Occupational exposure to asbestos and mortality among asbestos removal workers: a Poisson regression analysis

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The asbestos industry has shifted from manufacture to stripping/removal work. The aim of this study was to investigate early indications of mortality among removal workers. The study population consisted of 31 302 stripping/removal workers in the Great Britain Asbestos Survey, followed up to December 2005. Relative risks (RR) for causes of death with elevated standardised mortality ratios (SMR) and sufficient deaths were obtained from Poisson regression. Risk factors considered included dust suppression technique, type of respirator used, hours spent stripping, smoking status and exposure length. Deaths were elevated for all causes (SMR 123, 95% CI 119–127, n=985), all cancers including lung cancer, mesothelioma, and circulatory disease. There were no significant differences between suppression techniques and respirator types. Spending more than 40 h per week stripping rather than less than 10, increased mortality risk from all causes (RR 1.4, 95% CI 1.2–1.7), circulatory disease and ischaemic heart disease. Elevated mesothelioma risks were observed for those first exposed at young ages or exposed for more than 30 years. This study is a first step in assessing long-term mortality of asbestos removal workers in relation to working practices and asbestos exposure. Further follow-up will allow the impact of recent regulations to be assessed.

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Asbestos is a naturally occurring mineral with properties of heat and flame resistance, insulation, flexibility and strength, which made asbestos popular in the early twentieth century, especially in cars, buildings and many domestic products. It was not until the mid-1920s that a link with disease started to be discussed. This led to implementation of the first legislation in Britain in 1931 to reduce occupational exposure of asbestos workers (Bartrip, 2004).

Subsequent regulations, importation bans and the prohibition of asbestos installation changed the nature of the industry. Previously, most asbestos workers were employed in manufacture, but this has now shifted so that those employed in stripping/removal occupations make up the majority (Harding and Wegerdt, 2006).

The key tasks involved in asbestos removal include preparing the work area, removing the substance, bagging the debris, and cleaning up the site area (Williams et al, 2007). These workers therefore cause severe disruption to the fibres and come into contact with various forms. Working practices, including removal techniques and personal protective equipment, have been developed to reduce the exposure of workers to asbestos (Ewing and Spain, 1984). It has even been suggested that the stripping/removal industry has become so over-regulated that workers are unlikely to experience elevated exposure to airborne asbestos (Lange et al, 2006; Williams et al, 2007).

We have investigated the association between mortality and various risk factors associated with asbestos exposure and the stripping/removal industry.

MATERIALS AND METHODS

The Great Britain Asbestos Survey was established in 1971 to monitor mortality among workers in the asbestos manufacturing industry. Workers were initially invited to participate in the survey with voluntary medical examinations at 2 yearly intervals. Under the Asbestos Licensing Regulations (ALR) 1983 all individuals working with certain kinds of asbestos were required to undergo statutory examinations including pre-employment examinations. At this time substantial numbers of asbestos strippers were recruited into the survey. Our analysis was restricted to the sub-cohort of workers only ever employed as asbestos strippers.

At each medical examination workers completed the survey questionnaire, which included details of the date of first occupational exposure to asbestos and smoking habits. After the introduction of the Control of Asbestos at Work Regulations (CAWR) 1987, the questionnaire was changed to collect more detailed information about asbestos exposures. For removal workers this included information on the type of dust suppression technique used, the kind of respirator used and the weekly hours spent in a stripping enclosure while removal was going on.
Survey participants were flagged for death registrations at the National Health Service Central Register (NHSCR). Data collected at follow-up medical examinations were used to update smoking status and job details. Deaths occurring until December 2005 were included in the analysis. Mesothelioma deaths were coded according to the International Classification of Diseases revision 10 (ICD-10), and so deaths from mesothelioma included in the analysis occurred during 2001 to 2005 only.

**Statistical analysis**

Standardised mortality ratios (SMR) were calculated for all workers in the survey only ever employed in asbestos removal work \( (n = 52387) \). The expected number of deaths was calculated using the 5-year age-, period- and sex-specific mortality rates for England and Wales, and for Scotland. Person-years at risk were calculated from the date of the first medical examination. The SMRs were calculated using OCMAP-PLUS V4.00 (Release 01e) (Marsh et al, 2004).

