Discussion
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Main results
Recurrence of sickness absence
The studies in this thesis fill the gaps in our knowledge about the recurrence of sickness absence, depending on previous sickness absence patterns. The risk of recurrence is high. Approximately 50% of the employees with frequent or long-term episodes of sickness absence have a recurrent long-term episode within 4 years, compared with 28% in the reference population. The recurrence of frequent short episodes of sickness absence is even higher: 61% compared to 16% in the reference population.
Dekkers-Sanchez et al. reviewed 77 risk factors and found that only older age and history of sickness absence were weakly associated with long-term sick leave.1 There was insufficient evidence of influence of the other individual and work-related factors on long-term sick leave. Thus, a history of sickness absence not only predicts a recurrence, but also continued sickness absence in sick-listed employees.
In recent literature it has been reported that female gender, age, smoking, history of at least two previous episodes of low-back pain and previous days of sickness absence identified during pre-placement assessment, predict more than average subsequent sickness absence, amounting to almost twice as many days of sickness absence in the high-risk group as compared to the low-risk group.2
Recurrent sickness absence, disability and job termination occur more frequently among employees with prior frequent or long-term sickness absence. Butler et al. found the rate of successful return to work after the first episode of sickness absence to be 85%, but the rate of success evaluated over a longer period of time was only 50%.3 Moreover, an employee who misses several weeks of work over a number of years may lose previously acquired skills during prolonged absence. Thus, the probability that sickness absence ends in an unsuccessful return to work is expected to increase when the frequency and duration of the absence increases.3 This was supported by the results of our study on parametric models for long-term sickness absence: as the duration of sickness absence increases, the probability of returning to work decreases. Christensen et al. reported that the risk of absence increases with the frequency of absence.4
Research on sickness absence research has focused on long-term absence and disability because of the inherent high social and economic costs. We found long-term sickness absentee remain at an increased risk of sickness absence and work disability for a long period of time. Short-term sickness absence is not as costly, but interferes with work timetables when it results in frequent understaffing. Frequent short episodes of sickness absence are often interpreted as ‘voluntary
absence’ or as coping behaviour. The results of our study show that employees with frequent short episodes of sickness absence also have an increased risk of future long-term absence and work disability.

Recurrent absence may be based on two different mechanisms. One explanation is that this group is a somewhat weaker group of employees who have problems more often, i.e. employees with less capacity, who are less healthy or suffer from a chronic disease which makes them more prone to recurrent sickness absence (e.g. migraine, asthma or diabetes). When exacerbations occur, the employee is no longer able to cope with the work and therefore reports sick. An alternative explanation is that these employees tend to give up when they have problems, or they have very little loyalty towards the company, and this results in frequent sickness absence with psychological problems. They can be employees who are habitually unstable, have no stamina, or have little resistance. Yet another explanation is that employees who report sick on a regular basis are preoccupied with bodily sensations and react excessively or inappropriately to their symptoms, regardless of their objective state of health in terms of disease.

We recommend that further research should focus on these explanatory mechanisms. It would also be interesting to investigate whether this population is typically characterized by more neurotic complaints, which are perhaps associated with somatic symptoms. Somatizers frequently visit their general practitioner and are probably also frequently absent from work.

It is assumed that short episodes of sickness absence serve as a way of coping with bad health, enabling the employee to rest in order to recuperate more thoroughly than is possible when going to work. Those who do not take short-term sickness absence would comprise of a group of employees who are particularly prone to becoming ill at a later date because of a lack of resistance. According to our results, frequent absence is an indicator for future long-term absence, and not a method of prevention. On the other hand, it is possible that the incidence of long-term sickness absence in frequently absent employees would be even higher if they had not previously been frequently absent. More research is needed to investigate the underlying reasons for frequent episodes of sickness absence and their relationship with coping styles.

A clear sickness absence record is not always an indicator of good health. Hansen and Andersen found that sickness presence (going to work despite ill-health) was associated with sickness absence. The more frequent the sickness presence, the more likely the employee is to become sick-listed for more than 2 months (after adjustment for confounders such as baseline health status and previous long-term sickness absence). Apparently, the relationship between previous sickness...
absence, sickness presence and future absence is a complex one. Data on sickness presence is collected retrospectively from self-reports, and this may result in recall bias. Data on sickness absence is obtained from a registration system, which is more reliable and not subject to selection or recall bias. The relationship between sickness presence and future long-term absence may be confounded by the presence of a chronic disease. This may also be true for the relationship we found between frequent absence and future long-term absence. The most important mutual factor in sickness absence is still the way in which the employee perceives his/her own health.\textsuperscript{10-12} In our study we found differences in the duration of long-term sickness absence and disability risk according to diagnosis.

