ORIGINAL ARTICLE

A comparison of self-reported sickness absence with absences recorded in employers' registers: evidence from the Whitehall II study

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Aim: To compare self-reported sickness absence days in the last 12 months with recorded absences from the employers' registers for the same period.

Methods: Self-reported sickness absence data over the 12 months preceding baseline (1985–88) were compared with absence records from the employers' registers over the same period for 2406 women and 5589 men, participants in the Whitehall II study of British civil servants. Associations with self-rated health, longstanding illness, minor psychiatric disorder, physical illness, and prevalent coronary heart disease at baseline were determined.

Results: In general, women reported less sickness absence over the last year than was recorded in the employers' registers, while men, with the exception of those in the lower employment grades, reported more. Agreement between self-reported and recorded absence days decreased as the total number of days increased. After adjustment for employment grade and the average number of recorded and self-reported absence days, the total number of self-reported absence days was within two days of the recorded number of days for 63% of women and 67% of men. Associations between annual self-reported sickness absence days and self-rated health, longstanding illness, minor psychiatric disorder, physical illness, and prevalent coronary heart disease were as strong as those for recorded absence days.

Conclusion: These findings suggest that agreement between the annual number of self-reported and the annual number of recorded sickness absence days is relatively good in both sexes and that associations with health are equivalent for both measures.

Researchers have increasingly used sickness absence records as an indicator of health among working populations. Indeed, a strong association has repeatedly been shown between sickness absence recorded by the employer and various measures of ill health.[1–7] However, access to employers' registers can be highly problematic and many studies have to rely on self-reported data on sickness absences. Given this, surprisingly little work has actually assessed the level of comparability between sickness absence data from employers' registers with absences determined from questionnaires.

Most previous comparative studies have looked specifically at sickness absence due to back pain. Using data from the employers' registers as the standard, these studies have reported sensitivities ranging from 68% to 79% for recall periods of 6 months to 4 years.[8–11] These sensitivities measure the ability to detect whether or not a participant had taken sick leave for back pain during the follow up period. One of the studies also examined the reporting of all sickness absence episodes over a six month period. In this case the sensitivity was lower at 55%.[11] The same study also documented moderate agreement between the self-reported duration of a sickness absence episode and the duration recorded by the employer (intra-class correlation coefficient, 0.58).[11]

The few studies that have compared the two measures have mostly used relatively small datasets, often in occupational groups that allow for no examination of sex differences.[11 12] Furthermore, no existing studies appear to have evaluated self-reported sickness absence as a marker of general health status.

The purpose of this study was to compare self-reported sickness absence days in the last 12 months with recorded absences from the employers' registers for the same period, in data from the Whitehall II study. In addition, we examined whether self-reported sickness absence is as strong a marker of general health status as recorded absence.

METHODS

The target population for the Whitehall II study was all London based office staff, aged 35–55, working in 20 Civil Service departments. With a response rate of 73%, the final cohort consisted of 10 308: 6895 men and 3413 women.[13] The true response rate was higher, however, because around 4% of those invited were not eligible for inclusion. Although mostly white-collar, respondents covered a wide range of grades from office support to permanent secretary.

Baseline screening (phase 1) of the Whitehall II cohort took place between late 1985 and early 1988. It involved a clinical examination and a self-administered questionnaire. Age and employment grade were derived from the questionnaire. Employment grade was divided into two categories, of which administrative/professional/executive is the highest and clerical/support is the lowest.

Sickness absence measures

The annual number of self-reported sickness absence days was derived from responses to the following question in the phase 1 questionnaire. ''In the last 12 months how many days were you off work for health reasons?''. Item non-response was 4% in women and 2% in men.