Poisson regression was employed to estimate the relative risks (RR) of mortality among stripping/removal workers. Only those workers who had completed the more recent detailed questionnaire were included in the analysis \( (n = 31302) \). The dependent variable was the number of deaths, with the person-years at risk as the offset variable. Person-years were calculated from the date of first occupational exposure to asbestos as the starting date, and date of death, loss to follow-up or the end of the study period as the ending date. Only causes of death that had significantly elevated SMRs and sufficient deaths (greater than 20) were analysed using Poisson regression.

Relative risks were calculated with adjustment for age (5-year classes, 25–70+ years), calendar period (5-year periods, 1990–2000+) and sex. The covariates of interest were the stripping/removal-specific variables (dust suppression method, respirator type used, and weekly hours spent stripping), smoking status, age at first exposure, length of time in the survey (short- or long-term workers), length of exposure to asbestos and time of first exposure.

Short-term workers were participants who attended only one medical examination, with long-term workers having attended two or more. The dust suppression method was classified into the two techniques of wet and dry removal. There were six categories for respirator type: positive pressure mask, air stream helmet, full-face respirator type: positive pressure mask, air stream helmet, full-face respirator. The dust suppression method was classified into the two techniques of wet and dry removal. There were six categories for respirator type: positive pressure mask, air stream helmet, full-face respirator, half-face respirator, and full-face unpowered mask. Smoking status, age at first exposure, length of time in the survey (short- or long-term workers), length of exposure to asbestos and time of first exposure, smoking status, age at first exposure, length of time in the survey (short- or long-term workers), length of exposure to asbestos and time of first exposure.

**RESULTS**

In total, 52387 asbestos removal workers took part in the survey between 1971 and 2005. Ninety-eight percent of workers were traced for follow-up with the NHSCR. Altogether 31302 asbestos removal workers, who attended between one and 19 examinations during the study period, were included in the analysis (Table 1). Among the removal workers there were 985 deaths including 384 cancers, 115 lung cancers, and 23 mesotheliomas (Table 2). Statistically significant excesses of deaths from all causes, all cancers, and cancers of the rectum, larynx, lung, peritoneum, pleura and kidney, and mesothelioma were observed (Table 2). There were also significant excesses of deaths from circulatory disease, cerebrovascular disease, respiratory disease and asbestosis (Table 2).
The causes of death with significantly elevated SMRs and sufficient deaths, and therefore included in the Poisson regression analyses, were all causes, all cancers, cancer of the trachea, bronchus and lung, mesothelioma, circulatory disease, ischaemic heart disease, cerebrovascular disease and respiratory disease (Table 2). The characteristics of the asbestos removal workers are described in Table 1. The relative risks obtained using Poisson regression by cause of death and by risk factor are summarised in Table 3.

The majority of workers mainly used the wet removal technique (56%) (Table 1). There were no statistically significant differences in risk between using mainly the wet technique and using the dry method (Table 3).

The positive pressure mask was the main respirator used by the majority of participants (68%) (Table 1). No significant association between risk for any of the diseases of interest and the main respirator used was observed (Table 3).

The majority of participants (nearly 60%) spent, on average, more than 10 h a week in the stripping enclosure (Table 1). As the number of hours spent in the stripping enclosure increased, the proportion of current smokers also increased (Figure 1). There was a significant increase in risk for workers who spent more than 40 h as compared with less than 10 h a week in the enclosure for all causes, circulatory disease and ischaemic heart disease (all causes: RR 1.4, 95% CI 1.2–1.7; circulatory disease: RR 1.7, 95% CI 1.2–2.4; ischaemic heart disease: RR 1.9, 95% CI 1.2–2.8). Adjustment for smoking status attenuated the results but the observed increasing trend remained (not shown).

