



Occupational exposure to noise and hearing difficulties in Great Britain

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**Keith T Palmer MA, DM, BM, BCh, FFOM, MRCP
David Coggon MA, PhD, DM, FRCP, FFOM, FMed Sci
Holly E Syddall MSC**

Brian Pannett MSc, MRSC, CChem
MRC Environmental Epidemiology Unit
University of Southampton
Southampton General Hospital
Southampton SO16 6YD

Michael J Griffin BSc, PhD
Institute of Sound and Vibration Research
University of Southampton
Highfield
Southampton SO17 1BJ

The objectives of this research were to determine the prevalence of self-reported hearing difficulties and tinnitus in working-aged people from the general population, and to estimate the risks from occupational exposure to noise and the number of attributable cases nationally.

A questionnaire was mailed to 22 194 adults of working age selected at random from the age-sex registers of 34 British general practices (21 201 subjects) and from the central pay records of the British armed services (993 subjects). Information was collected on years of employment in a noisy job; and whether the respondent wore a hearing aid, had difficulty in hearing conversation, or had persistent tinnitus over the past year.

Some 2% of subjects reported severe hearing difficulties (wearing a hearing aid or having great difficulty in both ears on hearing conversation in a quiet room). In men, the prevalence of this outcome rose steeply with age, from below 1% in those aged 16-24 years to 8% in those aged 55-64. The pattern was similar in women, but with severe hearing loss was only about half as prevalent in the oldest age band. In both sexes, after adjustment for age, the risk of severe hearing difficulty and persistent tinnitus rose with years spent in a noisy job.

In conclusion, significant hearing difficulties and tinnitus are quite common in men from the older working age range. Both are strongly associated with years spent in a noisy occupation - predominantly male exposure. The national burden of hearing difficulties attributable to noise at work is substantial.

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SUMMARY

As part of a national postal survey of exposure to vibration, information was collected on occupational exposure to noise at work, and on hearing difficulties and tinnitus. These data were analysed:

- a) to determine the prevalence of hearing difficulties and tinnitus in working-aged people in Great Britain;
- b) to explore the association between hearing difficulties and tinnitus, and the definition of more severe categories of disease;
- c) to estimate the risk of severe hearing difficulties and tinnitus attributable to occupational noise exposure in Great Britain;
- d) to estimate the number of cases with hearing difficulties and tinnitus attributable to occupational noise exposure in Great Britain; and
- e) to identify the occupations in which hearing difficulties and tinnitus are most common, and to assess whether these are occupations in which workers often have to shout to be heard in an average working day.

Methods

The study sample comprised 21,422 men and women of working age who were selected at random from the age-sex registers of 34 general practices across Britain, and a further 993 men and women from HM Armed Services selected at random from pay records for serving members. Following a small number of exclusions, 22,194 questionnaires were mailed in two tranches, divided between the summer of 1997 and the following winter. Usable responses were obtained from 12,907 subjects (an overall response rate of 58%, and of 61% among those who could be contacted).

Among other items the questionnaire asked about current occupation: whether an average day in the job required the respondent to shout most of the time to be heard by colleagues; how many years altogether had been spent working in noisy places where there was a need to shout to be heard; whether the respondent wore a hearing aid; whether he or she had hearing difficulties in a quiet room; and whether he or she had had ringing, buzzing or whistling in the ears or head lasting more than five minutes and occurring most or all of the time in the past year (persistent tinnitus). Associations of hearing difficulty and tinnitus with noise exposure were examined by logistic regression, with adjustment for age, sex, smoking habits, and frequent complaints of headaches, tiredness or stress. The findings were expressed as prevalence ratios (PRs) with associated 95% confidence intervals (CIs). Attributable proportions (the proportions of cases with hearing difficulty that would be avoided if the

excess prevalence associated with exposure to noise were eliminated) were also calculated from the relevant PRs and an estimate of the prevalence of exposure to noise at work nationally.

Results

Around 2% of men and women reported wearing a hearing aid or having severe difficulties in hearing (great difficulty in both ears in hearing conversation in a quiet room). The prevalence of these outcomes rose strongly with age, from below 1% in men aged 16-24 years to 8% in men aged 55-64. The pattern was similar in women, but in contrast, severe hearing loss was only about half as prevalent in the oldest age band. Tinnitus was far more common in subjects with hearing difficulties.

In both sexes, severe hearing difficulty was uncommon under the age of 35 years, as was long-term noise exposure (exposure of 10 years or more). When analysis was confined to ages above this, the risk of reporting severe hearing difficulty and persistent tinnitus rose according to years worked in a noisy job, and according to age, and was associated with complaints of frequent headaches, and frequent tiredness or stress. In men with at least 10 years of exposure, the adjusted PR for severe hearing difficulty was 3.8 (95%CI 2.4-6.2) and that for persistent tinnitus 2.6 (95%CI 2.0 -3.4) in comparison with men who had never had occupational exposure to noise. Among women, the relationship to duration of noise exposure was less clear-cut. On the basis of the risk estimates made and the prevalence of occupational noise exposure in the sample, it was estimated that nationally some 153,000 men and 26,000 women aged 35-64 years have severe difficulties of hearing attributable to noise at work, and that 266,000 men and 84,000 women in this age band have attributable persistent tinnitus.

Among men, hearing difficulty was most prevalent in transport and machinery operatives, construction workers, material moving and storage workers and repetitive assembly and inspection workers; and in women, among cleaners and caterers. In construction workers, the prevalence of moderate or worse hearing difficulty was 11.5% (vs. 5% for all occupations), and that of severe hearing difficulty was 5% (vs. 1.9% for all occupations).

Conclusions

Significant hearing difficulty and tinnitus are quite common, especially in men in the older working age range. Both are strongly associated with years of exposure in a noisy occupation, and these exposures arise largely in men. The burden of hearing difficulties attributable to occupational noise exposure in Great Britain is substantial. This report highlights some occupations in which hearing difficulty and current reports of significant noise appear to coincide. The findings on risk by occupation should be regarded as exploratory (owing to small numbers in individual groups), but it seems appropriate to focus hearing conservation measures particularly on workers from the construction industry.

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BACKGROUND

Occupational exposure to noise is an important cause of hearing impairment and disability. In the early 1980s, the Health and Safety Commission estimated that in British manufacturing alone 600,000 workers were exposed to potentially injurious levels of noise (≥ 90 dB(A)).¹ More recently, it has been estimated that 11% of employed men and 6% of employed women in Britain nearly always need to raise their voices to be heard in the workplace, and that 3% of men and 2% of women encounter working conditions that leave them with ringing in their ears or temporary deafness on a daily basis.²

Evidence on hearing impairment attributed to noise exposure in Great Britain comes from several sources. In 1995, 14,200 individuals were in receipt of a state industrial injuries benefit for occupational deafness,³ but the burden of disease is likely to be considerably greater than this. Thus, in a recent HSE-commissioned survey of self-reported illness it was estimated that some 140,000 people had deafness or tinnitus caused or made worse by their work,⁴ while in the period 1991-1995, members of the UK Association of British Insurers handled some 230,000 noise-related claims for deafness.⁵

Recently, a large postal survey was conducted to obtain national estimates of occupational exposure to vibration.^{6,7} Because of interest in the relation between exposure to sources of hand-transmitted vibration and sensorineural hearing loss,^{8,9} the survey also collected information on exposure to noise and hearing impairment, and this provided an opportunity to investigate further the extent of hearing difficulties and tinnitus in working-aged people and the burden of disease attributable to occupational sources of noise exposure in Great Britain.

OBJECTIVES

- a) to determine the prevalence of hearing difficulties and tinnitus in working-aged people in Great Britain;
- b) to explore the association between hearing difficulties and tinnitus, and the definition of more severe categories of disease;
- c) to estimate the risk of severe hearing difficulties and tinnitus attributable to occupational noise exposure in Great Britain;
- d) to estimate the number of cases with hearing difficulties and tinnitus attributable to occupational noise exposure in Great Britain; and
- e) to identify the occupations in which hearing difficulties and tinnitus are most common, and to assess whether these are occupations in which workers often have to shout to be heard in an average working day.

METHODS

SAMPLE SELECTION

In 1997-98 a postal questionnaire was mailed to a sample of 21,201 men and women from the patient lists of 34 general practices (163 general practitioners), and to 993 members of HM Armed Services.^{6,7} The main purpose of the survey was to estimate national patterns of exposure to vibration, and so the practices were chosen to provide a broad geographical coverage of Great Britain and to ensure that industries with known exposure to vibration were included in the sample. The Royal College of General Practitioners and the Primary Care Rheumatology Society were contacted to discover whether GPs who had an interest in research were practising in the selected areas. Candidate practices were approached and recruited. In a few locations where practices could not be enlisted in this way, practices were identified from names in the Medical Directory. The locations of the practices are shown Figure 1. They included practices from Scotland, Wales, and rural and industrial locations in England. Details of the numbers selected from each practice are provided in Table 1. Prior approval was obtained from the Local Research Ethics Committee in each area (30 committees in all). Each practice supplied the research team with a computer disc containing the names and contact details of all men and women aged 16-64 on their age-sex register.

The mailing was split into two tranches during different calendar periods. In the summer of 1997, 1 in 8 samples of men and women were randomly selected from the patient lists of 18 of the practices. A similar procedure was followed in the following winter for the remaining practices, except that the sampling fraction was varied to include a higher proportion of men (1 in 6 men as compared with 1 in 12 women). The provisional mailing lists were vetted by the general practitioners concerned and a few subjects (1%) were excluded on their advice, because of terminal illness or recent bereavement. The remainder were each sent a postal questionnaire with covering letters from the study team and GP. The first mailing was conducted in the third week of May and first week of June 1997 (11,965 subjects), and the second in the last week of January 1998 (10,229 subjects). Non-responders were sent a single reminder after about five weeks.

In the armed forces, primary care services are provided by military rather than civilian doctors. To ensure serving members were included in the survey, a separate armed forces

Figure 1
Location of general practices in the national survey of vibration



Table 1
Questionnaire distribution and response rates, overall and by centre
(a) - 1997 mailing

Location of general practice	Typical local industry*	Numbers selected	Numbers vetted out [#]	Numbers mailed	Numbers not contactable ¹	Numbers returned [‡]	% Response rate ⁺
Devon	Agriculture	398	2	396	15	278	73.0
Suffolk		516	7	509	29	315	65.6
Wolverhampton	Metal Manufacture	512	15	497	11	327	67.3
Middlesbrough		611	18	593	22	345	60.4
Sheffield		437	3	434	26	193	47.3
Glasgow	Ship Building	774	18	756	91	357	53.7
Newcastle		284	0	284	18	143	53.8
Stoke	Heavy Engineering	856	7	849	10	543	64.7
Leeds		912	25	887	18	572	65.8
Coventry	Coach & Vehicle Repair	929	0	929	45	596	67.4
Derby		1196	6	1190	42	722	62.9
Eastleigh		565	0	565	19	333	61.0
Selby	Coal mining	764	0	764	20	417	56.0
Caernarfon	Quarrying	458	2	456	11	282	63.4
Hexham	Forestry	627	0	627	16	432	70.7
Lyndhurst		386	7	379	19	227	63.1
Birkenhead	Ships Crews	724	7	717	34	445	65.2
Lambeth	Various	1133	0	1133	168	375	38.9
	Totals	12082	117	11965	614	6902	60.8

