Identification of Occupational Cancer Risks in British Columbia, Canada: A Population-Based Case—Control Study of 1,155 Cases of Colon Cancer

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Received: 8 August 2011; in revised form: 2 September 2011 / Accepted: 19 September 2011 / Published: 26 September 2011

Abstract: Objective: Cancer has been recognized to have environmental origin, but occupational cancer risk studies have not been fully documented. The objective of this paper was to identify occupations and industries with elevated colon cancer risk based on lifetime occupational histories collected from 15,463 incident colon cancer cases. Method: A group matched case-control design was used. All cases were diagnosed with histologically proven colon cancers, with cancer controls being all other cancer sites, excluding rectum, lung and unknown primary, diagnosed at the same period of time from the British Columbia Cancer Registry. Data analyses were done on all 597 Canadian standard occupation titles and 1,104 standard industry titles using conditional logistic regression for matched data sets and the likelihood ratio test. Results: Excess colon cancer risks was observed in a number of occupations and industries, particularly those with low physical activity and those involving exposure to asbestos, wood dusts, engine exhaust and diesel engine emissions, and ammonia. Discussion: The results of our study are in line with those from the literature and further suggest that exposure to wood dusts and to ammonia may carry an increased occupational risk of colon cancer.
Keywords: occupational cancer; colon cancer; cancer risk; occupational exposure; carcinogen

1. Introduction

Colon cancer is one of the leading cancer causes of death. In Canada, colon cancer is the third most common form of cancer (after prostate cancer and lung cancer in men and breast cancer and lung cancer in women) and the third leading cancer cause of death (after lung cancer and prostate cancer in men and lung cancer and breast cancer in women) [1].

Despite the common occurrence of colon cancer, its etiology is not well established; age, family history [2], lifestyle factors [3-6] including daily alcohol use, low-fiber diets, a high consumption of animal fat and red meat, physical inactivity [7-10], obesity [11-13] and smoking [14] are reported risk factors. The evidence regarding occupational exposures related to the occurrence of colon cancer is generally limited and/or not consistent [15]. Exposures to asbestos [16,17], dyes in textile industry [18], hydrazine in rocket fuels [19], pesticides in agriculture [20], engine exhaust and diesel engine emissions [21] and occupations as managers [22], male farmers [23], painters, police, guards and firemen, motor transport workers and clerks as well as exposures in non-metallic mineral products, leather goods, meat, poultry, and fish products industries [24] have been reported to be associated with a higher risk of colon cancer. A consistent relationship, however, has primarily been found for physically inactive occupations [25-29].

We have, as part of a program aimed at detecting occupational risk factors in British Columbia, Canada, collected lifetime occupational histories from 15,463 incident cancer cases, of which 1,155 had a diagnosis of colon cancer. Occupational risks for this group of patients are presented in this article by assessing risk difference in comparison with internal controls consisting of all other cancer patients excluding lung and rectum cancer and cancer of unknown primary sites.

2. Materials and Methods

2.1. General Methodology

The general methodology of the study has been described in detail in a previous article [30]. Briefly, male cancer patients aged 20 years and older ascertained by the population-based British Columbia Cancer Registry (BCCR) for the years 1983 to 1990 inclusively, received a self-administered questionnaire requesting lifetime job descriptions, occupation and industry titles, and duration and period of work, as well as information on ethnic origin, education, and lifetime smoking habits. Questions about lifetime consumption of alcoholic beverages, which were initially omitted, were added to the questionnaire during the first year of the study. In the event of a patient’s death, information was requested from the spouse or closest living relative. For the first two years, questionnaires were sent to all cases. Data collection continued until 1,000 completed questionnaires were accrued for each tumor site, or until 31 December 1990, whichever occurred first. The distribution of patients’ usual occupations and usual industries as well as assessments of response bias
and of questionnaire validation and reliability was conducted and previously reported [30]. The anatomic site and pathology of the primary tumor were coded using the 9th revision of the International Classification of Diseases [31] and the International Classification of Diseases for Oncology [32], respectively. Occupations and industries were coded according to the Canadian Standard Occupational Classification (SOC) and the Canadian Standard Industrial Classification (SIC), respectively [33,34]. In the SOC, occupations are coded according to two-digit major group codes, three-digit minor group codes, and four-digit unit group codes. In the SIC, industries are coded according to two-digit major group codes, three-digit group codes, and four-digit class codes. During the data-collection period, questionnaires were sent to all 25,726 eligible male cancer cases ascertained by the BCCR and 15,463 (60.1%) were returned. Histological confirmation of diagnosis was obtained in all cases. For colon cancer, questionnaires were sent to 1,768 eligible cases, of which 1,156 (65.4%) were returned.

