



Scand J Work Environ Health 1984;10(4):211-217

<https://doi.org/10.5271/sjweh.2339>

Issue date: Aug 1984

Mortality of English furniture makers.

by [Acheson ED](#), [Pippard EC](#), [Winter PD](#)

The following article refers to this text: [2024;50\(7\):489-502](#)

This article in PubMed: www.ncbi.nlm.nih.gov/pubmed/6494840



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

Mortality of English furniture makers

by E Donald Acheson, DM, E Clare Pippard, MSc, Paul D Winter, MSc¹

ACHESON ED, PIPPARD EC, WINTER PD. Mortality of English furniture makers. *Scand J Work Environ Health* 10 (1984) 211—217. Men (5,108) who worked in the Buckinghamshire furniture industry before 1968 have been followed to the end of 1982; 1,638 (32.1 %) had died. With the exception of nasal cancer, there was no significant increase in mortality, nor any trend towards increasing mortality with increasing dustiness of the work, for cancer of any site.

Key terms: cancer, cohort study, nasal adenocarcinoma, wood dust.

The incidence of adenocarcinoma of the nasal cavity and ethmoid sinuses has been shown to be raised among woodworkers both in the English furniture industry (1, 2, 3) and in the furniture industry of a number of other countries (4, 8, 9, 12, 19). In view of the fact that, among workers in the nickel refining and chromate industries, the high risk of nasal cancer is associated with an increased risk of lung cancer (5, 10, 11, 13) and excesses of lymphomas have also been reported for certain groups of woodworkers (15, 20, 21), it was decided to investigate the risk of cancer of other sites in furniture workers. The mortality experience of more than 5,000 men employed in the Buckinghamshire furniture industry up to the end of 1968 has already been reported; it showed no definite increase in the risk of cancer other than for cancer of the nasal cavity (25). However there was a trend towards increasing mortality from lung cancer with increasing dustiness of the work within the cohort, and this trend could not be explained by smoking habits. The present paper reports the mortality of the same group of men up to the end of 1982.

Subjects and methods

Details of the cohort were given in the previous report. Briefly the group consisted of men who were born before 1 January 1940 and who had worked prior to 31 December 1968 for any period of time in at least one of the nine furniture factories located in High Wycombe or the surrounding district, which had adequate records of past employees. During the period in question these factories together comprised about

40 % of the total workforce of the Buckinghamshire furniture industry. After the exclusion of men for whom no date of birth or details of occupation within the industry could be found, 5,138 men remained whose records were used in the previous analysis. Identification data of all the men for whom no death certificate had previously been received were sent to the Central Register of the National Health Service at Southport for tracing, and the files of the Department of Health and Social Security at Newcastle upon Tyne were also used when necessary. Duplication and errors in classification led to the exclusion of 30 records, 5,108 men being left for the analysis. The underlying cause of death on the death certificates was classified according to the ninth revision of the International Classification of Diseases, Injuries and Causes of Death (28).

Information was abstracted about the nature and dates of the jobs done by the men in the nine firms. The largest categories were cabinet- and chairmakers (N = 858), sawyers and wood machinists (N = 840), upholsterers (N = 545), sanders and French polishers (N = 548), and laborers (N = 1,266), but the cohort also included other categories of weekly paid staff including clerks, truck drivers, and maintenance men (N = 1,051). When a man was known to have done more than one job, he was classified to the dustiest. However, movement between different types of job is uncommon in this industry. As little was known about the occupational histories of the men prior to employment in one of the nine firms, but it was known that many had been employed in other local furniture firms, assumptions had to be made about their total duration of work in the furniture industry. As far as skilled craftsmen were concerned (eg, cabinetmakers and machinists) two alternative sets of assumptions were made. In the first (used in table 5 in the Results section) it was assumed that, in line with the custom of the industry, the men had entered as apprentices on leaving school and had been employed continuously within it until retirement or until the date on which the

¹ The Medical Research Council's Environmental Epidemiology Unit, Southampton General Hospital, Southampton S09 4XY, England.