(b) -1998 mailing

Location of general practice	Typical local industry *	Numbers selected	Numbers vetted out [#]	Numbers mailed	Numbers not contactable ¹	Numbers returned [‡]	% Response rate ⁺
Devon	Agriculture	139	5	134	8	94	74.6
Suffolk		371	8	363	41	213	66.1
Birmingham	Metal manufacturing	835	1	834	34	447	55.9
Port Talbot		704	10	694	12	395	57.9
Newcastle	Ship building	878	15	863	30	385	46.2
Leeds	Heavy engineering	332	0	332	12	215	67.2
Derby	Coach & vehicle repair	401	9	392	25	243	66.2
Mansfield	Coal mining	885	6	879	21	553	64.4
Selby		1062	21	1041	26	675	66.5
Aberdeen	Quarrying	342	7	335	22	208	66.5
Portland		874	5	869	27	565	67.1
Lochgilphead	Forestry	524	4	520	28	328	66.7
Hull	Ships crews	528	1	527	37	270	55.1
Kendal	Shoe making	639	4	635	20	416	67.6
Lewisham	Various	331	2	329	24	133	43.6
Bolton	Various	495	6	489	41	220	49.9
RAF	Armed service	297	0	297	0	216	72.7
Navy	Armed service	220	0	220	5	139	64.7
Army	Armed service	476	0	476	1	290	61.1
Totals		10333	104	10229	414	6005	61.2

* The locations of practices were chosen with regard to typical industries in the area; however, as subjects were chosen at random from general practice lists, a wide range of local occupations and industries were sampled in each location

[#]Number excluded from the mailing on general practitioners' advice

¹Number of questionnaires returned as 'not known at this address', 'moved away' or 'deceased'

[‡]and confirmed (date of birth and sex consistent with the expectation)

⁺Among those who were mailed to, and not known to have moved away or deceased

mailing was conducted in January 1998. Sampling was restricted to those currently resident in Great Britain, and a simple random sample of men and women aged 16-64 was taken from each service, using central pay records for serving members as an enumeration list. Altogether, 993 names were selected divided between the services in proportion to their estimated national head counts, with the sampling fraction set accordingly. This resulted in questionnaires being mailed to 297 subjects from the Royal Air Force, 220 subjects from the Royal Navy and 476 subjects from the Army. For this mailing, a covering letter was provided by the Director General Medical Services (in lieu of the general practitioner), but the procedure was otherwise similar to that employed in the principal mailings.

STUDY QUESTIONNAIRE

The questionnaire (Appendix) was developed following consultation with health and safety professionals, vibration specialists, trades unions, trade associations and members of a former working group of the Faculty of Occupational Medicine. It underwent several rounds of field-testing and refinement, the details of which have been published.¹⁰

The items of interest in the context of this report were: current occupation; whether or not an average day in the job required the respondent to shout most of the time to be heard by colleagues (Q9); how many years altogether had been spent working in noisy places where there was a need to shout to be heard (Q31); whether a hearing aid was currently used (Q49); the level of hearing difficulty in a quiet room (Q50-51); and the prevalence of tinnitus in the previous year (Q52). Questions were also asked that permitted an assessment of potential reporting biases (for example, 'dummy' health outcomes, to gauge generalised over-reporting of symptoms; and questions about headaches, tiredness and stress, to identify psychological variables that might affect propensity to report symptoms).

The principal measure of **noise exposure** was years of working in a noisy occupation (Q31), for which five mutually exclusive ordinal response categories were provided (never, less than 12 months, 1-5 years, 6-10 years and more than 10 years).

Difficulty in hearing was ascertained using the following question:

'How well can you hear a person who is talking to you when he is sitting on your right [left] side in a quiet room?'

The categories of response (on a five-point ordinal scale) for each ear were: 'cannot hear him at all', 'with great difficulty', 'with moderate difficulty', 'with slight difficulty', and 'with no

difficulty'. In the analysis, the first two categories were combined, as were the last two, to create a three-point scale for each ear: (a) none or slight, (b) moderate, and (c) severe hearing difficulty (great difficulty or can't hear at all). The questions on hearing difficulty had been modelled on those used in the MRC Institute of Hearing Research National Survey of Hearing,¹¹ in which those who reported 'moderate difficulty' in hearing conversation in a quiet room were found to have a mean hearing impairment of about 45 db HL.

Occupational deafness is commonly bilateral, and the level of handicap in individuals is strongly influenced by the hearing in their better ear. So the hearing disability of *individuals* (as opposed to ears) was further classified as:

- (a) 'none or slight in *the better ear*', or
- (b) 'severe in *both ears*' or
- (c) 'intermediate between these'.

In those who only reported on hearing in one ear, the category was determined according to the hearing ability of the ear for which information was provided (as described on p18).

Information was also collected on **use of a hearing aid**. This sometimes resulted in individuals who wore an aid reporting no difficulties in hearing. In case compensated hearing abilities had been reported, an additional category of severe hearing difficulty was also considered - namely:

- (d) severe difficulty (as in (b) above) *and/or* use of a hearing aid.

Tinnitus was identified using the following question:

'During the past 12 months have you had noises in your head or ears (such as ringing, buzzing or whistling) which lasted longer than five minutes?'

The responses categories were: (a) 'no, never', (b) 'yes, but not most of the time', and 'yes, most or all of the time' (persistent tinnitus).¹²

DATA PROCESSING AND CODING

All returns were double-entered on to computer. A cross-comparison of duplicate entries was used to identify data entry errors, and then a set of checks was performed to detect inconsistencies, and improbable or impossible values for variables. The occupations of respondents were coded to the latest revision of the Standardised Occupational Classification (SOC90).¹³

ANALYSIS

All statistical analyses were carried out using STATA, Release 5.¹⁴ Several personal and occupational factors were considered as potential confounders of the relation between noise and hearing difficulty, including age, sex, smoking history, and co-reporting of stress, depression and anxiety.

Age and sex were included in all adjusted analyses because of their known associations with hearing difficulties and occupational exposure to noise. The other factors were investigated because of *a priori* concerns or evidence from the literature of a possible association. Hearing loss has been found to be more common in smokers,^{15,16} including those who have had no noise exposure.^{16,17} Moreover, smoking may potentiate the harmful effects of noise¹⁸ and may interact with other relevant occupational exposures such as vibration.¹⁹ Subjects may be more likely in some occupations than others to complain of tiredness, headaches, stress and depression or trouble with somatic symptoms such as buzzing in the head.

Exploratory analyses, including pairwise frequency counts, and χ^2 tests of association were first conducted to determine how these factors covaried. The associations between psychological risk factors such as headaches, low mood and feelings of constant tiredness and stress (Q53), were examined after first collapsing the response categories to create dichotomous variables ('frequently suffer' versus 'occasionally or never suffer').

Associations of hearing difficulty and tinnitus with noise exposure were examined by logistic regression, with adjustment for potential confounding, and the findings were expressed as prevalence ratios (PRs) with associated 95% confidence intervals (CIs). These were derived from the corresponding odds ratios according to a formula proposed by Zochetti *et al.*²⁰ Attributable proportions (the proportions of cases of hearing difficulty that would be avoided if the excess prevalence associated with exposure to noise were eliminated) were then calculated from the relevant prevalence ratios and from an estimate of the prevalence nationally of exposures to noise of differing duration at work, using the following formulae:

$$\text{Attributable proportion } (a_p) = \frac{p(R-1)}{1+p(R-1)}$$

where:

R = PR of hearing difficulty (or tinnitus) in a given exposure band compared with those in the lowest band (never exposed occupationally)

p = standardised estimate of the prevalence of having worked in a noisy occupation in the population of Great Britain*

Attributable number $\cong a_p n$

where:

a_p is as above

n = standardised estimate of the number of cases of hearing difficulty (or tinnitus) in the population of Great Britain.*

* Derived from information on prevalence in the study sample, standardised according to the national age and sex structure at the 1991 census.²¹ The analysis excluded members of the armed forces, as few subjects reported deafness, and because their exclusion obviated the need to also standardise for occupation. (The occupational distribution of the sample was otherwise similar to that at the last census).

RESULTS

Questionnaire distribution and returns

Table 1 (page 8 - 9) and Tables 2 - 4 provide information on the study sample and the patterns of response. A total of 22,415 subjects were provisionally selected to receive a questionnaire, but 221 of these were excluded on general practitioners' advice, and so 22,194 questionnaires were mailed. However 1,028 questionnaires (4.6%) were returned as 'address unknown', 'moved away' or 'deceased', and 56 questionnaires were subsequently excluded because their particulars (of date of birth and sex) implied that they were completed by someone other than the intended recipient. This meant that 12,907 usable questionnaires were received, leading to an overall response rate of 58%, and of 61% among subjects who could be contacted.

The response rate varied between general practices (Table 1), being lowest in Lambeth (39%) and highest in Devon (74.6%), but exceeding 65% in 16 of the 34 centres. The response rates in the armed services were: 61% for the Army, 65% for the Navy and 73% for the RAF.

The response rate was higher in women than men (69% as compared with 55%), and higher in older age bands than younger ones (Table 2), but was similar between the summer and winter mailings.

Seventy-three per cent of respondents were in a paid job or self-employed in the week preceding completion of the questionnaire, most of whom (9,084 out of 9,368) were at work in that week (Table 3). Five hundred and thirty-one respondents (4% of those making a usable return) held a second job in the same week, but only 38 men and 20 women reported exposures to noise during an average day in this work, and so analyses that concerned current exposure were confined to the main job held in the week preceding completion of the questionnaire.

The relative frequency of occupations in the sample was generally similar to that in the latest National Census¹³ and two recent random sample community surveys of working conditions² and occupational ill health,⁴ except that the sampling design led to some over-representation of the defence sector (Table 4).

Table 2
Returns and response rate by age and sex

Age Band (yrs)	All Subjects		Men		Women	
	No Returned	% Response	No Returned	% Response	No Returned	% Response
16 - 24	1601	50.6	814	43.4	787	61.0
25 - 34	2911	52.1	1516	45.2	1395	62.6
35 - 44	3033	62.9	1609	57.2	1424	70.8
45 - 54	2951	68.4	1652	64.2	1299	74.6
55 - 65 ⁺	2406	74.0	1317	71.2	1089	77.6
missing	5		5		0	
Total	12907	61.0	6913	55.4	5994	69.0

⁺The responses include 33 men and 39 women who were 64 when the mailing list was assembled, but were 65 at the time the questionnaire was completed

Table 3
Employment characteristics of the respondents

	All Subjects (n=12 907)		Men (n=6 913)		Women (n=5 994)	
	No	%	No	%	No	%
Employed in past week: in paid job (Q6) or self employed (Q8)	9368	72.6	5490	79.4	3878	64.7
At work in the past week (Q10)	9084	70.4	5364	77.6	3720	62.1
Second job held in past week (Q21)	531	4.1	274	4.0	257	4.3

Table 4

Occupational distribution of the study sample in relation to the 1991 Census, and two other surveys of occupational ill health

