on yes and no differed significantly, and if sick-listed represented the golden standard of possible sick-leave reduction or not, the sensitivity / specificity, including don't know in the yes group, would be 0.22 / 0.80 and 0.72 / 0.28, respectively.

Table 4 *Agreement on possible reduced sick leave between each of the two NIO medical consultants and the NIO officers, and the sick-listed respectively.*

Observer agreement between	Pairs of assessments	Bias index (BI)	Observed agreement [Po] (95% CI)	Kappa	Proportional agreement yes [Ppos] (95%CI)	Proportional agreement no [Pneg] (95%CI)
NIO consultant A and NIO-officers	1982	0.06	0.40 (0.38, 0.42)	0.08 (0.05, 0.12)	0.23 (0.20, 0.25)	0.32 (0.29, 0.35)
NIO consultant B and NIO officers	1953	-0,33	0.45 (0.43, 0.48)	0.08 (0.04, 0.11)	0.11 (0.08, 0.11)	0.43 (0.40, 0.45)
NIO consultant A and sick-listed	159	0.26	0.31 (0.24, 0.38)	-0.04 (-0.14, 0.07)	0.20 (0.13, 0.28)	0.22 (0.14, 0.30)
NIO consultant B and sick-listed	157	-0.29	0.46 (0.39, 0.54)	0.03 (-0.11, 0.17)	0.08 (0.01, 0.16)	0.45 (0.37, 0.53)

The assessments on possible immediate return to work showed identical pattern, with no agreement beyond chance between the NIO assessors and the sick-listed, Table 5. With extended medical information the agreement within NIO assessor groups improved to poor, kappa 0.18 and 0.19 respectively. The proportional agreements analysis reveals better agreement on sick leaves without expected effect of work adjustments than sick leaves where effect might be expected.

Table 5 *Agreement on possible immediate return to work by work adjustments between sick-listed, and NIO medical consultants and NIO officers, respectively, and agreement of assessments based on sickness certificate I (SC1) and on sickness certificate II (SC2), between and within the professions groups of NIO assessors .*

Observer agreement between	NIO assessments based on	Pairs of assessments	Observed agreement (Po)	Kappa	Proportional agreement yes (Ppos)	Proportional agreement no (Pneg)
NIO consultants and sick-listed	SC1	247	0.40	-0.02	0.10	0.40
			(0.34, 0.47)	(-0.12, 0.09)	(0.05, 0.16)	(0.33, 0.46)
NIO officers and sick-listed	SC1	247	0.42	0.02	0.18	0.38
			(0.36, 0.48)	(-0.09, 0.12)	(0.11, 0.25)	(0.31, 0.48)
NIO consultants and NIO-officers	SC1	3929	0.43	0.07	0.14	0.41
			(0.42, 0.45)	(0.04, 0.09)	(0.12, 0.16)	(0.39, 0.43)
	SCII	1350	0.49	0.13	0.18	0.48
			(0.46, 0.51)	(0.08, 0.17)	(0.15, 0.22)	(0.45, 0.51)
Within NIO consultants	SC1	982	0.45	0.03	0.09	0.42
			(0.42, 0.48)	(-0.11, 0.17)	(0.06, 0.13)	(0.38, 0.45)
	SCII	338	0.53	0.19	0.17	0.52
			(0.48, 0.59)	(0.09, 0.28)	(0.10, 0.24)	(0.46, 0.58)
Within NIO officers	SC1	983	0.43	0.06	0.23	0.36
			(0.40, 0.46)	(0.01, 0.11)	(0.20, 0.27)	(0.32, 0.39)
	SCII	337	0.51	0.18	0.27	0.47
			(0.46, 0.56)	(0.09, 0.27)	(0.21, 0.34)	(0.40, 0.53)

#### *Summary*

There were no agreements beyond chance between sick-listed and NIO officers or NIO medical consultants, on sick leaves that might be reduced by work adjustments. Neither was there any shared interpretation of the available information between the NIO assessors, in question of identifying sick leaves suitable for work adjustments.

### **4.3 Ability to identify long-lasting sick leaves.**

The sick-listed subjects predicted sick leaves equal to or longer than 12 weeks more accurately than the NIO medical consultants and officers (Paper III). Generally, the length of sick leave was predicted more accurately in older subjects than in younger subjects, and better in males than in females.

Although not significant, the overall predictive accuracy indicated by the ROC areas of predicted length by NIO assessors, tended to be more accurate than the accuracy in the responder group. This tendency was more apparent in females' sick leaves than in males, and more apparent in sick-listed persons less than forty years than in elderly.

The diagnostic accuracy as assessed by the ROC area did not change significantly if the length to be identified was set to 8, 12 or 26 weeks. Sensitivity and specificity changed according to the length of sick leave to be identified, and according to cut-offs in assessed length used for identification. The longer the sick leaves, observed or assessed, the lower was the sensitivity and the better was the specificity.

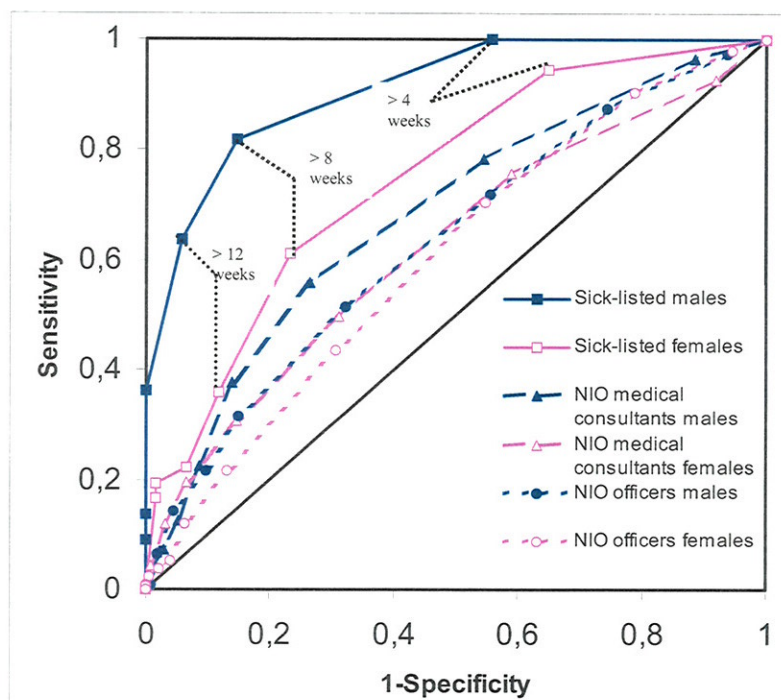
To identify sick leaves lasting at least 12 weeks, an assessed duration of at least 8 weeks was the preferable cut-off in sick-listed as well in NIO assessors' assessments, Figure 6. A predicted length of at least 12 weeks reduced the sensitivity markedly with only modest improvement in positive predictive value (PPV). In contrast to NIO assessors, sick-listed persons with mental-, neck-, or shoulder and arm disorders demonstrated the best predictive ability.

The sensitivity of identifying sick leaves lasting at least 26 weeks was generally low when medical consultants and officers predicted on the basis of SC1s. The sensitivity was improved somewhat by introducing SC2 information, but the effects on likelihood ratio and prevalence corrected PPV, were minor.

#### *Summary*

The diagnostic accuracy of NIO assessors in identifying the long lasting sick leaves were definitely inferior to accuracy of length of sick leave predicted by sick-listed themselves.

Figure 6 Gender specific ROC-curves of identifying sick leaves lasting at least 12 weeks, plotted at the average of two consecutive categories in length predicted by sick-listed ( $n$  males = 56,  $n$  females = 96), mean length predicted by NIO medical consultants and by NIO officers ( $n$  males = 379,  $n$  females = 579).



#### 4.4 The effect of extended medical information and medical competence

The extended information on sickness, obtained in extended medical certificates SC2, did not increase the agreement between NIO assessors and the sick-listed on expected sick leave reduction by work adjustments. Neither was the ability to identify the long lasting sick leaves noticeably improved by SCII, after prevalence adjustments. Generally the formal medical competence of NIO medical consultants had if any only marginal effects on the ability to select sick leaves for follow up, compared to NIO officers without formal medical competence.

The contributions of extended medical information and medical competence are summarised in Table 6.

Table 6 *The effect of extended medical information and of formal medical competence on ability to identify sick-listed subjects where work adjustments might reduce the sick leave, and corresponding effect on the ability to identify long-lasting sick leaves.*

	Extended medical information, SC2 compared to SC1.	NIO medical consultants compared to NIO officers without formal medical competence.
Ability to identify potential sick leave reduction by work adjustment (Paper II)	Extended medical information in SC2 did not increase agreement between NIO assessors and sick-listed and only marginally within groups of NIO assessors	Formal medical competence did neither increase agreement between NIO assessors and sick-listed nor within the NIO professions.
May work adjustments enable immediately return to work? (Table 5)	Extended medical information in SC2 did only marginally increase agreement within and between groups of NIO assessors.	Formal medical competence did neither increase agreement between NIO assessors and sick-listed nor within the NIO professions.
Ability to identify long lasting sick leaves. (Paper III)	Extended medical information in SC2 did not increase the prevalence adjusted predictive value of identifying sick leaves lasting at least 12 or 26 weeks.	The diagnostic accuracy of identifying long lasting sick leaves did not differ noticeably between NIO medical consultants and NIO officers.

#### 4.5 Minimal postal intervention and effect on sick leaves

One year after the start of the actual sick leave, 121 persons received sickness- benefits, 32 vocational rehabilitation benefits, 59 medical rehabilitation benefits, and finally 50 persons received disability pension. Another 80 persons received maternity benefits, 7 received old-age pension, and 2 persons were registered dead, leaving 639 persons without any benefits from the National Insurance Service (Paper IV).

The risk of receiving benefits due to sickness after 1 year was reduced in the intervention group. The reduced risk of sickness related benefits were most pronounced in the more educated subjects. In subjects sick-listed due to mental disorders the risk of the long lasting rehabilitation or disability benefits, were noticeable.

Compared to controls, the ongoing sick leaves at inclusion were reduced by a mean of 8.3 days in the intervention group. This reduction was not significant all over, and was not observed for sick leaves less than 12 weeks, except for subject with rheumatic disorders and arthritis. Totally the reduced sickness absence in the intervention group amounted to some 4,097 days compared to controls. However, the median length was identical 48 days in both groups. For sick leaves 12 weeks or longer, the overall reduction of sickness absence in the intervention group was statistically significant. Gender and occupation did not significantly influence the intervention effect.

Stratified analyses on diagnostic groups showed shorter sick leaves in the intervention group except for low back pain and neck disorders. Actually, restricted to 33 sick-listed persons younger than 41 years, and with a maximum of 12 years education, an inverse effect of intervention was observed in the low back pain group sick-listed for more than 12 weeks. The Hazard ratio for RTW in this subgroup was significant reduced compared to the 37 persons in the corresponding control group, Hazard ratio=0.39 (95% CI 0.21–0.74). In the RDA group, the reduction effect of minimal intervention was restricted to the group of sick-listed subjects with less education.

In the responder group, the return to work curves indicated delayed (reduced) return to work from 6 to 16 weeks for sick-listed subjects who provided their NIO officers with a copy of their response. A corresponding delay was observed for sick-listed subjects that expected reduced sick leaves if work adjustment measures were implemented.