**Disability risk**
The results of our study show that 26\% of employees with long-term sickness absence at baseline reached the disability limit within 4 years, compared to 4\% in the reference population. We also found that the disability risk was 2.5 times higher for frequent absentees (11\%), compared to the reference population. Employees with a combination of frequent and long-term absence have the highest disability risk: approximately 30\%. We conclude that previous sickness absence increases the possibility of disability. Kivimäki et al. found that the rate of medically certified absences and the total number of days of absence are predictive of a future disability pension.\textsuperscript{13} Our results add that absence due to anxiety or depression is also a strong predictor of future disability, with disability rates of 12.4 and 12.9 per 100 work-years in men and 14.0 and 15.9 per 100 work-years in women, as compared to an overall disability rate of 7.0 in men and 10.0 in women. Malignant disease increases the disability rate in men, amounting to 21.2 per 100-work years, but not in women (12.5 per 100-work-years).

To our knowledge, the influence of frequent sickness absence on future disability has not yet been documented. De Winter reported that the absence percentage in recent years is an important predictor of disability within a healthy employee population, and that former sickness absence is also a predictor of future disability in employees who were listed sick due to back pain.\textsuperscript{14} Borg et al. reported that employees with back complaints who had more than 14 days of sick-leave per episode during the three years before inclusion had a higher disability risk than those with less than 7 days per episode.\textsuperscript{15}

**The Dynamic Work Disability Model**
We have described the transition from short-term to long-term sickness absence and from long-term absence to disability. We also found a relationship between frequent absence and subsequent work disability.
We estimated the duration of return to work from long-term sickness absence, and found that with increasing duration the probability of returning to work from long-term absence decreases. Our results can be used to quantify the Dynamic Work Disability Model introduced by Labriola, see page 25.

**Job termination**

Our results show that frequent and/or long-term sickness absentees have an increased risk of job termination. They are particularly at risk for involuntary job termination, for example the termination of temporary employment contracts or lay-offs. Virtanen et al. found job termination among employees with high rates of sickness absence to be 1.6 times higher than for those with low rates of sickness absence. Our results showed relative risks ranging from 1.2 to 2.1 in different age-groups for employees with former frequent and/or long-term episodes of sickness absence.

According to De Winter, voluntary job termination is associated with the frequency of sickness absence, but not with the percentage of absence. Our results confirm this finding: the risk of voluntary job termination is higher among frequent sickness absentees than among long-term absentees. Frequent sickness absence can serve as a signal for mismatches between employees and their job, which might explain the relatively high probability of job termination among frequent absentees.

Our results also suggest that sickness absence is related to a higher risk of expulsion from the labour market, which supports the literature. Given that mental disorders carry a high risk of disability and job termination, special attention should be paid to employees who are absent due to these disorders.

**Mental disorders**

We studied the relationship between mental disorders and work disability, work loss and the risk of recurrence, which is important from an economic perspective. Mental disorders and employment status may also mutually influence each other. Mental disorders contribute to disability in the work place and work loss, but mental disorders may also originate from, or be maintained by problems at work. Neuropsychological consequences of mental disorders may create additional stressors for occupational functioning, which may contribute to their recurrent and chronic nature.

The prevalence of common mental disorders varies across Europe. The highest prevalence among primary care patients was found in the UK and Spain, and the lowest in Slovenia and the Netherlands.
However, according to the NEMESIS study, the prevalence of mental disorders in the population of the Netherlands is nevertheless high. It was reported that 41.2% of adults had experienced a DSM-III-R disorder in their lifetime, and in 23.3% this was within the previous year.21 Anxiety disorders, alcohol-dependence and mood disorders were most common, with prevalence rates of respectively 12.4%, 8.2% and 7.6%, and a high degree of co-morbidity. After the baseline measurement of 2,646 adults of employment age in 1996, approximately 10.5% of the women and 4.6% of the men had an episode of depressive and/or anxiety disorder within a period of two years.22

We investigated the annual incidence of sickness absence due to common mental disorders (CMDs); on average this was 23.4 (95% confidence interval 23.1–23.7) per 1000 persons per year. This is not the same as the incidence of CMDs in the workforce. Employees with mild to moderate symptoms might stay at work instead of taking sick-leave, resulting in an under-estimation of the incidence of CMDs. On the other hand, absentees can be considered to be a group of workers with poor health, in whom the incidence of mental disorders might well be higher than in the total workforce.