Occupational Groups*	National Census 1991²¹ (%)	Labour Force Survey 1995⁴ (%)	Survey of Working Conditions 1995² (%)	Current Survey 1997/8 (%)
Professional & related supporting management (1)	6.6	8.3	7.1	5.9
Teaching (2)	3.4	3.7	4.0	4.1
Nursing (3)	2.9	2.6	3.4	2.9
Other education & welfare (4)	2.8	3.4	3.2	3.7
Literary, artistic & sports (5)	1.4	1.8	1.5	1.1
Science & engineering (6)	5.2	5.4	6.0	4.9
Managerial (7)	10.6	10.4	9.5	8.5
Clerical (8)	11.4	11.1	11.5	10.5
Secretarial (9)	5.2	4.5	4.5	4.0
Selling (10)	6.4	7.2	6.9	6.1
Security & protective services (11)	2.4	2.2	2.1	8.7
Catering (12)	3.3	3.9	3.4	3.1
Care workers (13)	2.9	4.1	3.5	3.9
Hair & beauty (14)	0.7	0.6	1.1	1.0
Cleaners (15)	3.8	3.4	3.4	2.7
Other personal services (16)	0.8	0.9	1.1	1.0
Farming, fishing & forestry (17)	2.2	2.2	2.2	2.7
Metal processing (18)	6.5	5.0	4.7	5.2
Electrical processing (19)	2.0	2.0	1.5	1.9
Textile processing (20)	1.4	1.2	1.7	1.0
Other processing (21)	5.6	4.7	4.7	5.7
Repetitive assembly, inspection (22)	2.3	2.2	2.0	1.4
Construction (23)	4.0	3.2	2.7	2.3
Coal mining (24)	0.2	0.1	-	0.2
Road transport operatives (25)	2.9	2.9	3.9	2.5
Other transport & machinery operatives (26)	1.0	0.8	0.8	1.0
Material moving & storing (27)	1.6	1.8	1.6	1.4
Miscellaneous (28)	0.3	0.4	0.4	1.0

**As defined in 'Self-Reported Working Conditions in 1995', Appendix 2. Percentages are of those in employment.*

Hearing loss

Table 5 records the level of reported hearing difficulty in each ear. Among those providing full details, 8,854 subjects reported slight or no difficulty in both ears, 67 reported severe bilateral difficulties in hearing, and 505 reported intermediate combinations of hearing difficulty. Information on hearing abilities was missing for 1,113 subjects in respect of the right ear, and for 23 subjects in respect of the left ear (suggesting a strong order effect in completing the questionnaire). These subjects were categorised according to the hearing ability of the ear for which information was provided. After allowance for this, 10,207 subjects were counted as having slight or no difficulty of hearing, 89 as having severe difficulties in hearing, and 266 as having intermediate hearing abilities. A further 2,345 subjects failed to report on hearing in either ear.

Use of a hearing aid

Table 6 provides more information on the use of a hearing aid. Among 12,710 subjects who answered the relevant question, 165 (1.3%) reported that they wore a hearing aid. In those who provided full information on their hearing abilities, the prevalence of hearing aid use varied from 0.4% (for slight or no difficulties in both ears) to 64% (in those with severe hearing difficulties in both ears). In general, the prevalence rose with increasing difficulties in either ear. However, for those with missing information it was low (e.g. 0.1% in 2301 subjects who had omitted to answer both of the questions on hearing ability).

Prevalence of hearing difficulties and use of a hearing aid by age and sex

Around 2% of male and female respondents reported wearing a hearing aid or having severe difficulties in hearing or both. The prevalence of these outcomes rose strongly with age (Table 7) - from below 1% in men aged 16-24 years to 8% in men aged 55-64. A similar age-related trend was evident for intermediate levels of hearing difficulty in men (from <1% to 9%).

The pattern was similar in women, although, in comparison with men, severe hearing loss was only about half as prevalent among those from the oldest age band. However, when analysis was confined to men and women who had never reported working in a noisy job, sex differences in the 55-64 year age-band narrowed, with 4% of men and 3% of women reporting such difficulties.

Table 5
Relation between hearing abilities* in the left and right ears

Hearing in the right ear	Hearing in the left ear (No.)			
	Slight or no difficulty	Moderate difficulty	Severe difficulty or can't hear at all	Missing
Slight or no difficulty	8854	100	42	20
Moderate difficulty	88	174	31	3
Severe difficulty or can't hear at all	52	18	67	0
Missing	1051	40	22	2345

* *difficulty in hearing a whispered voice nearby in a quiet room*

Table 6
The prevalence of hearing aid use according to reported hearing capabilities

Hearing in the right ear	Hearing in the left ear (No. and %)			
	Slight or no difficulty	Moderate difficulty	Severe difficulty or can't hear at all	Missing
Slight or no difficulty	32/8820 (0.4%)	9/100 (9.0%)	11/41 (26.8%)	0/18 (0.0%)
Moderate difficulty	11/87 (12.6%)	21/171 (12.3%)	15/31 (48.4%)	2/3 (66.7%)
Severe difficulty or can't hear at all	7/52 (13.5%)	9/18 (50.0%)	43/67 (64.2%)	0/0 (0.0%)
Missing	1/954 (0.1%)	0/30 (0.0%)	1/17 (5.9%)	3/2301 (0.1%)

excludes 197 subjects who did not answer the question on use of a hearing aid

Table 7
Prevalence of hearing difficulty and use of a hearing aid by age and sex

	Difficulty in hearing*						use of a hearing aid		severe or can't hear at all in both ears and/or use of a hearing aid	
	none or slight in better ear		intermediate		severe or can't hear at all in both ears		No	%	No	%
	No	%	No	%	No	%				
MEN										
16 - 24	689	99	2	<1	0	<1	3	<1	3	<1
25 - 34	1303	99	7	<1	3	<1	7	<1	9	1
35 - 44	1325	97	38	3	7	<1	6	<1	11	1
45 - 54	1289	95	56	4	18	1	23	1	32	2
55 - 65 ⁺	925	88	94	9	31	3	64	5	78	8
<i>All</i>	<i>5531</i>	<i>96</i>	<i>197</i>	<i>3</i>	<i>59</i>	<i>1</i>	<i>103</i>	<i>2</i>	<i>133</i>	<i>2</i>
WOMEN										
16 - 24	640	99	1	<1	0	0	5	1	5	1
25 - 34	1141	99	9	1	3	<1	7	<1	8	1
35 - 44	1153	98	12	1	6	<1	8	1	11	1
45 - 54	969	97	17	2	11	1	20	2	25	3
55 - 65 ⁺	769	95	30	4	10	1	22	2	28	4
<i>All</i>	<i>4672</i>	<i>98</i>	<i>69</i>	<i>2</i>	<i>30</i>	<i><1</i>	<i>62</i>	<i>1</i>	<i>77</i>	<i>2</i>

Excludes 4 subjects with missing dates of birth.

** Categories as defined in text; + includes a few men and women who were 64 when the mailing lists were assembled but 65 when the questionnaire was returned.*

In both sexes, severe hearing difficulty was unusual under the age 35 of years.

Prevalence of tinnitus and its relation to age, sex and hearing abilities

Occasional tinnitus was common and similarly prevalent in all age bands, affecting around a quarter to a third of all respondents (Table 8). But persistent tinnitus (tinnitus occurring most or all of the time) increased markedly with age. As with hearing difficulty, this complaint was more common in men than women - overall (6% vs. 3%) and especially in the survey's oldest age band (13% vs. 5% in those aged 55-64 years).

Tinnitus was more common in those with hearing difficulties (Table 9). Among men, the age-standardised prevalence of persistent tinnitus was around three times greater in those who had severe hearing difficulty and/or wore a hearing aid than in those with slight or no difficulties in hearing. In women, it was approximately 12 times more common.

When analysis was confined to those who had never worked in a noisy job, a similarly strong relationship was found. Thus, the age-standardised prevalence of persistent tinnitus was 3.1% in men with no hearing difficulties, as compared with 18% in men who had severe difficulties or wore a hearing aid; and the corresponding figures in women were 2.2% and 27.1% respectively.

Age, sex, and years of employment in a noisy occupation

Table 10 records the duration of occupational exposure to noise according to sex and age band. Around a third of men and 11% of women had worked in a noisy job for a year or longer, with 16% of men and 3% of women reporting more than 10 years of such exposure. Long-term exposure was uncommon below the age of 35 years, but in the 55-64 year age-band, 26% of men and 5% of women reported such exposures. For lesser durations of exposure there was a weaker correlation with age.

In view of the low prevalence of hearing loss in younger age bands and their limited opportunity for long-term exposure, subsequent analyses focussed on men and women aged 35-64 years, as the population at risk of noise-attributable hearing loss.

Table 8
Prevalence of tinnitus by age and sex

	Tinnitus					
	never		sometimes		most or all of the time	
	No	%	No	%	No	%
MEN						
16 - 24	478	64	256	34	9	1
25 - 34	1006	71	371	26	32	2
35 - 44	1028	69	396	27	61	4
45 - 54	1059	69	366	24	104	7
55 - 65 ⁺	746	61	316	26	154	13
<i>All</i>	<i>4317</i>	<i>68</i>	<i>1705</i>	<i>27</i>	<i>360</i>	<i>6</i>
WOMEN						
16 - 24	458	64	237	33	16	2
25 - 34	957	74	323	25	18	1
35 - 44	1012	77	273	21	35	3
45 - 54	851	71	294	25	49	4
55 - 65 ⁺	671	68	261	27	49	5
<i>All</i>	<i>3949</i>	<i>72</i>	<i>1388</i>	<i>25</i>	<i>167</i>	<i>3</i>

Excludes 5 subjects with missing dates of birth

+ includes 31 men and 35 women who were 64 when the mailing lists were assembled but 65 when the questionnaire was returned

Table 9
Age-standardised prevalence of persistent tinnitus by level of hearing difficulty and use of a hearing aid

	Persistent tinnitus [†]	
	Men	Women
	%	%
Difficulty in hearing:		
none or slight in better ear	5.0	2.8
intermediate	21.9	14.9
severe or can't hear at all in both ears	12.1	23.4
Use of hearing aid	17.9	39.3
Severe difficulty in hearing or can't hear at all <i>and/or</i> use of hearing aid	16.1	33.1

[†] Ringing, buzzing or whistling in the head or ears, most or all of the time in past 12 months.
 In each sex, the prevalences were standardised according to the age distribution of the whole sample.

Table 10
Relation of age and sex with years worked in a noisy job

Age band	Years in a noisy job											
	None		<1		1-5		>5-10		>10		missing	
	No	%	No	%	No	%	No	%	No	%	No	%
MEN												
16 - 24	476	58	164	20	110	14	27	3	0	0	37	5
25 - 34	688	45	245	16	240	16	157	10	136	9	50	3
35 - 44	706	43	218	14	222	14	113	7	277	17	73	5
45 - 54	738	45	187	11	183	11	81	5	375	23	88	5
55 - 65 ⁺	597	45	108	8	126	10	64	5	340	26	82	6
<i>All</i>	3205	46	922	13	881	13	442	6	1128	16	330	5
WOMEN												
16 - 24	614	78	78	10	47	6	7	1	0	0	41	5
25 - 34	1065	76	91	7	98	7	39	3	18	1	84	6
35 - 44	1085	76	70	5	98	7	32	2	34	2	105	7
45 - 54	957	74	62	5	71	5	19	1	63	5	127	10
55 - 65 ⁺	761	70	27	2	61	6	33	3	53	5	154	14
<i>All</i>	4482	75	328	5	375	6	130	2	168	3	511	9

Excludes 5 subjects with missing dates of birth.

⁺ *includes 33 men and 39 women who were 64 when the mailing lists were assembled but 65 when the questionnaire was returned.*

Prevalence of hearing difficulty and tinnitus according to occupation

Table 11 records, for this subset, the prevalence of hearing difficulties and tinnitus according to occupation (classified in parts (a) and (b) as in Appendix 2 of the HSE report *Self-Reported Working Conditions in 1995*², and in part (c) according to SOC90¹³).

As in previous tables, data are presented for severe hearing difficulty (including the use of a hearing aid). But to ensure there were adequate numbers in the analyses by occupation and that the risks of more modest hearing loss were not overlooked, a new category was also examined - namely, 'moderate or worse hearing difficulty'. This was defined as *either* intermediate *or* severe hearing difficulty *or* the use of a hearing aid (the combination of categories (c) and (d) as defined on p12). The data are ordered according to the prevalence of moderate or worse hearing loss within occupational groups.

