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Epidemiology of sickness absence in a Swedish county in 1985, 1986 and 1987

A Three Year Longitudinal Study with Focus on Gender, Age and Occupation

Kristina Alexanderson, Margareta Leijon, Ingemar Åkerlind, Hillevi Rydh, Per Bjurulf

Department of Community Medicine, University Hospital, S-581 85 Linköping, Sweden

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In order to get a better epidemiological base for preventive intervention in the county of Östergötland, Sweden, a comprehensive study of sickness absence was done. During the years 1985, 1986 and 1987, all new periods of sick-leave exceeding seven days were registered with demographic variables. This information was related to data about the total population of Östergötland.

Each year approx. 45,000 persons had approx. 61,000 sickness spells. These figures were stable over the years while the number of sick-leave days increased. Blue-collar occupations had the highest sick-leave rates and the female sick-leave rate was higher in general and much higher in most male-dominated occupations. The male rate was lower within female-dominated areas, except among secretaries and textile workers.

Females in extremely male-dominated groups had the highest rates, while both male and female sick-leave rates were lower in more gender-integrated occupations.

Key words: Sickness absence, sick-leave, sick-leave rate, epidemiology, sickness certification, gender, men, women, occupational groups.

INTRODUCTION

From a public health perspective, it is essential to examine causes of sickness absence and morbidity more closely in order to reach a better epidemiological basis for preventive intervention (1, 2). Sickness absence, which can be regarded as one health-indicator, is a complex problem, related to human suffering, loss of welfare and national economic consequences (e.g. costs of sickness insurance and loss of production). In Sweden sickness benefit costs were 18,000 million SEK (2.1% of the GNP) in 1985. In 1989 that sum had risen to 34,000 million SEK (2.8% of the GNP). The total insurance cost for long sick-leaves, occupational injury and disability pension in 1991 amounted to about 50,000 million SEK/year. Considering the proportions of this problem and that sickness absence has been the subject of extensive empirical and theoretical research (3), it seems remarkable that no total long-range study, to our knowledge, has been done before, in Sweden or elsewhere. Most studies are done on small materials, on random samples, in specific occupational groups or companies and/or over short periods of time (4–7).

This paper is part of a comprehensive study of how sickness absence is related to different demographic variables in a Swedish county. It is based on a total investigation with a time-series design lasting over three consecutive years.

The aim here is to give a broad presentation of how sickness absence relates to sex, age and occupation; the occupational groups that are at high or low risk of sickness absence; and major changes that took place over the three years.

MATERIAL AND METHODS

This is a prospective incidence study based on the total number of sickness spells with a duration of more than seven days, during the years 1985, 1986 and 1987, in the county of Östergötland (from here on referred to as Östergötland).

Östergötland, located in the south-east of Sweden, has 13 municipalities, some urban, some more rural. In 1985 there were 392,887 inhabitants; 5% of Sweden's total population (8). Östergötland is an expanding, highly industrialised area, and can be considered representative of at least southern Sweden where 85% of our population lives.

Nearly all Swedish residents between 16 and 65 are covered by a national sickness insurance. Between 1985 and 1987 sickness benefit was at least 90% of lost income. Sickness absence covers work incapacity due to disease,

Table I. *Standardized sick-leave rate and absence days in different occupational groups in the county of Östergötland, 1985[a] and difference in days, 1987–1985*