Mental disorders have a negative impact on labour force participation, work performance, employment, wages and earnings.23,24 In an Australian population, fewer people with affective or anxiety disorders were employed, compared to healthy controls.25 Approximately 23% of the controls with no long-term health conditions or disabilities were out of the labour force or looking for work, as opposed to 50% of those with anxiety disorders and 58% of those with affective disorders. Within the working population, depression and simple phobia are the most common disorders, and associated more with ‘presenteeism’ than with ‘absenteeism’.26

Anxiety disorders among women appear to be associated with negative labour market outcomes, whereas for men there was less evidence of such a pattern. Anxiety disorders often have a chronic and recurrent course (Chapter 6) and are usually related to social anxiety, and therefore possibly also to less social participation. Mood disorders were associated with negative labor market outcomes in both men and women.23 However, due to the cross-sectional design in their study, no inferences about cause and effect can be made. Mood disorders may be compounded by negative experiences in the labour market.23

In our prospective longitudinal studies we analyzed the outcome after sickness absence due to mental disorders in the baseline year. Our results add that, for employees, mental disorders carry a high risk of disability and job termination. We found that men with mental disorders were more at risk of job termination and disability than men with musculoskeletal disorders. Although women had an overall higher risk
of disability and job termination than men, there was no difference between the risk of expulsion due to mental disorders and musculoskeletal disorders in women.

In our study we found that CMDs constituted one fifth of certified sickness absence episodes, and that they were responsible for a quarter of the work days lost in the period from 2001 to 2007. The percentage of sickness absence days due to CMDs was highest in the fields of public service and education (39%), followed by financial services (31%) and health care (30%). Most CMDs were stress-related, and their incidence increased until 2004, after which it decreased.

Furthermore, we found that CMDs often result in recurrent sickness absence. After a first absence due CMDs, 40% of employees have another episode of absence due to CMDs in a 6 year follow-up period, based on survival analysis results. Mental disorders are also associated with involuntary job termination and disability. The importance of mental disorders in the prediction of disability corresponds with the finding of other studies. The burden of mental disorders in the working population is high, not only because of the high prevalence of sick leave due to mental disorders, but also because of the high risk of recurrence.

The duration of sickness absence due to depression found in our study exceeds the estimation of the duration of depressive episodes in the general population in the Netherlands. Although methodological explanations may account for these contradictory results, it does imply that sickness absence due to depression is long-term.

**Risk groups**

We related risk of disability and recurrence to employee and work characteristics, in order to obtain risk profiles which may make it possible to target interventions at groups with the highest risk profiles.

Females, older employees and employees with a lower salary have a higher risk of sickness absence than males, younger employees and employees with a higher salary, respectively. After one year of frequent and/or long-term sickness absence these employees also show a higher relapse rate or an even more unfavourable outcome, i.e. disability after one year of long-term absence.

Females, older employees, unmarried employees, employees in an urban working environment, employees with a lower salary scale and employees with longer seniority have a higher risk of work disability. However, the probability of job termination or work disability also differs between sub-groups. For example, employees in higher salary scales have a higher probability of job termination than employees in lower salary scales. After long-term sickness absence, women more often reach the disability pension date than men. After a year
of frequent sickness absence, younger employees terminate their employment more often than older employees. This influences the risk of further sickness absence, whereas an employee who has terminated employment or is disabled cannot report sick (again). Therefore, we reported recurrence rates instead of cumulative incidences wherever possible.

**Gender**

We found a higher incidence of frequent and long-term sickness absence in women than in men. From our data it appeared that women were absent more often due to mental disorders than men. However, men and women have the same risk of recurrent sickness absence due to mental disorders. Compared with men, women have a higher risk of employment disability and a higher risk of involuntary job termination. The Dutch Social and Cultural Planning Office found that, compared to men, a higher proportion of working women are unfit for work. It is interesting to note that this gender difference seems to disappear after an initial episode of sickness absence due to CMDs. It is possible that this finding is the result of bias, because women had longer periods of sickness absence than men. In a recent meta-analysis, some studies found a longer delay in return to work after sickness absence due to mental disorders for women, other studies for men. Differences in the occurrence of mental disorders between men and women are explained by different theories, i.e. the double-burden theory, the spill-over or inference theory and the multiple role theory. 

Negative spill-over refers to the extent to which participation in one domain (e.g. work) negatively impacts participation in another domain (e.g. family). This mechanism is sometime referred to as work-family interference.