#### **4.6 Reproducibility**

The intra-rater agreement of assessed possible sick leave reduction by modified work was not better than fair (Kappa 0.23, 95% CI –0.03, 0.48) for assessment on SC1 and moderate (Kappa 0.52, 95% CI 0.26, 0.78) for assessment with SC2. (Paper II)

The two NIO medical consultants did not represent either of the extremes of expected reduced sick leaves possibilities by work adjustments, in the reproducibility study with another 8 NIO medical consultants. And, and neither agreement between different NIO medical consultants, nor agreement between NIO medical consultants and sick-listed, were improved by introducing the new NIO medical consultants.

In April 2001 the questions of possible reduced sick leave, or return to work, by work adjustments were retested on 798 sick-listed persons as their sick leave passed 6 weeks. The proportion expecting effect did not differ between musculoskeletal disorders and other diagnosis, except for the reduced proportion of mental disorders, Table 7.

Table 7 *Self assessed possibility of return to job or reduced sick leave if job adjustments were offered, among 386 sick-listed subjects responding to a questionnaire on self evaluated function after 6 weeks on sick leave, in April 2001. The numbers of missing answers to the actual questions were 13 and 14, respectively.*

	Do you think that modified work measures could reduce your/this actual sick leave?				Do you think you could return to work immediately if modified work measures were offered?			
	N	No %	Don't know %	Yes % 95% CI	N	No %	Don't know %	Yes % 95% CI
Musculoskeletal disorders	186	50.5	24.7	24.7 18.7, 31.6	186	57.0	19.4	23.7 17.7, 30.4
Mental disorders	43	72.1	16.3	11.6 3.9, 25.1	44	65.9	20.5	13.6 5.2, 27.3
Other diagnosis*	143	57.3	18.2	24.5 17.7, 32.4	143	50.3	23.8	25.9 18.9, 33.9
All diagnosis	372	55.6	21.2	23.1 18.8, 27.4	373	55.5	21.2	23.3 19.0, 27.6

\* Includes 8 subjects with missing diagnose.



#### 4.7 Main findings

##### MAIN FINDINGS

- Sick-listed, National Insurance officers, and NIO medical consultants all reported a considerable potential for reducing sick leave by different measures at work.
- There was no agreement between sick-listed and professionals at the National Insurance Office on whom of the sick-listed that would benefit from work adjustments.
- Sick-listed significantly predicted the length of sick leave better than professionals at National Insurance Office did, based on available information on the sick-listed persons.
- Neither supplementary medical information nor specialised medical knowledge improved the prediction of who would benefit on work adjustments, or ability to identify the long-lasting sick leaves.
- Minor interventions as inquiries to the sick-listed on expected length of sick leave, seemed to reduce the length of the ongoing sick leave and the risk of receiving sickness related benefits after one year.

## **5.0 DISCUSSION**

In this population-based, randomised and controlled study we have shown that professional judgement and predictions related to sick-listing are highly unreliable, and that the sick-listed themselves predict the length of absence far better than NIO officers and medical consultants. Further, we have demonstrated that work adjustments and inquiries to the sick-listed on their expectations, have a potential to reduce the length of sick leave and the risk of receiving sickness related benefits within one year.

The potential should be considerable, as according to the opinion of more than a third of sick-listed, they could return to work and prevent future sick leaves if predefined work adjustments were established. NIO officers and medical consultants also agreed in that a third of the sick-listed could shorten their ongoing and reduce future sick leaves. However, they did not agree in which third that could benefit, neither within the group, nor between the groups, or compared to the sick-listed.

### **5.1 Methodological considerations**

#### *5.1.1 Study population*

Regarding gender, age and subgroups of diagnoses, the studied population of sick-listed was representative for sick-listed nationally for the current years. Unemployment rates for the years of inclusion were low, less than 4% of the labour force, and corresponded to the national rates. To secure a representative sick-listed population, the inclusion periods were divided between late fall and early spring.

In another study on self assessed physical function and coping among sick-listed, the question "Do you think work adjustment might reduce this sick leave" after 6 weeks was retested. The proportion yes in this study, in Harstad and Tromsø, was 23.3% compared to a mean of 23.2 % (range 17.2-28.0) for all four counties (32). This support that the response to the applied question is reproducible and reliable in different study populations of sick-listed in Norway.

The restriction to musculoskeletal and mental disorders includes some two thirds of refunded sickness benefits days from the NIOs (22). The reuse of the question on possible sick leave reduction by work adjustments indicates that the results on this matter might be generalised to the third of sick leaves beyond 14 days that was not

included. Subgroups analysis on length of sick leave indicated caution in generalisation to other diagnostic groups on predicting length and any effect of minimal postal intervention.

Besides changes in the legislation, the unemployment rates would probably be the major factor that influences the composition of the sick-listed population (40). High unemployment rates increase the threshold for sick leave, and the potential effect for work adjustments on sickness absence would probably be less. The results will probably be more valid in societies with relatively high rates of sick leaves, as we would expect greater potential effect of work adjustments on sickness absence in high absence societies. The coincidence of increased use of part-time sick leave, and reduced sickness absence the latter years in Sweden and Norway may support this (15).

#### *5.1.2 The response rate*

The low response rate from the sick-listed carries a considerable potential for information bias. As only one third answered the questionnaire, it is difficult to generalise the proportion of sick-listed that expect reduced sick leave if work adjustments were offered. However, the responders and non-responders did not differ in sex, age, diagnose or occupation, but among the responders' ongoing sick leave was marginally longer than in the non-responders'. This might indicate a selection bias affecting the view on work adjustment. That the length of the sick leave in responders is less predictable, and that the NIO assessors estimated a marginally larger proportion where work adjustments was expected to reduce sick leave in the responder group, might also indicate potential selection bias (Paper III, Paper I). However, whether the proportion of sick-listed subjects who denies any effect of work adjustments are 50 or 60 %, and on the other hand whether one of five, or one of three, positively expect effect, does not affect the conclusions of this study.

The sick-listeds' ability to identify the long-lasting sick leaves might be influenced by the response rate. The NIO assessors tended to be less accurate in predicting length of the responders; hence the risk of over-estimating accuracy of self-predicted length is minor.

### *5.1.3 Randomisation*

The randomisation protocols were unknown within the NIOs that included sick-listed subjects. Table 2 indicates a successful randomisation with balanced groups, as one significant difference is expected by chance in testing 20 issues. The sickness history randomisation revealed corresponding result, and the overrepresentation of transport worker couldn't explain why the sick leave history did not improve agreement on possibilities of work adjustments, or why sickness history had no effect on accuracy of predicted length in females.

The results of length of sick leaves, and any entitlement to benefits after one year, were collected from the National Insurance Register. The enrolments in the study were not known for those who routinely recorded continued sick leaves.

In accordance to the CONSORT Statement (41;42), neither the randomisation process nor the characteristics of randomised sick-listed, support randomisation bias.

### *5.1.4 The assessors*

Crucial for the generalisability were the representativeness of the assessors (43;44). The NIO officers were recruited from three different offices, and the use of four rather than two, ensured a better representativeness. Being dedicated and experienced officers working on follow-up of sick-listed, introduced a risk of overestimating the accuracy in NIO assessments. Consequently, if any NIO-officers bias, this would not affect the main conclusions of this dissertation.

The differences in assessments on potential sick leave reduction of the two NIO medical consultants, questioned their representativeness. However, in the reproducibility study, neither of them represents the extremes among their colleagues, and with one scoring fairly optimistic and one more pessimistic of possible effect of work adjustments, they were probably representative of their group. They varied less in accuracy of predicted length of sick leaves.

### *5.1.5 Sample size*

The sample size was decided on different sample size calculations. In identifying long lasting sick leaves, 187 sick-listed had to answer to identify a difference in sensitivity from 0.7 – 0.8 at the 0.05 level with 80 % power. And 398 sick-listed would be necessary to identify a difference of 0.1 in observed agreement between NIO medical consultants and the NIO officers at 0.05 level with 80 % power. The same terms would allow subgroup analyses between NIO assessor and the sick-listed in subgroups of 67 sick – listens.

Finally the randomised intervention study on length of sick leave was calculated to require 500 in each group to detect a length difference of four days in sick leave at the 0.05 level with 80 % power. A sample from the NIO register on sick leave the last year was used to estimate the standard deviation (SD). However, SD turned out to be 114 instead of the estimated 45, and a power of 80 % would required nearly 10 days difference in mean length of sick leave at the 0.05 level.

Despite the low responder rate the study size was sufficient with exception of the RCT part on minimal postal intervention. Doubling the size would have identified 5 days, a practical important difference in mean sick leave, with 80% power at the 0.05 level. Consequently, the RCT study (Paper IV) is in risk of type II errors.

### *5.1.6 Information bias*

Different interpretation of the questions would reduce the validity. The NIO assessors met at the start of their assessment to discuss the understanding of the wording. Simultaneously, categories of their VAS assessments were established. Their areas of don't know on the scale showed only minor variations. The individual established limits of categories of the VAS scales should minimise the risk of information bias among the NIO assessors. The triple-clustered distribution of sick-listed assessment indicated sparse, if any, potential information bias.

The questions on possible effect on sick leave by work adjustments might include an implicit question whether work adjustments are possible or not at my work place. Such a two-step interpretation would probably lower the proportion of sick-listed assessing potential sick leave reduction. Although more actual for sick-listed, conceptions and misconceptions among NIO assessors on the possibilities for work adjustments could

not be excluded as the employers were known. During meetings and discussions through the different reproducibility studies, there was no indication that interpretation diversity caused the lacking agreement on potential sick-leave-reduction.

The quality control and audit programs the register undergoes, serving as account system for payments of sickness absence, suggests that the lengths of actual sick leaves were reliable.

## **5.1 Summary**

The sick-listed population was representative for the actual diagnostic groups, and the NIO medical consultants came out representative. The dedicated and experienced NIO officers might introduce a favourable result, which did not turn up. Differences in interpretation of the questions, another hazard to the results, were not traced. The internal validity of the NIO assessments is consequently assessed as good. The low response rate might influence the assessments of the sick-listed. However, the reuse of some of the questions indicated that the main results are reliable and internal validity acceptable. The results in the reuse of the questions indicated even external validity to the rest of Norway, and to sick-leaves caused by other diagnoses than musculoskeletal and mental disorders. The level of sickness absence might influence the result and caution should be taken in generalising to low level sickness absence situations.

## **5.2 Discussion of main results**

### *5.2.1 Work adjustments and potential sick leave reduction.*

The conceptions of possible sick leave reduction by work adjustments were significant and shared between sick-listed and NIO collaborators. The same question after six weeks on sick leave in another study showed marginally lower proportion of yes answers (32). Both selection of more severe disorders with longer sick leaves, and adaptations to the role as sick-listed might contribute to reduced optimism on effect of work-adjustment (27).

A qualitative study in Sweden confirms sick-listeds' opinion on importance for work adjustments for return to work (11), and studies by Ekberg support that work adjustments can facilitate return to work (12;13). Also the Swedish Council on

Technology Assessment in Health Care acknowledge the connection between sickness absence and working condition (45). The best documented association are reduced sickness absence with increased self-control of working situations (4;46-50). The influence of physical work environment on sickness absence seems to have more limited effects (45).

