

# Reported incidence and precipitating factors of work-related stress and mental ill-health in the United Kingdom (1996–2001)

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**Background** Work-related mental ill-health appears to be increasing. Population-based data on incidence are scarce but in the United Kingdom occupational physicians and psychiatrists report these conditions to voluntary surveillance schemes.

**Aims** To estimate the incidence of work-related stress and mental illness reported 1996–2001 by occupational physicians and 1999–2001 by psychiatrists.

**Methods** Estimated annual average incidence rates were calculated by sex, occupation and industry against appropriate populations at risk. An in-house coding scheme was used to classify and analyse data on precipitating events.

**Results** An estimated annual average of 3624 new cases were reported by psychiatrists, and 2718 by occupational physicians; the rates were higher for men in reports based on the former and for women on the latter. Most diagnoses were of anxiety/depression or work-related stress, with post-traumatic stress accounting for ~10% of cases reported by psychiatrists. High rates of ill-health were seen among professional and associated workers and in those in personal and protective services. Factors (such as work overload) intrinsic to the job and issues with interpersonal relations were the most common causes overall.

**Conclusions** The steep increase in new cases of work-related mental ill-health reported by occupational physicians since 1996 may reflect a greater willingness by workers to seek help but may also signify an increasing dissonance between workers' expectations and the work environment. Greater expertise is needed to improve the workplace by adjustment of job demands, improvement of working relations, increasing workers' capacities and management of organizational change.

**Key words** Mental ill-health; stress; surveillance; work-related.

## Introduction

A nationwide network of clinical specialists and occupational physicians in the United Kingdom has been developed for reporting new cases of occupational and work-related illness. The first scheme was set up in 1989 at the National Heart and Lung Institute in London for the surveillance of work-related respiratory diseases [1] and the next, in 1993 [2], for occupational skin disorders,

at the Centre for Occupational and Environmental Health, the University of Manchester. There followed similar schemes for infections [3], audiological disorder [4] musculoskeletal disorders [5] and mental ill-health and, in 1996, a separate scheme, Occupational Physicians Reporting Activity (OPRA), for occupational physicians to report all types of work-related illness [6]. In 1998, the seven constituent schemes were brought together under the umbrella of Occupational Disease Intelligence Network (ODIN), coordinated from Manchester. In 2002, The Health and Occupation Reporting network scheme superseded ODIN and has aimed to develop the project further. It was therefore considered appropriate at this point to summarize the information obtained from the ODIN programme for respiratory [7], skin, musculoskeletal and, in the present paper, on mental illnesses. This report represents the first attempt to estimate national incidence rates of physician diagnosed work-related mental ill-health.

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**Methods**

Some 842 occupational physicians took part in OPRA between 1996 and 2001. This was ~75% of occupational physicians who were in active practice in the United Kingdom. Some 5000 psychiatrists, registered with the Royal College of Psychiatrists in the United Kingdom were approached. Over 1000 of them were working in the National Health Service at the consultant (specialist) level and so potentially eligible for inclusion in the scheme for Surveillance of Occupational Stress and Mental Illness (SOSMI). Of these, 878 saw adult patients and took part in the reporting scheme between 1999 and 2001. This was ~81% of practising consultant psychiatrists eligible to report. Subsequently, the ongoing recruitment of new reporters was carried out by searching the updated specialists register data published by the General Medical Council and by searching the advertisements of new consultant posts in the *British Medical Journal*. In addition, in order to further recruit occupational physicians, new members of the Society of Occupational Medicine were also approached.

Between 1996 and 2001, participating occupational physicians and psychiatrists reported for only one randomly allocated month each year, around one-twelfth of all participants per month. The annual numbers of cases within each 12-month period were estimated by multiplying the number of cases per month by 12. Reports from Health & Safety Executive medical inspectors were excluded from this analysis.

Physicians received simple report cards at the beginning of their reporting month for recording newly diagnosed cases that in their clinical judgement were attributed to patients' work. They were asked to return the completed cards at the end of the month. For each reported case, physicians were asked to provide information on diagnosis, age, sex, area of residence (the first half of postcode), job, industry, and precipitating events thought to have contributed to development or occurrence of the condition.