Occupational area	No. employed 1)	% ♀ 2)	Sick-leave rate; standardized 3,4,5)				Absence days 6)			Difference in days 1987–85 7)
			All	Women	Men	Ratio ♀/♂	Median	Mean	± SD	
All employed	184549	46	0.23	0.27	0.20	1.35	23	56	91	8
Metal industry	16085	9	0.51	0.73	0.31	2.35	23	58	93	8
Textile industry	1216	71	0.47	0.41	0.52	0.79	28	66	95	20
Saw mills/carpenters	1661	9	0.46	0.38	0.53	0.72	25	60	96	3
Paper/pulp industry	1482	16	0.44	0.51	0.38	1.34	24	72	117	−1
Food industry	1704	31	0.41	0.56	0.29	1.93	25	59	93	11
Chemical proc. work	2067	31	0.38	0.45	0.32	1.41	27	68	106	19
Various	1638	21	0.34	0.42	0.27	1.56	25	61	96	4
Painting	1803	3	0.32	0.37	0.27	1.37	23	61	97	6
Social work	12165	92	0.28	0.34	0.23	1.48	23	50	81	12
Hotel/restaurant	5840	84	0.27	0.30	0.25	1.20	25	58	91	8
Trans./communic.	5698	7	0.25	0.32	0.20	1.60	22	57	97	4
Crane/excavator	2339	6	0.25	0.28	0.22	1.27	27	69	110	3
Storemen	4117	32	0.25	0.25	0.24	1.04	22	59	97	16
Cleaning	8042	67	0.25	0.33	0.18	1.83	30	73	109	5
Secretarial/clerical	10769	93	0.24	0.23	0.26	0.88	20	48	79	9
Electrical work	7605	34	0.24	0.30	0.19	1.58	23	61	100	12
Printing, graphics	1897	33	0.24	0.29	0.20	1.45	25	59	91	14
Post, etc	3838	58	0.23	0.18	0.26	0.69	24	56	87	10
Firemen/police	2004	9	0.23	0.28	0.18	1.56	22	49	77	−1
Hairdresser/laundry	1391	81	0.23	0.28	0.18	1.56	23	56	94	23
Health worker	16197	86	0.21	0.27	0.15	1.80	23	51	83	9
Farming/forestry	9249	18	0.20	0.22	0.19	1.16	26	63	92	−2
Construction	4916	<1	0.20	0.18	0.21	0.86	24	64	104	0
Engineer/technician	14963	12	0.17	0.23	0.11	2.09	20	46	78	12
Salesmen	12762	53	0.17	0.25	0.11	2.27	21	54	90	12
Adv./purchasing	1746	25	0.15	0.18	0.12	1.50	20	50	86	2
Clergym./legal prof.	3336	45	0.14	0.16	0.12	1.33	21	50	82	3
Bank/insurance	7510	45	0.14	0.18	0.11	1.63	18	45	79	7
Teacher	12235	66	0.13	0.18	0.09	2.00	18	37	57	8
Military work	1032	2	0.11	0.18	0.04	4.50	42	69	87	−11
Administration	7242	48	0.09	0.11	0.08	1.38	21	44	69	5

[a] Regarding sick-leave spells exceeding 7 days.
1) According to ref. nr. 12.
2) Percentage of women within the occupational group, according to ref. nr. 12.
3) Standardized according to sex and age, direct standardization.
4) Rate = $\frac{\text{No. of persons, within a group, with at least one sickness spell in 1985}}{\text{No. of persons employed within the group}}$
5) Ratio = female sick-leave rate/male sick-leave rate.
6) No. of sickness absence days/person sick-listed in 1985; median, mean and standard deviations.
7) Calculated on mean values.

injury or illness, not confinement, maternity or parental leave (9). Groups like housewives, persons on e.g. parental leave and most unemployed are likewise covered. Self-certification is accepted for the first seven days of a spell. There is no maximum duration of a sick-leave spell in Sweden. Self-employed persons, who can have a 1, 3, or 30 day qualifying period and pay insurance accordingly, are regarded as employees for the purpose of the study.

Staff at the 23 local National Insurance Offices were specially trained for this project. For each new sickness spell sex, age, occupation (10), diagnosis (11) were registered and linked to other registers for information of number of children at home, civil status, postcode, income, nationality, date of start and end of the spell and number of lost days/person, as well as spells during the three preceding years. Each spell was followed till its end or, at the longest, till September 1st the following year. In order to relate these results to the population at risk, relevant cen-

Table II. *Sick-leave rate[a] and sex ratio[b] in gender-differentiated groups*

	% of women	Sick-leave rate			
		All	Women	Men	Ratio ♀/♂
Extremely male-dominated jobs	0–10	0.29	0.56	0.26	2.15
Male-dominated jobs	0–40	0.24	0.34	0.22	1.55
Gender-integrated jobs	40–60	0.16	0.19	0.12	1.58
Female-dominated jobs	60–100	0.26	0.28	0.17	1.65
Extremely female-dominated jobs	90–100	0.29	0.29	0.24	1.21

[a] $\text{Rate} = \frac{\text{No. of persons, within a group, with at least one sickness spell exceeding 7 days, in 1985}}{\text{No. of persons within the group}}$

[b] Ratio = female sick-leave rate/male sick-leave rate.

sus data from the Swedish Official Population and Residence Investigation 1985 (12) have been used.