Men and women are exposed to different working conditions and do not react identically. With regard to gender differences at work, women have lower salaries, less promotion perspectives, higher levels of stress, and they are typically active in professions with high emotional demands (such as nursing and education). There are indications in the literature that employees who are exposed to high emotional demands are at risk of developing psychological disorders because they have to cope either with threats or aggression from clients, or they are obliged to keep their own emotions under control during the working day. Women more often work in emotionally demanding jobs, such as in health care, education and client services, which may explain the higher incidence of mental disorders among women. Moreover, women are more exposed to home and family
bureaucracy and therefore experience higher levels of work-related stress than men.39

Having double-care tasks is also an explanation, especially with regard to the rate of sickness absence. The number of working hours is associated with the frequency of sickness absence among nurses, and the nurses who worked full-time had the most short episodes of sickness absence over a 5-year period.40 Väänänen et al. recently investigated interactions between work and family among Finnish employees. Their data only partly supported the double-burden hypothesis, i.e. that women have the main responsibility for domestic work and children, and that this was found to increase the rates of sickness absence in female white-collar workers only. They found a more important role for negative spill-over between work and family,41 which was also found by Kinnunen at al.39

Gjesdal et al. found that men who were on sick leave due to mental health disorders had an increased disability risk, in comparison with other diagnostic categories.42 There was no significant difference between the main diagnostic groups in women. We replicated this finding. However, the disability risk in a 4-year follow-up period, after long-term sickness absence due to a mental disorder at baseline, was found to be higher in women (36%) than in men (28%) (see Chapter 3). We also found that the disability risk, once absent due to depression, is higher for women than for men (26% versus 22%) (see Chapter 5).

In Scandinavian countries, no differences or inverse gender differences in the risk of a disability pension were found.29 Our results are not in agreement with those of Virtanen et al., who found disability pension in the public sector to be more common among men than among women.17 This is possibly due to the fact that their study population consisted of employees in the public sector, with more emotional demands, whereas our study population consisted of employees in the Post and Telecommunications companies, whose jobs were more physically demanding.

Cultural differences between the Netherlands and Scandinavian countries may also account for this difference. The number of women employed in Scandinavia is higher than in the Netherlands.52,43 It is possible that the emancipation process there is in a further stage, with more women in senior positions and less employers who have negative attitudes towards combining part-time work with managerial positions.

The favourable arrangements for parental leave, childcare provision and childcare leave in Scandinavian countries may also impose less of a burden on women in combining work with caring for children.43 In contrast to Virtanen et al., we found no difference in overall job termination between men and women, whereas they found that women had a higher risk of job termination than men (RR = 1.25).17 They
studied employees in the public sector, and we studied employees in the private sector, which may account for this contradictory finding. It is possible that men employed in the public sector have better career perspectives than women, whereas this difference is less prominent in the private sector.

**Age**
We found an elevated risk of sickness absence and disability among older employees. Other researchers also found that a high rate of sickness absence was associated with a subsequent work disability pension among older employees.\(^{15,29,42}\)

The incidence of CMDs was highest in men aged 30–50 years and women aged 30–40 years. This corresponds with the fact that in population of the Netherlands the incidence of CMDs is higher in people aged 18 to 45 years than in those who are older.\(^{11,34,44,45}\)

According to King et al., men aged 30–50 and women aged 18–30 had the highest prevalence of major depression; men aged 40–60 had the highest prevalence of anxiety, and men and women aged 40–50 had the highest prevalence of panic syndrome.\(^{20}\) In several studies, including ours, a longer duration of sickness absence was found among older employees. Nieuwenhuijsen et al. reported a negative association with recovery from mental disorders in employees over 50 years of age.\(^{27}\)

Recurrence of sickness absence due to CMDs was more frequent in women under 35 years of age and in women between 35 and 44 years of age, compared to women over 55 years. No differences in RD between age groups in men was observed. However, after adjustment for confounders, men between 35 and 55 years of age had more recurrences than their counterparts over 55 years.

This might be due to differential loss to follow-up, because of early retirement or a disability pension for older employees, or the RD is biased by a longer duration of sickness absence due to CMDs or other causes in older employees. Young employees might be less well equipped to cope with stressful life events, compared to older employees.\(^{46}\) Another explanation might be that younger employees have a lower sick-leave threshold.\(^{47}\)

Young employees with frequent episodes of sickness absence terminate their employment more often than older employees, possibly because the labour market offers them more alternatives than is the case for older employees. It could be that when younger employees are frequently absent it serves as a signal for a mismatch between the employee and the job. Older employees are more at risk of involuntary job termination (e.g. discharged, termination of job contract) than young employees, but the risk of leaving employment involuntarily
after a year of frequent or long-term sickness absence was the same across all age-groups.

**Socio-economic status**

From our study it appeared that a low salary was associated with a higher risk of recurrent sickness absence. A lower socio-economic status is also known to be related to more sickness absence.\textsuperscript{44} A meta-analysis concluded that this socio-economic gradient also occurs in the case of CMDs, with a higher risk in the lowest socio-economic status groups compared to the highest groups.\textsuperscript{48} In our study, men and women with a lower salary had a higher risk of a recurrence of mental disorders than those with a high salary. The reasons why a relationship was found between the socio-economic gradient and a recurrence of sickness absence due to mental disorders merits further investigation.