There were differences in methods of recording diagnoses between occupational physicians and psychiatrists. Psychiatrists were asked to choose the diagnosis according to disease categories listed on the front of the reporting card (Appendix 1, available as Supplementary data at *Occupational Medicine* Online), for example, anxiety/depression, post-traumatic stress disorder (PTSD), other work-related stress, substance abuse, psychotic episode and other psychological problems. Occupational physicians were asked to report all types of work-related ill-health, and to specify the diagnosis for each case. The diagnostic information was subsequently coded using the International Classification of Disease, 10th revision (ICD-10). Cases were then grouped into the diagnostic categories used by the psychiatrists. This allowed a comparison of information collected from occupational

**Table 1.** Estimated average annual incidence and incidence rates of work-related mental ill-health reported by psychiatrists (1999–2001) and occupational physician (1996–2001); rate = number of cases/million/year

	Psychiatrists <sup>a</sup>						Occupational physicians <sup>b</sup>																	
	1999–2001			1996–98			1999–2001			1996–2001														
	Male	Female	Total	Male	Female	Subtotal	Male	Female	Subtotal	Male	Female	Total												
	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate												
Anxiety/depression	1581	104	1028	83	2613	95	564	344	528	336	1092	340	2188	681	810	493	830	529	1640	511				
PTSD	280	18	84	7	364	13	132	80	20	13	152	47	64	39	56	36	120	37	98	60	38	24	136	42
Other work-related stress	112	7	88	7	200	7	396	241	392	250	788	245	628	383	768	489	1396	435	512	312	580	370	1092	340
Alcohol or drug abuse	212	14	104	8	316	12	20	12	12	8	32	10	12	7	4	3	16	5	16	10	8	5	24	8
Psychotic episode	56	4	68	6	124	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other problems	88	6	96	8	184	7	40	24	32	20	72	22	56	34	64	41	120	37	48	29	48	31	96	30
Total cases (patients)	2232	147	1388	112	3624	131	1044	636	848	540	1892	589	1636	997	1860	1185	3544	1103	1340	816	1354	862	2718	846

<sup>a</sup>LFS data 1999 were used as denominator for psychiatrists' reporting.

<sup>b</sup>OPRA survey data 2001 were used as denominator for occupational physicians' reporting.

physicians with that from psychiatrists. A total of 69 ICD-10 codes were used to classify mental ill-health diagnoses reported by occupational physicians; F32.0–F32.9 signify depression, F41.0–F41.9 anxiety, F43.1 PTSD, Z56.6 other work-related stress, F10–F19 substance abuse, F29 psychotic episodes. Multiple codes represented ‘other’ mental ill-health. A complete list of ICD-10 codes used to group diagnoses is available from the authors.

An in-house coding scheme (Appendix 2, available as Supplementary data at *Occupational Medicine* Online) was used for classification and analysis of data on precipitating events. The scheme was developed from the literature and its reliability assessed during a pilot exercise in which three raters, working independently,

coded 656 cases reported to SOSMI during 1999 and 2000; the inter-reviewer agreement was high (kappa statistics > 0.7) [8].

Occupations were coded to four digits using Standard Occupational Classification 1990 (SOC 1990) codes [9]. Industries were coded using the Standard Industrial Classification (SIC 1992) codes [10].

In the calculation of incidence rates, 1999 Labour Force Survey (LFS) data were used as the denominator for psychiatrists’ reports. The LFS carried out by the Office for National Statistics collects information on a sample of persons in employment in the United Kingdom [11]. From this, the total numbers employed in the United Kingdom were estimated. For cases reported by occupational physicians, the denominator was obtained by a special survey carried out in 2001 that collected information on the number of employed persons served by participating occupational physicians in OPRA [12].

From this survey, it was estimated that only 12.4% of workers in the United Kingdom were in such organizations and for these denominators were estimated for nine occupational and eight industry groups [13].

Exact 95% confidence intervals (CIs) were calculated for incidence rates taking into account the number of reported cases and the number of employed persons in the denominator. The number of reported cases was assumed to be Poisson distributed. As a case might be reported as having more than one diagnosis, and each diagnosis attributed to more than one precipitating event, rates and percentages have, in each analysis, been calculated using the number of estimated cases (rather than total diagnoses or events) as the denominator. The statistical packages SPSS V11.5 and STATA V8 were used for the analysis.