Occupations were coded according to Nordic Occupational Classification, NOC (10), on a 2-digit level, in this study assembled into 31 groups.

We have used a register of completed spells, kept by the National Insurance office, in order to estimate the drop-out size, and then got the figures 14.8% in 1985, 11.8% in 1986 resp. 15.1% in 1987. As this study is based on number of new spells, these two incidence measurements are not quite comparable, especially not in the higher ages, where spells tend to be longer. However differences regarding age are so small that they can be considered without importance for the interpretation of the figures. The drop-out consisted of two parts; spells not included at all due to slips of individual staff and spells where there were no hits in the matching with other registers. Due to the way the first part came up there should be no systematic errors regarding sex, age, diagnoses, occupation or length of spell. In 1987 one of the local offices missed to send in approx. 150 spells in due time. The second part of the drop out is the smallest, about 0.5% each year, and mainly due to the fact that date of start of the spells did not correspond in the different registers (13).

The term sick-leave rate here refers to the rate of employees; within each occupational group, having had one or more sick-leave spells exceeding seven days during a year. Rates of occupational groups were age- and sex-adjusted through direct standardisation.

As high risk groups for sickness absence we have defined those with rates above 0.34; as low risk, those with rates below 0.17. The data are analysed with the Statistical Package for Social Sciences (SPSS). χ^2 test has been used for the difference between observed and expected rates and *t*-test for mean differences.

RESULTS

Of the 184,729 employees in Östergötland in 1985, 42,254 persons had 57,750 sickness spells, so most individuals had only one spell/year. The registration also included approx. 2,400 additional individuals; students, housewives or unemployed seeking work; here not included in the group "employees".

There were large variations in sick-leave rates between different occupational groups (Table I). High-risk groups are found in the top sequence of the table, low-risk groups at the bottom. High-risk groups were more of blue-collar type, such as woodwork and metal work. The low-risk-groups were found in occupations demanding higher education, such as teachers and engineers.

The sick-leave rate of female employees averaged 0.27; of male employees 0.20 ($p < 0.0001$).

In most occupational areas more women had sickness absences than men, in all age-groups. When looking at the ratio between male and female sick-leave rate, we found some exceptions, mainly in the female-dominated areas secretarial work and textile industry, where the men more often were sick-listed ($p = 0.06$ resp. $p < 0.01$). The more gender-integrated post/tele also had a higher male rate ($p < 0.0001$), as had the male-dominated area woodwork, e.g. timber and sawmill industry ($p < 0.001$), where a larger proportion of the 1,504 men had sick-leave spells than the women (only 157). We found the same ratio for construction, but this was not significant. For storemen the male and female rates were almost equal ($p = 0.4$). The ratio between female and male rates was high in occupations like metal work, engineer, salesmen, teaching and military work.

When grouping the occupations according to their degree of gender-integration, the pattern becomes more evident (Table II). The five gender-integrated groups with an equal number (40–60%) of male and female employees all had low sick-leave rates and together had a rate of 0.16, which is significantly