The result of asking what measures that could reduce the current sick leave (Paper I), indicates that adapting work tasks, was more important than organising the physical work environment. Regarding future sick leaves, the proportion that focused on organising the physical work environment, equals the proportion that focused on adapting the work tasks. Messing et al (51) found that the importance of physical work environment might be dependent of sex, and they found lack of individual work place adaptation, and poor relationship to co-workers and supervisors, to be associated with increased risk of sickness absence.

Based on Sweden Post, Voss et al (50) found that physical, psychosocial, and organisational factors, all influenced sickness absence. In our study, the proportion that pointed at improvement of physical work environment, equalled those pointing at improvement of psychosocial environment. The combination adapting tasks and possibility of adjusting workload to actual experienced subjective capacity fits the "Demand/Control" model introduced by Karasek and Theorell (52;53).

The opinions of the sick-listed, on possible adjustments of work tasks and physical work environment, were coherent to existing knowledge of factors that are associated with increased sickness absence. When only about half the sick-listed reject the possibility of reducing their sick leave by work adjustments, this indicates a substantial potential for reduced sickness absence. The NIO co-workers shared the optimistic potential of sick – leaves that could be reduced by work adjustments. Tellnes et al (9) found back in 1986, that sickness certifying general practitioners assessed that 37 % of sick listed had preventable complaints due to physical or psychological factors at job. The focus groups of Nordqvists's (11) emphasised the importance of the employer's role in back-to-work program, including dialogue with the sick-listed, and information to colleagues on possible work tasks adaptations on return to work.

Thus, sick-listed, GPs, and social insurance co-workers all recognise a substantial potential for reduced sickness absence by work adjustments, and one may ask why this potential are not realised. However, the latest development showing decreasing sickness absence in Sweden and Norway, combined with increased use of part-time spells, might indicate an initial realisation of the potential (9;15;24).

### *5.2.2 Work adjustment – identifying the candidates*

The National Insurance co-workers in Norway are supposed to initiate and coordinate work adjustments for sick-listed at the work sites. The individual decisions on which cases she should intervene contribute to the dilemmas of social insurance officers (26). Each officer decides which cases she should intervene on. There are no formal circular or informal common knowledge on how to select cases for intervention, if not asked for by sick-listed or identified by GPs.

The results of this study show that there is hardly any agreement beyond chance, on which cases work intervention might reduce sick leave. Validity of the self-assessments of sick-listeds are unknown, but as long as there was no shared knowledge within the NIO on markers indicating potential effect of work adjustments, self-assessments are probably the best we have as reference standard?

The result implies that sickness certificates carried little exploitable information on the possibilities for work adjustments. The legislation states that only work incapacity due to reduced function, clearly caused by sickness, is entitled sickness benefits (54). However, the association between sickness and sickness absence are not necessarily obvious (55). In the different models used to explain sickness absence the disease, or rather the diagnoses are a necessary, but only occasionally a sufficient explanation for sickness absence (56-59). A sick role, legitimated by sickness certification, might not only be a way to be freed from duties on job, but also a way to be freed from daily life demands (27;60;61).

The lack of agreement between sick-listed and the NIO assessors might at least partly be explained by sick-listed's better insights in the complex background, including personal and work place factors, for the current sickness absence. The background factors



include local absence cultures (62-64), and whether the sick-listed could be easily replaced or not (65).

Tellnes (9) found only poor agreement between sick-listed and their GP on possibilities to prevent the current sick leave causing health problem. In assessment of work ability, Reiso (66) demonstrated a poor agreement (*kappa* 0,15-0,25) between sick-listed and their GPs as all sick-listed that assessed their work ability to “not much” or “hardly reduced at all” was assessed to “moderately”, “much” or “very much reduced” by their GP. This hints to that one of the main problem in identifying sick leaves for work adjustments is that the medical approach to sickness absence are too narrow. Regarding the complexity in causes for sickness absence, including different sickness absence cultures unknown for medical doctors and NIO officers, there is no common and shared knowledge on factors identifying sick-listed suitable for work adjustments. All efforts to supply medical information, and to assess physical function, seem to be a vast compared to challenge the sick-listed and to stimulate the employer-employee dialogue.

### *5.2.3 Predicting length of sick leave*

According to the results from this study (Paper III), self-predicted length of sick leave might be a sufficient basis to select sick-listed for follow-up by the NIOs. Sick-listeds' statement of expected length of at least eight weeks, identified sick leaves lasting 12 weeks or more, with a sensitivity of 0.7 and a specificity of 0.8. But, then they have to be asked. Selection based on medical certificates was proved to be too inaccurate for the purpose.

In predicting return to work four weeks in advance, Reiso (67;68) observed the same predictive accuracy for self-assessments and the assessments of the sickness certifying GPs. At the start of sick-leaves they predicted the return to work within 4 weeks with a sensitivity of 0.85 (specificity 0.70). After 8 weeks on sickness leave, the sensitivity/specificity ratio for return to work within 4 weeks, was 0.38-0.48, respectively, and the specificity for both sick-listed and GPs around 0.90 (67). However, even if the prediction of return to work within four weeks is comparable between sick-listed and their GPs, the prediction of long-term sick leave might differ considerable between those two groups. The factors important for short-term and long-term sick leave are probably distinctive different (69). The prevalence of long-lasting sick leaves

would also markedly influence the predictive ability at fixed sensitivity/specificity values.

#### *Gender*

The results in Paper III, shows that male sick-listed predict their sick-leaves more accurate than females. In a recent Swedish study testing predictive accuracy of 10 different instruments/scales in sick-listed after 28 days confirmed better prediction among men than among women (70). Here, the men scored higher than women, high scores indicated less impaired functions. If men had fewer items with impairments, this might explain the difference in score, and indicated a more complex reason for women's sick leave. Krantz and Østergren (71) found strong associations between high scores on common symptoms scale and sickness absence. Sandanger et al (72) discussed a more clear-cut decision on sick leave or not among men. If the reasons for female sickness absences are more multi symptomatic than males, this would contribute to differences in predictability. The Whitehall II study identified female overrepresentation in sick leave due to more ill defined conditions (73). Well-defined conditions imply improved prognostic knowledge of the disease or illness and might therefore improve prediction of length of sick leave.

To understand, beyond speculations, the association between gender and sick-leave predictability, further investigations are needed, as to the association between gender and sickness absence (45).

#### *Screening instruments*

Perceived health was a strong predictor of sickness absence in the Whitehall II study (74). Fishbain et al (75) showed that voiced "intent", not to return to work, was a strong predictor of prolonged sick leave in chronic pain patients.

Regarding predicting return to work, sick-listed with low back pain is the most frequent studied group in the literature. In Cox regression analyses of long-term sickness absence, Reiso (76) found that self-assessed continued sickness absence after 4 weeks, was a strong predictor for long-term sick leave, whereas the COOP/WONCA charts did not contribute significantly to explain the observed variation. A Danish study from general practice, found that the subjective assessments of GPs predicted better than

objective measures on sign and symptoms (77). Functional capacity tests have proved to be not very predictive of time to return to work (78), and psychosocial factors might be most predictive for return to work among patients with low back pain (79).

In Örebro, Linton et al (80) constructed a screening questionnaire of 24 items, Acute Low Back Pain Screening Questionnaire (ALBPSQ), to identify those in risk of long-lasting sick leaves. Included in psychosocial factors was self-assessed work status six months ahead. The total scores showed to predict long-lasting sick leave with a sensitivity of 0.67 and specificity of 0.81 (81). The accuracy of predicting sick leave 30 days ahead, corresponded to the accuracy presented in this study for self-assessments identifying sick leaves 60 days ahead (Paper III). The findings indicate that simple screening, as self-assessed length of sick leave, might compete in accuracy to more sophisticated screening instruments. The difference in recommended cut offs in Sweden, (Linton (81)) and Northern Ireland, (Hurley (82;83)), support that even cut-offs in self-assessed length has to be calibrated for difference in various social security systems, diagnostic groups, and lengths of sick leave. And the prediction varies between genders.

Although not significant, self-assessed length of sick leave seemed to be less predictive in patients with back disorders than in patients with other musculoskeletal disorders. This might reflect that the Low Back Pain group is special unpredictable in matter of length of sick leave, and caution should be taken before recommending simple self-assessments in preference to ALBPSQ, or vice versa, until comparing studies are performed.

The bodily pain scale of SF-36 is another instrument shown to predict one-year of work disability (84;85). However, Brage et al (32), could not demonstrate any significant correlation between bodily pain in SF-36, and self-assessed length of sick leave after 6 weeks on sick leave. In a Dutch study (86), the general health items of SF-36 were predictive for return to work in low back pain patients sick listed for 3-4 months. In Hansons (70) comparison of 10 different instruments/scales for low back pain and neck disorder, the five dimensioned EuroQol (87) seemed to give the best prediction, while the social function part of SF-36 was promising predicting not RTW after three month

on sick leave. Again more studies comparing different instruments and self-assessed length should be designed.

#### *5.2.4 Medical competence and medical information in sick leave assessments.*

To be entitled to sickness benefits, the legalisation requires incapacity to work because of reduced function, clearly caused by sickness (54). When neither the medical competence of NIO medical consultants, nor extended information on the sickness in extended medical certificates, improved the ability to identify sick-listed subjects that could utilise work adjustments, this challenges the understanding or the application of the term sickness in sickness absence (Paper II). Regarding agreement between NIO assessors and sick-listed on potential effect of work adjustments, there are no difference between NIO assessor with or without medical competence. The agreements on no expected effect were better than agreement on possible effects, indicating that the certificates communicated incapacity for work better than possibilities for work adjustments. This is in line with better agreement on much reduced work-ability then on less reduced work-ability between sick listed and their GP as observed by Reiso et al (66).

The NIO medical consultants identified the more incapacitating disorder better than the NIO officers, as supported by better prediction in sick-listed more than 40 years old, and in identifying the longest sick-leaves. However, the differences were marginal and do not justify systematic use of medical consultants for selection to interventions within the NIOs. Studies involving medical consultants in scrutinising extended medical certificates have not demonstrated effect on sickness absence (16;17).

Corresponding with the result of this study, Maeland et al (18) concluded that the extended medical certificates was of limited use in assessing needs for active interventions by the NIOs. This despite their conclusion of sufficient medical information for decision on further sickness benefits in nine of ten cases, in contrast to Söderberg et al (88) that found certificates after 28 days on sick leave insufficient on medical disorders, functional capacity or both in 73% of the cases.

Studies from Sweden, Germany and Norway have demonstrated that patient initiated sickness certification is nearly always granted by their GP (89-91). This might raise the

question: Do sickness certificate act more like a legalisation of absence, than an objective assessment of reduced work ability due to sickness?

The sickness certificating is time consuming (89;92), and even if administrative reforms might influence filling in of certificates, it does not necessarily influence the decision on sickness absence (93). When patients refused more issued sick leaves than GPs (90;91), transition from medical-certification to self-certification reduced length of short-time absence (94), and medical consultants overruled sick-listeds' assessed potential of reduced sick leave by work adjustments (Paper II), this indicates an potential inverse gate-keeper function, conserving absence by physicians' sick-listing.

#### *5.2.5 Effect of minimal intervention on duration of sick leave*

The RCT study showed that return to work, and benefits statuses one year ahead, are sensitive to minimal postal intervention introducing challenges on possible effect of work adjustments, and on expected length of sick leave (Paper IV). This contrasts the finding of Nystuen (95), experiencing if any effect, prolonged sick leaves offering solution focused followed-up by postal intervention.