Employees with a low salary scales (approximately €1700 gross monthly in 2000) had a high risk of disability. Unskilled workers are mainly employed for the sorting and delivery of mail, characterized by a high physical work load. A negative association between salary scale and disability was also found by Gjesdal et al.\textsuperscript{42} Krokstad et al. reported that a low level of education and socio-economic factors contributed more to the risk of disability pension among young employees than in employees over 50 years of age.\textsuperscript{49}

We found a non-linear relationship between salary scale and risk of job termination. Virtanen et al. also found that highest and lowest income categories had a higher risk of job termination than the middle income categories.\textsuperscript{17}

**Methodology**

In this section some strong and weak points of the various studies are summarized.

**Strong points**

**Sickness absence data**

A strong point of our studies is that we used a computerized sickness absence registration system, containing employer-reported sickness absence data, thereby restricting recall bias. The source of the data was two-fold. Every month the companies transferred full employee registers to our occupational health department. The sickness absence data was collected by means of an automatic upload from the company registers, and when an employee on sick-leave visited the occupational health department, an occupational physician made a medical diagnosis. These data sources were linked by means of a unique employee number. When an employee resigned from his or her job, there was no
further information about sickness absence, but we accounted for this with statistical methods. As we uploaded the information registered in the personnel department of the company, we obtained complete data on the employee and the work characteristics, and on the sickness absence. The dataset is very large, and it contains many years of observations in uniform coding. It is available for research purposes, and this keeps the costs low compared to the costs of prospective cohort studies.

**Longitudinal study**
A strength of our study is the longitudinal design, following large cohorts of employees from 1997 to 2007. Most sickness absence research is based on studies with a cross-sectional design. However, the connections that are found in cross-sectional studies do not make it possible to draw any conclusions on causal relationships. In interpreting correlational research, there is a tendency to determine sickness absence as a dependent variable. However, drawing conclusions based on such correlations is subject to restrictions. One of the prerequisites for causal interpretation is that the cause precedes the effect. In our study of the influence of a history of sickness absence on future sickness absence this condition was met. However, it is possible that the same mechanisms, i.e. health status, chronic disorders or work factors, underly (recurrent) sickness absence and act as a confounder.

**Medically certified diagnoses**
Another strength of the present study is the use of medically certified diagnoses instead of complaints reported by the employee, as in the Norwegian HUNT study. However, there was a change in the dataset with regard to the coding of the diagnose. This changed from the original ICD-9 coding to a system with main diagnostic groups in 1999, and since 2001 the diagnoses are coded in a classification system for occupational health departments (CAS-classification), which can be converted to ICD-10 codes.

**Methods**
The figures presented in our studies give a constructive description of the employees who are at risk of recurrent sickness absence. By censoring employees who resigned from their job or claimed disability pension after one year of absence, the rates presented are an accurate reflection of the true rates.

Most studies on sickness absence do not pay attention to partial work resumption. However, graded return to work may be an indicator of the success of an intervention stimulating return to work, and may improve labour market attachment. Partial return to work often
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precedes full return to work, but it can also operate as a long-term solution for remaining occupationally active. In our study of the duration of sickness absence due to depression, the mean number of days of sickness absence decreased by 22%, due to partial work resumption. More research into graded return to work is recommended.

Weak points

Generalizability

The results of our studies of the Post and Telecommunications companies cannot be generalized to the entire private sector in the Netherlands, because it has been reported that there are differences between companies in sickness absence policies and cultures. The mean age of the employees in the Post and Telecommunications companies (40 years) was higher than the mean age of the general workforce in the Netherlands (36 years), which may have contributed to the relatively high disability rate (6.7%), although this high disability rate corresponds with the national statistics. In the study period, the 12-month incidence of disability pension in the Netherlands was approximately 1.3%–1.4% of the working population under 55 years of age. Moreover, in the companies we studied, several reorganizations and staff reductions took place, and at that time it was quite common in the Netherlands to grant sick employees a disability benefit rather than an unemployment benefit. The percentage of male employees (70%) in our study was higher than the percentage in the total working population in the Netherlands during the same period (62%). There are, however, a considerable number of employees working in the transport and communications sectors who carry out various types of work (heavy physical labour, back-office, technique, sales, IT, and executive functions) in a nationwide spread of establishments, which heightens the generalizability of results.

Comparison with other studies

General population studies and occupational health registration studies can yield different results because of differences in the study population, i.e. the general population versus the working population. Due to the “healthy worker” effect, there may be relatively more healthy individuals in the working population than in the general population. Thus, population differences restrict the comparison of our results with the results of studies in the general population. Unless stated otherwise, we analyzed composite absences (in which absences succeeding each other with an interval of less than 28 days are summed), in accordance with the definition of work disability in the Netherlands. This was not the case in most other sickness absence
studies, so this can restrict the comparability of our results with the results of other studies.