The majority of participants were current smokers at their final examination (57%) (Table 1). Mortality from all causes, all cancers, cancer of the trachea, bronchus and lung, mesothelioma, circulatory disease, ischaemic heart disease, cerebrovascular disease and respiratory disease (Table 2). The characteristics of the asbestos removal workers are described in Table 1. The relative risks obtained using Poisson regression by cause of death and by risk factor are summarised in Table 3.

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Table 3 Relative risks (RRs) of mortality for stripping/removal workers, using Poisson regression analyses

| All causes | All MN | MN Trachea, bronchus & lung |
|------------|--------|-----------------------------|
| **Cases**  | **RR* (95% CI)** | **LR test (d.f.)** | **Cases**  | **RR* (95% CI)** | **LR test (d.f.)** | **Cases**  | **RR* (95% CI)** | **LR test (d.f.)** |
| **Main stripping method** | | | | | | |
| Wet | 4.03 (2) | 2.35 (2) | 48 | 1.0 | 6.28 (6)
| Dry | 4.09 | 1.2 (0.9–1.5) | 39 | 0.8 (0.5–1.2)
| Both | 0.8 (0.6–1.1) | 0.6 (0.4–0.9) | 13 | 1.3 (0.7–2.7)

| **Main respirator type** | | | | | | |
| Positive pressure mask | 2.82 (6) | 10.20 (6) | 70 | 1.0 | 6.76 (2)**
| Airstream helmet | — | — | 1 | — |
| Full face unpowered mask | 1.1 (0.8–1.5) | 1.1 (0.8–1.5) | 16 | 1.1 (0.6–1.8)
| Half face mask | 0.8 (0.5–1.3) | 0.8 (0.5–1.3) | 1 | — |
| Minimal | 0.7 (0.4–1.3) | 0.7 (0.4–1.3) | 2 | — |
| None | 0.4 (0.2–0.8) | 0.4 (0.2–0.8) | 1 | — |
| Mixed | 0.8 (0.6–1.1) | 0.8 (0.6–1.1) | 11 | 1.7 (0.9–3.5)

| **Weekly hours spent stripping** | | | | | | |
| <10 | 283 | 1.0 | 222 | 1.0 | 66 | 1.0 |
| 10– | 74 | 1.0 (0.7–1.5) | 32 | 1.0 (0.7–1.5) | 8 | 0.9 (0.4–1.8)
| 20– | 125 | 1.0 (0.8–1.5) | 48 | 0.9 (0.4–1.7) | 12 | 1.0 (0.5–1.8)
| 30+ | 124 | 1.1 (0.9–1.4) | 33 | 0.9 (0.6–1.5) | 9 | 0.9 (0.4–1.7)
| 40+ | 163 | 0.7 (0.5–1.1) | 44 | 0.7 (0.5–1.1) | 15 | 1.2 (0.7–2.1)

| **Smoking status** | | | | | | |
| Never smokers | 1.18 | 1.0 | 38 | 1.0 | 9 | 1.0 |
| Current smokers | 622 | 2.5 (2.0–3.0) | 216 | 1.0 | 86 | 4.0 (6.0–30.5)
| Former smokers | 225 | 1.5 (1.2–1.9) | 125 | 1.5 (1.2–1.9) | 26 | 16.0 (22.2–118.4)

| **Age at first exposure (years)** | | | | | | |
| <20 | 184 | 1.0 | 91 | 1.0 | 21 | 1.0 |
| 20– | 278 | 1.0 (0.7–1.2) | 81 | 0.9 (0.7–1.2) | 18 | 1.0 (0.5–1.8)
| 30– | 193 | 1.0 (0.8–1.2) | 70 | 0.9 (0.6–1.3) | 23 | 1.0 (0.7–2.1)
| 40+ | 211 | 1.0 (0.8–1.2) | 84 | 0.7 (0.5–1.0) | 33 | 1.2 (0.7–2.0)
| 50+ | 119 | 0.8 (0.6–1.0) | 58 | 0.8 (0.6–1.0) | 20 | 0.7 (0.4–1.3)