Computerised sickness absence records from 1 January 1985 to 31 December 1998 were obtained from Civil Service pay centres.[14] These records included the first and last dates of all absences. For absences of seven calendar days or less, civil servants complete their own certificate, while for

Main messages

- Agreement between the annual number of self-reported and the annual number of recorded sickness absence days is relatively good in both women and men.
- Associations between self-reported sickness absence over the preceding 12 months and health are as strong as those between recorded absence and health.
- While recorded absence will remain the ''gold'' standard, these findings will be useful for studies in which data from employers' registers are unavailable.

absences longer than seven days, a medical certificate is required. Sickness absence records were checked for inconsistencies and any duplicate spells were removed. Spells of sickness that were either consecutive or overlapped were merged into a single spell of absence. Public holidays and weekend days were ignored when identifying and merging consecutive spells. For each employee, we computed the number of sickness absence days in the 12 months immediately prior to baseline screening. Consent to access these records was given by 93% (9564) of participants, and of these, 96% (9179) were linked with their record. A full 12 month recording period prior to baseline screening was not available for 979 participants, either because they were screened during 1985 or because they joined or changed departments during the preceding year. Thus, of the 9179 participants with linked data, 8220 had a complete 12 month Civil Service sickness absence record for the preceding year.

Self-reported measures of health

Three measures were derived from the phase 1 questionnaire: self-rated health over the last year, presence of longstanding illness, disability, or infirmity, and minor psychiatric morbidity. Health over the last year was self-rated as very good, good, average, poor, or very poor. For the purpose of analysis, reports of health as average, poor, or very poor were combined to form the measure of interest. Minor psychiatric disorder was assessed using the 30 item General Health Questionnaire (GHQ),[15] and defined as GHQ caseness, a GHQ score of 5 or more.

Unlike other indicators, there was considerable lack of information for the measure of longstanding illness as it was introduced after the start of the baseline survey. Where baseline longstanding illness data were missing, values from the follow up survey (1989/1990) were used. Further details of these measures have been reported previously.[13]

Physical illness indicator

A composite indicator of physical illness was comprised of diabetes, diagnosed heart trouble, ECG abnormalities, hypertension, and/or respiratory illness. The category ''diabetes'' included all diabetics on treatment or a two hour post-load blood glucose in excess of 11.1 mmol/l. Data on past medical history of doctor diagnosis of coronary heart disease (CHD) were derived from the phase 1 questionnaire. ECG abnormalities were probable/possible ischaemia identified on ECG during the baseline screening examination. The category ''hypertension'' included all participants on antihypertensive medication or with a systolic or diastolic blood pressure greater than 160 or 95 mm Hg respectively. The presence of a respiratory illness was detected using the Medical Research Council chronic bronchitis questionnaire.[16]

Table 1 Mean of and difference between annual recorded sickness absence (sick) days and self-reported sick days

	n	Mean annual sick days		Difference in no. sick days	% of employees with ⩽2 days discrepancy
		Recorded	Self-reported		
Sex					
Women	2406	12.01	10.82	1.19	60
Men	5589	5.34	5.50	−0.17	73
				p<0.001	
Women					
Age group (years)					
35–39	568	11.21	9.66	1.56	63
40–44	556	10.20	9.98	0.22	60
45–49	544	13.80	12.15	1.64	59
50–55	738	12.68	11.37	1.31	57
				p=0.22	
Grade					
Admin/prof/executive	1293	9.58	9.40	0.18	67
Clerical/support	1113	14.84	12.47	2.37	51
				p<0.001	
Men					
Age group (years)					
35–39	1624	4.82	5.07	−0.25	73
40–44	1554	5.31	5.45	−0.14	73
45–49	1089	5.41	5.47	−0.06	73
50–55	1322	5.94	6.12	−0.18	73
				p=0.97	
Grade					
Admin/prof/executive	5125	4.61	4.91	−0.30	75
Clerical/support	464	13.33	12.04	1.29	55
				p<0.001	

Mean difference between the annual number of recorded sick days and the annual number of self-reported sick days. Positive values indicate a greater number of recorded than self-reported days.