An unexpected observation was the late onset of reducing sick leave. Any awareness effect, often referred to as "Hawthorne effect" (96), would probably have induced a more instant effect on sick leave. The late onset except in subgroup with Rheumatic disorders and arthritis, might reflect that the chronically nature of these disorders possibly primes the question on how to work with the reduced function. With a more subacute start of prolonged reduced work ability, a reflective period might be necessary both within the sick-listed, his or her physicians, and at the work site, to accept the return to work if not fully recovered. According to the experience from a local study in Southern Troms, preliminary identification of suitable tasks for temporally disabled employees at the worksite, might act as a catalyst for the effect of work adjustments (20). The effect of minimal postal intervention contrasted the meagre effects on sick leave of health promotion interventions, despite effect on musculoskeletal disorders (45;97;98).

Searching the Cochrane database the last five years revealed vague evidence for treatment-recommendations of musculoskeletal disorders, effective in reducing time

until RTW (99-112). Low back pain rehabilitation is the most widely studied. Evidence for the advice of staying active as the preferred treatment in reducing time until RTW, has increased (100;101;104). Karjalainen et al (113;114) could not demonstrate additional effects on sickness absence by worksite visits by physiotherapist in addition to their intervention focused on reassurance, exercise, and activity in patient with subacute low back pain.

The prolonged sick leave by minimal intervention in sick-listed 40 years or younger with low back pain in the present dissertation might be coincidently, or could be explained by expectation of gaining vocational rehabilitation benefits (Paper IV). The observed lag in return to work between 6 to 12 weeks in the subgroups, either expecting reduced sick leave by work adjustments, or those who had marked for copy of their assessments to their NIO officer, might support a “waiting for something to be done” effect (Paper IV).

A possible hypothesis of little effect of different treatment packages, visits at work place for some groups, and the lag in return to work observed in our study, might be that any intervention introducing expectation of something to be done, might result in a passive attitude, with a prolonged sick-leave as a result. Introducing challenges on how to work with the present disabilities might thus be more effective, than introduce reflection on what must be done before return to work is acceptable, like reduced pain or worksite improvements. This would be in accordance to the advice of Arentz et al (25).

The media campaign “Back pain – don’t take it lying down” in Victoria Australia (115-117) suggested that general campaign on attitudes on how to handle back pain can be more effective than sophisticated intervention strategies directed to subjects identified in risk for long time absence. The recent reduction in sickness absence started at the time of public debate on the obligation to try work related activity unless positively advised against by physicians, introduced in Norway July the first, 2004 (54). This work activity obligation and focus on work place dialogue seems far more effective on reducing sick leave, than focus on adequate information in sickness certificates, ten years prior to this latest reform.

## **6.0 RECOMMENDATIONS AND CONCLUSIONS**

### **6.1 Recommendations**

The result presented in this dissertation, questions the focus on medical certification as guidelines for follow up of sick-listed. The medical information collected does not enable identifications of sick-listed, for tailored follow-up by NIO officers, based on expected length or expected effect of work adjustments. When use of neither medical consultants nor extended medical certificates improved the ability of identification for tailored follow-up, this strongly support search for alternative strategies. Both the proportion of sick listed expecting effect of work adjustments, and their predictive ability support a more active part played by the sick-listed. Furthermore, asking the sick-listed on potential work adjustments and length of sick leave in the early phases of sick leave might itself reduce length of long-lasting sick leaves.

The potential of work adjustments can hardly be exploited without involving the employer and many times even the fellow workers. And, the results in this study support needs for further studies focusing the assessments of the sick-listed on work-ability, potential work adjustments, and prognoses in dialog at the worksite. One example is the study on entitling self-certification for until 50 days, combined with follow up dialogs at the worksite, at least partly initiated by the result of this study (94;118). The results indicates not only reduced sick leave and improved possibilities of employee to undertake own health, but also important barriers on implementing dialog strategies (94;119;120). Further multidisciplinary studies are clearly necessary to exploit the potentials and optimal implementations of such strategies.

The role of NIOs in granting sickness benefits, ascertaining measures to facilitate return to work, and coordinating such measures are practically unexplored (88;121). The diagnostic accuracy of assessments based on medical sickness certificates in this dissertation, revealed the importance of exploiting diagnostic accuracy of all instruments used within the handling of sickness absence. Comparisons to self-assessments should be known before new instruments are included in ordinary follow-up activities.

The discrepancy between individual, workplace, and societies costs by sickness absence and the research investments in the area are striking, and this study support the conclusion of the Swedish Council on Technology Assessment in Health care on needs for more and qualitatively better studies (122;123).

The focus on workplace dialogue the latest years in Norwegian sickness absence policies, are in line with the presented result, and the recent reduction of sickness absence indicate a substantial potential when the employee and the employer unite in understanding of adjusted work privileges, and the obligation to use the actual residual work-ability.

## **6. 2 Conclusions**

Both sick-listed and social security officers recognise a substantial potential for reduced sickness absence by work adjustments. However, there were no agreements beyond chance between NIO officers and the sick-listed subjects on whom of the sick-listed that would benefit from work adjustments. Neither more medical information nor formal medical competence improved the ability to select for work adjustments.

The lengths of sick leaves were significantly better predicted by sick-listed than by NIO officers and NIO medical consultants on routinely collected medical information. The results indicate that the potential role of sick-listed in handling sickness absence have been underestimated, and favour a far more prominent role of the sick listed at the expense of extended medical information in tailored follow-up of sick-listed. Furthermore, merely asking sick-listed questions on possible work adjustments and expected length of sick leaves might contribute to reduced sickness absence.

The results revealed needs of quality insurance, and the establishing of diagnostic accuracies of instruments used in handling sickness absence, and high quality studies on involving sick-listed and the employers. The recent policy of work place dialogue are supported by the results, but the optimal follow-up policies should be established by reproducible research rather than interchanging good ideas.



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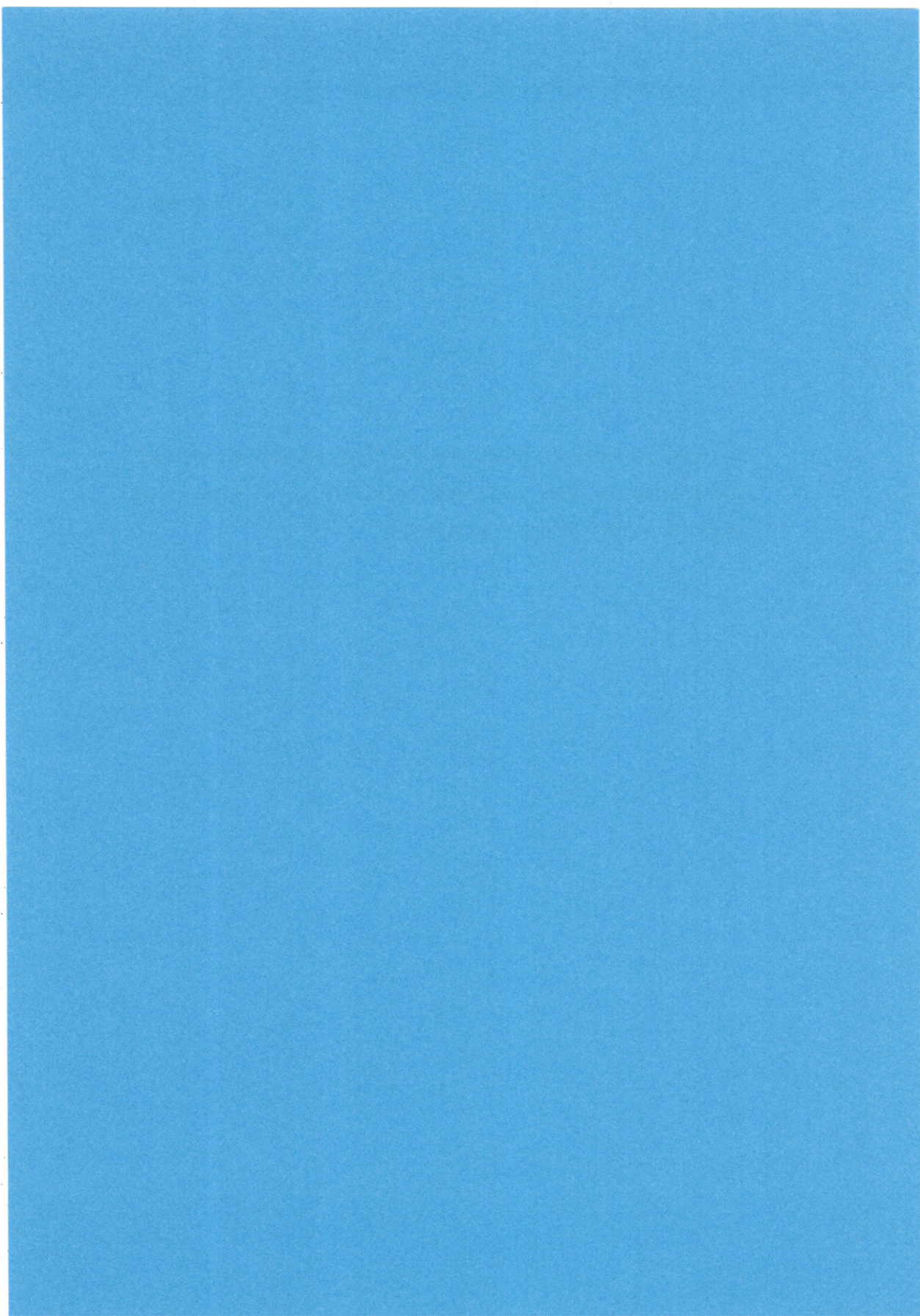
## 9 Abbreviation used

ALBPSQ	Acute Low Back Pain Screening Questionnaire (Ørebro questionnaire)
CI	Confidence Intervals
GP	General Practitioner
ICPC	International Classification of Primary Health Care
NIO	National Insurance Office
NIS	(Norwegian) National Insurance Service
NOC	Nordic Classifications of Occupations
PPV	Positive Predictive Value
RDA	Rheumatic Disorders and Arthritis
RR	Relative Risk
RTW	Return to work
SC1	Sickness certificate
SC2	Extended medical certificate
VAS	Visual Analogue Scale