Reprint requests to: Ms EC Pippard, The Medical Research Council's Environmental Epidemiology Unit, Southampton General Hospital, Southampton S09 4XY, England.

information was abstracted (personal communication from High Wycombe Furniture Manufacturer's Society). In the second assumption (not shown) only definitely documented periods of work were included in the estimate of duration of employment. For the remainder of the workforce, including laborers and clerical workers, we assumed that, as in the second set of assumptions already noted, their work in the industry had been limited to that within the nine firms. In any event, the conclusions to be drawn from the two sets of analyses were the same.

The classification of jobs in respect to the dustiness of the work is the same as that prepared for the previous study. As no quantitative data concerning dust during the period in question were available, jobs were classified as:

Class I (less dusty): office workers, upholsterers, and yard men;

Class II (dusty): polishers, veneers, and maintenance men;

Class III (very dusty): cabinet- and chairmakers, sanders, and wood machinists.

Unskilled laborers were distributed according to the dustiness of the area where they worked (yard, machine shop, etc). Of the 5,108 men, 1,757 were placed in class I, 845 in class II, and 2,506 in class III.

The number of deaths expected was calculated according to the person-years method (18) and compared with the number observed. Deaths from 1 January 1941 to 31 December 1982 were included, and

Table 1. Male Buckinghamshire furniture workers classified according to vital status on 31 December 1982.

| Vital status | Number | Percent |
|--------------|--------|---------|
| Alive | 3,348 | 65.5 |
| Dead | 1,638 | 32.1 |
| Emigrated | 60 | 1.2 |
| No trace | 62 | 1.2 |
| Total | 5,108 | 100 |

Table 2. Mortality of 5,108 male Buckinghamshire furniture workers by main cause during 1941—1982.

| ICD ^a group | Observed | Expected | Standardized mortality ratio | 95 % confidence limits |
|---|----------|----------|------------------------------|------------------------|
| 140—239 (neoplasms) | 438 | 523.1 | 84 | 76—92* |
| 400—405, 410—414, 428—429 (heart disease) | 499 | 726.4 | 69 | 63—75* |
| 460—519 (respiratory diseases) | 259 | 316.3 | 82 | 72—92* |
| 800—999 (accidents, etc) | 62 | 82.3 | 75 | 58—97* |
| — (other causes) | 380 | 555.9 | 68 | 62—76* |
| 001—999 (all causes) | 1,638 | 2,204.0 | 74 | 71—78* |

^a ICD = International Classification of Diseases, Injuries and Causes, ninth revision.

* $p < 0.05$.

Table 3. Mortality from cancer among Buckinghamshire furniture workers (1941—1982). The standardized mortality ratios and 95 % confidence limits have been adjusted for Buckinghamshire.

| ICD ^a number | Site | Observed | Expected | Observed: expected | Standardized mortality ratio | 95 % confidence limits |
|-------------------------|----------------------------------|----------|----------|--------------------|------------------------------|------------------------|
| 143—149 | Mouth, pharynx | 6 | 5.2 | 1.16 | 122 | 45 —266 |
| 150 | Esophagus | 15 | 14.2 | 1.06 | 112 | 62 —183 |
| 151 | Stomach | 63 | 62.5 | 1.01 | 120 | 92 —153 |
| 153 | Large intestine | 22 | 33.6 | 0.66 | 68 | 42 —102 |
| 154 | Rectum | 23 | 26.1 | 0.88 | 110 | 70 —165 |
| 155, 156 | Liver and gall bladder | 8 | 9.0 | 0.89 | 80 | 35 —159 |
| 157 | Pancreas | 13 | 21.9 | 0.59 | 60 | 33 —104 |
| 160 | Nasal cavity | 9 | 1.1 | 8.14 | . ^b | 3.7—15.5* |
| 161 | Larynx | 3 | 5.3 | 0.57 | 58 | 12 —170 |
| 162, 163 | Lung | 160 | 209.6 | 0.76 | 80 | 68 —93* |
| 185 | Prostate | 28 | 29.6 | 0.95 | 94 | 62 —136 |
| 186 | Testis | 3 | 1.5 | 1.95 | 148 | 30 —431 |
| 188 | Bladder | 11 | 21.0 | 0.52 | 60 | 30 —109 |
| 189 | Kidney | 6 | 8.2 | 0.73 | 78 | 29 —169 |
| 191, 192 | Brain | 8 | 10.1 | 0.80 | 83 | 35 —160 |
| 200—208 | Lymphatic and hemopoietic system | 27 | 27.4 | 0.99 | 92 | 61 —134 |
| .. | All other | 30 | 31.2 | 0.96 | . | . |
| 140—208 | All cancers | 435 | 517.5 | 0.84 | 88 | 80 —97* |

^a International Classification of Diseases, Injuries and Causes of Death, ninth revision.