Prevalent CHD

Prevalent CHD, which includes potential, non-fatal myocardial infarction and angina events, was determined from self-reports and confirmed by clinical records.[17]

Statistical analysis

Of the 10 308 participants in the baseline screening, 8220 had a complete 12 month Civil Service sickness absence record for the preceding year. Of these, 2406 (96%) women and 5589 (98%) men also had data on self-reported sickness absence. A simple non-response analysis was performed on the 1007 women and 1306 men with missing sickness absence data. The 22% of participants with incomplete sickness absence data were more likely to be women and to be in the lower grade. Their age distribution was similar to that for the entire cohort.

We examined the discrepancy between the two sickness absence measures by looking at the absolute differences between them in the number of days of absence. The percentage of subjects with no discrepancy and the percentages with discrepancies within two, seven, and fourteen days were also calculated. We used analyses of variance to test the associations between demographic characteristics and the difference in the number of self-reported and recorded sick days. For this analysis we used the difference in the logarithms of the number of sick days + 0.5 since the distributions of both recorded and self-reported sickness absences included zero and were highly skewed. Logistic regression models were used to study the association between sick days and all other measures of health status since the presence of these were assessed cross-sectionally. These models allowed the associations to be summarised using age and grade adjusted odds ratios and 95% confidence intervals. Tests for trend across the sickness absence categories were calculated using the logarithm of the number of sickness absence days + 0.5 as the exposure variable. The resulting trend terms were compared to assess whether the associations between sickness absence and the self-reported health measures differed between self-reported absences and recorded absences. All analyses were conducted using the SAS 8.2 program.

RESULTS

Table 1 presents the mean number of self-reported and recorded sickness absence days in the last 12 months, by sex, age, and employment grade. In these data the two measures are quite highly correlated, with a Spearman correlation coefficient of 0.79 for women and 0.75 for men (p values <0.001).

Self-reported sickness absence days in the Whitehall II cohort have not been reported previously, but, as illustrated by table 1, the data follow similar patterns to those for recorded absence data. As expected, the mean number of days for both measures is much greater among women. The mean number of days for both sexes increases with age, with a slight tailing off among women aged 50–55. There is also a strong employment grade effect in both sexes ($p < 0.001$), which is more pronounced in men.

The overall difference in mean number of absence days between the two measures is greater for women than men ($p < 0.001$). However, once adjusted for age, employment grade and average number of recorded and self-reported absence days, this difference is non-significant ($p = 0.06$). The differences did not vary significantly by age group in either sex, but adjustment for employment grade produced an inverse association with age in men ($p = 0.04$). The differences between recorded and self-reported absence were significantly greater in the lower employment grade in both sexes ($p < 0.001$).

Table 2 shows the distribution of the absolute differences between the recorded and self-reported sickness absence. In conjunction with fig 1 it also further explores the agreement between the two measures of sickness absence. Table 2 shows that the discrepancy between the number of self-reported absence days and the number of recorded absence days for 60% of women and 73% of men was within 2 days. The proportion of participants with discrepancy between the two measures of sickness absence is consistently higher for women than men. Part of this sex difference is explained by employment grade and the average number of recorded and reported absence days. However, significant sex differences remain for the discrepancy categories 0, 2, and 7 days.

Figure 1 shows that agreement between the two sickness absence measures decreases with increasing number of recorded sick days. On the whole, patterns for women and men are similar, regardless of employment grade. For nearly 80% of men in the clerical/support grades there is complete agreement between self-reported and recorded zero absence days, while among higher grade men complete agreement on zero absence is seen for just over 60%.

Table 3 shows the associations between the two measures of sickness absence and self-reported measures of health at baseline (the end of sickness absence follow-up). As expected, there are strong positive associations between the number of sick days and all the self-reported health measures ($p < 0.001$). The strongest associations are for self-rated health, followed by longstanding illness. All associations are stronger in men than women. A comparison of the tests for trend between self-reported and recorded sickness absence showed the association between the absence measure and the health outcome to be significantly stronger for self-rated health in both sexes and for minor psychiatric disorder in men.