Legislation
Another limitation concerns the changes in sickness absence policies in the Netherlands during the study period. In 2002, medical certification of sickness absence was emphasized, and both the employers and the employees were made more responsible for systematic return to work. These changes have reduced the levels and duration of sickness absence considerably. Disability pension policies have also changed. Before 2004, employers continued to pay employees who were on sick-leave for one year, after which a disability pension was granted. Since 2004, employers must pay sick-listed workers for a period of two years, during which our occupational health service monitors the absence data. The combination of absence data for one year with data for a maximum of two years will have resulted in underestimation of absence durations. Differences in social policies also limit the generalization of our results across countries. Sickness absence and return to work are dependent on sick-leave benefits, social security systems and other socio-cultural factors, and although the results of our study are well in agreement with those of studies in other countries, they must be considered valid only for the workforce in the Netherlands.

Validity of psychiatric diagnoses
The validity of psychiatric diagnoses is still under discussion. Sickness absence certification by occupational physicians was either based on the clinical diagnosis made by the treating physician (general practitioner or psychiatrist) or ascertained according to the occupational health guidelines. The overall agreement between occupational physicians and physicians with regard to mental health diagnoses suggests that the diagnoses made by occupational physicians are valid for epidemiological purposes. However, the within-group reliability of the diagnosis of “stress” is low. Given differences in opinions with regard to about work-relatedness, further research is needed to investigate this aspect of diagnosis.

Co-morbidity and changes in diagnosis
We had no knowledge about co-morbidity or whether or not the diagnoses changed over time. These are common shortcomings in such studies, especially with regard to mental illnesses. These shortcomings play a role, especially in Chapter 3, in which disability and job termination are studied separately, according to diagnosis and in Chapters 6 and 7 concerning the recurrence risk of sickness absence due to common mental disorders, since it is possible that other diagnoses
apart from the registered diagnosis play a role. For instance, people with depression often have high rates of non-specific physical disorders, and employees with depressive or anxiety disorders usually have somatoform complaints. Therefore, either the occupational physician might not have recognized all cases of CMDs or might not have registered them as such because our registration system does not allow co-morbidity, and this could have resulted in an under-estimation of the risk of recurrence. On the other hand, occupational physicians might be more aware of specific mental symptoms in cases of recurrent sickness absence, compared to an initial episode of sickness absence, and this would result in an over-estimation of the risk of recurrence.

**Technical restrictions**

It is a complex matter to monitor sickness absence and disability in a cohort over a period of more than 10 years, due to changes in legislation, employees leaving their job and companies leaving our occupational health service. However, we accounted for loss to follow up by right censoring the risk period. We may have under-estimated the incidence and recurrence of sickness absence due to CMDs. In Chapters 6 and 7 we included episodes of sickness absence in the risk period, and therefore we under-estimated the true risk of incidence and recurrence. It was, however, technically difficult to omit absence episodes from the risk period. The fact that we nevertheless found high risks of recurrence gives extra emphasis to the seriousness of the problem of recurrent sickness absence due to CMDs.

**Lack of information on important confounders**

We adjusted for a broad set of confounders and mediators; age, gender, duration of employment, salary scale, and rural versus urban employment. It is, however, likely that other factors such as health, work factors, family circumstances and subjective factors confound the relationships that were found. Work factors are significantly related to (long-term) sickness absence and return to work. When, for example, work-related factors cause sickness absence, in a longitudinal analysis the intermediate variable absence will predict this more accurately than the underlying causes. Whether or not work factors also interact with recurrent sickness absence should be investigated in more detail.

We had no information on health or chronic illness. Health or chronic illness is likely to determine the risk of sickness absence. Eriksen et al. reported that health complaints were associated with a higher risk of sickness absence. Andrea et al. reported that the presence of at least one long-term disease is one of the strongest predictors of long-term sickness absence.
Physical workload may also cause high levels of sickness absence.\textsuperscript{44,64,67,69} In a similar study population to ours in Sweden, clear associations with sickness absence were observed for health problems, complaints attributed to heavy and arduous work, heavy lifting and monotonous movements.\textsuperscript{65,70} This is supported by our finding that having to cope with a high physical workload, (e.g. sorting and delivering post, call centre work characterized by repetitive strain) is related to more frequent and long-term sickness absence.

We did not investigate the subjective component of sickness absence, although for example, personality traits, and particularly negative affectivity, act as predisposing factors for health and illness behaviour, and thus affect sickness absence.\textsuperscript{71,72} Such dispositions are not likely to change over time, and this could also explain why sickness absence remains constant over time. Further research on these and other factors is needed to identify mechanisms that explain recurrent sickness absence.