^b Adjustment not sensible, see text.

* $p < 0.05$.

five-year age-group cause-specific death rates for five-year calendar periods were used to calculate the expected numbers (22, 23). The rates used were for England and Wales as a whole, and an area correction was then incorporated into the analysis to adjust for local mortality during the years 1968—1978 (16). Tests of the statistical significance of the observed number of deaths compared with the numbers expected were based on the Poisson distribution. Tests for trend were carried out with the method described by Darby & Reissland (7).

Results

At the end of 1982 almost all (98.8 %) of the men had been traced, and 1,638 (32.1 %) were known to be dead (table 1).

For the main classes of causes of death table 2 shows the numbers of deaths observed during the period 1941—1982, the expected numbers calculated on the basis of national rates, and the standard mortality ratios (SMR) with 95 % confidence limits (CL). The mortality of the furniture workers was more favorable than that of the general population for all causes combined and for each of the classes shown.

Table 3 shows mortality according to the principal sites of cancer. In addition to the expected number and observed : expected ratio derived from national rates, it has been possible, to give a standardized mortality ratio (shown as SMR') and 95 % confidence limits (CL') adjusted for the mortality experience of Buckinghamshire for each site of cancer in this and subsequent tables. As in the previous report, a significant deficiency of deaths was observed from all

Table 4. Mortality for selected sites of cancer and for all causes among Buckinghamshire furniture workers (1941—1982) by dustiness of occupation. The standardized mortality ratios and 95 % confidence limits have been adjusted for Buckinghamshire.

| Cause of death | Observed | Expected | Observed: expected | Standardized mortality ratio | 95 % confidence limits |
|--------------------------------|----------|----------|-----------------------|------------------------------------|---------------------------|
| All cancers | | | | | |
| Occupation less dusty | 139 | 161.51 | 0.86 | 91 | 76—107 |
| Occupation dusty | 73 | 89.55 | 0.82 | 86 | 67—108 |
| Occupation very dusty | 223 | 266.38 | 0.84 | 88 | 77—100 |
| Total | 435 | 517.50 | 0.84 | 88 | 80— 97* |
| Cancer of the lung | | | | | |
| Occupation less dusty | 51 | 65.35 | 0.78 | 81 | 61—107 |
| Occupation dusty | 30 | 36.67 | 0.82 | 85 | 57—122 |
| Occupation very dusty | 79 | 107.54 | 0.73 | 77 | 61— 95* |
| Total | 160 | 209.56 | 0.76 | 80 | 68— 93* |
| Cancer of the stomach | | | | | |
| Occupation less dusty | 23 | 19.37 | 1.19 | 141 | 90—212 |
| Occupation dusty | 11 | 10.82 | 1.02 | 121 | 60—217 |
| Occupation very dusty | 29 | 32.34 | 0.90 | 107 | 72—153 |
| Total | 63 | 62.52 | 1.01 | 120 | 92—153 |
| Cancer of the rectum | | | | | |
| Occupation less dusty | 7 | 8.11 | 0.86 | 108 | 43—222 |
| Occupation dusty | 5 | 4.48 | 1.12 | 140 | 45—326 |
| Occupation very dusty | 11 | 13.50 | 0.81 | 102 | 51—182 |
| Total | 23 | 26.09 | 0.88 | 110 | 70—165 |
| Cancer of the esophagus | | | | | |
| Occupation less dusty | 6 | 4.46 | 1.35 | 142 | 52—308 |
| Occupation dusty | 1 | 2.45 | 0.41 | 43 | 1—239 |
| Occupation very dusty | 8 | 7.30 | 1.10 | 115 | 50—227 |
| Total | 15 | 14.22 | 1.06 | 112 | 62—183 |
| Cancer of the nose | | | | | |
| Occupation less dusty | — | 0.35 | — | .a | . |
| Occupation dusty | — | 0.19 | — | .a | . |
| Occupation very dusty | 9 | 0.57 | 15.79 | .a | . |
| Total | 9 | 1.11 | 8.14 | .a | . |
| All causes | | | | | |
| Occupation less dusty | 564 | 686.3 | 0.82 | 92 | 85—100 |
| Occupation dusty | 281 | 375.75 | 0.75 | 84 | 74— 94* |
| Occupation very dusty | 793 | 1,141.49 | 0.69 | 77 | 72— 83* |
| Total | 1,638 | 2,204.07 | 0.74 | 83 | 79— 87* |

^a Adjustment not sensible, see text.