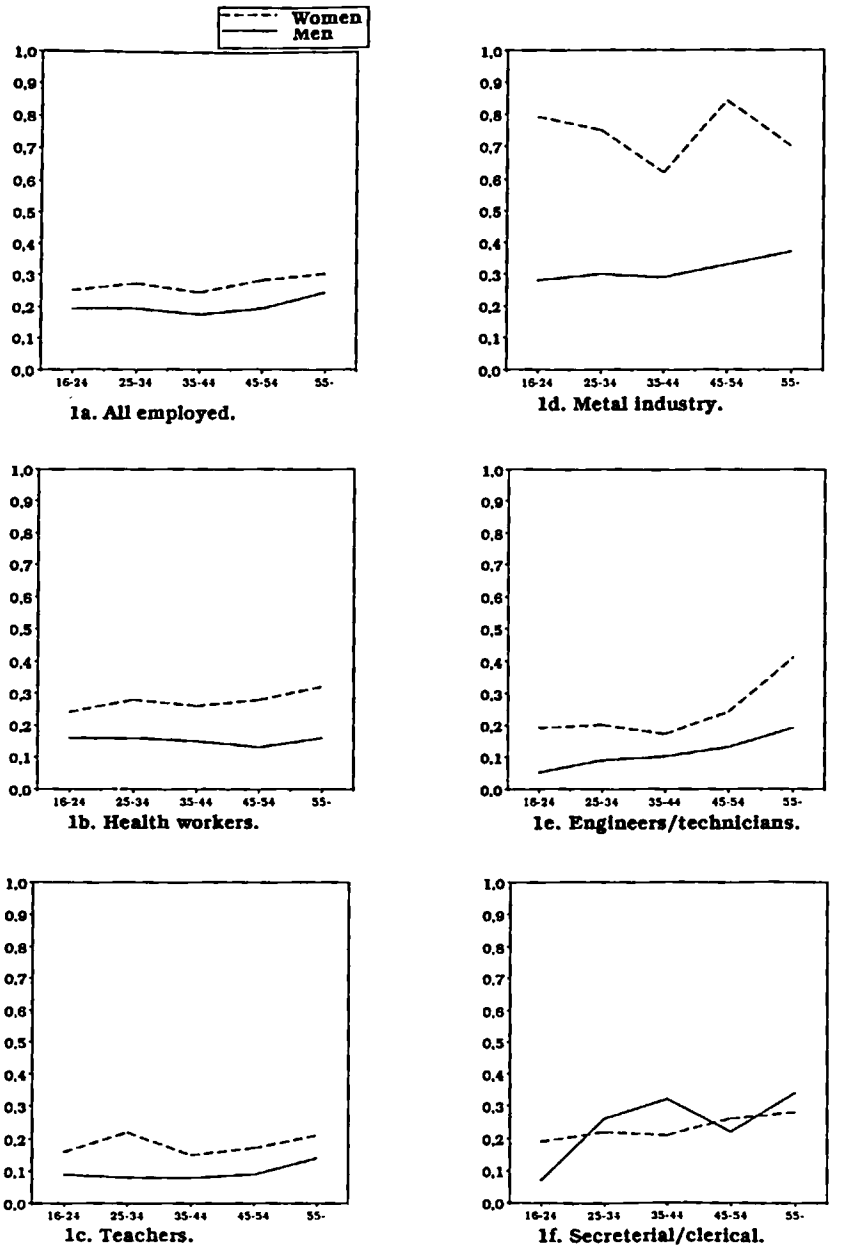

Fig. 1. Variation of sick-leave rate [a,b] with age for men and women within different occupational groups in the county of Östergötland 1985.

[a] For sick-leave spells exceeding 7 days.

[b] Rate = (No. of persons within an occupation, with at least one spell 1985) / (No. of persons employed within that occupation)

lower than for the gender-segregated groups' 0.25 ($p < 0.0001$). Sick-leave rate was somewhat higher in female- (0.26) than in male dominated (0.24) areas ($p < 0.0001$). For women, male-dominated groups were high-risk (0.34). Within extremely male-dominated areas (>90% men), the female rate was 0.56 and the ratio between male and female rate was high, 2.15. The equivalent ratio for extremely female-dominated areas was only 1.21. Both male and female rates were lower in female than in male-dominated areas ($p < 0.0001$). The one exception here is that there is no significant difference between male rates in the extremely male-segregated and the extremely female-segregated group.

Absence days. Table I shows how the average number of sick-leave days/person sick-listed during a year varied between occupational areas. Those in

high-risk groups were absent longer, while those in low-risk groups were absent for shorter periods ($p < 0.0001$), with some exceptions. For instance, the few sick-listed in military work tended to be absent for long periods, while absent teachers were back to work nearly twice as fast ($p < 0.05$). Although the female rate is high among military personnel, the women are absent for short periods, with a mean of 25 absence days compared to 73 for the men ($p = 0{,}01$).

The median figures are all considerably lower than the mean as only few of the sick-listed were absent for very long periods.

Sick-leave rate of different occupations related to sex and age. Looking further at the separate figures classified according to sex and age, within the different occupational groups, a number of specific high and low risk-groups emerge.

Fig. 1 (a–f) shows how sick-leave rate varied with sex and age for the whole employed population and in particular, in some groups. We have selected the largest occupations in the high and low risk group, the two largest in the middle section and the largest group with a higher male sick-leave rate. The rate here is calculated on the number of employees in each age-interval within each occupation (14).