Apart from marital status we had no information about family circumstances, such as number of children, family stressors, life-events, etc.

\textit{One year of sickness absence as proxy for work disability}

We used one year of sickness absence as a proxy for disability. We agree that it is interesting to know how many employees end up with permanent work disability. The social security agency in the Netherlands (UWV) determines whether and to what extent the employee is entitled to a disability pension. However, there is a strong division between the occupational health department and the social security agency; privacy regulations and technical problems make it impossible to link the files. Therefore, we had no information about permanent work disability pensions in our study population. We recommend this as a topic for future research.

On the other hand, our research is important for employers who want to assess the risks of future sickness absence. They, too, have no information about the health and subjective aspects of their employees. However, they do have information about their sickness absence behaviour. Our study provides insight that can be used to develop policies based on former sickness absence behaviour.

\textit{Implications of this study for occupational health care}

The results of our studies bear some important implications for occupational health care. In policies targeting work disability, it is not only advisable to monitor sick-listed employees who are absent for longer periods of time, but also frequently sick-listed employees. It is recommended to identify these employees at an early stage, in order to limit disability as much as possible. The identification of employees who
are at risk for sickness absence is also important for the development of targeted interventions.\textsuperscript{73-75}

Organizations have much to gain from the reduction of sickness absence through interventions aimed at either frequent or long-term sickness absence. However, stigmatisation of these employees should be prevented. In our studies, one third of these employees had no further frequent or long-term sickness absence, whereas approximately one third of the reference group, who had no such sickness absence at baseline, were frequently absent or for longer periods of time during the four years of follow-up. It is important to determine in what way the group of employees with no risk of frequent or long-term sickness absence differs from the group of employees with a high risk of sickness absence.

More studies within the sub-groups who are at risk may reveal the specific reasons for the sickness absence. Women have more long-term and frequent sickness absences than men, and have a greater risk of disability and involuntary job termination. The incidence of sickness absence due to CMDs was higher in women than in men, and in particular in women between 20 and 40 years of age. Practical implications for the employer are: in the case of complaints enquire about the cause and make concrete arrangements to address the causes and to involve the occupational health service earlier if no structural solutions can be found. It is also recommended to discuss in more detail frequent sickness absence and a history of sickness absence for more than six weeks, and adequate regulations and career potentials should be offered as a ‘buffer’ against stress. Health care providers should offer lower threshold evidence-based care for psychological complaints. The occupational physician can take the following measures: an earlier consultation for sickness absence, more attention to prevent recurrence, reinforce boundaries for work/personal interference and stimulate the employee’s awareness and control over stress factors. In addition to the health status (e.g. chronic disorder or paroxysmal disease), occupational physicians should inquire about the double burden of work and family care as well as negative work-family spill-over when women are absent due to CMDs, or have repeated short episodes of sickness absence over the years.\textsuperscript{37}

Older employees are more at risk for long-term sickness absence, many older employees also become disabled after a year of frequent and/or long-term sickness absence. Considering the fact that the working population is growing older, it is important to intensify age-awareness in personnel policies in order to prevent drop-out. This should start at a young age, so that people continue to “grow” in their career (personal growth and development) and stream through into functions that are appropriate for their ability.
Simple prediction rules for the onset and duration of sickness absence due to mental disorders would be useful for occupational health care. Kuijpers et al. developed a prediction rule for sickness absence due to shoulder pain.76 Prediction models could also play a role in the management of employees with sickness absence due mental disorders, on the one hand to predict whether or not they will have a long sickness absence or, on the other hand, to predict the risk of recurrence. Nieuwenhuijsen et al. reported a negative association between recovery from mental disorders in employees over 50 years of age, a higher level of education, a diagnosis of depression or anxiety, and the prognosis of the employee (expected to be absent for more than 3 months).27 Our results add that the rate of return to work decreases monotonically with the duration of the sickness absence. This duration-dependence could also be incorporated into the prediction model. Nieuwenhuijsen et al. found no relationship with level of depressive symptoms, pre-baseline days of absence, gender, marital status, work-relatedness of the disorder, support at work or job demands.27 We found that women have a longer duration of sickness absence due to depression, and we found a longer duration among employees in educational and public services and in companies with less than 75 employees.

A model taking into account the above-mentioned predictors could be constructed and tested relatively easily. A specific rule to predict the risk of recurrence of mental disorders should be the focus of further research, and the results we have presented can be used as a starting point. The incidence of sickness absence due to CMD’s was higher in women than in men, but the risks of recurrence were similar. In both groups, employees under 55 years of age had more recurrences than older employees, and especially women under 45 years of age have a particularly high risk of recurrence. Men and women with a lower salary and married women also had a relatively high risk of recurrence.