Using the HSE classification, moderate or worse hearing difficulties among men were most prevalent in other transport and machinery operatives (16%), construction workers (12%), material moving and storage workers (11%) and repetitive assembly and inspection workers (11%); while severe hearing difficulty was most common in construction workers (5.0%) and material moving and storage workers (5.4%). In comparison, the prevalences of reported hearing difficulty for employed men were 5.0% (moderate or worse) and 1.9% (severe) respectively. Persistent tinnitus tended to be about a third to a half as common in these workers, and in process workers and farming, fishing and forestry workers, as in all workers combined. However, no particular excesses of hearing difficulty were found among men working in security (- a category which included many military personnel), or in farming, fishing, forestry, and road transport. The prevalence of hearing difficulty and of having to shout in an average working day tended, in general, to correlate.

Among women, moderate or worse hearing difficulty was most common in caterers (10%) and cleaners (7%), and women in these occupations also most commonly reported severe hearing difficulty (5.7% and 3.8% respectively, as compared with 1.6% for all workers collectively). Caterers most often reported having to shout in an average working day, but the prevalence was also high among female school teachers, among whom no hearing difficulty was reported.

Table 11
Prevalence of hearing difficulty and tinnitus by occupation and their relation to current noise exposure
(a) in men

Occupational group *	No. in occupation reporting on hearing	Hearing difficulty ¹				Persistent tinnitus (%)	% Having to shout in average work day ⁺ (%)
		Moderate or worse		Severe only			
		No.	%	No.	%		
Other transport & machinery operatives (26)	43	7	16.3	1	2.4	10.6	28.9
Missing	63	8	12.7	3	4.8	6.9	16.9
Construction (23)	122	14	11.5	6	5.0	8.3	26.2
Material moving & storing (27)	56	6	10.7	3	5.4	8.2	9.6
Repetitive assembly, inspection (22)	38	4	10.5	1	2.6	6.0	20.2
Metal processing (18)	257	23	8.9	7	2.7	8.0	25.4
Other processing (21)	229	15	6.6	6	2.6	6.6	30.9
Electrical processing (19)	102	5	4.9	2	2.0	8.8	14.4
Managerial (07)	354	15	4.2	6	1.7	4.5	4.1
Clerical (08)	182	7	3.8	5	2.7	5.5	0.6
Selling (10)	98	3	3.1	1	1.0	6.3	3.6
Science & engineering (06)	241	7	2.9	2	0.8	6.1	4.3
Farming, fishing & forestry (17)	108	3	2.8	1	0.9	10.7	11.6
Road transport operatives (25)	151	4	2.6	1	0.7	6.4	7.1
Other education & welfare (04)	104	2	1.9	1	1.0	2.7	3.3
Security & protective services (11)	257	4	1.6	0	0.0	4.2	17.8
Professional & related supporting management (01)	199	2	1.0	1	0.5	3.7	0.3
Teaching (02)	104	1	1.0	1	1.0	2.5	6.0
<i>All occupations</i>	2925	146	5.0	56	1.9	6.1	13.0

*As defined in 'Self-reporting Working Conditions in 1995, Appendix 2

¹As defined in the text

⁺Percentage of all respondents in the occupation.

Analysis confined to men and women aged 35 - 64 years (except for the last column).

(b) in women

Occupational group *	No. in occupation reporting on hearing	Hearing difficulty ¹				Persistent tinnitus (%)	% Having to shout in average work day ⁺ (%)
		Moderate or worse		Severe only			
		No.	%	No.	%		
Catering (12)	70	7	10.0	4	5.7	3.4	16.2
Cleaners (15)	106	7	6.6	4	3.8	5.1	2.6
Selling (10)	139	4	2.9	4	2.9	2.3	1.2
Clerical (08)	339	8	2.4	6	1.8	2.6	1.2
Missing	44	1	2.3	0	0.0	1.7	3.0
Professional & related supporting management (01)	108	2	1.9	1	0.9	2.6	0.9
Other education & welfare (04)	109	2	1.8	1	0.9	1.6	2.1
Care workers (13)	180	3	1.7	0	0.0	1.4	4.3
Secretarial (09)	182	3	1.6	3	1.6	3.3	0.3
Nursing (03)	134	2	1.5	2	1.5	0.0	0.8
Managerial (07)	137	2	1.5	1	0.7	4.8	1.5
Teaching (02)	140	0	0.0	0	0.0	3.0	8.3
<i>All occupations</i>	<i>1881</i>	<i>48</i>	<i>2.6</i>	<i>30</i>	<i>1.6</i>	<i>2.6</i>	<i>4.3</i>

*As defined in 'Self-reporting Working Conditions in 1995, Appendix 2

¹As defined in the text

⁺Percentage of all respondents in the occupation.

Analysis confined to men and women aged 35 - 64 years (except for the last column).

(c) in men and women (according to SOC 90)

Occupation (SOC 90)	No. in occupation reporting on hearing	Hearing difficulty ¹				Persistent tinnitus (%)	% Having to shout in average work day ⁺ (%)
		Moderate or worse		Severe only			
		No.	%	No.	%		
MEN							
Electricians and electrical maintenance fitters (521)	52	4	7.7	1	1.9	10.9	22.1
Production workers and maintenance managers (110)	66	5	7.6	2	3.0	5.6	8.5
Metal working, production and maintenance fitters (516)	94	4	4.3	2	2.1	7.4	20.7
Other managers & administrators nec (199)	90	3	3.3	2	2.2	4.1	2.4
Drivers of road goods vehicles (872)	105	2	1.9	1	1.0	6.8	9.6
Managers & proprietors in service industries (179)	55	1	1.8	0	0.0	8.5	2.0
<i>All occupations</i>	2925	146	5.0	56	1.9	6.1	13.0
WOMEN							
Cleaners, domestics (958)	93	5	5.4	3	3.2	4.3	2.5
Clerks (430)	122	4	3.3	4	3.3	2.8	1.2
Accounts & wages clerks etc (410)	60	2	3.3	1	1.7	1.5	1.6
Sales assistants (720)	106	2	1.9	2	1.9	2.3	0.7
Counter clerks and cashiers (411)	56	1	1.8	1	1.8	1.6	2.0
<i>All occupations</i>	1881	48	2.6	30	1.6	2.6	4.3

¹As defined in the text

⁺Percentage of all respondents in the occupation.

Analysis confined to men and women aged 35 - 64 years (except for the last column).

When considered by SOC classification (Table 11 (c)), hearing difficulty among men was most common in electricians and electrical maintenance fitters, production workers and maintenance managers, and metal working, production and maintenance fitters; and among women, in cleaners and domestics. Over 20% of male electricians and fitters reported having to shout in an average working day.

Hearing difficulty, tinnitus and years of occupational exposure to noise

Table 12 presents the risks of severe hearing difficulty (severe hearing loss and/or use of a hearing aid) and persistent tinnitus according to years worked in a noisy job. In the logistic model adjustments were made for smoking habits, complaints of frequent tiredness or stress, frequent headaches (data for which are presented), and also for age. Separate models were fitted for men and women.

Smoking habits showed no clear relation with hearing loss or tinnitus. But there were significant associations with reports of frequent headaches (PR 1.7 for tinnitus in men, and 1.7-2.3 for severe hearing difficulties and tinnitus in women) and of tiredness or stress (PRs 1.5-2.0 for the two outcomes in men).

After allowance for these factors and for age, the risk of auditory symptoms rose with years of employment in a noisy job. Thus, in men with 10 or more years of exposure, the PR for severe hearing difficulty was 3.8 (95%CI 2.4-6.2) and that for persistent tinnitus 2.6 (95%CI 2.0 -3.4) in comparison with those who had never had occupational exposure to noise. Among women, those who reported occupational exposure to noise more often had severe hearing difficulties and persistent tinnitus (with PRs of around 2), but the relationship to duration of noise exposure was less clear-cut. An increased risk of severe hearing difficulty was also found in 168 men who did not complete the question on lifetime occupational exposure to noise (PR 2.6, 95%CI 1.2 - 5.5).

Hearing loss and tinnitus attributable to vocational noise exposures in Britain

Table 13 provides estimates of the number of men and women with hearing difficulties and persistent tinnitus attributable to occupational noise exposure nationally. The estimate is based on a dichotomous classification of exposure (ever vs. never worked in noisy places where there was a need to shout to be heard), and relates only to those aged 35-

Table 12
Risk of hearing difficulty and tinnitus according to years of employment in a noisy work environment and also some non-occupational factors
(a) in men

	Men								
	Moderate or worse hearing difficulty [†]			Severe hearing difficulty [†]			Persistent tinnitus [†]		
	No.	% + ve	PR (95% CI)	No.	% + ve	PR (95% CI)	No.	% + ve	PR (95% CI)
Years worked in a noisy job:									
None	1617	3.0	1.0	1616	1.4	1.0	1849	4.5	1.0
<1	425	2.1	0.8 (0.4, 1.5)	425	1.7	1.4 (0.6, 3.1)	464	6.9	1.6 (1.1, 2.3)
1-5	430	5.4	1.8 (1.1, 2.8)	430	2.6	1.9 (0.9, 3.8)	478	8.0	1.8 (1.2, 2.5)
>5-10	217	11.5	3.3 (2.1, 5.0)	216	4.6	3.0 (1.5, 6.1)	240	7.5	1.6 (1.0, 2.5)
>10	779	18.5	5.2 (3.8, 7.1)	773	6.9	3.8 (2.4, 6.2)	897	13.4	2.6 (2.0, 3.4)
Missing	169	8.3	2.1 (1.2, 3.5)	168	4.8	2.6 (1.2, 5.5)	188	8.5	1.6 (0.9, 2.6)
Ever smoked	2207	8.5	1.1 (0.8, 1.4)	2202	3.9	1.3 (0.9, 2.1)	2499	8.2	1.0 (0.8, 1.2)
Frequent headaches	359	13.7	1.6 (1.1, 2.2)	356	4.8	1.2 (0.7, 2.0)	395	13.4	1.7 (1.2, 2.2)
Frequent tiredness or stress	1069	11.3	1.7 (1.3, 2.2)	1065	5.0	2.0 (1.3, 2.9)	1186	10.6	1.5 (1.2, 1.9)

* Analysis confined to those aged 35-64 years

[†]As defined in the text

[†] Ringing, buzzing or whistling in the head or ears most or all of the time over the past 12 months.
 Prevalence ratios were mutually adjusted and also for age (in 3 bands).

(b) in women

	Women								
	Moderate or worse hearing difficulty ¹			Severe hearing difficulty ¹			Persistent tinnitus [†]		
	No.	% + ve	PR (95% CI)	No.	% + ve	PR (95% CI)	No.	% + ve	PR (95% CI)
Years worked in a noisy job:									
None	2145	2.6	1.0	2145	1.7	1.0	2541	3.0	1.0
<1	127	2.4	1.0 (0.3, 2.9)	127	0.8	0.5 (0.1, 3.4)	145	6.2	2.1 (1.1, 4.0)
1-5	167	10.2	3.6 (2.1, 6.1)	167	4.2	2.3 (1.0, 5.1)	204	8.8	2.8 (1.7, 4.5)
>5-10	62	8.1	2.7 (1.1, 6.2)	61	4.9	2.6 (0.8, 8.0)	76	6.6	1.9 (0.8, 4.5)
>10	112	11.6	3.8 (2.1, 6.6)	111	4.5	2.2 (0.9, 5.4)	136	6.6	1.9 (1.0, 3.7)
Missing	249	5.6	1.8 (1.0, 3.1)	248	3.6	1.8 (0.8, 3.6)	319	4.7	1.4 (0.8, 2.4)
Ever smoked	1334	4.2	1.0 (0.7, 1.5)	1332	2.2	0.9 (0.5, 1.4)	1599	4.1	1.0 (0.7, 1.4)
Frequent headaches	545	6.8	2.1 (1.4, 3.3)	544	4.0	2.3 (1.3, 4.0)	652	6.1	1.7 (1.2, 2.5)
Frequent tiredness or stress	1082	5.0	1.3 (0.9, 1.9)	1080	2.9	1.4 (0.8, 2.3)	1300	4.9	1.2 (0.9, 1.8)

* Analysis confined to those aged 35-64 years

¹As defined in the text.