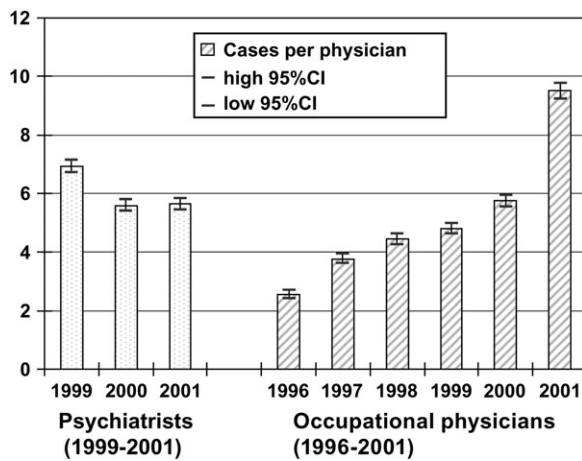


Figure 1. Estimated case of work-related mental ill-health reported per reporter per year.

Table 2. Estimated average annual cases by precipitating events

Precipitating events	Psychiatrists						Occupational physicians					
	Male		Female		Total <sup>a</sup>		Male		Female		Total <sup>b</sup>	
	n	%	n	%	n	%	n	%	n	%	n	%
1. Factors intrinsic to the job	500	22	352	25	852	24	348	26	358	26	708	26
2. Changes at work	328	15	188	14	516	14	128	10	138	10	268	10
3. Interpersonal relationships	352	16	312	22	664	18	170	13	244	18	414	15
4. Inequality (racism or sexism)	0	0	16	1	16	0	2	0	2	0	4	0
5. Personal development	236	11	112	8	348	10	54	4	60	4	116	4
6. Physical working environment	56	3	20	1	76	2	16	1	14	1	32	1
7. Traumatic events	396	18	200	14	596	16	182	14	102	8	284	10
8. Home–work interface	196	9	136	10	332	9	42	3	56	4	102	4
9. Others	456	20	296	21	752	21	342	26	332	25	676	25
9.9 No reason given	100	4	64	5	168	5	94	7	96	7	206	8
Total cases	2232	100	1388	100	3624	100	1340	100	1354	100	2718	100

Cases reported by psychiatrists (1999–2001) and occupational physicians (1996–2001).

<sup>a</sup>Including 12 estimated cases with missing information on gender.

<sup>b</sup>Including 144 estimated cases with missing information on gender.

**Table 3.** Estimated average annual cases by precipitating events

Precipitating events	Anxiety/depression		PTSD		Other work-related stress		Other diagnoses		All diagnoses	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Psychiatrists										
1. Factors intrinsic to the job	640	25	20	5	48	24	176	28	852	24
2. Changes at work	440	17	0	0	32	16	52	8	516	14
3. Interpersonal relationships	544	21	36	10	44	22	88	14	664	18
4. Inequality	12	0	0	0	0	0	4	1	16	0
5. Personal development	260	10	0	0	16	8	96	15	348	10
6. Physical working environment	56	2	8	2	0	0	24	4	76	2
7. Traumatic events	300	11	248	68	24	12	52	8	596	16
8. Home-work interface	236	9	0	0	24	12	88	14	332	9
9. Others	504	19	68	19	48	24	172	28	752	21
9.9 No reason given	144	6	4	1	0	0	20	3	168	5
Total cases	2612	100	364	100	200	100	620	100	3624	100
Occupational physicians										
1. Factors intrinsic to the job	470	28	4	3	282	25	48	40	708	26
2. Changes at work	202	12	0	0	104	9	4	3	268	10
3. Interpersonal relationships	292	18	6	4	160	14	8	7	414	15
4. Inequality	0	0	0	0	4	0	0	0	4	0
5. Personal development	70	4	2	1	48	4	4	3	116	4
6. Physical working environment	18	1	0	0	12	1	2	2	32	1
7. Traumatic events	120	7	124	91	50	4	10	8	284	10
8. Home-work interface	60	4	6	4	40	4	14	12	102	4
9. Others	548	33	8	6	206	18	30	25	676	25
9.9 No reason given	122	7	0	0	92	8	16	13	206	8
Total cases	1656	100	136	100	1116	100	120	100	2718	100

Cases reported by psychiatrists (1999–2001) and occupational physicians (1996–2001).