Employees with a lower salary have a higher risk of recurrent sickness absence, disability pension and job termination. The course of depressive symptoms in employees with long-term sickness absence is also less favourable among those with a lower level of education and those who are the sole breadwinner.77 Partial or full-time return to work and a change the employee’s task indicated a more favourable course of depressive symptoms.77 More attention should be paid to the vocational rehabilitation of people in low-grade jobs, i.e. by offering them annual discussions with their supervisors.

The results of our study show that employees who have returned to work after having coped with a mental disorder remain at risk for recurrent sickness absence. In view of the median time to recurrence,
early identification of the risk groups is important. In accordance
with the Dutch guideline, we advise extra consultations, to prevent
a relapse, 3 months after return to work. In would be interesting to
investigate the input that the employer can provide with regard to the
work situation and, to a certain extent, also with regard to the employ-
ee’s functioning.
Men as well as women of all ages should be monitored after they return
to work, because we found no gender or age-specific risk-groups for
the recurrence of sickness absence due to CMDs. On the basis of
our results we recommend that monitoring should be continued for
approximately 3 years, which is the period during which a recurrence
usually takes place. Consultations should provide extra time for treat-
ment (e.g. cognitive behavioral treatment) and preventive actions (e.g.
reduction of stressors at the workplace or in private life) or, when
appropriate, preventive referral to a physiotherapist or a psychologist.
Van der Klink et al. found that it is possible to influence the recurrence
of sickness absence and thus also the process of the approach from the
Gatekeeper Improvement Act (WVP). The results of our study add to
the NVAB guidelines.
We can argue that it is important to develop and apply interventions
to identify and treat (sub-threshold) mental disorders in order to pre-
vent or reduce long-term sickness absence. Initiatives for research on
interventions for mental disorders in the workforce have been taken by
Vlasveld et al, Van Oostrom and Nieuwenhuijsen, but though such
interventions have been associated with reduced symptoms of depres-
sion and increased labour output, the labour benefits were small.

Prospects
1. Sickness absence records are registered routinely by employers,
and have the advantage – as opposed to questionnaires – that they
are complete. However, essential information is also often lacking
or not systematically registered, for example, branch, function,
extension and duration of employment. With relatively low costs
and effort registration systems can be used to identify risk groups
and to develop targeted occupational health interventions. However,
in order to improve our understanding of the phenomenon of
recurrent sickness absence, we need to unravel the mechanisms
underlying recurrence. The way in which to investigate this would
be to develop questionnaires and to interview employees who
are on sick-leave or have returned to work (qualitative research)
to investigate underlying motives, support form the environment,
perceived barriers, etc.
2. Sickness absence records can be used to identify employees who
have an increased risk of recurrent sickness absence, because those
with a history of a high rate of sickness absence are likely to be prone to recurrent sickness absence. The results of randomised controlled trials aimed at reducing the rates of sickness absence have shown that interventions applied to the entire workforce are not effective, whereas interventions can reduce the number of days of sickness absence among high risk employees.74,75,84

3. It would be interesting to develop a screening strategy for distress, mild depressive and anxiety symptoms, or deficits in work performance to detect mental problems early in a sub-clinical stage and to intervene before they develop into full-blown disorders that might result in sickness absence.24 We recommend more longitudinal studies on sickness absence due to mental disorders, focusing on recurrences and multiple episodes of sickness absence as well as long-term sickness absence.

4. It is important to produce and validate prediction models in order to estimate the duration of sickness absence in combination with common mental disorders, and to decide whether or not interventions are needed. There is need for simple prediction rules, because the population at risk is too large to make it possible to treat everybody in a cost-effective way. There is also the risk of ‘medicalising’ and ‘psychologising’. These prediction models could provide an answer to the question of who should be treated. From our study it appears that gender, age, socio-economic status and a history of sickness absence are important predictors of (recurrent) sickness absence.

5. Specific intervention studies are also needed. It would be interesting to investigate how to treat employees while they are at work under the motto ‘place and then train’ in stead of ‘train and then place’, with the goal to increase practical coping abilities as much as possible. Schene et al. found that additional occupational therapy did not accelerate the outcome of depression, but it did improve productivity without increasing work stress, and it was superior to treatment as usual in terms of cost-effectiveness.19 Sick-listed employees who received occupational therapy in addition to care as usual returned to work approximately 3 months earlier than the care as usual group.19 Segal et al. developed Mindfulness-Based Cognitive Therapy, a method to prevent recurring depression.85 It would be interesting to find out whether this programme can be applied in the occupational health setting, and whether they really do influence the risk of recurrent absence due to depression. The aim of our study was to assess baseline relapse rates, and future studies can shed a light on the effectiveness of interventions.
References