2.2. Statistical Methodology

A group matched case-control design was used. Cases comprised all 1,156 colon cancer patients. Controls comprised internal controls with all other cancer sites, excluding lung cancer (n = 2,998), rectum cancer (n = 1,095) and cancers of unknown primary site (n = 708), matched to the cases on exact age and year of diagnosis. These were based on a few methodological considerations. First, using other cancers as controls has a few advantages over population controls with regard to recall and interviewer bias when using general population controls, a mixture of live and deceased controls can be expected when selecting other cancer patients as controls and there are logistical and cost advantages in using other cancer patients as controls. Thus the study design using cancers as controls is likely to be used increasingly in the future, particularly in cancer registry settings [35]. Next, since lung cancer is mainly caused by smoking, excluding it from the control group would avoid potential bias of having too many smokers in controls. In addition, matching on age and year of diagnosis is a way to control for major confounders. Including year of diagnosis is a control of time when rapid changes in population structure were happened from 1960s through 1990s.

Data were analyzed using conditional logistic regression for matched sets and the likelihood ratio test [36,37] in a two-step procedure. In step 1, the effect of the following non-occupational confounding variables was assessed: marital status; education (less than 8 years; 8 to 11 years; high school; post-secondary); smoking (starting age at smoking, average number of cigarettes, pipe or cigars smoked per day, total years smoked); alcohol consumption (starting age at consuming alcohol; average of number of bottles of beer, glasses of wine, ounces of spirits consumed per day; total years of consuming alcohol); and person who filled out the questionnaire (self or proxy). Variables were selected in a forward fashion each being examined separately; Potentially important confounders ($P < 0.2$) were then included in the model and the remaining ones were examined; the process was repeated until no factor with $P < 0.2$ was identified. In step 2, each occupation and industry was assessed separately using conditional logistic regression in which all significant confounding variables identified in step 1 were taken into account. The cut point of 0.20 was chosen in step 1 to ensure that the process has sufficient power to identify potentially important confounders.
Matched case-control analyses were carried out using PECAN software [38], test of significance of the adjusted odds ratios (ORs), p-values and 95% confidence intervals were calculated and presented. Analyses were performed for the following two different estimates of occupational exposures: ever occupation/industry (whether a job was ever held in a given occupation/industry under consideration) versus never, and usual occupation/industry (job with the longest held lifetime employment in a given occupation/industry). People in either ever or usual occupation/industry categories were always compared to their counterparts who were never in such occupation/industry. Due to all 597 occupation titles and 1,104 industry titles were analyzed and small numbers of cases in many occupation/industry categories, we intended to maximally present results of the analyses in this article with occupations and industries as long as their number of cases is five and over.

3. Results

Matching resulted in 1,155 colon cancer cases having at least one matching control and 7,552 controls, leaving an overall control to case ratio of 6.5:1. Site distribution of controls is listed in Table 1.

Table 1. Cancer site distribution of 7,552 controls.

| Site                  | Controls | Percent |
|-----------------------|----------|---------|
| lip                   | 99       | 1.3%    |
| oral cavity           | 390      | 5.2%    |
| esophagus             | 174      | 2.3%    |
| stomach               | 343      | 4.5%    |
| liver                 | 38       | 0.5%    |
| pancreas              | 136      | 1.8%    |
| larynx                | 280      | 3.7%    |
| soft tissue sarcoma   | 101      | 1.3%    |
| melanoma              | 458      | 6.1%    |
| non-melanoma skin     | 1,050    | 13.9%   |
| prostate              | 1,366    | 18.1%   |
| testis                | 82       | 1.1%    |
| bladder               | 972      | 12.9%   |
| kidney                | 314      | 4.2%    |
| brain                 | 159      | 2.1%    |
| Hodgkin’s Disease     | 52       | 0.7%    |
| non-Hodgkin’s lymphoma| 417      | 5.5%    |
| multiple myeloma      | 118      | 1.6%    |
| leukemia              | 184      | 2.4%    |
| other sites           | 326      | 4.3%    |
| multiple sites        | 493      | 6.5%    |
| Total                 | 7,552    | 100.0%  |