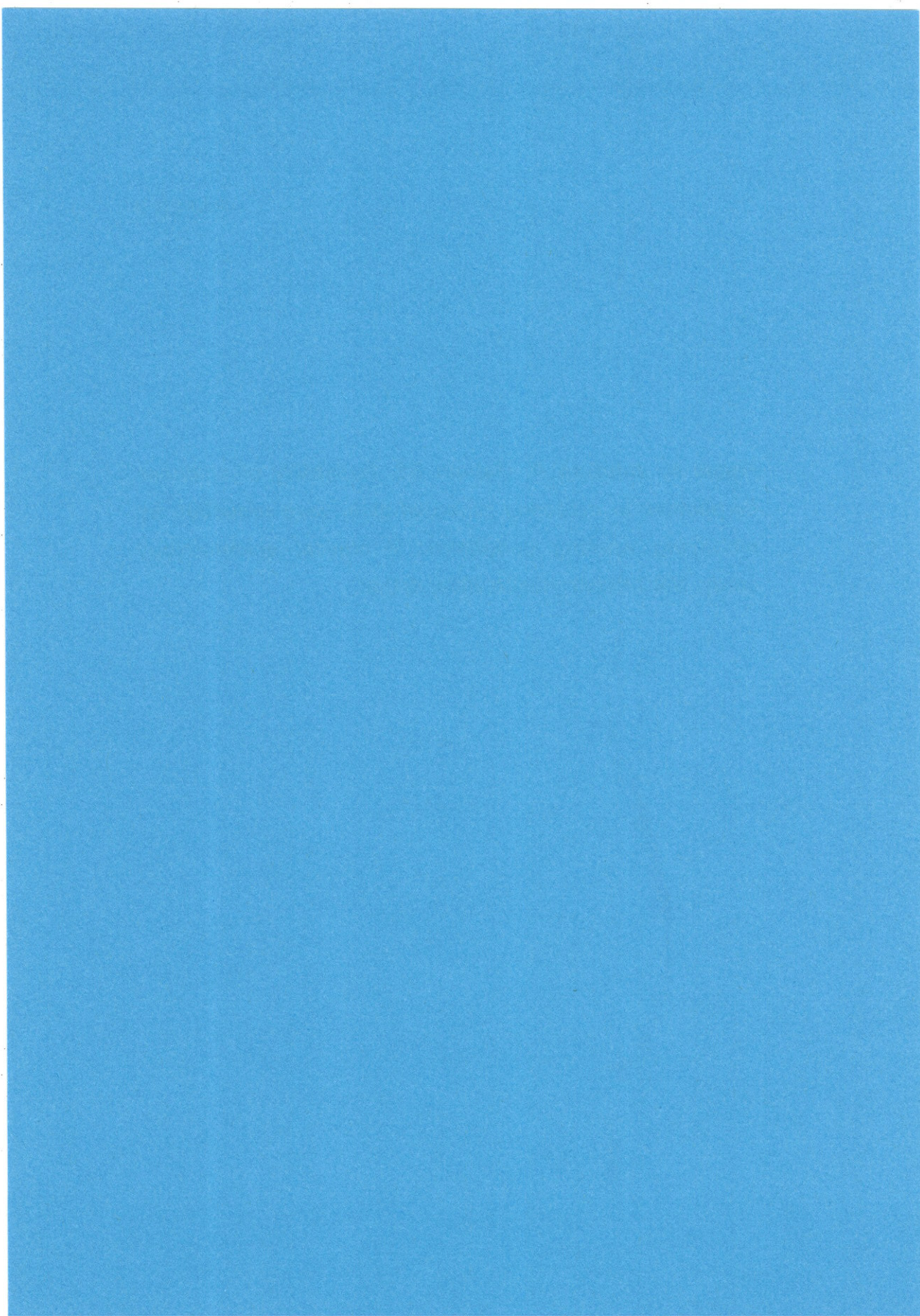
## PAPER I

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## PAPER II

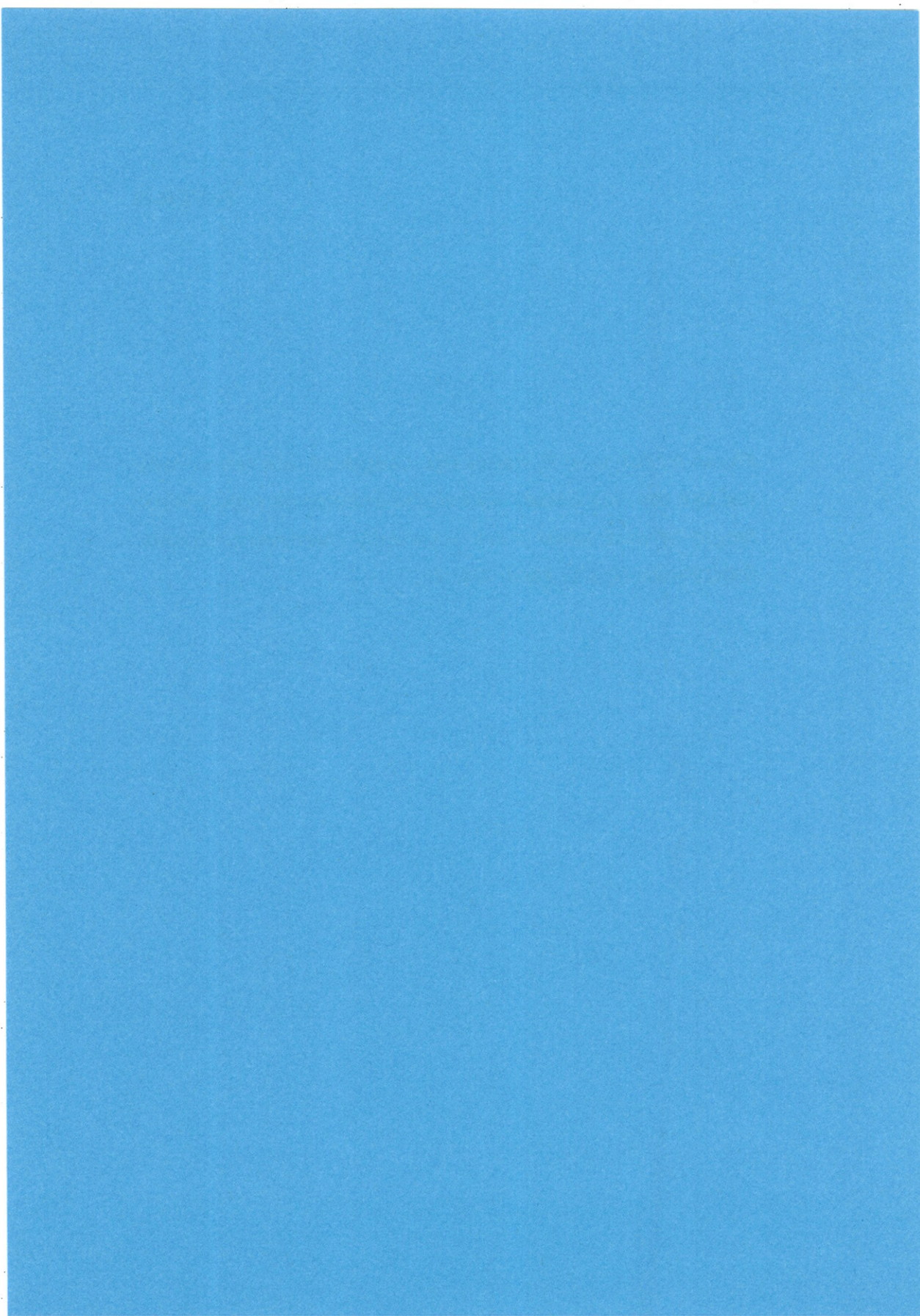
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## PAPER III

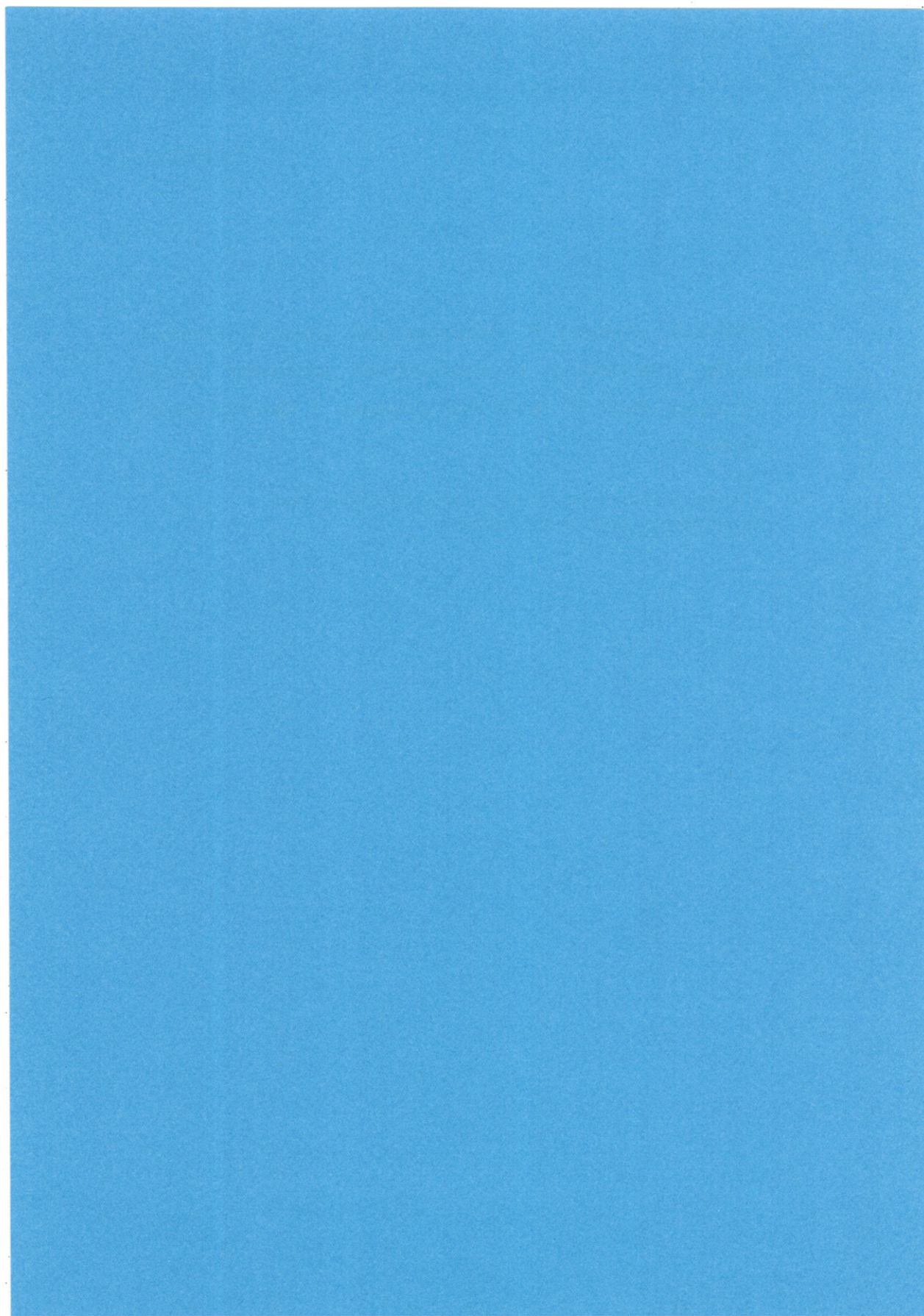
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PAPER IV

*Fleten N, Johnsen R. Reducing sick leave by minimal postal intervention: a randomized, controlled study. Accepted April 7<sup>th</sup> 2006: Occupational & Environmental Medicine*

(The unedited manuscript will be available at OEM Online First:  
<http://oem.bmjournals.com/onlinefirst.dtl>)