Due to a much lower event rate, the highest exposure categories have been collapsed for presentation in table 4. Both measures of sickness absence show similar positive associations between annual number of days and physical illness and prevalent CHD in women and men.

Table 2 Discrepancy (%) between annual recorded and self-reported sick days

	Max. discrepancy between recorded and self-reported sick days			
	0 days	±2 days	±7 days	±14 days
Women (n = 2406)				
Unadjusted*	29*	60*	84*	92*
Adjusted for grade	29*	59*	83*	91*
Adjusted for grade and average number of recorded and self-reported sick days	31*	63*	87*	94
Men (n = 5589)				
Unadjusted*	42*	73*	93*	97*
Adjusted for grade	37*	66*	88*	94*
Adjusted for grade and average number of recorded and self-reported sick days	38*	67*	89*	95

Figures are cumulative percentages.
*Differences between women and men significant, $p<0.05$.

DISCUSSION

We found relatively good agreement between the number of self-reported sickness absence days per annum and the number of recorded days. For more than two thirds of employees, the discrepancy was two days or less. As the total number of absence days increased, agreement between the measures decreased. This means that, in general, it was lower

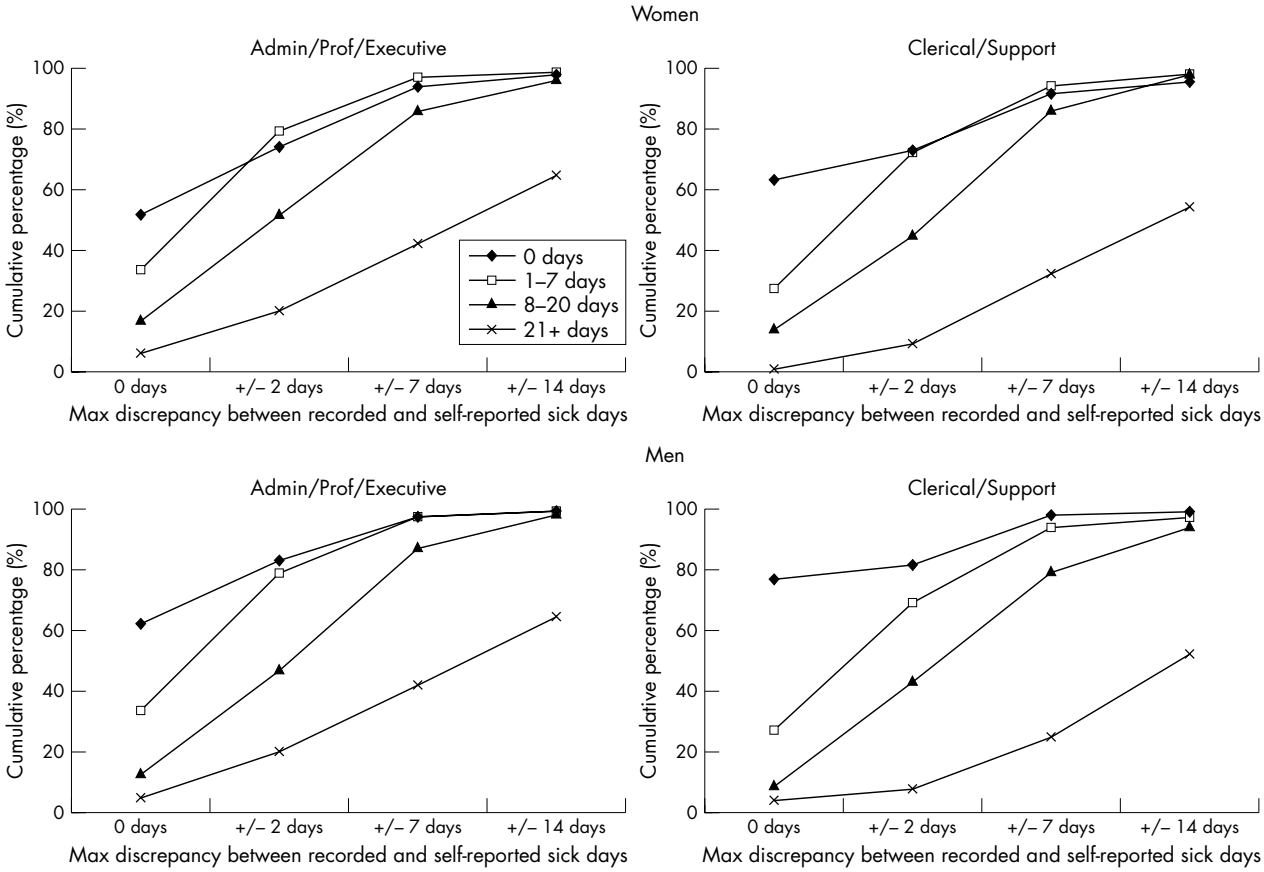

Figure 1 Discrepancy between annual recorded and self-reported sick days by number of recorded sick days.

Table 3 The association between annual number of sick days and self-reported measures of health status

Number of annual sick days	Poor self-rated health		Reported longstanding illness		Psychiatric disorder*	