[†] Ringing, buzzing or whistling in the head or ears most or all of the time over the past 12 months.
Prevalence ratios were mutually adjusted and also for age (in 3 bands).

Table 13
Estimated number of cases of hearing difficulty and tinnitus in adults aged 35-64 years attributable to noise exposure at work in Great Britain

Ever vs. never employed in a noisy job*	Moderate or worse hearing difficulty¹	Severe hearing difficulty¹	Persistent tinnitus[†]	Severe hearing difficulty or persistent tinnitus or both
MEN				
PR	3.6	2.9	2.1	2.3
Attributable proportion	58.0%	50.5%	36.0%	39.8%
Attributable no. in Great Britain (95% CI)	414,300 (317,100 - 511,500)	153,000 (88,600 - 217,300)	266,300 (175,600 - 357,000)	387,400 (277,100 - 497,700)
WOMEN				
PR	2.9	1.8	2.5	2.2
Attributable proportion	25.4%	12.4%	20.9%	17.9%
Attributable no. in Great Britain (95% CI)	94,400 (47,800 - 140,900)	25,800 (0 - 56,000)	84,000 (37,900 - 130,200)	97,200 (47,500 - 147,000)

*Ever worked in a noisy place where there was a need to shout to be heard

¹As defined in the text

[†] Ringing, buzzing or whistling in the head or ears most or all of the time over the past 12 months.

The PRs were adjusted for age (in 3 bands), tiredness or stress, frequent headaches, and smoking habits. The prevalence of exposure and the number of cases in the population were estimated after standardising the sample estimates according to the 1991 census estimate of the age distribution of men and women nationally. Estimates have been rounded to the nearest hundred. Bootstrapped confidence intervals (CIs) for the attributable numbers were based on 200 re-sampling iterations (after Efron B et al. An Introduction to the Bootstrap. New York: Chapman and Hall, 1993).

64 years. (It should be noted that the overall burden of attributable disease is likely to be higher than this, as no comparable information was obtained in retired people).

Altogether, it was estimated that some 153,000 men and 26,000 women in this age band had attributable severe hearing difficulty; 266,000 men and 84,000 women were estimated to have attributable persistent tinnitus; and 387,000 men and 97,000 women to have either or both categories of disorder. The corresponding estimates for moderate or worse hearing difficulty were roughly three times higher than for severe difficulty (although the heterogenous nature of the case definition argues the need for some caution in interpretation).

DISCUSSION

Our findings indicate that hearing difficulties and tinnitus both increase with age, and tend, among those of working age, to be to a particular problem in men approaching retirement. The data also confirm that the prevalence of both hearing loss and tinnitus increases with the duration of occupational exposure to noise, even after allowance for age. Hence, noise exposure accounts for a part of the pattern, especially in men, and in the 35-64 years age-band in Great Britain contributes an estimated 153,000 men and 26,000 women with severe difficulties of hearing and an additional burden of disease from persistent tinnitus.

POTENTIAL BIASES AND ERRORS

A particular strength of this survey was the large sampling base which included over 22,000 randomly selected subjects. Almost everyone registers with a general practitioner in Great Britain except those in the Armed Forces who were sampled separately, and so the initial sample is likely to have been adequately representative of working-aged adults in Britain.

The response rate was 58%, and so the prevalence of hearing loss and tinnitus could have been overestimated if those with auditory symptoms returned a questionnaire preferentially. However, the questionnaire did not focus on hearing loss or noise exposure specifically, the distribution of occupations in respondents was similar to that at the last national census, and the prevalence of auditory symptoms was similar in those who responded with and without a reminder (whereas response bias might lead to a higher prevalence in ready responders than in tardy ones). The questionnaire mainly concerned vibration, which is a well-recognised source of noise exposure, and so a higher response rate among users of vibratory tools could lead to bias in the estimate of hearing loss, especially in men. But the prevalence of exposure to hand-transmitted vibration was independently corroborated by a second community survey,² and also varied little according to the timing of response.⁶ These observations argue against a major response bias.

Errors might also arise from inaccuracies in the information supplied. Thus, the association of noise exposure with hearing loss and tinnitus might have been exaggerated if those with hearing problems recalled their history of noise exposure more completely, or if those with a long history of noise exposure paid more attention to their hearing difficulties, or if some people shared a lower threshold for reporting health complaints in general. Conversely, non-differential (random)

errors in reporting on exposure or auditory symptoms would bias risk estimates downwards towards the null (no effect) value. However, the associations that were found persisted after adjustment for reports of frequent headaches, tiredness and stress; and the validity of the questions on hearing impairment and tinnitus have been previously established.^{11,12}

A significant minority of subjects failed to report on their hearing abilities, raising the possibility that the attributable burden of hearing loss at the ages studied was underestimated. This seems unlikely, however, as the prevalence of using a hearing aid was similar in these subjects to that in subjects who reported good levels of hearing ability.

Finally, one weakness of the survey is that no direct audiometric screening was possible. The correspondence between self-reported hearing difficulties and measured hearing impairment will not be exact. However, when similar questions were used in an earlier community survey with audiometric follow-up, moderate or worse hearing difficulties were found on the average to correspond with a hearing loss of 45 dB,¹¹ and to this extent the levels of difficulty reported are likely to be material and clinically significant.

RELATION TO OTHER SURVEYS OF DEAFNESS AND TINNITUS

There have been several investigations of the prevalence of hearing impairment in the community. In Hinchcliffe's survey²² of Welsh and Scottish residents, speech hearing loss greater than 25 dB (dB HL) was detected in 4.9% of 45 - 54 year olds and 6.2% of those aged 55 - 64 years. D'Souza *et al* found the prevalence of deafness (mean loss >30 dB in both ears over the vocal frequencies) to be 4.9% among men and 6.6% among women aged 40-64 years who were sampled from the patient lists of two general practices in South-east England.²³ However, the most comprehensive assessment of hearing abilities in Britain, the National Survey of Hearing (NSH),¹¹ was conducted in the 1980s. In the NSH over 48,000 subjects from Cardiff, Glasgow, Nottingham and Southampton were selected at random and mailed a questionnaire about hearing capabilities, using similar questions to those used in the current study. A response rate of 80% was achieved. The prevalence of severe hearing impairment (great difficulty or inability to hear at all in the better ear) ranged from 0.2% in 17 - 30 year olds to 4.1% in those aged 61 - 70 years. More than 3% of respondents reported at least moderate bilateral difficulty in hearing in the quiet. A subset underwent comprehensive audiological assessment, among whom, in the older working aged band (51-60 year age group), 8% had bilateral hearing impairment of 35 - 45 dB HL and 5% had a greater deficit.

Elsewhere, Quaranta *et al*²⁴ assessed 2,170 subjects selected from the electoral registers of six Italian cities (Bari, Florence, Milan, Padua and Palermo). The self-reported prevalence of 'some difficulty in understanding speech' was 24%. Measurable speech hearing loss of 45 dB or greater in the better ear was present in 0.6% of those aged 18 - 30 but in 6% of 51 - 60 year olds and 11% of 61 - 70 year olds. And in the US National Health Examination Survey (1960-2),²⁵ pure tone audiometric thresholds were measured in 6,672 adults, comprising a probability sample representative of the general population. Around 2.7% had an average hearing loss exceeding 40 dB HL (considered at least sufficient to cause frequent difficulties with normal speech).

Differences in the definitions and methods employed, and in the populations sampled and the calendar periods of sampling, make it difficult to compare these findings with our own. However, the level of self-reported hearing difficulty appears to have been higher than in the NSH.¹² (Interestingly, some evidence has accrued recently in the US population of a secular decline in hearing abilities, perhaps attributable to increasing levels of environmental noise pollution.²⁶)

In the majority of surveys, hearing levels have been found to be worse in men than in women. The extent to which this is explained by occupational noise is unclear, but this study points to smaller sex differences for severe hearing impairment in older subjects who have never worked in a noisy job. In the NSH¹¹ and in the Italian study²⁴ hearing impairment was found to be about twice as common in manual workers as in non-manual ones. Both studies also investigated the effects of noise exposure. In the NSH, an estimated exposure at more than 90 dB(A) Leq for a 50-year working lifetime increased the odds of ≥ 45 dBHL in the better ear by 2.3-fold after adjustment for age and sex, while in the Italian study noise exposure (at an undefined level) increased the odds of a loss ≥ 25 dBHL by 2.1 fold and a loss ≥ 45 dBHL by 1.7-fold. These findings are broadly compatible with our own.

Tinnitus has also been widely surveyed in the community setting, and its prevalence has varied markedly according to case definition. In Hinchcliffe's survey 21% - 39% of adults had ever experienced 'any noises' in their ears or head.²² In an OPCS study, 22% said that they had heard noises in their head or ears such as ringing or buzzing sounds, but in a third of these cases the noises were brought on only by the stimulus of a loud noise, water in the ears or catarrhal illness, and only 2% were 'bothered a great deal' by them.²⁷ And in a survey of 6,913 Americans, 26% reported ringing in the ears 'at some point in the past few years', but this was 'more than momentary' in only 8.6% and severe in 5.6%.²⁸

In an analysis based upon 6,804 subjects from the NSH, the point prevalence of tinnitus which was spontaneous (not immediately following noise) and more than transient (lasting at least five minutes) varied little (from 15.5% - 18.6%) between the four cities surveyed, but the prevalence of severely annoying symptoms varied more widely (from 0.4% in Nottingham to 2.8% in Glasgow).¹² In a later more detailed phase of the NSH, persistent spontaneous tinnitus was reported in 9.7% of all adults, with a prevalence of 5.7% in 17 - 30 year olds and 12.4% in 51 - 60 year olds.¹¹ And among 32,000 men and 1,600 women with noise exposure who were assessed as part of an industrial hearing conservation programme in British Columbia, ringing in the ears which was 'more than momentary' and 'recurring or continuous' was reported by 6.6%.²⁹ The prevalence of persistent tinnitus in our survey is broadly compatible with these estimates.

Several investigators have found an increased prevalence of tinnitus in manual workers,^{24,30} and in workers with occupational exposure to noise.³⁰ Coles *et al* found, within each age stratum of the NSH considered, that tinnitus was twice as common in those with a history of occupational exposure to noise (defined as having ever worked in a place for more than six months where the voice had to be raised to be heard) as in unexposed subjects.³⁰

A strong association has often been reported between tinnitus and sensorineural hearing loss, (including noise-induced hearing loss).^{29,31,32} This might arise from confounding by age or noise, or independently of these factors. However, some analyses have indicated an association which is independent of ageing,²⁹ and our data indicate a relation which is independent of both age and occupational exposure to noise.

Significant sex differences have not generally been found.^{24,30} In contrast, our study indicated a higher prevalence of tinnitus in men approaching the age of retirement, in keeping with the greater prevalence of prolonged noise exposure and severe hearing difficulty, and consistent with the known relations of these factors. Also in keeping with other investigations, we found tinnitus and hearing difficulty to be strongly related, and tinnitus to be more common in those reporting prolonged occupational exposure to noise.