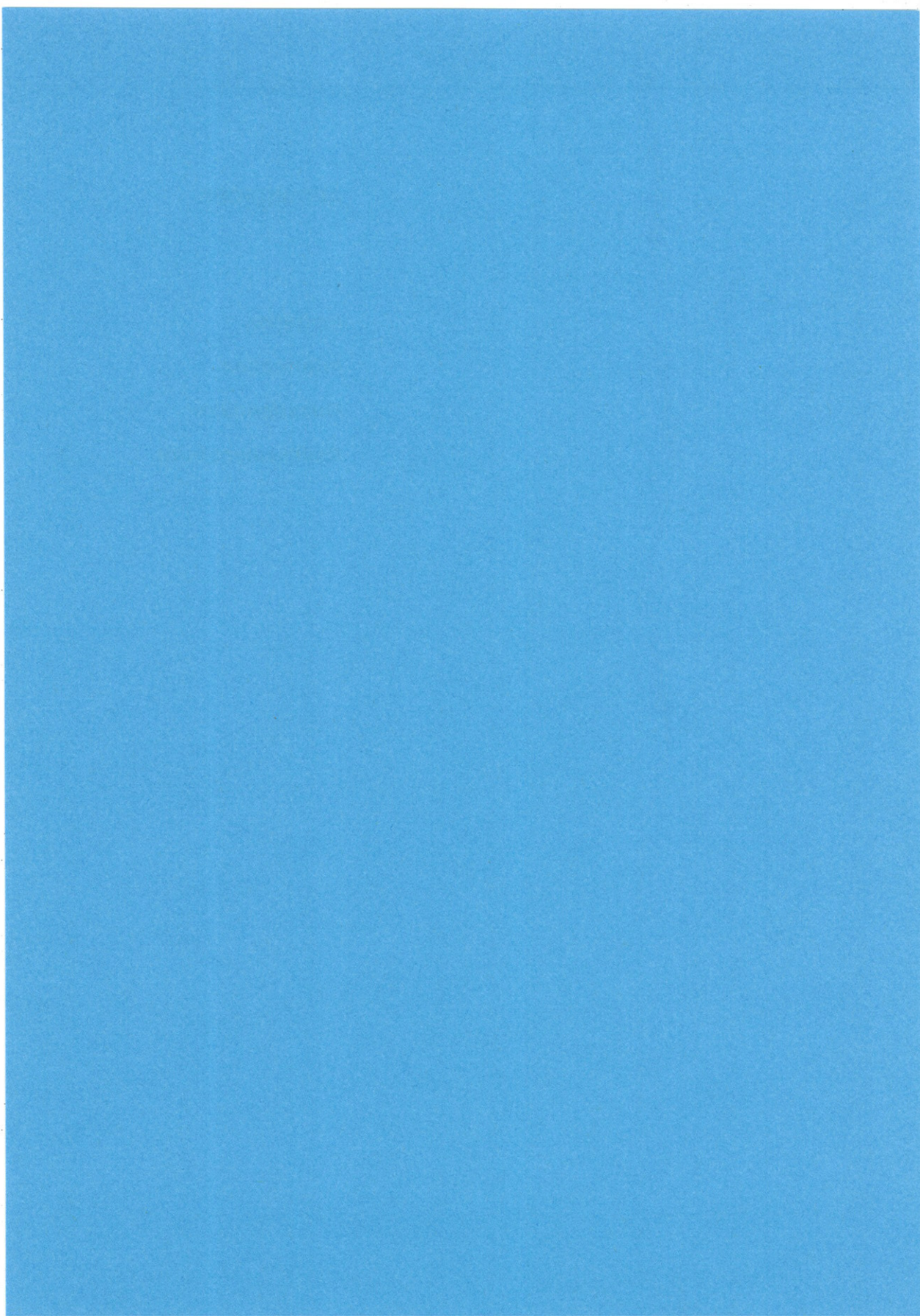
## **APPENDICES**

*Invitation*

*Information*

*Questionnaire*

*Assessment form*



## Spørsmål om deltagelse i forskningsprosjektet

### Oppfølging av sykmeldte

Av de som har vært sykmeldt i minst 14 dager i Tromsø og Harstad, er du en av 500 som er tilfeldig trekt ut til å motta vedlagte spørreskjema.

Formålet med spørreskjemaet er å undersøke om noen få spørsmål til deg som sykmeldt kan gi trygdekontoret et bedre grunnlag for til å velge ut de som vil nytte / ikke vil ha nytte av oppfølging.

I arbeidet med oppfølging av sykmeldte har trygdeetaten de siste åra fått flere muligheter. Mellom anna rett til sykepenger under bedriftsintern aktivisering og økte muligheter for å være behjelpelig med tiltak på arbeidsplassen. Målsettinga er å hindre at sykmeldte mister kontakten med arbeidsplassen og å gjøre tilbakegangen til arbeid lettere.

En av mange utfordringer i trygden er å gi rett person rett tilbud til rett tid. Sagt på en annen måte: Når skal vi gi tilbud om oppfølgingshjelp, og når vil alle parter være best tjent med at tilfriskning og tilbakevending til arbeid skjer uten aktiv medvirkning fra trygdekontoret.

Vi ønsker også å se i hvilken grad de sykmeldte er kjent med muligheten for hjelp til tiltak på arbeidsplassen for å komme raskere tilbake i arbeid.

#### **Godkjenning av undersøkelsen**

Undersøkelsen er finansiert av Rikstrygdeverket gjennom forskningsmidler fra Sosial- og Helsedepartementet. KONSESJON er gitt av Datatilsynet, og Regional komité for medisinsk forskningsetikk, Helseregion V har ingen innvendinger mot at undersøkelsen gjennomføres.

#### **Utfylling av spørreskjemaet**

Vi venter ikke at du skal være sikker når du svarer på spørsmålene, men kryss av for det du tror er mest riktig i ditt tilfelle. Skjemaet bør fylles ut samme dag det mottas og legges i vedlagte frankerte svarkonvolutt. Navn og fødselsdata fylles kun ut når du ønsker at saksbehandler skal få kopi av skjemaet. Opplysningene vil bli behandlet konfidensielt og blir lagt inn på data med det tilfeldig valgte idnr som identifikasjon.

Deltagelse i undersøkelsen er frivillig, og du kan til enhver tid trekke deg fra undersøkelsen uten nærmere begrunnelse. Dersom du ikke ønsker delta i undersøkelsen, ber vi om at du krysser av for dette på skjemaet og returnerer dette uten videre utfylling, slik at unødvendig purring kan unngås.

Vedlagt finner du en mer utførlig beskrivelse av undersøkelsen og bakgrunnen for denne.

Vennlig hilsen Fylkestrygdekontoret i Troms

Lisbeth Hatteng  
Direktør

Nils Fleten  
Rådgivende overlege





## **Oppfølging av sykmeldte**

Dette forskningsprosjektet gjennomføres for at trygdeetaten skal kunne gi et bedre tilbud til personer som står i fare for å bli langvarig sykmeldt.

Undersøkelsen gjøres i regi av Fylkestrygdekontoret i Troms i samarbeid med Institutt for samfunnsmedisin, Universitetet i Tromsø, og er finansiert av Sosial- og helsedepartementet via Rikstrygdeverket.

### ***Bakgrunn for undersøkelsen***

Fra og med 1. juli 1993 ble trygdekontorene pålagt et tettere oppfølgingsansvar for sykmeldte som ledd i den såkalte arbeidslinja. Målsettinga er å hindre at sykmeldte mister kontakten med arbeidsplassen og å gjøre tilbakegangen til arbeid lettere.

Det ble mellom annet gitt anledning til å yte sykepenger under bedriftsintern aktivisering. Det vil si at for en periode på inntil 3 mnd vil den som er arbeidsufør i sitt arbeid på grunn av sykdom, kunne få sykepenger ved å utføre tilpassede oppgaver på arbeidsplassen eller ved opplæring til andre arbeidsoppgaver. Hvilke oppgaver den sykmeldte kan utføre må avklares i samarbeid med legen til den sykmeldte. Ordningen krever en avtale mellom den sykmeldte og arbeidsgiver som skal godkjennes av trygdekontoret.

Trygdekontorene skal og fatte et eget skriftlig vedtak om fortsatt rett til sykepenger utover 12 uker. Dette vedtaket bør også inneholde en plan for videre tiltak.

12 uker kan være lang tid, og for mange kan det være ønskelig å få tilbud om eventuelle tiltak på arbeidsplassen langt tidligere. En stor utfordringen for trygden vil være å velge ut de som vil ha nytte av tidlig oppfølging med tanke på tiltak på arbeidsplassen.

### ***Formålet med undersøkelsen***

Formålet med undersøkelsen er å få kunnskap om hvem av de sykmeldte som vil ha nytte av at trygdekontoret prøver få igang tiltak i samarbeid med den sykmeldte. Dette kan være tiltak i samarbeid med arbeidsgiver for tilrettelegging av arbeid, hjelpemidler i arbeidssituasjonen, forandring av arbeidsoppgaver eller andre ting. Økt kunnskap om hvem som vil ha nytte av oppfølging, vil også gi et bedre grunnlag til å velge ut de personene der oppfølgingsarbeid tidlig i sykepengeperioden vil ha liten hensikt, og der dette kan oppleves som unødvendig innblanding. På den måten håper vi å kunne bruke oppfølgingsressursene på en mer målrettet måte.

Vi ønsker også å se i hvilken grad de sykmeldte er kjent med muligheten for hjelp til tiltak på arbeidsplassen for å komme raskere tilbake i arbeid.

### **Undersøkelsen er todelt:**

A: På sykmeldingen gir legen opplysninger om sykdom, yrke og arbeidsgiver. Vi vil undersøke om dette kan brukes til bedre å finne fram til de sykmeldte som vil kunne oppleve det som nyttig at trygdekontoret tar kontakt med tanke på eventuelle tiltak på arbeidsplassen. Vi vil også se om opplysningene kan fortelle hvor lenge sykmeldingen vil vare. Senest etter 8 ukers sykmelding skal legen sende en mer utfyllende legeerklæring til trygdekontoret. For de som blir sykmeldt så lenge vil vi undersøke om disse mer utfyllende opplysningene gir et bedre grunnlag til å velge ut de som vil ha nytte av et oppfølgingstilbud.

B: I samsvar med ordtaket "Den vet best hvor skoen trykker, som har den på" vil vi også undersøke om de sykmeldte mener at tiltak på arbeidsplassen vil ha betydning for sykmeldingsforløpet, og i hvilken grad de kan anslå hvor lenge sykmeldingen vil vare.

### **Praktisk gjennomføring**

Saksbehandler tar kopi av 1000 sykmeldinger som varer utover 14 dager. Før kopien oversendes prosjektleder som arbeider som rådgivende overlege ved Fylkestrygdekantoret, fjernes navn, fødselsnummer og adresse. Hver kopi blir påført et fortløpende identitetsnummer. Bearbeiding av dataene vil prosjektleder gjøre ved Institutt for samfunnsmedisin, Universitetet i Tromsø.

Halvparten av de sykmeldte får etter loddtrekning tilsendt forespørsel om å besvare det vedlagte spørreskjemaet. Opplysningene i spørreskjemaet er ment kun til forskningsformål og vil ikke bli kjent for saksbehandler ved trygdekantoret eller arbeidsgiver. Sykmeldte som ønsker kontakt med saksbehandler eller at informasjonen gjøres kjent for saksbehandler, kan krysse av i spørsmål 8 nederst på skjemaet og føre på navn og fødselsdata slik at kopi av skjemaet kan sendes riktig saksbehandler.