	n (cases)	OR (95% CI)	n (cases)	OR (95% CI)	n (cases)	OR (95% CI)
Women						
Recorded sick days†						
0	581 (102)	1.00	432 (101)	1.00	575 (171)	1.00
1–7	920 (257)	1.77 (1.4 to 2.3)	726 (220)	1.46 (1.1 to 1.9)	906 (266)	1.03 (0.8 to 1.3)
8–20	530 (255)	3.97 (3.0 to 5.2)	435 (162)	1.99 (1.5 to 2.7)	525 (157)	1.19 (0.9 to 1.5)
21+	373 (249)	8.34 (6.1 to 11.3)	306 (136)	2.67 (1.9 to 3.7)	367 (148)	1.89 (1.4 to 2.5)
Self-reported sick days†						
0	395 (64)	1.00	314 (67)	1.00	388 (100)	1.00
1–7	1117 (292)	1.83 (1.4 to 2.5)	859 (257)	1.64 (1.2 to 2.2)	1102 (336)	1.25 (1.0 to 1.6)
8–20	603 (299)	4.76 (3.5 to 6.5)	488 (179)	2.21 (1.6 to 3.1)	595 (185)	1.42 (1.1 to 1.9)
21+	289 (205)	11.94 (8.2 to 17.3)	238 (116)	3.56 (2.4 to 5.2)	288 (121)	2.32 (1.7 to 3.2)
Test of difference in trend		p=0.02		p=0.17		p=0.19
Men						
Recorded sick days†						
0	2421 (295)	1.00	1959 (524)	1.00	2415 (551)	1.00
1–7	2190 (497)	2.08 (1.8 to 2.4)	1783 (549)	1.25 (1.1 to 1.4)	2187 (540)	1.11 (1.0 to 1.3)
8–20	676 (246)	3.99 (3.3 to 4.9)	555 (228)	1.94 (1.6 to 2.4)	674 (211)	1.59 (1.3 to 1.9)
21+	284 (181)	12.08 (9.2 to 15.9)	236 (134)	3.52 (2.7 to 4.7)	286 (110)	2.25 (1.7 to 2.9)
Self-reported sick days†						
0	1738 (189)	1.00	1441 (363)	1.00	1735 (333)	1.00
1–7	2839 (550)	1.94 (1.6 to 2.3)	2292 (693)	1.35 (1.2 to 1.6)	2832 (730)	1.45 (1.2 to 1.7)
8–20	749 (326)	6.11 (4.9 to 7.5)	599 (262)	2.42 (2.0 to 3.0)	748 (258)	2.25 (1.9 to 2.7)
21+	245 (154)	13.13 (9.7 to 17.8)	201 (84)	4.02 (3.0 to 5.5)	247 (91)	2.58 (1.9 to 3.4)
Test of difference in trend		p=0.002		p=0.12		p=0.006