The group *health workers* (Fig. 1b) is the largest occupational group in Östergötland and represents 8.8% of the employed population. It is highly female-dominated and nearly half of the men are medical doctors. The female sick-leave rate rose with age while the male was fairly even in all age-groups. The male rate rose with age during the period.

The extremely male-dominated *metal industry* (Fig. 1d) is the second largest occupational group, representing 8.7% of the employed population. The difference between the younger and the elderly decreased over the three-year period.

The female rate was extremely high, and rose from 0.73 to 0.86 over the period. The increase was especially high in the two youngest age-groups. This is the highest risk group in our whole material. Between 70 and 90% of women employed in metal industry had at least one sickness spell exceeding seven days each year, with an average of 70 sick-leave days/year.

The group *engineers and technicians* (Fig. 1e) is the third largest, 8.1%. Of these, 87.6% are men, leaving 1,858 women. The male age-adjusted sick-leave rate was 0.11, the female 0.23 ($p < 0.0001$). Notable is the high frequency among the oldest women, which decreased over the years.

The *teachers* (Fig. 1c) amount to 6.6% of the employed, most are women. The male sick-leave rate was 0.09, the female 0.18 ($p < 0.0001$); these rates did not change much over the period, and the group was well below the average.

The extremely female-dominated group *secretarial and clerical* (Fig. 1f) amount to 5.8% of the employed. This is one of the few groups with a higher male rate ($p = 0.06$, in the ages 25–44 $p < 0.001$).

Changes over the three years. The total number of sickness spells, and of persons with at least one sick-leave spell, exceeding seven days, each year, were fairly identical, not only over the period as a whole, but also within each occupational group. The sick-leave rate of the total employed population of Östergötland was stable at 0.23 for each of the three years. The difference between the three years was less than 0.03 in all occupations except textile industry and in the group "various", where the rate decreased by 0.08 and 0.04, respectively.

Simultaneously, the average number of sick-leave days/persons sick-listed in a year increased in nearly all groups, (Table I) ($p < 0.01$), mostly within hairdressing/laundry ($p < 0.01$), textile ($p < 0.01$) and chemical process work ($p < 0.01$). The figures for 1986 are well in line with this trend. Military work was again an exception, with a considerable decrease (NS).

DISCUSSION

This study shows large differences in sick-leave rate between gender, different age-groups and occupational groups. There is a mixture of expected and more surprising results. Unexpected results are the sick-leave rates of some occupations and also the stable number of sick-leave spells and individuals with sickness absence over the years. Studying sickness absence in relation to gender-integrated/segregated types of jobs brings additional knowledge to this research area.

The Swedish figures for sickness spells and number of sickness absence days/persons sick-listed in a year are very high, in an international perspective, which might seem peculiar in a country with one of the highest living standards in the world. This hardly means that Swedes are more ill. Rather, one can

conclude that a nation's level of sickness absence varies with different national traits, such as attitudes and the structure of the social security system (15, 16).

It is important to bear in mind that sick-leave is a complex phenomenon, not synonymous with morbidity in a society.

As expected we found large differences in sickness absence between blue collar and white collar workers (17, 18).

One exception to this is the large group engaged in farming and forestry. In the northern and southern wooded parts of Östergötland there are numerous small farms, often with equal parts of farming and forestry. The work is strenuous and quite dangerous. In spite of this, the group had a low sick-leave rate compared with similarly physically demanding occupations. On the other hand the sick-listed farmers often were absent for long periods. Probably both the special work circumstances, e.g. as self-employed, and sickness insurance forms this group has, influence the rate. The ongoing research done on lifeforms (the meaning work has to a person, e.g. as both work and hobby) (19) may enlighten these results.

During recent years the teacher's work situation has been intensively debated in the Swedish press. Teachers have strongly maintained that their work is physically and psychologically very burdensome (20). The low sick-leave rate and low number of absence days of teachers found in our study is in this context notable.

The analyses within the different groups were performed on a 2-digit-level according to NOC. However, in NOC, as in other codes of occupation, "male" occupations often are coded on a more detailed level than "female" ones, within the same digit-level. This is a problem when investigating gender differences in the employed population. In future studies we will analyse some of the larger occupational groups on a NOC 3-digit-level, e.g. the very heterogeneous groups health work and social work.

Sick-leave rate in relation to gender, age and occupation. The higher sick-leave rate for women in the present study is in agreement with other national and international studies (15–18, 21–23). This could be related to the fact that women, within the same work-area, generally have more repetitive and less stimulating tasks than men (24, 25).