## Results

Reporting cards were received from 878 psychiatrists (reporting to SOSMI) from 1999–2001 and 846 occupational physicians (reporting to OPRA) during the period 1996–2001, with an estimated annual 3624 cases reported by psychiatrists and 2718 by occupational physicians (Table 1). For the latter group, there was a marked increase in cases reported, from an average of 1892 for the first 3 years (1996–98) to 3544 per year in the second (1999–2001). The mean estimated cases per reporter in each scheme are shown in Figure 1, indicating no important change in the number of cases reported by psychiatrists but a clear increase year by year in the estimated number of cases reported by occupational physicians. This change in reporting of mental ill-health took place against a stable background level of all work-related diagnoses in OPRA and represented a 3-fold increase, from 11.4% in 1996 to 36.7% in 2001, in the proportion of cases reported by occupational physicians that were classified as work-related mental ill-health; the number of cases of all work-related disease reported by occupational physicians remained relatively unchanged, from an estimate of 11 839 cases in 1996 to one of 12 597 in 2001.

The estimated rate per million of mental ill-health was somewhat higher for men (147, 95% CI: 141–153)

than women (112, 95% CI: 106–118) in cases reported by psychiatrists and for women (862, 95% CI: 817–910) than men (816, 95% CI: 773–861) among cases reported by occupational physicians.

In both groups of reporters, the most common diagnosis was anxiety and/or depression, accounting for 72% of diagnoses from psychiatrists and 60% from occupational physicians; the less specific diagnosis of 'work-related stress' was used to describe the illness for a substantial number of cases reported, particularly by occupational physicians where this diagnosis was recorded, sometimes in addition to anxiety/depression, for 40% of cases. PTSD was more common in males from both reporting groups (psychiatrists: men 12% of cases, women 6%; occupational physicians: men 7%, women 3%). No psychotic episode was reported by an occupational physician (compared with 3% of cases reported by psychiatrists). Alcohol and drug abuse associated with work was also less frequently reported by occupational physicians, forming <1% of these cases but 9% of those from psychiatrists.

About one-quarter of the new episodes were reported to be precipitated by factors intrinsic to the job (Table 2) with work overload being the cause most frequently cited. Changes at work, including new responsibilities, technologies and organization accounted for 10% of cases recorded by occupational physicians and 14% of those

**Table 4.** Estimated average annual cases and incidence rates per million by major occupational groups

Major occupational group (SOC)	Psychiatrists <sup>a</sup>						Occupational physicians <sup>b</sup>					
	1999–2001						1996–2001					
	Male		Female		Total		Male		Female		Total	
	<i>n</i>	Rate <sup>c</sup>	<i>n</i>	Rate <sup>c</sup>	<i>n</i>	Rate <sup>c</sup>	<i>n</i>	Rate <sup>c</sup>	<i>n</i>	Rate <sup>c</sup>	<i>n</i>	Rate <sup>c</sup>
Managers and administrators (10–17, 19)	384	131	124	85	508	115	254	<b>1563</b>	126	<b>1156</b>	382	<b>1407</b>
Professionals (20–27, 29)	592	<b>333</b>	444	<b>367</b>	1036	<b>346</b>	276	<b>972</b>	216	538	496	723
Associated professional and technical (30–39)	224	<b>160</b>	256	<b>180</b>	480	<b>170</b>	188	<b>1299</b>	390	<b>2369</b>	578	<b>1869</b>
Clerical and secretarial (40–46, 49)	104	97	224	73	328	79	98	<b>1007</b>	356	<b>1369</b>	454	<b>1270</b>
Craft and related (50–59)	188	62	12	47	200	61	76	585	2	42	78	440
Personal and protective services (60–67, 69)	356	<b>356</b>	204	100	560	<b>184</b>	166	<b>1559</b>	150	<b>988</b>	318	<b>1231</b>
Sales (70–73, 79)	68	82	48	33	116	51	20	339	28	223	48	260
Plant and machine operatives (80–89)	176	86	32	71	208	83	174	661	30	249	204	532
Other occupations (90–95, 99)	128	115	36	36	164	77	74	188	46	243	120	206
Occupation not codeable	12	.	8	.	24	.	14	.	10	.	40	.
Total	2232	147	1388	112	3624	131	1340	816	1354	862	2718	846

Cases reported by psychiatrists (1999–2001) and occupational physicians (1996–2001, excluding HSE).