Odds ratios (OR) and their 95% confidence intervals (CI) are adjusted for age and employment grade.
*GHQ score of 5 or more.
†All tests for linear trend significant, p<0.001.

among women and participants in the lower employment grade. Positive associations between self-reported annual sickness absence days and all the measures of morbidity did not differ markedly from those for recorded absence days.

The Whitehall II study is much larger than any previous study that has compared self-reported and recorded sickness absence data. Also, the availability of retrospective data covering a 12 month period provided sufficient sickness absence events for meaningful analysis. While a number of previous studies have examined the predictive validity of recorded sickness absence data,[5–8] no other study to our knowledge has attempted prospectively to validate self-reported sickness absence against measures of health.

The relatively good agreement between self-reported absence days and recorded absence days accords with previous smaller studies of all-cause sickness absence.[10 18] Among 36 employees of a US research organisation, the mean discrepancy between recorded and reported absence days over a three month period was 0.20 days. As for men in our study, the number of recorded days was slightly less than the number of self-reported days.[19] A study of 210 white-collar workers in the Netherlands found that self-reported number of sickness absence days matched the number of recorded days perfectly over a 12 month period for 51% of participants. When accepting a margin of two days' difference between the two data sources, approximately 73% fell within this margin of agreement.[12] While the percentage with perfect matching is higher than in our study, the latter percentage is the same as that seen among Whitehall II men.

Most research on cause specific absence has focused on back pain. A study among coalminers in England, which compared data over a 12 month period, found both sensitivity and specificity to be over 80%.[9] Another study, among men in an animal feed factory, found a sensitivity of 88% and a specificity of 97% over a six month period.[10] Although these are different measures of agreement they suggest a higher level of agreement than observed in our study. However, it is likely that episodes of back pain are easier to remember than general spells of sickness absence, especially among heavy manual workers.

As shown previously in Whitehall II and in other studies, sickness absence was much higher among women than men, reflecting women's higher rate of morbidity.[20 21] The discrepancy between recorded and reported absence among women appears to be about one day per year greater than for men. However, much of this difference is explained by low employment grade and the greater number of sickness absence days. Figure 1 shows that the discrepancy between annual recorded and self-reported sickness absence days is much greater when 21 days or more of absence have been recorded. The greater the number of days, the less the likelihood that recall will be accurate to the day, but the greater the likelihood that some of the absence will fall as long spells. Long spells of sickness absence may be inaccurately recalled, but are more likely to be correctly recorded as they are medically certified. Absences that fall partially outside the 12 month period will be censored in the analyses of recorded data, but may be included in full in the reported data.

Both the number of recorded and the number of self-reported absence days and the difference between them were much higher in the lower grade. The greater number of days undoubtedly reflects the strong grade gradients in morbidity seen in these data.[14] However, the greater differences observed in the lower grade could be due either to imperfect recall and reporting bias or the greater number of days taken by these participants. Adjustment for the number of days accounted for less than half of the difference for women and between a half and two thirds for men. It thus appears that the differences between recorded and reported absence in participants from the lower grade reflect systematic differences in recall or reporting. Differences in reporting may reflect differences in autonomy between the grades. Participants in the lower grade may report in sick when waiting for the plumber rather than lose annual leave, while those in higher grades can legitimately work from home while waiting. Among men in the higher grades the number

Table 4 The association between annual number of sick days and objective measures of health status