Within the group engineers and technicians the majority of the women have a subordinated position, while the majority of the men are found on a high or middle level. Also the women are mainly found within some limited sections (26), which could explain the high female/male ratio.

Of course, the extremely high female rate in the metal industry has to be further investigated.

Noteworthy is the considerably higher female sick-leave rate in most male-dominated areas. We do not have any explanation for the exception here – the relatively low female sick-leave rate within sawmill industry – but will study how this coincides with diagnoses.

Another notable exception is that men within some female-dominated, and traditionally female, occupations were more often sick-listed than the women. This is valid for secretaries and textile workers, but also found within some of the subgroups (e.g. health and social work) (27).

The Swedish labour-market is very gender-segregated; most occupations are either male- or female-dominated (25, 28). The few fairly gender-integrated groups all have both a low sick-leave rate and low number of absence days per absentee. Men seem to be better off in female-dominated jobs, women worse off in male-dominated jobs. Both men and women have less sick-leave spells when working in female-dominated jobs and much less in gender-integrated areas.

The issue of how sick-leave corresponds to male/female dominated occupations has so far been neglected in sickness absence research. However, this approach has been taken in another area, by Ellen Hall. In an extensive study, she has examined the way in which work control varies with gender-segregation of occupations and class (25). Her findings with regard to which groups of workers report low/high work control correspond remarkably well to our findings about low/high sick-leave rate. She found, for example, that women in general had lower levels of work control than men, even in female-dominated jobs. Highest work control was found among white-collar employees. Men in white-collar, male-dominated jobs had the highest levels, while blue collar women in male-dominated jobs had the lowest levels of control. It seems evident that it is not enough to study how more traditional variables as sex, age class/social group and different occupational characteristics correspond with sick-leave. Studies of how they interact with gender-segregation of the work force and its implications for men, and

especially for women, also have to be included and further investigated.

Changes over the three years

The results in this study were strikingly constant over the three years, which underscores its generality. Several international studies have shown a trend over the past decades of an increasing number of spells/person (18, 29). It is difficult to compare our results with these as they also include short spells, and as the number of days with self-certification varies both between nations and over time. When excluding the short sick-leave spells, we have found an unvarying number of spells/year, but an increasing number of sick-leave days. This correlated with a shift in the pattern of a few large diagnostic areas. There was a decrease in sickness spells due to respiratory infections and a corresponding increase in locomotor diagnoses, which have a longer duration (27).

The rise of sick-leave days/person and year corresponds well with the development for the whole of Sweden during these years.

During the years of the registration, the Swedish unemployment rate was very low, 2.5%, and demand for labour high. Furthermore the rate of working (average work-time/week) increased for both men and women (30). In addition, Sweden has the highest frequency of employment in the western world, both for men (90%) and women (85%). These factors influence sick-listing. It is well known, for example, that sick-listing increases when unemployment figures decrease (31). Other factors presumed to have brought about the increase are changes in the practice and application of the insurance-system (32); how much can not be exactly calculated, of course.

Statistics. We have chosen to study the sector of sickness absence exceeding seven days and thus confirmed by a doctor's certification for several reasons. One is economics; the short spells, although many (77% in 1986) only represented a small part of the number of lost days and sickness insurance costs (17% in 1986). Another is statistics; including the short spells would make the material less manageable, and somewhat misleading (18, 33). Moreover, the validity of the diagnosis is higher when self-certified days are excluded. This design implies a systematic underestimating of both the number of absence days and insurance costs.

When sex- and age-standardising a material like this, some information that is of importance when planning preventive actions might be lost. As a base for interventions nominal values are often needed.

In research on sickness absence two variables are of primary interest: spells and days of absence (34–36). Here we mainly have focused on spells (the rate of persons with spells) and will further penetrate number of days in future studies.

The design of this investigation brings additional possibilities of interpretation. Our rates are based on the total employed population, which others have emphasised the importance of in sickness absence studies (37). The study has given us the means to identify groups with high and low risks of sickness absence and provides grounds for directed primary and secondary preventive steps, which, for example, have been adopted in the present Health Programme for Östergötland (38).

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Address for offprints:

Kristina Alexandersson
Dept of Community Medicine
University Hospital
S-58185 Linköping
Sweden