**Deltagelse i undersøkelsen er frivillig, og deltagerne kan til enhver tid trekke seg fra undersøkelsen uten nærmere begrunnelse ved å gi beskjed til prosjektleder.** Han vil da slette opplysningene som er gitt i vedlagte spørreskjema. Trygdekantoret vil ikke vite om den sykmeldte deltar eller ikke, med mindre det er krysset av for kopi til saksbehandler. Dette for å sikre at deltakelse i denne undersøkelsen ikke skal få konsekvenser for den sykmeldtes nåværende eller senere forhold til Trygdekantoret.

Sykmeldte som ikke ønsker besvare spørsmålene bes krysse av for dette og returnere skjemaet uten videre utfylling slik at unødvendig purring kan unngås.

Deltagerne vil få tilsendt et sammendrag av resultatene av undersøkelsen andre halvår 1999.

### **Godkjenning av undersøkelsen**

Undersøkelsen er finansiert av Rikstrygdeverket gjennom forskningsmidler fra Sosial- og Helsedepartementet. Datatilsynet har godkjent undersøkelsen, og Regional komite for medisinsk forskningsetikk Helse-region V har ingen innvendinger mot at undersøkelsen gjennomføres.

## OPPFØLGING AV SYKMELDTE

Spørreskjema til personer som har vært sykmeldt minst 14 dager.

Jeg ønsker ikke å delta i undersøkelsen:  Ved kryss her returneres skjemaet uten videre avkryssing.

1. Kjenner du til om det på din arbeidsplass blir satt igang tiltak for at sykmeldte lettere skal kunne holde kontakt med arbeidsplassen sin? Sett et kryss for hvert alternativ.

Sykepenger under bedriftsintern aktivisering : Ja  Nei

Tilpassning av arbeidsoppgaver ved delvis sykmelding: Ja  Nei

Anskaffelse av hjelpemidler/utstyr til sykmeldte: Ja  Nei

Andre tiltak: Ja  Nei

Ved ja andre tiltak, oppgi hvilke:.....

2. Tror du at tiltak på arbeidsplassen ville kunne redusere (enten ved redusert lengde eller ved delvis sykmelding) denne sykmeldingsperioden din?

Gi din vurdering på skalaen fra helt sikkert ikke til helt sikkert ved å sette kryss der du synes det passer best med din oppfatning.

Helt sikkert ikke  Helt sikkert

3. Tror du at tiltak på arbeidsplassen ville kunne redusere antall og/eller varigheten av framtidige sykmeldingsperioder for din del?

Gi din vurdering på skalaen fra helt sikkert ikke til helt sikkert ved å sette kryss der du synes det passer best med din oppfatning.

Helt sikkert ikke  Helt sikkert

Dersom du allerede er friskmelt sett kryss her  og gå til sp 5.

4. Tror du at du kunne gå helt eller delvis tilbake til arbeidet nå dersom det ble iverksatt endringer eller tiltak på arbeidsplassen din?

Gi din vurdering på skalaen fra helt sikkert ikke til helt sikkert ved å sette kryss der du synes det passer best med din oppfatning.

Helt sikkert ikke  Helt sikkert

Vend arket

**5. Hvilke tiltak / endringer på arbeidsplassen tror du vil kunne redusere dette eller framtidige sykefravær for din del? Sett eventuelt flere kryss**

- a) Ingen
- b) Tilpassning av arbeidsplassen, nytt tilpasset utstyr, tekniske hjelpemidler, ol.
- c) Tilpassning av arbeidsoppgaver, andre arbeidsoppgaver, fysisk lettere arbeid ol.
- d) Økt mulighet for å styre egen arbeidsdag etter "dagsformen".
- e) Tiltak som øker trivsel og / eller rydder opp i mulige konflikter.
- f) Økt anerkjennelse for arbeidet av sjefen(e), herunder oppjustering av lønn, endret ansvar ol.
- g) Attføring til annet arbeid.
- h) Andre tiltak? Gi stikkord. ....

**6. Med utgangspunkt i dine plager, samtaler med legen og erfaringene med arbeidet ditt, hvor lenge tror du at du kommer til å være sykmeldt?  
(Regnet fra og med første sykmeldingsdag denne gangen, og uavhengig av hvor lenge den siste sykemeldingen du har fått av legen varte).**

*Kryss av i det alternativet du i dag anser som mest sannsynlig. Sett kryss også dersom du er friskmeldt.*

< 4 uker  4-7 uker  8-11 uker  12-16 uker  4-6 mnd  > ½ år  > 1 år

**7. Med utgangspunkt i dine plager, samtaler med legen og erfaringene med arbeidet ditt, hvor mange flere perioder tror du at du vil gå sykmeldt mer enn 14 dager av samme lidelse eller andre lidelser i muskelskjelett apparatet det kommende året (de neste 12 mnd)?**

*Kryss av i det alternativet du i dag anser som mest sannsynlig. Den sykemeldingsperioden du er inne i, regnes ikke med.*

Ingen  en  to - tre  minst fire

**8. Jeg ønsker at min saksbehandler ved trygdekontoret får kopi av spørreskjemaet. Ja  Nei**

Dersom spørsmål 8 er besvart med ja, ber vi om at spørsmål 9 besvares, og at felt for navn og fødselsdato blir fylt ut.

Er spørsmål 8 besvart med nei, avsluttes skjemaet her.

**9. Jeg ønsker også at saksbehandler kontakter meg for drøfting av mulige tiltak. Ja  Nei**

Navn:  (Fylles kun ut når sp 8 er besvart med ja)  
Fødselsdato:

Takk for hjelpen

## Oppfølging av sykmeldte

### Vurderingsskjema 1

Vurderer

Idnr:

1. Tror du at tiltak på arbeidsplassen ville kunne redusere (enten ved redusert lengde eller med delvis sykmelding) den aktuelle sykmeldingsperioden?

*Gi din vurdering på skalaen fra helt sikkert ikke til helt sikkert ved å sette kryss der du synes det passer best med din oppfatning.*

Helt sikkert ikke  Helt sikkert

2. Tror du at tiltak på arbeidsplassen ville kunne redusere antall og/eller varigheten av framtidige sykmeldingsperioder for denne sykmeldte?

Helt sikkert ikke  Helt sikkert

3. Tror du at han/ho ville kunne gå helt eller delvis tilbake til arbeidet nå dersom det ble iverksatt endringer eller tiltak på arbeidsplassen til den sykmeldte?

Helt sikkert ikke  Helt sikkert

4. Hvilke tiltak / endringer på arbeidsplassen tror du vil kunne redusere dette eller framtidige sykefravær for den sykmeldte? *Sett eventuelt flere kryss*

- a) Ingen
- b) Tilpasning av arbeidsplassen, nytt tilpasset utstyr, tekniske hjelpemidler, ol.
- c) Tilpasning av arbeidsoppgaver, andre arbeidsoppgaver, fysisk lettere arbeid ol.
- d) Økt mulighet for å styre egen arbeidsdag etter "dagsformen".
- e) Tiltak som øker trivsel og / eller rydder opp i mulige konflikter.
- f) Økt anerkjennelse for arbeidet av sjefen(e), herunder oppjustering av lønn, endret ansvar ol.
- g) Attføring til annet arbeid.
- h) Andre tiltak? Gi stikkord. ....

5. Med utgangspunkt i foreliggende opplysninger, hvor lenge tror du at han/ho vil være sykmeldt fra og med første sykmeldingsdag denne gangen? (Svar uavhengig av hvor lenge den siste sykmeldingen fra legen varte).

< 4 uker  4-7 uker  8-11 uker  12-16 uker  4-6 mnd  > ½ år  > 1 år

6. Med utgangspunkt i foreliggende opplysninger, hvor mange flere perioder tror du at han/ho vil gå sykmeldt mer enn 14 dager av samme eller andre lidelser i muskel-skjelett apparatet det kommende året,(de neste 12 mnd)?

Ingen  en  to-tre  minst fire









**ISM SKRIFTSERIE - FØR UTGITT:**

1. Bidrag til belysning av medisinske og sosiale forhold i Finnmark fylke, med særlig vekt på forholdene blant finskattede i Sør-Varanger kommune.  
**Av Anders Forsdahl, 1976. (nytt opplag 1990)**
2. Sunnhetstilstanden, hygieniske og sosiale forhold i Sør-Varanger kommune 1869-1975 belyst ved medisinalberetningene.  
**Av Anders Forsdahl, 1977.**
3. Hjerter-karundersøkelsen i Finnmark - et eksempel på en populasjonsundersøkelse rettet mot cardiovasculære sykdommer. Beskrivelse og analyse av etterundersøkelsesgruppen.  
**Av Jan-Ivar Kvamme og Trond Haider, 1979.**
4. D. The Tromsø Heart Study: Population studies of coronary risk factors with special emphasis on high density lipoprotein and the family occurrence of myocardial infarction.  
**Av Olav Helge Førde og Dag Steinar Thelle, 1979.**
5. D. Reformer i distriktshelsetjenesten III: Hypertensjon i distriktshelsetjenesten.  
**Av Jan-Ivar Kvamme, 1980.**
6. Til professor Knut Westlund på hans 60-års dag, 1983.
- 7.\* Blodtrykksovervåkning og blodtrykksmåling.  
**Av Jan-Ivar Kvamme, Bernt Nesje og Anders Forsdahl, 1983.**
- 8.\* Merkesteiner i norsk medisin reist av allmennpraktikere - og enkelte utdrag av medisinalberetninger av kulturhistorisk verdi.  
**Av Anders Forsdahl, 1984.**
9. "Balsfjordsystemet." EDB-basert journal, arkiv og statistikk-system for primærhelsetjenesten.  
**Av Toralf Hasvold, 1984.**
10. D. Tvuget psykisk helsevern i Norge. Rettsikkerheten ved slikt helsevern med særlig vurdering av kontrollkommisjonsordningen.  
**Av Georg Høyer, 1986.**
11. D. The use of self-administered questionnaires about food habits. Relationships with risk factors for coronary heart disease and associations between coffee drinking and mortality and cancer incidence.  
**Av Bjarne Koster Jacobsen, 1988.**
- 12.\* Helse og ulikhet. Vi trenger et handlingsprogram for Finnmark.  
**Av Anders Forsdahl, Atle Svendal, Aslak Syse og Dag Thelle, 1989.**

13. D. Health education and self-care in dentistry - surveys and interventions.  
**Av Anne Johanne Sjøgaard, 1989.**
14. Helsekontroller i praksis. Erfaringer fra prosjektet helsekontroller i Troms 1983-1985.  
**Av Harald Siem og Arild Johansen, 1989.**
15. Til Anders Forsdahls 60-års dag, 1990.
16. D. Diagnosis of cancer in general practice. A study of delay problems and warning signals of cancer, with implications for public cancer information and for cancer diagnostic strategies in general practice.  
**Av Knut Holtedahl, 1991.**
17. D. The Tromsø Survey. The family intervention study. Feasibility of using a family approach to intervention on coronary heart disease. The effect of lifestyle intervention of coronary risk factors.  
**Av Synnøve Fønnebo Knutsen, 1991.**
18. Helhetsforståelse og kommunikasjon. Filosofi for klinikere.  
**Av Åge Wifstad, 1991.**
19. D. Factors affecting self-evaluated general health status - and the use of professional health care services.  
**Av Knut Fylkesnes, 1991.**
20. D. Serum gamma-glutamyltransferase: Population determinants and diagnostic characteristics in relation to intervention on risk drinkers.  
**Av Odd Nilssen, 1992.**
21. D. The Healthy Faith. Pregnancy outcome, risk of disease, cancer morbidity and mortality in Norwegian Seventh-Day-Adventists.  
**Av Vinjar Fønnebo, 1992.**
22. D. Aspects of breast and cervical cancer screening.  
**Av Inger Torhild Gram, 1992.**
23. D. Population studies on dyspepsia and peptic ulcer disease: Occurrence, aetiology, and diagnosis. From The Tromsø Heart Study and The Sørreisa Gastrointestinal Disorder Studie.  
**Av Roar Johnsen, 1992.**
24. D. Diagnosis of pneumonia in adults in general practice.  
**Av Hasse Melbye, 1992.**
25. D. Relationship between hemodynamics and blood lipids in population surveys, and effects of n-3 fatty acids.  
**Av Kaare Bønnaa, 1992.**