<sup>a</sup>LFS data 1999 were used as denominator for psychiatrists' reporting.

<sup>b</sup>OPRA survey data 2001 were used as denominator for occupational physicians' reporting.

<sup>c</sup>Rates greater than average are shown in bold.

seen by psychiatrists. Interpersonal relationships were cited more frequently for women than men in both schemes while traumatic events were given as the cause more frequently for men, again consistently between groups of reporters.

The relationship between the type of precipitating event and the three main diagnostic groups is given in Table 3. As expected, traumatic events were reported to be the cause in a very high proportion of those with PTSD, although only two-thirds of the events cited by a psychiatrist as precipitating this condition were coded in this way. The pattern of precipitating factors given for anxiety/depression and other work-related stress appeared very similar, perhaps suggesting that the two diagnoses may be used for essentially similar disorders.

Inspection of the rates of illness by occupational group (Table 4) shows higher rates/million for professionals (346, 95% CI: 326–368) than for all workers (131, 95% CI: 127–136) reported by psychiatrists and for associated professional and technical workers (1869, 95% CI: 1719–2027) than all workers (846, 95% CI: 814–879) reported by occupational physicians. Men and, for occupational physicians, women in personal and protective services also had high rates of illness. Occupational physicians, but not psychiatrists, reported high rates of illness among both men and women employed as managers and administrators and those in clerical or secretarial work.

The pattern of disease also differed by professional group. Psychiatrists, but less markedly occupational physicians, reported higher rates of anxiety/depression among professionals, managers and clerical workers than other occupational groups (Table 5) and higher than expected proportions with alcohol and drug use for people in sales. For both groups of reporters, PTSD was particularly common in those working in personal protective services and in plant and machine operators (which includes train drivers, subject to involvement in suicide attempts).

When cases were classified by industry high rates were found in mining and quarrying, for health and social services in cases reported by psychiatrists and for women in the petrochemical and automotive products in reports of occupational physicians (see Table 6, available as Supplementary data).

A relatively high proportion of cases were in 'other industries'. Among these, high rates were found, for psychiatrists, in Public Administration and Defence (industry code 75) with a rate of 351 per million, Finance (industry code 65, with 192 cases, 279 per million) and Education (industry code 80, with 560 cases and a rate of 258 per million). Rates could not be calculated for subgroups within other industries for occupational physicians, as this detail was not available for the denominators, but large estimated numbers of cases were reported for both Public Administration and Defence

**Table 5.** Estimated average annual cases by major diagnostic category and major occupational groups

Occupational groups	Anxiety/depression		PTSD		Other work-related stress		Alcohol or drug abuse		Psychotic episode		Other problems		All diagnoses	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Psychiatrists														
Managers and administrators (10–17, 19)	408	80	28	6	32	6	40	8	4	1	20	4	508	100
Professionals (20–27, 29)	836	81	20	2	48	5	92	9	32	3	44	4	1036	100
Associated professional and technical (30–39)	348	73	32	7	24	5	44	9	20	4	32	7	480	100
Clerical and secretarial (40–46, 49)	264	80	8	2	4	1	32	10	20	6	20	6	328	100
Craft and related (50–59)	136	68	20	10	16	8	16	8	4	2	16	8	200	100
Personal and protective services (60–67, 69)	296	53	164	29	64	11	24	4	20	4	16	3	560	100
Sales (70–73, 79)	84	72	4	3	0	0	24	21	8	7	4	3	116	100
Plant and machine operatives (80–89)	132	63	56	27	4	2	20	10	4	2	12	6	208	100
Other occupations (90–95, 99)	92	56	28	17	8	5	20	12	12	7	20	12	164	100
Occupation not codeable	16	67	4	17	0	0	4	17	0	0	0	0	24	100
Total cases	2612	72	364	10	200	6	316	9	124	3	184	5	3624	100
Occupational physicians														
Managers and administrators (10–17, 19)	230	60	6	2	164	43	6	2			14	4	382	100
Professionals (20–27, 29)	350	71	8	2	184	37	4	1			8	2	496	100
Associated professional and technical (30–39)	346	60	16	3	250	43	4	1			22	4	578	100
Clerical and secretarial (40–46, 49)	272	60	4	1	226	50	0	0			8	2	454	100
Craft and related (50–59)	44	56	8	10	24	31	0	0			2	3	78	100
Personal and protective services (60–67, 69)	188	59	56	18	94	30	4	1			14	4	318	100
Sales (70–73, 79)	32	67	2	4	16	33	0	0			4	8	48	100
Plant and machine operatives (80–89)	106	52	32	16	82	40	2	1			8	4	204	100
Other occupations (90–95, 99)	64	53	4	3	44	37	4	3			16	13	120	100
Occupation not codeable	24	60	0	0	32	80	0	0			0	0	40	100
Total cases	1656	61	136	5	1116	41	24	1			96	4	2718	100