* $p < 0.05$.

neoplasms combined (SMR' 88, 95 % CL' 80—97). Nine nasal cancer deaths were observed giving a relative risk of 8.1 (95 % CL 3.7—15.4) based on an expected number derived from national rates. A local adjustment for nasal cancer was inappropriate due to the large number of furniture workers in the county. All nine deaths were due to adenocarcinoma although this tumor usually represents less than 10 % of nasal cancer deaths. Thus the relative risk for nasal adenocarcinoma within the cohort was at least 80. No increases in risk significant at the 5 % level were found for any other cancer site, on the basis of either national or locally adjusted expected numbers. With

both standards of comparison a significant deficiency of deaths was found for cancer of the lung, and for bladder cancer a corresponding deficiency was seen when the national standard was used. The deficiency of deaths from cancer of the large intestine (SMR' 68, 95 % CL' 42—102) was of borderline significance.

Table 4 presents the mortality from all causes, all neoplasms, nasal cancer, lung cancer, and cancers with an SMR greater than 100, for which more than 10 deaths were observed (esophagus, stomach, and rectum) by degree of dustiness of the work. As in the previous analysis those who worked in the less dusty jobs had a less favorable mortality from all causes

Table 5. Mortality for selected sites of cancer and from all causes among Buckinghamshire furniture workers (1941—1982) by presumed duration of work in the furniture industry. The standardized mortality ratios and 95 % confidence limits have been adjusted for Buckinghamshire.

| Cause of death | Observed | Expected | Observed: expected | Standardized mortality ratio | 95 % confidence limits |
|--------------------------------|----------|----------|-----------------------|------------------------------------|---------------------------|
| All cancers | | | | | |
| Work duration ≤ 19 years | 117 | 146.03 | 0.80 | 84 | 70—101 |
| Work duration 20—39 years | 87 | 85.55 | 1.02 | 107 | 86—132 |
| Work duration ≥ 40 years | 101 | 148.22 | 0.68 | 72 | 58— 87* |
| Work duration unknown | 4 | 7.86 | 0.51 | 54 | 15—137 |
| Total | 309 | 387.66 | 0.80 | 84 | 75— 94* |
| Cancer of the lung | | | | | |
| Work duration ≤ 19 years | 44 | 60.55 | 0.73 | 76 | 55—102 |
| Work duration 20—39 years | 34 | 35.43 | 0.96 | 100 | 69—140 |
| Work duration ≥ 40 years | 31 | 59.27 | 0.52 | 54 | 37— 77* |
| Work duration unknown | 3 | 3.11 | 0.96 | 100 | 21—293 |
| Total | 112 | 158.36 | 0.71 | 74 | 61— 89* |
| Cancer of the stomach | | | | | |
| Work duration ≤ 19 years | 19 | 16.49 | 1.15 | 137 | 83—214 |
| Work duration 20—39 years | 12 | 10.13 | 1.18 | 141 | 73—246 |
| Work duration ≥ 40 years | 14 | 18.96 | 0.74 | 88 | 48—148 |
| Work duration unknown | — | 1.02 | — | — | — |
| Total | 45 | 46.60 | 0.97 | 115 | 84—154 |
| Cancer of the rectum | | | | | |
| Work duration ≤ 19 years | 6 | 6.91 | 0.87 | 109 | 40—236 |
| Work duration 20—39 years | 2 | 4.15 | 0.48 | 60 | 7—218 |
| Work duration ≥ 40 years | 5 | 7.83 | 0.64 | 80 | 26—186 |
| Work duration unknown | — | 0.42 | — | — | — |
| Total | 13 | 19.30 | 0.67 | 84 | 45—144 |
| Cancer of the esophagus | | | | | |
| Work duration ≤ 19 years | 4 | 4.02 | 0.99 | 105 | 29—268 |
| Work duration 20—39 years | 5 | 2.35 | 2.13 | 224 | 73—524 |
| Work duration ≥ 40 years | 3 | 4.02 | 0.75 | 79 | 16—230 |
| Work duration unknown | — | 0.22 | — | — | — |
| Total | 12 | 10.60 | 1.13 | 119 | 62—208 |
| Cancer of the nose | | | | | |
| Work duration ≤ 19 years | 1 | 0.32 | 3.13 | .a | . |
| Work duration 20—39 years | 1 | 0.19 | 5.18 | .a | . |
| Work duration ≥ 40 years | 7 | 0.30 | 23.34 | .a | . |
| Work duration unknown | — | 0.02 | — | .a | . |
| Total | 9 | 0.83 | 10.84 | .a | . |
| All causes | | | | | |
| Work duration ≤ 19 years | 448 | 590.70 | 0.76 | 85 | 78— 93* |
| Work duration 20—39 years | 272 | 351.27 | 0.77 | 87 | 77— 98* |
| Work duration ≥ 40 years | 406 | 652.73 | 0.62 | 70 | 63— 77* |
| Work duration unknown | 40 | 34.53 | 1.16 | 130 | 93—177 |
| Total | 1,166 | 1,629.23 | 0.72 | 81 | 73— 89* |