| **Length of time in the survey** | | | | | | |
| Short-term | 449 | 1.0 | 116 | 1.0 | 33 | 1.0 |
| Long-term | 599 | 1.0 (0.9–1.1) | 268 | 1.0 (0.9–1.1) | 82 | 1.6 (1.1–2.4)

| **Length of exposure (years)** | | | | | | |
| <10 | 553 | 1.0 | 166 | 1.0 | 49 | 1.0 |
| 10– | 161 | 1.0 (0.8–1.2) | 60 | 1.0 (0.8–1.2) | 26 | 1.6 (1.0–2.5)
| 20– | 88 | 1.0 (0.8–1.2) | 45 | 1.1 (0.8–1.5) | 11 | 0.8 (0.4–1.6)
| 30– | 94 | 1.0 (0.8–1.2) | 61 | 1.4 (1.1–1.9) | 14 | 1.0 (0.5–1.8)
| 40+ | 79 | 1.0 (0.8–1.2) | 52 | 1.2 (1.0–1.5) | 15 | 1.7 (0.9–3.2)

| **Time of first exposure** | | | | | | |
| Pre-ALR | 430 | 1.0 | 217 | 1.0 | 66 | 1.0 |
| Post-ALR | 555 | 1.0 (0.9–1.1) | 167 | 0.8 (0.7–1.0) | 49 | 0.8 (0.5–1.2)

| **Mesothelioma** | | | | | | |
| Cases | RR* (95% CI) | LR test (d.f.) | Cases | RR* (95% CI) | LR test (d.f.) | Cases | RR* (95% CI) | LR test (d.f.) |
|---------|---------------|----------------|---------|---------------|----------------|---------|---------------|----------------|
| 12 | 1.0 | 1.0 | 109 | 1.0 | 1.0 | 77 | 1.0 | 1.0 |
| 10 | 0.9 (0.4–2.1) | 1.0 | 107 | 1.0 (0.7–1.5) | 1.0 | 106 | 0.9 (0.6–1.2) | 1.2 |
| 8 | — | 7 | 0.4 (0.2–0.9) | 1.54 (6) | 1.0 | 110 | 1.0 | 2.24 (6)

| **Circulatory disease** | | | | | | |
| Cases | RR* (95% CI) | LR test (d.f.) | Cases | RR* (95% CI) | LR test (d.f.) | Cases | RR* (95% CI) | LR test (d.f.) |
|---------|---------------|----------------|---------|---------------|----------------|---------|---------------|----------------|
| 3.25 (2) | 6.81 (2)* | 8.61 (2)* | 12 | 1.0 | 1.0 | 77 | 1.0 | 1.0 |
| 10 | 0.9 (0.4–2.1) | 1.0 | 107 | 1.0 (0.7–1.5) | 1.0 | 106 | 0.9 (0.6–1.2) | 1.2 |
| 8 | — | 7 | 0.4 (0.2–0.9) | 1.54 (6) | 1.0 | 110 | 1.0 | 2.24 (6)

| **Ischaemic heart disease** | | | | | | |
| Cases | RR* (95% CI) | LR test (d.f.) | Cases | RR* (95% CI) | LR test (d.f.) | Cases | RR* (95% CI) | LR test (d.f.) |
|---------|---------------|----------------|---------|---------------|----------------|---------|---------------|----------------|
| 3.25 (2) | 6.81 (2)* | 8.61 (2)* | 12 | 1.0 | 1.0 | 77 | 1.0 | 1.0 |
| 10 | 0.9 (0.4–2.1) | 1.0 | 107 | 1.0 (0.7–1.5) | 1.0 | 106 | 0.9 (0.6–1.2) | 1.2 |
| 8 | — | 7 | 0.4 (0.2–0.9) | 1.54 (6) | 1.0 | 110 | 1.0 | 2.24 (6)
| Airstream helmet | Cases | RR* (95% CI) | LR test (d.f.) | Full face unpowered mask | Cases | RR* (95% CI) | LR test (d.f.) | Half face mask | Cases | RR* (95% CI) | LR test (d.f.) |
|------------------|-------|--------------|----------------|--------------------------|-------|--------------|----------------|---------------|-------|--------------|----------------|
| 0                | 1     | —            |                | 1                        | 34    | 1.0 (0.7–1.4)  | 5              | 7             | 1.1  | (0.5–2.5)    | 2              |
| 0                | 4     | —            |                | None                     | 0     | —            |                | None          | 0     | —            |                |
| 1                | 12    | 1.0 (0.5–1.7) |                | Mixed                    | 24    | 1.1 (0.7–1.7)  | 5              | 2             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
| Weekly hours spent stripping |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
| Weekly hours spent stripping |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
| Smoking status   |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
| Age at first exposure (years) |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
| Length of time in the survey |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
| Length of exposure (years) |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
| Time of first exposure |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
| Cerebrovascular disease |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
| Respiratory disease |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |
|                  |       |              |                |                          |       |              |                | 0             | —                |