26. D. Risk factors for, and 13-year mortality from cardiovascular disease by socioeconomic status. A study of 44690 men and 17540 women, ages 40-49.  
**Av Hanne Thürmer, 1993.**
27. Utdrag av medisinalberetninger fra Sulitjelma 1891-1990.  
**Av Anders Forsdahl, 1993.**
28. Helse, livsstil og levekår i Finnmark. Resultater fra Hjerte-karundersøkelsen i 1987-88. Finnmark III.  
**Av Knut Westlund og Anne Johanne Sjøgaard, 1993.**
29. D. Patterns and predictors of drug use. A pharmacoepidemiologic study, linking the analgesic drug prescriptions to a population health survey in Tromsø, Norway.  
**Av Anne Elise Eggen, 1994.**
30. D. ECG in health and disease. ECG findings in relation to CHD risk factors, constitutional variables and 16-year mortality in 2990 asymptomatic Oslo men aged 40-49 years in 1972.  
**Av Per G. Lund-Larsen, 1994.**
31. D. Arrhythmia, electrocardiographic signs, and physical activity in relation to coronary heart risk factors and disease. The Tromsø Study.  
**Av Maja-Lisa Løchen, 1995.**
32. D. The Military service: mental distress and changes in health behaviours among Norwegian army conscript.  
**Av Edvin Schei, 1995.**
33. D. The Harstad injury prevention study: Hospital-based injury recording and community-based intervention.  
**Av Børge Ytterstad, 1995.**
- 34.\* D. Vilkår for begrepsdannelse og praksis i psykiatri. En filosofisk undersøkelse.  
**Av Åge Wifstad, 1996. (utgitt Tano Aschehoug forlag 1997)**
35. Dialog og refleksjon. Festskrift til professor Tom Andersen på hans 60-års dag, 1996.
36. D. Factors affecting doctors' decision making.  
**Av Ivar Sønbo Kristiansen, 1996.**
37. D. The Sørreisa gastrointestinal disorder study. Dyspepsia, peptic ulcer and endoscopic findings in a population.  
**Av Bjørn Bernersen, 1996.**
38. D. Headache and neck or shoulder pain. An analysis of musculoskeletal problems in three comprehensive population studies in Northern Norway.  
**Av Toralf Hasvold, 1996.**

39. Senfølger av kjernefysiske prøvespreninger på øygruppen Novaya Semlya i perioden 1955 til 1962. Rapport etter programmet "Liv". Arkangelsk 1994.  
Av A.V. Tkatchev, L.K. Dobrodeeva, A.I. Isaev, T.S. Podjakova, 1996.
40. Helse og livskvalitet på 78 grader nord. Rapport fra en befolkningsstudie på Svalbard høsten 1988. Av Helge Schirmer, Georg Høyer, Odd Nilssen, Tormod Brenn og Siri Steine, 1997.
- 41.\* D. Physical activity and risk of cancer. A population based cohort study including prostate, testicular, colorectal, lung and breast cancer.  
Av Inger Thune, 1997.
42. The Norwegian - Russian Health Study 1994/95. A cross-sectional study of pollution and health in the border area.  
Av Tone Smith-Sivertsen, Valeri Tchachtchine, Eiliv Lund, Tor Norseth, Vladimir Bykov, 1997.
43. D. Use of alternative medicine by Norwegian cancer patients  
Av Terje Risberg, 1998.
44. D. Incidence of and risk factors for myocardial infarction, stroke, and diabetes mellitus in a general population. The Finnmark Study 1974-1989.  
Av Inger Njølstad, 1998.
45. D. General practitioner hospitals: Use and usefulness. A study from Finnmark County in North Norway.  
Av Ivar Aaraas, 1998.
- 45B Sykestuer i Finnmark. En studie av bruk og nytteverdi.  
Av Ivar Aaraas, 1998.
46. D. No går det på helsa laus. Helse, sykdom og risiko for sykdom i to nord-norske kystsamfunn.  
Av Jorid Andersen, 1998.
47. D. The Tromsø Study: Risk factors for non-vertebral fractures in a middle-aged population.  
Av Ragnar Martin Joakimsen, 1999.
48. D. The potential for reducing inappropriate hospital admissions: A study of health benefits and costs in a department of internal medicine.  
Av Bjørn Odvar Eriksen, 1999.
49. D. Echocardiographic screening in a general population. Normal distribution of echocardiographic measurements and their relation to cardiovascular risk factors and disease. The Tromsø Study.  
Av Henrik Schirmer, 2000.

50. D. Environmental and occupational exposure, life-style factors and pregnancy outcome in arctic and subarctic populations of Norway and Russia.  
Av Jon Øyvind Odland, 2000.
- 50B Окружающая и профессиональная экспозиция, факторы стиля жизни и исход беременности у населения арктической и субарктической частей Норвегии и России  
Юн Ойвин Удлан 2000
51. D. A population based study on coronary heart disease in families. The Finnmark Study 1974-1989.  
Av Tormod Brenn, 2000.
52. D. Ultrasound assessed carotid atherosclerosis in a general population. The Tromsø Study.  
Av Oddmund Joakimsen, 2000.
53. D. Risk factors for carotid intima-media thickness in a general population. The Tromsø Study 1979-1994.  
Av Eva Stensland-Bugge, 2000.
54. D. The South Asian cataract management study.  
Av Torkel Snellingen, 2000.
55. D. Air pollution and health in the Norwegian-Russian border area.  
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56. D. Interpretation of forearm bone mineral density. The Tromsø Study.  
Av Gro K. Rosvold Berntsen, 2000.
57. D. Individual fatty acids and cardiovascular risk factors.  
Av Sameline Grimsgaard, 2001.
58. Finnmarkundersøkelsene  
Av Anders Forsdahl, Fylkesnes K, Hermansen R, Lund E, Lupton B, Selmer R, Straume E, 2001.
59. D. Dietary data in the Norwegian women and cancer study. Validation and analyses of health related aspects.  
Av Anette Hjertåker, 2001.
60. D. The stenotic carotid artery plaque. Prevalence, risk factors and relations to clinical disease. The Tromsø Study.  
Av Ellisiv B. Mathiesen, 2001.
61. D. Studies in perinatal care from a sparsely populated area.  
Av Jan Holt, 2001.
62. D. Fragile bones in patients with stroke? Bone mineral density in acute stroke patients and changes during one year of follow up.  
Av Lone Jørgensen, 2001.

63. D. Psychiatric morbidity and mortality in northern Norway in the era of deinstitutionalisation. A psychiatric case register study.  
Av Vidje Hansen, 2001.
64. D. Ill health in two contrasting countries.  
Av Tom Andersen, 1978/2002.
65. D. Longitudinal analyses of cardiovascular risk factors.  
Av Tom Wilsgaard, 2002.
66. Helseundersøkelsen i Arkangelsk 2000.  
Av Odd Nilssen, Alexei Kalinin, Tormod Brenn, Maria Averina et al., 2003.
67. D. Bio-psycho-social aspects of severe multiple trauma.  
Av Audny G. W. Anke, 2003.
68. D. Persistent organic pollutants in human plasma from inhabitants of the arctic.  
Av Torkjel Manning Sandanger, 2003.
69. D. Aspects of women's health in relation to use of hormonal contraceptives and pattern of child bearing.  
Av Merethe Kunmle, 2003.
70. Pasienterfaringer i primærlegetjenesten før og etter fastlegereformen.  
Av Olaug Lian, 2003.
71. D. Vitamin D security in northern Norway in relation to marine food traditions.  
Av Magritt Brustad, 2004.
72. D. Intervensjonsstudien i Finnmark. Evaluering av lokalsamfunns basert hjerte- og kar forebygging i kystkommunene Båtsfjord og Nordkapp.  
Av Beate Lupton, 2004.
73. D. Environmental factors, metabolic profile, hormones and breast and endometrial cancer risk.  
Av Anne-Sofie Furberg, 2004.
74. D. Det skapende mellomrommet i møtet mellom pasient og lege.  
Av Eli Berg, 2004.
75. Krefregisteret i Arkhangelsk oblast i nordvest Russland. Med en sammenligning av kreftforekomst i Arkhangelsk oblast og Norge 1993 - 2001.  
Av Vakt skjold Arild, Lebedintseva Jelena, Korotov Dmitrij, Tkatsjov Anatolij, Podjakova Tatjana, Lund Eiliv, 2004

76. D. Characteristics and prognosis of long-term stroke survivors. The Tromsø Study.  
Av Torgeir Engstad, 2004
77. D. Withdrawal and exclusion. A study of the spoken word as means of understanding schizophrenic patients.  
Av Geir Fagerjord Lorem, 2005.
78. "Søkelys på safunnsmedisinene." Evaluering av kommunal samfunnsmedisinsk legetjeneste, offentlig legearbeid og de forebyggende oppgaver i Fastlegeordningen.  
Av Betty Pettersen og Roar Johnsen, 2005.
79. **Prosjekt egenmelding Kristiansand kommune.**  
Evaluering av kontrollert intervensjonsforsøk i stor skala, med utvidet rett til egenmelding i kombinasjon med økt og formalisert samhandling mellom arbeidstaker og arbeidsplassen ved sykefravær.  
Av Nils Fleten og Roar Johnsen, 2005.
80. D. Abdominal aortic aneurysms:Diagnosis and epidemiology. The Tromsø study.  
Av Kulbir Singh, 2005.
81. D. A population based study on cardiovascular diseases in Northwest Russia.The Arkhangelsk study 2000.  
Av Maria Averina, 2005.
82. D. Exposure to exogenous hormones in women: risk factors for breast cancer and molecular signature.  
Av Vanessa Dumeaux, 2005.
83. D. Repeated ultrasound measurements of carotid artery plaques in a general population. The Tromsø Study 1994-2001.  
Av Stein Harald Johnsen, 2005.
84. D. Risk Factors For Fractures In Tromsø. The Tromsø Study.  
Av Luai Awad Ahmed, 2005.
85. D. The quality and use of two health registries in Russia. The Arkhangelsk Cancer Registry and the Kola Birth Registry  
Качество и использование двух медицинских регистров в России. Архангельск регистр рака и Кольский регистр родов  
Av Arild Vaktskjold, 2005.
86. D. Haemoglobin, anaemia and haematological malignancies.  
Av Tove Skjelbakken, 2006

De som er merket med D er doktorgradsarbeid.

De som er merket med \* har vi dessverre ikke flere eksemplar av.