.a Adjustment not sensible, see text.

* $p < 0.05$.

combined ($p < 0.05$). Similar trends were found when skilled and unskilled workers were considered separately (not shown), but the reason for this occurrence is unknown. With the exception of nasal cancer, for which there was a significant trend ($p < 0.05$), no relationships between increasing mortality and increasing dustiness of the work were found. For cancer of the lung the SMR¹ was lower in the group exposed to the dustiest conditions than in the other two groups, and similar findings were observed for both skilled and unskilled workers separately.

The mortality patterns for the specified causes of death were also examined by presumed duration of work in the furniture industry (0–19, 20–39, ≥ 40 years) and by interval since presumed date of entry into the industry (0–19, 20–39, ≥ 40 years) (tables 5 & 6). This analysis was limited to skilled workers.

In both there were significant increasing trends for nasal cancer ($p < 0.05$), but no trends were found for the other cancer sites. A significant trend of increasing mortality was observed by interval since first entry into the industry for all causes of death combined.

The mortality for selected causes (all causes, all cancers, lung cancer, stomach cancer) for cabinet-makers, sawyers, upholsterers, sanders, and laborers is shown in table 7. With the exception of stomach cancer, for which slight excesses (not significant at the 5% level) were found, the mortality observed was more favorable than expected for four of the five occupational groups.

Of the rarer sites of cancer which have been reported as having possible associations with wood work, it is noteworthy that there was no excess of deaths from tumors of the lymphatic and hemopoietic system as

Table 6. Mortality for selected sites of cancer and from all causes among skilled Buckinghamshire furniture workers (1941–1982) by time since entry into the furniture industry. The standardized mortality ratios and 95% confidence limits have been adjusted for Buckinghamshire.