Table 3 (Continued)
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|                              | Cerebrovascular disease | Respiratory disease |
|------------------------------|-------------------------|---------------------|
|                              | Cases | RR* (95% CI) | LR test (d.f.) | Cases | RR* (95% CI) | LR test (d.f.) |
| **Main respirator type**     |       |              |                |       |              |                |
| Positive pressure mask       | 31    | 1.0          |                | 33    | 1.0          |                |
| Airstream helmet             | 0     | —            |                | 0     | —            |                |
| Full face unpowered mask     | 4     | —            |                | 4     | —            |                |
| Half face mask               | 0     | —            |                | 0     | —            |                |
| Minimal                      | 1     | —            |                | 1     | —            |                |
| None                         | 0     | —            |                | 0     | —            |                |
| Mixed                        | 0     | —            |                | 3     | —            |                |
| **Weekly hours spent stripping** |       | 0.68 (2) |                | 3.46 (3) |                |
| 10<10                        | 21    | 1.0          |                | 21    | 1.0          |                |
| 20<20                        | 10    | 1.4 (0.6–2.9)|                | 8     | 1.1 (0.5–2.5)|                |
| 30+                          | 10    | 1.2 (0.6–2.7)|                | 7     | 2.0 (0.8–4.6)|                |
| **Smoking status**           |       |              |                |       |              |                |
| Never smokers                | 12    | 1.0          |                | 2     | 1.0          |                |
| Current smokers              | 22    | 0.9 (0.4–1.8)|                | 30    | 7.4** (1.8–30.6)|                |
| Former smokers               | 6     | 0.3* (0.1–0.9)|                | 11    | 3.8 (0.8–17.2)|                |
| **Age at first exposure (years)** |       | 3.04 (4) |                | 4.35 (3) |                |
| 20<20                        | 6     | 1.0          |                | 6     | 1.0          |                |
| 30+                          | 8     | 1.1 (0.4–3.2)|                | 12    | 1.7 (0.7–4.8)|                |
| 40+                          | 8     | 1.5 (0.5–4.7)|                | 12    | 2.1 (0.8–5.3)|                |
| 50+                          | 12    | 2.2 (0.8–6.6)|                | 14    | 1.0 (0.4–2.6)|                |
| **Length of time in the survey** |       | 0.45 (1) |                | 0.46 (1) |                |
| Short-term                   | 15    | 1.0          |                | 20    | 1.0          |                |
| Long-term                    | 26    | 1.2 (0.7–2.3)|                | 24    | 0.8 (0.5–1.5)|                |
| **Length of exposure (years)** |       | 0.94 (2) |                | 7.14 (3) |                |
| 10<10                        | 24    | 1.0          |                | 25    | 1.0          |                |
| 20<20                        | 6     | 0.8 (0.3–1.9)|                | 6     | 0.4 (0.2–1.1)|                |
| 30+                          | 11    | 0.7 (0.3–1.5)|                | —     | —            |                |
| 40+                          | 6     | 1.1 (0.4–2.7)|                | 7     | 1.9 (0.8–4.4)|                |
| **Time of first exposure**   |       | 1.16 (1) |                | 0.01 (1) |                |
| Pre-ALR                       | 18    | 1.0          |                | 22    | 1.0          |                |
| Post-ALR                      | 23    | 1.4 (0.7–2.8)|                | 22    | 1.0 (0.5–1.8)|                |

*significant at P<0.05; **significant at P<0.01; LR test = Likelihood ratio test of goodness-of-fit; d.f. = degrees of freedom; CI = confidence interval. *Relative risk adjusted with Poisson regression for age, calendar period and sex. **ICD-10, post-2001. *Reference category. **Categories: <30, 30+.  