Cases reported by psychiatrists (1999–2001) and occupational physicians (1996–2001).

(552 cases) and Education (298 cases) suggesting it was these two industry groups that account for a high rate of ill-health in the 'other industry' group. Few systematic differences in diagnoses were obvious between industrial groups (data not shown).

The precipitating events cited as a cause of illness were very different in different occupations (see Table 7, available as Supplementary data). For example, among cases reported by psychiatrists interpersonal relationships and traumatic events accounted for only 25% of cases in managers and administrators but 51% of cases in personal and protective services. Similar proportions were found in reports of occupational physicians, 17% managers and administrators; 46% personal and protective services. Psychiatrists attributed work-related mental ill-health to factors intrinsic to the job particularly for those in higher levels of non-manual work (for example, for 29% in professional jobs but only 10% in sales workers). For occupational physicians, the citing of intrinsic factors as a cause was less strongly related to job status.

## Discussion

We report here surveillance data for new onset work-related mental ill-health from consultant psychiatrists for 3 years (1999–2001) and occupational physicians for 6 years (1996–2001). While there may be limitations in comparing data from these two sources and with different (but overlapping) periods, it is nevertheless of note that by 2001 more than one-third of the new cases of occupational disease reported by occupational physicians were of work-related mental ill-health, with a steep increase in numbers since 1996. Although <13% of workers in the United Kingdom were covered by an occupational physician, by 2001 more cases were being reported from this subgroup than by psychiatrists for the working population as a whole. This would suggest that many cases of work-related mental ill-health in workers without access to occupational health units are being treated, if at all, by general practitioners, with little time to investigate the occupational aetiology and even less for prevention.

Analyses of precipitating events suggest that much of the ill-health was associated with factors that may be remediable by changes in job demands in relation to worker capacities. Skilled workplace interventions may be particularly indicated for the 10–15% for whom ill-health was associated with organizational or other changes that may require an adaptation that is difficult but not necessarily permanently incapacitating. Interpersonal difficulties may represent ongoing personality characteristics in the worker as well as colleagues but may also be amenable to interventions. It is notable that very few (9% of cases reported by psychiatrists and 4% reported by occupational physicians) were thought to have resulted from tensions between home and work.

Mental ill-health arising from traumatic events at work form a markedly different cluster, by both occupation and diagnosis. The nature of the precipitating event may require aggressive primary and secondary prevention, both to avoid (where feasible) the catastrophic occurrence and to deal rapidly with its aftermath.

In general, however, management of mental ill-health requires both the adaptation of the workplace to meet legitimate expectations and capacities of the worker, and of the worker to increase, through training and cognitive therapy, a capacity to cope with work demands. In the United Kingdom, the Health & Safety Executive, in collaboration with stress management professionals, have provided guidance for both employers [14] and employees [15] on how to tackle stress at work. From the data reported here, the steep rise in the number of cases reported by occupational physicians suggests that recognition of mental ill-health as work-related is increasingly widespread. Training for physicians to work in occupational medicine (or indeed in psychiatry) must include developing particular competence in recognizing and managing the early signs of poor functioning in workers and workplaces if mental ill-health is to be reduced.

## Acknowledgements

We are grateful to Susan Hutton for work on the development and validation of the coding scheme for precipitating events, to the UK Health & Safety Executive for funding provided to the ODIN reporting schemes and to the psychiatrists and occupational physicians who participated.

## Conflicts of interest

None declared.

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