| Cause of death | Observed | Expected | Observed: expected | Standardized mortality ratio | 95% confidence limits |
|----------------------------------|----------|----------|-----------------------|------------------------------------|--------------------------|
| All cancers | | | | | |
| Time since entry ≤ 19 years | 62 | 82.98 | 0.75 | 79 | 60–101 |
| Time since entry 20–39 years | 96 | 125.88 | 0.76 | 80 | 65–98* |
| Time since entry ≥ 40 years | 151 | 187.70 | 0.80 | 84 | 72–99* |
| Total | 309 | 396.56 | 0.78 | 82 | 73–92* |
| Cancer of the lung | | | | | |
| Time since entry ≤ 19 years | 25 | 33.57 | 0.74 | 77 | 50–115 |
| Time since entry 20–39 years | 33 | 52.14 | 0.63 | 66 | 45–93* |
| Time since entry ≥ 40 years | 54 | 75.73 | 0.71 | 74 | 56–97* |
| Total | 112 | 161.44 | 0.69 | 72 | 60–87* |
| Cancer of the stomach | | | | | |
| Time since entry ≤ 19 years | 13 | 10.15 | 1.28 | 152 | 81–261 |
| Time since entry 20–39 years | 16 | 14.91 | 1.07 | 128 | 73–207 |
| Time since entry ≥ 40 years | 16 | 23.00 | 0.70 | 83 | 47–135 |
| Total | 45 | 48.06 | 0.94 | 111 | 81–149 |
| Cancer of the rectum | | | | | |
| Time since entry ≤ 19 years | 3 | 3.90 | 0.77 | 96 | 20–281 |
| Time since entry 20–39 years | 5 | 6.03 | 0.83 | 104 | 34–242 |
| Time since entry ≥ 40 years | 5 | 9.87 | 0.51 | 63 | 21–148 |
| Total | 13 | 19.80 | 0.66 | 82 | 44–140 |
| Cancer of the esophagus | | | | | |
| Time since entry ≤ 19 years | 2 | 2.05 | 0.98 | 103 | 12–371 |
| Time since entry 20–39 years | 3 | 3.42 | 0.88 | 92 | 19–270 |
| Time since entry ≥ 40 years | 7 | 5.31 | 1.32 | 139 | 56–286 |
| Total | 12 | 10.78 | 1.11 | 117 | 61–205 |
| Cancer of the nose | | | | | |
| Time since entry ≤ 19 years | — | 0.19 | — | .a | . |
| Time since entry 20–39 years | 2 | 0.30 | 6.74 | .a | . |
| Time since entry ≥ 40 years | 7 | 0.36 | 19.20 | .a | . |
| Total | 9 | 0.86 | 10.51 | .a | . |
| All causes | | | | | |
| Time since entry ≤ 19 years | 224 | 356.51 | 0.63 | 71 | 62–80* |
| Time since entry 20–39 years | 347 | 507.81 | 0.68 | 76 | 69–85* |
| Time since entry ≥ 40 years | 595 | 812.11 | 0.73 | 82 | 76–89* |
| Total | 1,166 | 1,676.42 | 0.70 | 79 | 74–83* |

^a Adjustment not sensible, see text.

* $p < 0.05$.

Table 7. Mortality of Buckinghamshire furniture workers (1941—1982) by occupational group. The standardized mortality ratios and 95 % confidence limits have been adjusted for Buckinghamshire.

| Cause of death | Observed | Expected | Standardized mortality ratio | 95 % confidence limits |
|------------------------------|----------|----------|------------------------------|------------------------|
| All causes | | | | |
| Cabinet makers | 289 | 423.84 | 76 | 69—87* |
| Sawyers | 254 | 377.05 | 75 | 66—85* |
| Upholsterers | 165 | 201.19 | 92 | 79—108 |
| Sanders/French polishers | 191 | 270.37 | 80 | 69—91* |
| Laborers | 449 | 547.98 | 92 | 84—101 |
| All cancers | | | | |
| Cabinet makers | 75 | 100.25 | 79 | 62—99* |
| Sawyers | 76 | 88.54 | 91 | 72—113 |
| Upholsterers | 39 | 48.76 | 84 | 60—115 |
| Sanders/French polishers | 52 | 64.29 | 85 | 63—112 |
| Laborers | 119 | 123.76 | 101 | 84—121 |
| Cancer of the lung | | | | |
| Cabinet makers | 23 | 40.87 | 58 | 37—87* |
| Sawyers | 29 | 35.93 | 84 | 56—121 |
| Upholsterers | 15 | 20.09 | 78 | 44—128 |
| Sanders/French polishers | 19 | 26.32 | 75 | 45—118 |
| Laborers | 43 | 48.76 | 92 | 67—124 |
| Cancer of the stomach | | | | |
| Cabinet makers | 7 | 12.22 | 68 | 27—140 |
| Sawyers | 13 | 10.70 | 145 | 77—248 |
| Upholsterers | 7 | 5.76 | 145 | 58—298 |
| Sanders/French polishers | 9 | 7.83 | 137 | 63—260 |
| Laborers | 17 | 15.18 | 133 | 77—213 |

* $p < 0.05$.

a whole (ICD 200—208) (15, 20, 21) (table 3). Within this group there was a slight excess of lymphoma deaths (ICD 200—203) (19 observed, 16.0 expected) and a deficiency of deaths from leukemia (ICD 204—208) (8 observed, 11.4 expected), neither of which approached statistical significance. A significant excess of deaths ascribed to ICD 202 (other and unspecified lymphoma) (8 observed, 2.3 expected, SMR 350, 95 % CL 151—691) is difficult to interpret in the presence of a deficiency of deaths ascribed to Hodgkins disease (1 observed, 4.0 expected) and may well be a diagnostic artifact. Six deaths from multiple myeloma (ICD 203) were observed and 4.6 were expected.