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The majority of workers included in the analysis (over 80%) were first occupationally exposed to asbestos after the introduction of the ALR (1983). The latency period for asbestos-related diseases is 10–40 or more years (Levin et al, 1998; Yarborough, 2006) so any such diseases were beginning to emerge in the survey time frame. However, a longer follow-up period would begin to capture the full extent of asbestos-related disease.

Workers recruited under the 1983 ALR were required to attend pre-employment examinations and so would be unable to answer the removal worker-specific questions. Also, questionnaires completed before 1987 did not include these questions. Altogether, 51% of records had at least one missing response for the detailed stripping/removal variables and 41% of records had missing entries in all of these.

Wetting the area where removal is being carried out controls asbestos fibres and reduces airborne contamination (Paik et al, 1983; Sawyer et al, 1985; Lange and Thomulka, 2002), so such techniques have become the recommended working practice over dry methods. This study found no evidence that the use of mainly wet suppression techniques reduced the risk of mortality for workers. However, it is possible that this result is due to the combined effect of suppression technique and working practices aimed at reducing asbestos exposure.

Respirators can reduce the exposure of removal workers to asbestos fibres to 10% or less of the airborne concentrations measured outside the respirator (Williams et al, 2007). The majority of participants mainly used the positive pressure mask (68%), resulting in few cases in other categories. Workers who used little or no respiratory protection may still report that they did, diluting differences that may have otherwise been observed. Also important to note is that the effectiveness of any control method is highly dependent on the individual and how closely they follow procedures (Clayton et al, 2002).

There was a trend of increasing risk of mortality as the number of hours spent in the stripping enclosure increased. Spending a large number of hours per week in a stripping enclosure exposes workers not only to more asbestos fibres, but also to risk factors associated with working long hours. In particular, high stress because of work demands may increase negative behaviours such as physical inactivity, poor diet, and tobacco and alcohol use.

**DISCUSSION**

The main strength of the study is that it captured the vast majority of asbestos removal workers covered by the regulations in Great Britain (GB), together with such confounders as smoking status and on the working practices of the participant specific to the asbestos removal industry.
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(2006). This is in agreement with this study, which found that participants spending long hours in the enclosure were more likely to be current smokers. However, the observed trends remained even after adjustment for smoking habits (not shown).

For all cancers and mesothelioma mortality, the risk decreased as age at first occupational exposure to asbestos increased. Pira et al (2005) looked at the mesothelioma death rates in asbestos textile workers using a multiplicative (or relative risk) model. Under this model, age at first exposure was inversely related with mesothelioma risk. Other studies, however, found that age at first exposure had no significant effect on the incidence of mesothelioma (Peto et al, 1982; Hansen et al, 1998).

With changes in legislation and attitudes towards asbestos usage, the emphasis is now being placed on investigating how effective new regulations and procedures are at reducing the risks associated with occupations in the asbestos industry. However, the length of follow-up since their implementation, in particular the 1983 ALR considered in this study, is still relatively short given the latency periods of asbestos-related diseases. The significant reduction in risk of mortality from all cancers and mesothelioma when the first exposure occurred after the ALR should therefore be treated with caution.

In conclusion, there was no evidence that any particular method of dust suppression during asbestos removal was associated with reduced mortality. A link was suggested between the number of hours spent in the stripping enclosure and smoking status. In addition, the risk of mortality increased as the number of hours spent removing asbestos increased. This study is a first step in assessing the mortality of asbestos removal workers and further follow-up should allow assessment of the efficiency of recent regulations in this respect.

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