SUMMARY

A case-control study of nasal cancer, based on death certificate statements on occupation in North Carolina counties with furniture-manufacturing industries, revealed a 4-fold excess risk linked to this occupation. Although woodworking exposures have been associated with nasal adenocarcinomas in several areas of the world, this is the first report of such a relationship in the United States.

INTRODUCTION

In 1965 a clinical report suggested a relation between furniture making and nasal adenocarcinomas in Buckinghamshire, England (6). The association was confirmed by epidemiological studies in several areas of the world. Among furniture workers in England, the annual incidence rate for nasal adenocarcinoma was 60/100,000, which approximated the rate for cancer of the bronchus in the general male population (1). Subsequent studies in Denmark (10), France (4), Belgium (3), and Australia (5) also revealed an excess risk of nasal cancer among furniture workers. A survey of death certificates in the state of Washington uncovered no nasal cancer excess for the wood and pulp industry, but the number of furniture workers was small (9).

In a preliminary attempt to determine whether nasal cancer occurs excessively among furniture workers in the United States, age-adjusted cancer mortality rates for the period 1950 to 1969 were calculated for counties with a substantial proportion of the population employed in furniture manufacture. These rates were then compared with rates for counties with similar socioeconomic and demographic characteristics but no involvement in the industry (2). Nasal cancer mortality was significantly elevated in furniture industry counties, while rates for nearly all other cancers were at or below control levels.

To investigate this association further, we obtained death certificates from North Carolina, where the furniture industry is heavily concentrated, and employed a case-control approach in examining the statements on usual occupation for persons dying of nasal cancer.

METHODS

Computerized listings of deaths from 1956 to 1974 for residents of North Carolina were obtained for counties in which at least 1% of the total population was employed in furniture and fixtures manufacture (Code 25) according to the 1963 U. S. Census of Manufactures (12).1 We received copies of certificates for the 37 deaths attributed to cancer of the nasal cavity and sinuses [Code 160 of the Eighth Revision of the International Classification of Disease (11)] among white males. For each case we obtained 2 control certificates matched by sex, race, county of death, age at death (within 2 years), and time of death (exact year match). Heart disease, stroke, and other circulatory diseases accounted for 64% of the control deaths, and cancer accounted for 11%. The median age at death for both cases and controls was 66 years. No major differences were found between cases and controls with respect to marital status or place of birth.

Industry and occupation, as recorded on the certificate, were considered together to categorize each individual with regard to woodworking exposure. Exposure was defined in 2 ways: (a) those employed in furniture manufacturing; and (b) those with other exposure to wood, including carpenters, sawyers, lumbermen, and loggers. Odds ratios, significance tests, and 95% confidence intervals were then calcu-

RESULTS

Table 1 shows the distribution of occupations recorded among cases and controls. Eight of the 37 people dead from nasal cancer (21.6%) were employed in the furniture industry, compared with 5 of 73 (6.8%) controls. An additional 5 cases (13.5%) were people with jobs involving other types of

1 Counties included Alexander, Ashe, Burke, Caldwell, Catawba, Chatham, Davidson, Davie, Guilford, Haywood, Iredell, Lee, Lincoln, McDowell, Moore, Randolph, Stanly, Surry, and Wilkes.
lulated for each category of exposure according to matched triplet procedures (7, 8).

woodworking, as compared with 7 (9.6%) of the controls. The actual statements on the death certificates for these 25 individuals are presented in the "Appendix."

The matched triplet analysis resulted in an odds ratio of 4.4 (95% confidence limits, 1.3 to 15.4) for employment as furniture workers and 1.5 (95% confidence limits, 0.4 to 4.3) for other woodworking occupations. The excess risk among furniture workers was apparent below and above age 65 and in both halves of the study period, except for those who died over age 65 from 1965 to 1974 (Table 2).

Twenty-four of the 37 deaths (65%) from nasal cancer were reported to arise from the maxillary sinus. Histology was recorded on only 13 of the certificates: 4 adenocarcinomas, 4 squamous cell or epidermoid carcinomas, 1 lymphoepithelioma, 1 myxosarcoma, and 3 undifferentiated carcinomas. Three of the 4 cases of adenocarcinoma were among workers in the furniture industry.

DISCUSSION

This study provides the 1st indication of an excess risk of nasal cancer among furniture workers in the United States, although the relation has been established elsewhere (1, 3-6, 10). Based on a crude assessment of occupational exposure in individuals, the results confirm an earlier link based on a county-by-county correlation between aggregate mortality and industrial data (2). Despite the limitations of death certificate data on occupation, this approach seems to be useful as a quick and inexpensive 1st step in generating and evaluating hypotheses linking industrial exposures to cancer. Further study is needed to clarify the risk of nasal cancer in U. S. furniture workers and to identify the specific carcinogens involved.

ACKNOWLEDGMENTS

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REFERENCES


APPENDIX

Statements on the death certificates pertaining to furniture or wood exposures

Table 2

Number of certificates and percentage employed in the furniture industry by year and age at death

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Cases</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retired</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>Partner</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Furniture*</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Furniture worker*</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>Furniture worker*</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Carpenter</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Furniture*</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Lumberman</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>Furniture worker*</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Furniture factory*</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>Retired lumberman</td>
<td>6</td>
<td>12</td>
</tr>
</tbody>
</table>

Odds ratio = 4.0

* N, total number in each stratum, used as denominator for calculation of percentages.

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