Three deaths (1.18 expected) from cancers of connective and other soft tissue were noted (ICD 171). The details of the deaths were as follows: fibrosarcoma of the thigh in a truck driver (employed 1928—1965), fibrosarcoma of the abdomen in a wood machinist (1927—1960), abdominal sarcoma in a man who worked as a polisher (1921—1925) and later as a storeman (1960—1961). Sarcomas of connective tissue have been reported in association with exposure to chlorophenols (6, 17). These compounds have been used in the preservation of timber and in the pulp and paper industry. So far as is known chlorophenols have been used rarely in the Buckinghamshire furniture industry (personal communication from Furniture Industry Research Association). The preferred explanation is that the small excess noted in this study was due to chance.

In view of the fact that work with certain varieties of timber has been associated with bronchial asthma

(26, 27), the mortality from diseases of the respiratory system was analyzed in some detail. There was an overall deficit of deaths (SMR 82, 95 % CL 72—92), and no trends were found with increasing dustiness of work, for either skilled or unskilled workers (not shown). Only 2 of the 259 deaths from respiratory disease were due to bronchial asthma.

Discussion

The object of this study has been to determine whether the well-known risk of nasal adenocarcinoma among furniture makers is associated with an increased mortality from cancer of any other organ and in particular from cancers of other parts of the respiratory tract. We have found no evidence for this. In the previous study of this cohort, which followed the men to the end of 1968 (25), although no excess of lung cancer mortality was found relative to external standards calculated on the basis of national or local rates, there were trends of increasing mortality with increasing dustiness of work and increasing duration of exposure. Such trends are not present in the current study, and there is therefore no evidence of an increased risk of lung cancer associated with work in the Buckinghamshire furniture industry. Our results accord with those of Olsen & Sabroe's study (24) of 40,000 active and retired Danish carpenters for whom no significant excess of cancer of any site other than the nose was found. For lung cancer an SMR of 96 (95 % CL 68—114) was found for men under 65

years of age. On the other hand in a case-referent study based on the examination of burial registers in a small Swedish town with a large woodworking industry Esping & Axelson (14) found that 5 of 23 lung cancer deaths had been woodworkers as compared with 28 of 370 referents. The relative risk corrected for age was 4.1 (95 % CL 1.6—10.6).

As furniture makers are forbidden to smoke in the workplace because of the risk of fire, it is important to consider to what extent more favorable smoking habits may have contributed to the low lung cancer mortality. Full details of the smoking data collected in the present study have been reported elsewhere (25). Slightly fewer current cigarette smokers were found among current and exworkers who were living on 1 January 1969 than among men in the South East of England, but there were more exsmokers and fewer persons who had never smoked among the woodworkers. When the different types of workers were compared, slightly fewer current smokers (43.8 %) were found among the men exposed to very dusty conditions than in the other two groups (46.9 & 47.4 %). But the differences were small, and this deficit was associated with an excess of exsmokers rather than of nonsmokers. We conclude that the marginally more favorable smoking habits among the woodworkers may have contributed to the low mortality from lung cancer but were probably insufficient to conceal an occupational risk associated with the inhalation of wood dust.

Although an association has been reported between Hodgkin's disease and work in sawmills and the paper and pulp industry and among carpenters and joiners (20, 21), there is no convincing evidence in the literature concerning an association with the furniture industry. This lack of evidence accords with the findings in this study.

Acknowledgments

This study was supported by a grant from the Cancer Research Campaign.

We are grateful for the cooperation of the staff of the Office of Population Censuses and Surveys who provided the mortality data. The study could not have been carried out without the help and cooperation of the High Wycombe Furniture Manufacturers Association and its members.