ATTRIBUTABLE NUMBERS

Estimates of the frequency of noise-induced hearing loss have come largely from compensation claims under the Department of Social Security's Industrial Injuries Scheme. In 1995/6, 531 new

claimants were assessed for benefits, and it was estimated that some 14,200 people were receiving compensation payments.³ However, this official scheme is heavily influenced by awareness and willingness to report. Moreover, awards are only made for having loss of at least 50 dB in both ears averaged over the 1,2 and 3 kHz bands (a quite substantial impairment) in workers employed for at least 10 years in a list of specified noisy occupations. As such, this does not provide an adequate basis for determining the number of attributable cases of hearing impairment nationally.

Information is also available from two surveys of Self-reported Work-related Illness (SWI) carried out by the Health and Safety Executive in 1990 and 1995. In the second of these surveys,⁴ it was estimated that some 140,000 adults had deafness caused or made worse by their work (including 31,000 who also had tinnitus); and that an additional 10,000 adults had work-related tinnitus in isolation.

The determination of deafness caused by work was based upon a review of the answers to several questions which provided evidence of work conditions being the causal link between occupation and deafness (J Jones, personal communication). An attempt was made to contact respondents' doctors to confirm their self-reports of illness, and where replies were received, these generally supported the reported diagnosis. In contrast to our own survey, the surveys included elderly respondents, being based on interviews of adults in private households. However, cases were only ascertained if they themselves attributed their symptoms to an occupational exposure. As the link with occupation, in a disorder which is insidious, progressive, and an expected concomitant of ageing, may not be apparent to the individual concerned, this is likely to represent a conservative estimate of the attributable burden of hearing loss.

These estimates and our own may also be conservative to the extent that subjects quite often have worse measurable levels of hearing than they admit to on questioning, and both surveys focussed on overall hearing abilities, rather than deficits in the better ear. Such estimates also depend critically on the definition of hearing loss. As Jones *et al* point out, UK Industrial Injuries benefits are only paid when 50 dB of hearing loss has been sustained in the better ear across the frequency ranges of 1, 2 and 3 kHz, whereas insurance companies may compensate losses of 10 dB.³³ Also, our own estimate was confined to workers aged 35-64 years, as retired workers were not sampled. A second pool of former workers with noise-induced hearing loss is therefore likely to exist. And finally, random errors in the classification of noise exposure (mistaken reporting of the time spent in noisy jobs) would tend to cause underestimation of the attributable prevalence.

Direct comparison of our findings with those of the 1995 SWI is hampered by differences in methods, case definition and ages studied. However, our estimates on attributable hearing loss are similar to those of the SWI, while our findings on persistent tinnitus suggest a bigger problem than previously indicated.

International comparisons cannot readily be made either, as populations levels of attributable hearing loss have seldom been estimated. But a prevalence of noise-induced hearing loss of between 8 and 12 per thousand (and as high as 17 per thousand in men) has been quoted among Americans and Hungarians.³⁴ In Western Australia, compulsory baseline testing was introduced as a state requirement for those with ≥ 90 dB(A) Leq or peak exposures of ≥ 140 dB(A). Over 11% of the workforce of western Australia were regarded as exposed to this extent, and 89,500 workers underwent audiometric assessment: 58% of these were found to have noise-induced hearing loss (especially from age 35 years onwards), indicating a minimum prevalence of nearly 7% for all workers in this state.³⁵ Thus, it seems that the attributable burden of deafness in industrialised countries is likely to be considerable.

OCCUPATIONS REPORTING HEARING LOSS

Interpretation of the findings on hearing loss by occupation is limited by the small numbers within some occupational groups. Although analysis was restricted to those aged over 35 years of age, further adjustment for age and other potential confounders was not possible. Also, although there was reasonable stability of employment (60% of subjects had been in their current occupation for more than 5 years), in some cases difficulties of hearing could have arisen from noise exposure in a previous employment. It is also possible that workers with hearing difficulties were selected out of noisy jobs, resulting in an underestimation of risk in some occupations relative to all occupations. For these reasons the findings on risk by occupation should be regarded as exploratory, and as pointers towards of the need for further assessment.

The index of occupational noise exposure (having to shout in an average working day) was also limited to the extent that shouting sometimes arises from the need for voice projection (e.g. in outdoor occupations) or to gain attention (e.g. in teachers) rather than because of ambient levels of noise.

Nonetheless, excesses of hearing difficulty and tinnitus were found among male transport and machinery operatives, construction workers, material handling workers, and electricians and

fitters, as well as female caterers and cleaners, and some of these groups reported a need to shout in an average working day.

High levels of noise exposure and hearing impairment have been recognised to occur in a number of these trades. For example, risks have been evaluated in carpenters, labourers, ironworkers, plumbers, boilermakers, pipefitters, users of powered pneumatic tools (especially in mining and quarrying), and several other occupations;^{8,9,36-40} and a relatively high incidence of compensation claims has been reported by the Department of Social Security.³ Some of these activities are recognised as giving rise to State-compensable hearing losses.⁴¹ Significant noise exposures have also been reported among mariners and mechanical plant drivers. However, there is less information on other groups, such as caterers and cleaners.

Some groups considered to be at risk from noise exposure did not report an excess of hearing difficulties. These included lorry drivers,⁴² farmers,⁴³ and members of the armed forces.⁴⁴⁻⁴⁷ In this last group, hearing impairments have sometimes been demonstrated within a year of recruitment,^{44,45} and the most likely explanation for the absence of risk in our study is selection out of the work (at recruitment and during routine audiometric surveillance).

By contrast, construction workers quite often receive no audiometric screening⁴⁸ and tend to show poor compliance with hearing conservation measures.^{38,48} Our observations on hearing impairment highlight the health consequences and the need in this industry for closer attention to preventive measures.

CONCLUSIONS

Significant difficulties of hearing and tinnitus are quite common, especially in men in the older working age range. Both symptoms are strongly associated with years of exposure in a noisy occupation, and such exposures arise largely in men. The burden of hearing impairment attributable to occupational noise exposure in Great Britain is substantial. Noise is a major cause of industrial disease and compensable illness, and as such should represent a high priority for control measures. This report highlights some occupations in which hearing loss and current reports of significant noise appear to coincide. Hearing conservation measures should be focussed particularly on workers from the construction industry, among whom current provision is likely to be patchy in relation to the risks.

REFERENCES

1. Health and safety Commission. *Prevention of damage to hearing from noise at work. Draft proposals for Regulations and Guidance*. London: HMSO, 1987.
2. Jones JR, Hodgson JT, Osman J. *Self-reported Working Conditions*. Health and Safety Executive. London: HMSO, 1995.
3. Health and Safety Commission. *Health and Safety Statistics 1996/7*. London: HMSO, 1997.
4. Jones JR, Hodgson JT, Clegg TA, Elliott RC. *Self-reported Work-Related Illness in 1995. Results from a household survey*. Sudbury: HSE Books HMSO, 1998.
5. *Occupational Disease Enquiry 1995*. Association of British Insurers, 1996.
6. Palmer KT, Coggon DN, Bendall HE, Kellingray S, Pannett B, Griffin M, Haward B. *Hand-transmitted vibration: Occupational exposures and their health effects in Great Britain. HSE Contract Research Report 232/1999*. London: HMSO, 1999.
7. Palmer KT, Coggon DN, Bendall HE, Pannett B, Griffin M, Haward B. *Whole-body vibration: Occupational exposures and their health effects in Great Britain. HSE Contract Research Report 233/1999*. London: HMSO, 1999.
8. Iki M, Kurumatani N, Hirata K. *et al*. Association between vibration-induced white finger and hearing loss in forestry workers. *Scand J Work Environ Health* 1986;**12**:365-370.
9. Iki M, Kurumatani N, Satih M, Matsura F, Arai T, Ogata A. Hearing of forest workers with vibration-induced white finger: a five-year follow-up. *Int Arch Occup Environ Health* 1989;**61**:437-442.
10. Palmer K, Coggon D, Griffin MJ, Pannett B. The development of a self-administered questionnaire to assess exposures to hand-transmitted and whole body vibration and their health effects. *J Sound Vib* 1998;**215**:653-686.
11. Davis AC. The prevalence of hearing impairment and reported hearing disability among adults in Great Britain. *Intl J Epidemiol* 1989;**18**:911-917.
12. Coles RRA. Epidemiology of tinnitus: (1) Prevalence. *J Laryngol Otol* 1984; **9**: 7-15.
13. Office of Population Censuses and Surveys. *Standard Occupational Classification 1990*. London: HMSO, 1990.
14. StataCorp. *Stata Statistical Software: Release 5.0* College Station, TX: Stata Corporation, 1997.
15. Barone JA, Peters JM, Garabrant DH, Bernstein L, Krebsbach R. Smoking as a risk factor in noise-induced hearing loss. *J Occup Med* 1987;**29**:741-5.

16. Virokannas H, Anttonen H. Dose-response relationship between smoking and impairment of hearing acuity in workers exposed to noise. *Scandinavian Audiology* 1995;**24**:211-6.
17. Cruickshanks KJ, Klein R, Klein BE, Wiley TL, Nondahl DM, Tweed TS. Cigarette smoking and hearing loss: the epidemiology of hearing loss study. *JAMA* 1998;**279**:1715-9.
18. Noorhassim I, Rampal KG. Multiplicative effect of smoking and age on hearing impairment. *Am J Otolaryngology* 1998;**19**:240-3.
19. Starck J, Toppila E, Pyykko I. Smoking as a risk factor in sensory neural hearing loss among workers exposed to occupational noise. *Acta Oto-Laryngologica* 1999;**119**:302-5.
20. Zocchetti C, Consonni D, Bertazzi PA. Estimation of prevalence ratios from cross-sectional data. *Int J Epidemiol* 1995;**24**:1064-1065.
21. Office of Population Censuses and Surveys. *Census 1991: Economic Activity Report*. London: HMSO, 1993.
22. Hinchcliffe R. Prevalence of the common ear, nose, and throat conditions in the adult rural population of Great Britain. A study by direct examination of two random samples. *Brit J Prev Soc Med* 1961;**15**:128-140.
23. D'Souza MF, Irwig LM, Trevelyan HT, Swan AV, Shannon D, Tuckman E, Woodall JT. Deafness in middle age - how big is the problem? *J Royal Coll Gen Pract* 1975;**25**:472-478.
24. Quaranta A, Assennato G, Sallustio V. Epidemiology of hearing problems among adults in Italy. *Scand Audiol* 1996; **25 (Suppl 42)**: 7-11.
25. Glorig A, Roberts J. *Hearing levels of Adults by Age and Sex. United States. 1960-1962*. Public Health Service Publication No. 100, Series 11, no. 11, 1965.
26. Wallhagen MI, Strawbridge WJ, Cohen RD, Kaplan GA. An increased prevalence of hearing impairment and associated risk factors over three decades of the Alameda County Study. *Am J Pub Health* 1997;**87**:440-442.
27. Office of Population Censuses and Surveys. *General Household Survey: the prevalence of tinnitus, 1981*. OPCS Monitor GHS 83/1, Information Branch (Dept M). London: OPCS, 1983.
28. Leske MC. Prevalence estimates of communicative disorders in the US: language, learning and vestibular disorders. *Asha* 1981; **23**:229-237.
29. Chung DY, Gannon P, Mason K. Factors affecting the prevalence of tinnitus. *Audiology* 1984;**23**:441-452.
30. Coles RRA, Davis AC, Haggard MP. Epidemiology of tinnitus. In: *Tinnitus. (Ciba Foundation symposium 85)*. London: Pitman Books Ltd, 1981, p16-34.