Number of annual sick days	Physical illness indicator*		Prevalent CHD	
	n (cases)	OR (95% CI)	n (cases)	OR (95% CI)
Women				
Recorded sick days				
0	569 (45)	1.00	581 (17)	1.00
1–7	901 (92)	1.31 (0.9 to 1.9)	921 (42)	1.58 (0.9 to 2.8)
8+	860 (144)	2.28 (1.6 to 3.3)	904 (56)	2.10 (1.2 to 3.7)
Linear trend		p<0.001		p=0.012
Self-reported sick days				
0	388 (31)	1.00	395 (10)	1.00
1–7	1085 (105)	1.24 (0.8 to 1.9)	1117 (43)	1.59 (0.8 to 3.2)
8+	857 (145)	2.29 (1.5 to 3.5)	894 (62)	2.85 (1.4 to 5.6)
Linear trend		p<0.001		p<0.001
Men				
Recorded sick days				
0	2157 (237)	1.00	2428 (78)	1.00
1–7	2152 (223)	1.06 (0.9 to 1.3)	2195 (77)	1.14 (0.8 to 1.6)
8+	933 (148)	1.68 (1.3 to 2.1)	966 (47)	1.46 (1.0 to 2.1)
Linear trend		p<0.001		p=0.003
Self-reported sick days				
0	1724 (163)	1.00	1744 (50)	1.00
1–7	2784 (287)	1.13 (0.9 to 1.4)	2846 (91)	1.23 (0.9 to 1.8)
8+	971 (158)	1.86 (1.5 to 2.4)	999 (61)	2.25 (1.5 to 3.3)
Linear trend		p<0.001		p<0.001

Odds ratios (OR), hazard ratios (HR), and their 95% confidence intervals (CI) are adjusted for age and employment grade.
*Diabetes, diagnosed heart trouble, hypertension, ECG abnormalities, and/or respiratory illness.

of days reported exceeds the number that reaches the records. In large organisations like the Civil Service, where sickness absence involves reporting and paperwork, those with the option—mostly those in the higher grades—may prefer to say they are working at home rather than calling in sick.

Most previous studies that have compared self-reported and recorded absence data have taken the employers' register data as the reference standard.[11] Although in our study self-reported absence appears to be the measure more closely associated with health, part of this association may be spuriously generated by common method bias. This limitation indicates that recorded absence from employers' registers should remain the ''gold'' standard for studies. However, the fact that there is little difference in the strength of associations between the two sickness absence measures and physical illness or prevalent CHD indicates that reporting bias is less of a problem with these more objective measures of health.

A limitation of a cohort aged 35–55 at baseline and almost exclusively white-collar is that findings may not apply to wider populations. However, in the study by Burdorf *et al* no significant difference was found between office workers and blue-collar workers regarding the reliability of retrospective measurement of sickness absence.[10] A further limitation of our study is that 22% of participants had incomplete sickness absence data. Seven per cent (744) of participants did not give consent to obtain their sickness absence records, 4% (385) gave consent but could not be linked, 9% (979) did not have complete sickness absence data for the preceding year, and 2% (205) did not have self-reported sickness absence data. The mean number of self-reported sickness absence days per annum among the 7995 participants with recorded data was 7.1, a figure little different from the mean of 7.4 days taken by the 2041 participants without recorded data. Similarly, comparisons between participants included and excluded from the analyses of sickness absence for all the health outcomes found only small differences in prevalence, ranging from 0.5% for CHD to 4.3% for self-rated health.

One obvious advantage of sickness absence data from employers' registers is that data are collected routinely and so are better suited to studying trends. The other is that the problem of recall bias is eliminated. On the other hand, any systematic recording of non-illness related absence as sickness absence in the lower grade or under-recording in the higher grades may introduce another source of bias. Furthermore, access to employers' sickness absence registers is often problematic, if not impossible.

In our data the agreement between self-reported and recorded number of sickness absence days over a 12 month period was reasonably good and both measures predicted health status. These findings will be of use to the research community as the retrospective collection of sickness absence data by questionnaire is the only option open to many studies, including national surveys that may wish to monitor trends in sickness absence.

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