References

1. Acheson ED. Nasal cancer in the furniture and boot and shoe manufacturing industries. *Prev Med* 5 (1976) 295—315.
2. Acheson ED, Cowdell RH, Hadfield E, Macbeth RG. Nasal cancer in woodworkers in the furniture industry. *Br Med J* 2 (1968) 587—597.
3. Acheson ED, Winter PD, Hadfield E, Macbeth RG. Is nasal adenocarcinoma in the Buckinghamshire furniture industry declining? *Nature* 299 (1982) 263—265.
4. Andersen HC. Exogenous causes of cancer of the nasal cavities [In Danish]. *Ugeskr Laeg* 137 (1975) 2567—2571.
5. Bidstrup PL, Case RAM. Carcinoma of the lung in workmen in the biochromates-producing industry in Great Britain. *Br J Ind Med* 13 (1956) 260—264.
6. Coggon D, Acheson ED. Do phenoxy herbicides cause cancer in man? *Lancet* 1 (1982) 1057—1059.
7. Darby SC, Reissland JA. Low levels of ionising radiation and cancer — Are we underestimating the risk? *J R Stat Soc A* 144 (1981) 298—331.
8. Debois JM. Tumours of the nasal cavities among woodworkers [In Flemish]. *Tijdschr Soc Geneeskde* 2 (1969) 92—93.
9. Desnos J, Martin A. Epitheliomas cylindriques de l'ethmoïde de travail du bois. *Cah Otorinolaryngol* 8 (1973) 367—374.
10. Doll R. Cancer of the lung and nose in nickel workers. *Br J Ind Med* 15 (1958) 217—223.
11. Doll R, Morgan LG, Speizer FE. Cancers of the lung and nasal sinuses in nickel workers. *Br J Cancer* 24 (1970) 623—632.
12. Engzell U, Englund A, Westerholm P. Nasal cancer associated with occupational exposure to organic dust. *Acta Oto Laryngol* 86 (1978) 437—442.
13. Enterline PE. Respiratory cancer amongst chromate workers. *J Occup Med* 16 (1974) 523—526.
14. Esping B, Axelson O. A pilot study of respiratory and digestive tract cancer among woodworkers. *Scand J Work Environ Health* 6 (1980) 201—205.
15. Franco G, Fonte R. Malignant lymphomas and occupational risk in woodworkers. *IRCS Med Sci* 11 (1983) 216—217.
16. Gardner MJ, Winter PD, Taylor CP, Acheson ED. Atlas of cancer mortality for England and Wales 1968—78. Wiley, Chichester 1983.
17. Hardell L, Sandstrom A. Case-control study: Soft tissue sarcoma and exposure to phenoxyacetic acids or chlorophenols. *Br J Cancer* 39 (1979) 711—717.
18. Hill ID. Computing man years at risk. *Br J Prev Soc Med* 26 (1972) 132—134.
19. International Agency for Research on Cancer. Wood, leather and some associated industries. Lyon, 1981. (IARC monographs on the evaluation of the carcinogenic risk of chemicals to humans, volume 25).
20. Milham S. Neoplasia in the wood and pulp industry. *Ann NY Acad Sci* 271 (1976) 294—300.
21. Milham S, Hesser JE. Hodgkin's disease in woodworkers. *Lancet* 2 (1967) 136—137.
22. Office of Population Censuses and Surveys. Cancer mortality, England and Wales, 1911—70. Her Majesty's Stationery Office, London 1975.
23. Office of Population Censuses and Surveys. Cancer mortality in England and Wales, 1971—78. Her Majesty's Stationery Office, London 1980.
24. Olsen J, Sabroe S. A follow-up study of non retired and retired members of the Danish Carpenter/Cabinet Makers' Trade Union. *Int J Epidemiol* 8 (1979) 375—382.
25. Rang EH, Acheson ED. Cancer in furniture workers. *Int J Epidemiol* 10 (1981) 253—261.
26. Sosman AJ, Schlueter DP, Fink JN, Barboriak JH. Hypersensitivity to wood dust. *New Engl J Med* 281 (1969) 977—980.
27. Woods B, Calnan CD. Toxic woods. *Br J Dermatol* 94 (1976): suppl 13, 1—97.
28. World Health Organization. International classification of diseases 1975. Ninth revision. Her Majesty's Stationery Office, London 1977.

Received for publication: 14 May 1984