31. Davis AC. Effects of noise and socio-economic factors on hearing impairment. Proceedings of 4th International Conference on Noise as a Public Health Problem, Torino, July 1983. Maryland: American Speech-Language-Hearing Association, Asha Report, 1983.
32. MacShane DP, Hyde ML, Alberti PW. Tinnitus prevalence in industrial hearing loss compensation claimants. *Clin Otololaryngol* 1988;**13**:323-330.
33. Jones CM, Hughes KB. Hearing and vestibular problems. In: Cox RAF, Edwards FC, Palmer K (eds). *Fitness for Work: The medical aspects (3rd edn)*. Oxford: Oxford University Press, 2000, p190.
34. Phaneuf R, Hetu R. An epidemiological perspective of the causes of hearing loss among industrial workers. *J Otololaryngol* 1990;**19**:31-40.
35. Monley P, West A, Guzeleva D, Dinh DA, Tzvetkova J. Hearing impairment in the Western Australian noise-exposed population. *Austr J Audiol* 1996;**18**: 59-71.
36. Kenney GD, Ayer HE. Noise exposure and hearing levels of workers in the sheet metal construction trade. *Am Ind Hyg Assn J* 1975;**36**: 626-632.
37. Arndt V, Rothernbacher D, Brenner H et al. Older workers in the construction industry: results of a routine health examination and a five year follow up. *Occup Environ Med* 1996;**53**: 686-691.
38. Lusk SL, Kerr MJ, Kauffman SA. Use of hearing protection and perceptions of noise exposure and hearing loss among construction workers. *Am Ind Hyg Assn J* 1998;**59**: 466-470.
39. Neitzel R, Seixas NS, Camp J, Yost M. An assessment of occupational noise exposures in four construction trades. *Am Ind Hyg Assn J* 1999; **60**: 807-817.
40. Hessel PA. Hearing loss among construction workers in Edmonton, Alberta, Canada. *J Occup Environ Med* 2000; **42**: 57-63.
41. Social Security (Industrial Injuries) (Prescribed Diseases) Regulations 1985 (SI 1985 No. 967). London: HMSO, 1985.
42. Seshagiri B. Occupational noise exposure of operators of heavy trucks. *Am Ind Hyg Assn J* 1998;**59**: 205-213.
43. Schenker MB. Preventive medicine and health promotion are overdue in the agricultural workplace. *J Pub Health Policy* 1996; **17**: 275-305.
44. Klockhoff I, Lyttkens L, Svedberg A. Hearing damage in military service. A study on 38,294 conscripts. *Scand Audiol* 1986;**15**: 217-222.
45. Kiurkaanniemi H, Lopponen H, Sorri M. Noise-induced low- and high-frequency hearing losses in Finnish conscripts. *Military Medicine* 1992; **157**: 480-482.

46. Ylikoski ME, Ylikoski JS. Hearing loss and handicap of professional soldiers exposed to gunfire noise. *Scand J Work Environ Health* 1994; **20**: 93-100.
47. Dancer A, Buck K, Parmentier G, Hamery P. The specific problems of noise in military life. *Scand Audiol (Suppl.)* 1998; **48**: 123-130.
48. Reilly MJ, Rosenman KD, Kalinowski DJ. Occupational noise-induced hearing loss surveillance in Michigan. *J Occup Environ Med* 1998; **40**: 667-674.

APPENDIX
VIBRATION EXPOSURE QUESTIONNAIRE



**National Survey of Health
and Vibration**

The answers given on this form are confidential.

You do not need to write your name on the form.

Replies will be seen by MRC staff ONLY

YOURSELF

SECTION ONE ABOUT YOURSELF

1. Please fill in your date of birth

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
day		month		year	

and your sex

male female

2. How tall are you? ____ feet ____ inches
or _____ cm

3. Are you right or left handed?

Right Left Able to use both hands equally

4. How would you best describe your racial origin?

European India/Pakistan Afro-Caribbean
South-east Asia Other _____

5. Have you ever smoked regularly (i.e. at least once a day for a month or longer)?

No Yes

If yes, how old were you when you first smoked regularly?

years

And do you still smoke regularly?

No Yes

If no, how old were you when you last smoked regularly?

years

6. Have you had a paid job during the past week?

No Yes

If no, please go to Section Four on page 14

If yes, please continue.

SECTION TWO MAIN JOB

<p>7. What was your main OCCUPATION during the past week?</p>	<p>In what INDUSTRY did you carry out this occupation (e.g. farming, shipyard, car factory, shoe shop, hospital, insurance office)?</p>
---	---

On what date did you start this job?

Date started

month			year	

8. Are you self employed in this job? No Yes

9. Does an **average working day** in the job involve any of the following?

Working outdoors for more than two hours (i.e. not in a building or enclosed vehicle) No Yes

Working in a refrigerated building or room (e.g. a coldstore) No Yes

Lifting or moving weights of 20 lbs (10 kg) or more by hand No Yes

Lifting or moving weights of 56 lbs (25 kg) or more by hand No Yes

Digging or shovelling No Yes

Working with your hands above shoulder height for more than one hour No Yes

Needing to shout most of the time to be heard by your colleagues No Yes

Use of a computer keyboard or typewriter for more than four hours No Yes

Work on a night shift. No Yes

10. **Were you at work in the past week?** No Yes

If no, please go to Section Three on page 12. If yes, please continue.

MAIN JOB**PAST WEEK**

11. During the past week, did you use any of the following powered tools or machines in the job?
(tick as many boxes as apply)

Tool or machine**Tool or machine**Floor polisher Stone-working hammer Nut runner Rotary hammer swager Impact wrench Rotary burring tool Impact screwdriver Engraving pen Jig saw Hammer drill Circular saw Riveting hammer or dolly Chain saw Chipping hammer Hand-guided mower Scaling hammer Hand-held hedge trimmer Caulking hammer Brush saw Rammer Barking machine Needle gun Stump grinder Nibbling machine Concrete breaker (road breaker) Clinching and flanging tool Rock Drill Concrete vibrothickener Tamper Nailing or stapling gun Scabblor Pedestal grinder

MAIN JOB

PAST WEEK

Continued

Pedestal finisher

Hand-held sander

Hand-held portable grinder

Shoe pounding-up machine

Hand-held polisher

Vibratory roller

Or **None of these** (If none, go to question 13, page 6)

12. For those tools/machines that you have ticked in question 11, we would like to know the total number of hours (or minutes) you worked with them over the whole week.

Please only count the time that the tool was SWITCHED ON AND HELD. If you cannot give the exact time, please give your best estimate.

Write the name of the tool/machine below	Write the total time you used it over the whole week in the boxes below								
1.	<table border="0"> <tr> <td><input type="text"/></td><td><input type="text"/></td> <td><input type="text"/></td><td><input type="text"/></td> </tr> <tr> <td colspan="2">hours</td> <td colspan="2">mins</td> </tr> </table>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	hours		mins	
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hours		mins							

13. During the past week did you use any other powered tools or machines in the job that vibrated your hands?

No
(go to question 14)

Yes
(continue below)

If yes, we would like to know which tools or machines, and the total number of hours (or minutes) you worked with them over the whole week.

Please only count the time that the tool was SWITCHED ON AND HELD. If you cannot give the exact time please give your best estimate.

Write the name of the tool/machine below	Write the total time you used it over the whole week	Describe the job that the tool/machine was used to do		
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MAIN JOB

PAST WEEK

14. In your main job, do you ever use other powered vibrating tools that you have not already told us about (e.g. tools used only occasionally or at certain times of the year)?

No

Yes

If yes, which tools?

1 _____

4 _____

2 _____

5 _____

3 _____

6 _____

15. Was your use of powered vibrating tools/machines in the past week fairly typical of the current job?

Not applicable (don't use them)

No

Yes

If no, in what way was it unusual?

MAIN JOB

PAST WEEK

16. During the past week did you drive, ride or stand on any of the following machines or vehicles in the job? (tick as many boxes as apply)

Vehicle or machine

Vehicle or machine

Car (other than going to and from work)	<input type="checkbox"/>	Dumper	<input type="checkbox"/>
Van (other than going to and from work)	<input type="checkbox"/>	Other earth-moving machinery (specify) _____	<input type="checkbox"/>
Bus or coach (other than going to and from work)	<input type="checkbox"/>	Road Roller	<input type="checkbox"/>
Train (other than going to and from work)	<input type="checkbox"/>	Mower (seated)	<input type="checkbox"/>
Motor cycle (other than going to and from work)	<input type="checkbox"/>	Off road forestry vehicle	<input type="checkbox"/>
Rock crusher	<input type="checkbox"/>	Armoured vehicle	<input type="checkbox"/>
Concrete production machinery	<input type="checkbox"/>	Other off-road vehicle (specify) _____	<input type="checkbox"/>
Tractor	<input type="checkbox"/>	Lift truck/Forklift truck	<input type="checkbox"/>
Loader	<input type="checkbox"/>	Mobile crane	<input type="checkbox"/>
Excavator	<input type="checkbox"/>	Lorry	<input type="checkbox"/>
Bulldozer	<input type="checkbox"/>	Helicopter	<input type="checkbox"/>
Grader	<input type="checkbox"/>	Other aircraft	<input type="checkbox"/>
Scraper	<input type="checkbox"/>	Highspeedboat, hovercraft or hydrofoil	<input type="checkbox"/>
Or	<input type="checkbox"/>	None of these	(If none, go to question 18, page 10)

17. For those machines or vehicles that you have ticked in question 16, we would like to know the total number of hours (or minutes) that you drove/rode/stood on them over the whole week.

Please only count the time that the ENGINE WAS RUNNING OR POWER ON.
If you cannot give the exact time, please give your best estimate.

Write the name of the machine/vehicle below	Write the total time you drove/rode/stood on it over the whole week in the boxes below										
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18. During the past week in your job did you drive/ride/sit or stand on any other vehicles or machines that caused vibration or frequent jolting or both?

No
(go to question 19)

Yes

If yes, we would like to know which machines/vehicles, and how long in total you drove/rode/stood on them over the whole week.

**Please only count the time that the ENGINE WAS RUNNING OR POWER ON.
If you cannot give the exact time, please give your best estimate.**

Write the name of the vehicle/machine	Write the total time over the whole week	Describe the job the vehicle/machine was used to do								
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hours		mins								

19. Was the time you spent over the past week riding/driving/standing on such machines typical of the job?

Not applicable
(Don't ride or drive vehicle or machine)

No

Yes

If no, in what way was it unusual?

20. In your main job do you ever ride on/drive/stand on vehicles or machines (other than those you have already described) that cause vibration or frequent jolting that you can feel (e.g. vehicles only used occasionally or at certain times of the year)?

No

Yes

If yes, which vehicles/machines?

- 1. _____
- 2. _____
- 3. _____

- 4. _____
- 5. _____
- 6. _____

SECTION THREE OTHER JOBS HELD

21. Did you work at any other job during the past week?

No Yes

If no, please move on to Section Four on page 14.

If yes, please continue

22. What was the other job?

Occupation _____ Industry _____

Are you self-employed in this job?

No Yes

Does an **average working day** in the job involve any of the following?

Working outdoors for more than two hours (i.e. not in a building or enclosed vehicle)

No Yes

Working in a refrigerated building or room (e.g. a coldstore)

No Yes

Lifting or moving weights of 20 lbs (10 kg) or more by hand

No Yes

Lifting or moving weights of 56 lbs (25 kg) or more by hand

No Yes

Digging or shovelling

No Yes

Working with your hands above shoulder height for more than one hour

No Yes

Use of a computer keyboard or typewriter for more than four hours

No Yes

Needing to shout most of the time to be heard by your colleagues?

No Yes

Work on a night shift

No Yes

OTHER JOBS

PAST WEEK

25. During the past week did the job involve work with a powered tool or machine that made your hands vibrate?

No

Yes

If yes, we would like to know which tools and for how long (in hours or minutes) you worked with them over the whole week. Please only count the time that the tool was SWITCHED ON AND HELD.

Write the name of the tool/machine below	Write the total time you used it over the whole week in the boxes below								
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hours		mins							

26. During the past week did the job involve driving/riding/standing on a vehicle/machine (such as those listed in question 16 page 8)?

No

Yes

If yes, We would like to know which machines or vehicles and for how long (in hours or minutes) you drove /rode /stood on them over the whole week. Please count only the time with THE ENGINE RUNNING OR POWER ON.

Write the name of the vehicle/machine below	Write the total time you drove/rode/stood on it over the whole week in the boxes below								
1.	<table style="width: 100%; text-align: center;"> <tr> <td style="border: 1px solid black; width: 30px; height: 20px;"></td> <td style="border: 1px solid black; width: 30px; height: 20px;"></td> <td style="border: 1px solid black; width: 30px; height: 20px;"></td> <td style="border: 1px solid black; width: 30px; height: 20px;"></td> </tr> <tr> <td>hours</td> <td></td> <td>mins</td> <td></td> </tr> </table>					hours		mins	
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hours		mins							

SECTION FOUR EARLIER JOBS AND EXPOSURES

27. Other than in the work you have already told us about, have you EVER had a paid job which involved working with a powered tool or machine that made your hands vibrate for more than an hour a week?

No
(go to question 29)

Yes
(continue)

Approximately how old were you when you first did this work?

years

28. What were the tools/machines you used at that time?
(Question 11 page 4 lists some possible tools)

- 1. _____
- 2. _____
- 3. _____
- 4. _____

And what was the job and industry?

Occupation	Industry (e.g. farming, shipyard, car factory etc.)
_____	_____
_____	_____

29. In your spare time (i.e. outside work), have you ever regularly used a tool or machine that made your hands vibrate, for more than an hour per week?

No
(go to question 30)

Yes
(continue)

Approximately how old were you when you first did this?

years

And what were the tools or machines? (Question 11 page 4 lists some possible tools)

- 1. _____
- 2. _____
- 3. _____
- 4. _____

30. In your spare time (i.e outside work and going to and from work), please estimate for the past week the **total number** of hours (or minutes) you spent driving or riding in the vehicles listed below. If you cannot give the exact time please give your best estimate.

	Total time over week		Total time over week	
Car or van	<input type="text"/>	<input type="text"/>	Train	<input type="text"/>
	hours	mins		hours
				mins
Bus or coach	<input type="text"/>	<input type="text"/>	Motorcycle	<input type="text"/>
	hours	mins		hours
				mins

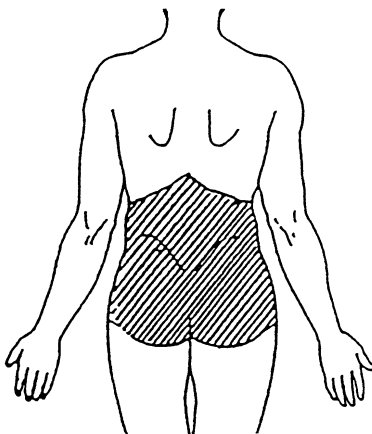
31. How long altogether have you worked in noisy places where you had to shout to be heard?

Never less than 12 months 1-5 years

6-10 years More than 10 years

SECTION FIVE HEALTH

32. During the **PAST 12 MONTHS**, have you had back pain in the area shown in the diagram, which lasted for more than a day? (Do not include pain occurring only during pregnancy, during menstrual periods, or during the course of a feverish illness such as 'flu).



No Yes

If yes, did the pain spread down your leg to below your knee?

No Yes

Did it make it difficult or impossible to put on socks, stockings or tights?

No difficulty Difficult but not impossible Impossible

And have you had the pain during the past week?

No Yes

33. **PAIN IN THE PAST WEEK AND PAST YEAR:**
 Answer the questions below using the tick boxes - one tick for each question. Please answer these questions even if you have never had any trouble in these parts of your body.

During the past week have you had pain lasting a day or more in your:	During the past 12 months have you had pain lasting a day or more in your:	During the past 12 months have you been prevented from carrying out normal activities (eg. job, housework, hobbies) because of pain in your:
Knees No Yes <input type="checkbox"/> <input type="checkbox"/>	Knees No Yes <input type="checkbox"/> <input type="checkbox"/>	Knees No Yes <input type="checkbox"/> <input type="checkbox"/>
Hips No Yes <input type="checkbox"/> <input type="checkbox"/>	Hips No Yes <input type="checkbox"/> <input type="checkbox"/>	Hips No Yes <input type="checkbox"/> <input type="checkbox"/>
Shoulders No Yes <input type="checkbox"/> <input type="checkbox"/> right shoulder <input type="checkbox"/> left shoulder <input type="checkbox"/> both shoulders	Shoulders No Yes <input type="checkbox"/> <input type="checkbox"/> right shoulder <input type="checkbox"/> left shoulder <input type="checkbox"/> both shoulders	Shoulders No Yes <input type="checkbox"/> <input type="checkbox"/> right shoulder <input type="checkbox"/> left shoulder <input type="checkbox"/> both shoulders
Neck No Yes <input type="checkbox"/> <input type="checkbox"/>	Neck No Yes <input type="checkbox"/> <input type="checkbox"/>	Neck No Yes <input type="checkbox"/> <input type="checkbox"/>
Wrists/hands No Yes <input type="checkbox"/> <input type="checkbox"/> right wrist/hand <input type="checkbox"/> left wrist/hand <input type="checkbox"/> both wrists/hands	Wrists/hands No Yes <input type="checkbox"/> <input type="checkbox"/> right wrist/hand <input type="checkbox"/> left wrist/hand <input type="checkbox"/> both wrists/hands	Wrist/hands No Yes <input type="checkbox"/> <input type="checkbox"/> right wrist/hand <input type="checkbox"/> left wrist/hand <input type="checkbox"/> both wrists/hands
Elbows No Yes <input type="checkbox"/> <input type="checkbox"/> right elbow <input type="checkbox"/> left elbow <input type="checkbox"/> both elbows	Elbows No Yes <input type="checkbox"/> <input type="checkbox"/> right elbow <input type="checkbox"/> left elbow <input type="checkbox"/> both elbows	Elbows No Yes <input type="checkbox"/> <input type="checkbox"/> right elbow <input type="checkbox"/> left elbow <input type="checkbox"/> both elbows

34. If you have had elbow pain in the last year, have you received an injection from a doctor to treat it?

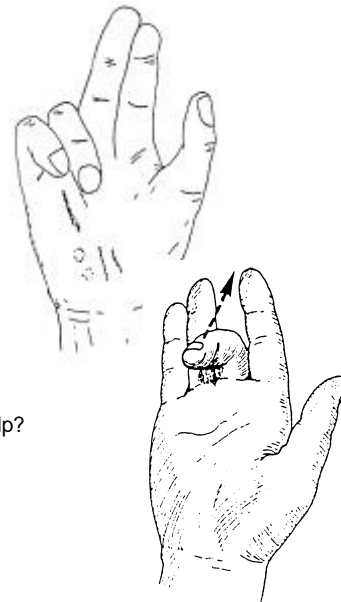
No Yes No elbow pain

35. NUMBNESS OR "PINS AND NEEDLES" IN THE PAST WEEK AND PAST YEAR.

	In the past week have you had tingling or numbness that lasted at least three minutes in your:	In the past 12 months have you had tingling or numbness that lasted at least three minutes in your:
Fingers/thumbs?	No <input type="checkbox"/> Yes <input type="checkbox"/>	No <input type="checkbox"/> Yes <input type="checkbox"/>
Other parts of the hand(s)?	No <input type="checkbox"/> Yes <input type="checkbox"/>	No <input type="checkbox"/> Yes <input type="checkbox"/>
Other parts of the arm(s)?	No <input type="checkbox"/> Yes <input type="checkbox"/>	No <input type="checkbox"/> Yes <input type="checkbox"/>
If yes to any of the above, has the tingling or numbness disturbed your sleep?	(PAST WEEK) No <input type="checkbox"/> Yes <input type="checkbox"/>	(PAST 12 MONTHS) No <input type="checkbox"/> Yes <input type="checkbox"/>

36. Is your little finger (or little and ring finger) of either hand permanently bent as shown opposite so that you cannot straighten it, even with the other hand?

No Yes



37. In the past year have you once or more had episodes when a finger or fingers have locked (got stuck), in the position shown in the diagram opposite and needed to be straightened using the other hand to help?

No Yes

If yes, how many fingers have got locked or stuck?
(write a number in the boxes below)

Number in the right hand Number in the left hand

38. Have you ever had attacks in which any or all of your fingers suddenly became cold and numb, and at the same time turned white or pale?

No

Yes

If no please move on to question 47. If yes please continue

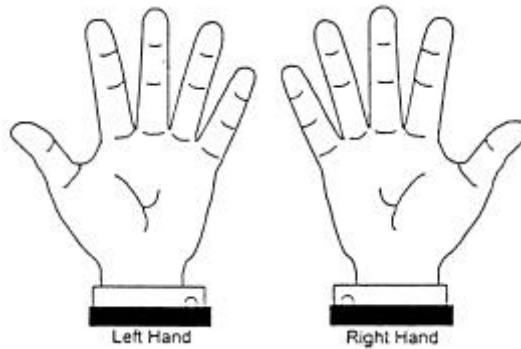
39. Approximately how old were you when you first had one of these attacks?

--	--

years

40. Which fingers/thumbs have gone white or pale? (Indicate by shading the parts that have

gone pale on the diagram).



41. Have attacks ever been brought on by any of the following?

Cold conditions

No Yes

Washing up

No Yes

Use of a tool or machine

No Yes

(If yes, which tools or machines?)

42. During an attack, have you ever noticed a clear "edge" between the white or pale part of your finger and the normal colour of your hand?

No

Yes

43. Have you ever had an attack during the summer?

No

Yes

44. Have you ever had an attack so bad that you were unable to carry on with what you were doing at the time?

No

Yes

45. Have the attacks ever been bad enough for you to see a doctor about them?

No

Yes

If yes, what did the doctor say the problem was?

HEALTH

OTHER HEALTH PROBLEMS

51. How well you can hear a person who is talking to you when he is sitting on your LEFT SIDE in a quiet room? *(Please tick one box)*

Cannot hear him at all With great difficulty With moderate difficulty
With slight difficulty With no difficulty

52. During the past 12 months have you had noises in your head or ears (such as ringing, buzzing or whistling) which lasted longer than five minutes?

No, never Yes, but not most of the time Yes, most or all of the time

53. **OTHER HEALTH PROBLEMS:**

How often do you suffer from the following?

Headaches	Never <input type="checkbox"/>	Occasionally <input type="checkbox"/>	Frequently <input type="checkbox"/>
Feeling constantly tired	Never <input type="checkbox"/>	Occasionally <input type="checkbox"/>	Frequently <input type="checkbox"/>
Feeling low in mood or spirits	Never <input type="checkbox"/>	Occasionally <input type="checkbox"/>	Frequently <input type="checkbox"/>
Feeling tired or under stress	Never <input type="checkbox"/>	Occasionally <input type="checkbox"/>	Frequently <input type="checkbox"/>

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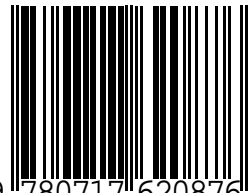
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