The characteristics of cases and controls are shown in Table 2.
Table 2. Characteristics of cases and controls.

| Colon Cancer Characteristics | Cases (n = 1,155) | Controls (n = 7,552) |
|-----------------------------|------------------|----------------------|
| Year of diagnosis           |                  |                      |
| 1983                        | 218(18.9)        | 2,674(35.4)          |
| 1984                        | 254(22.0)        | 1,660(22.0)          |
| 1985                        | 259(22.4)        | 1,302(17.2)          |
| 1986                        | 246(21.3)        | 1,010(13.4)          |
| 1987                        | 178(15.4)        | 906(12.0)            |
| Marital Status              |                  |                      |
| Single                      | 56(4.8)          | 352(4.7)             |
| Married/common law          | 958(82.9)        | 6,269(83.0)          |
| Widowed                     | 74(6.4)          | 463(6.1)             |
| Separated/divorced          | 54(4.7)          | 405(5.4)             |
| Not answered                | 13(1.1)          | 63(0.8)              |
| Education                   |                  |                      |
| ≤7 years                    | 136(11.8)        | 842(11.1)            |
| 8–11 years                  | 511(44.2)        | 3,336(44.2)          |
| High school                 | 138(11.9)        | 830(11.0)            |
| Post-secondary              | 329(28.5)        | 2,144(28.4)          |
| Not answered                | 41(3.5)          | 400(5.3)             |
| Alcohol consumption status  |                  |                      |
| Never drinker               | 137(11.9)        | 738(9.8)             |
| Ever drinker                | 890(77.1)        | 5,456(72.2)          |
| Not answered                | 128(11.1)        | 1,358(18.0)          |
| Smoking duration, years     |                  |                      |
| 0                           | 282(24.4)        | 1,501(19.9)          |
| 1–29                        | 379(32.8)        | 2,026(26.8)          |
| 30–44                       | 284(24.6)        | 2,216(29.3)          |
| 45+                         | 196(17.0)        | 1,682(22.3)          |
| Not answered                | 14(1.2)          | 127(1.7)             |
| Cigarette Pack-Years        |                  |                      |
| 0                           | 282(24.4)        | 1,501(19.9)          |
| 1–24                        | 348(30.1)        | 2,039(27.0)          |
| 25–49                       | 271(23.5)        | 2,012(26.6)          |
| ≥50                         | 200(17.3)        | 1,582(20.9)          |
| Unknown                     | 54(4.7)          | 418(5.5)             |
| Pipe smoking status         |                  |                      |
| Non-Pipe Smoker             | 1,098(95.1)      | 7,053(93.4)          |
| Pipe Smoker                 | 57(4.9)          | 499(6.6)             |
| Respondent to questionnaire |                  |                      |
| Patient                     | 930(80.5)        | 5,955(78.9)          |
| Proxy                       | 199(17.2)        | 1,403(18.6)          |
| Unknown                     | 26(2.3)          | 194(2.6)             |
Statistically significant ORs were noted for the following variables: smoking duration and education level as shown in Table 3; the latter was mainly due to the unknown category.

Table 3. Odds Ratios (OR) for potentially important confounding variables/effect modifiers.

| Confounding Variable     | Cases | Controls | OR  | P-value | 95% Confidence Interval (95% CI) |
|--------------------------|-------|----------|-----|---------|---------------------------------|
| Smoking duration, years  |       |          |     |         |                                 |
| 0                        | 282   | 1,504    | 1.00|         |                                 |
| 1–29                     | 379   | 2,026    | 1.05| 0.60    | 0.87–1.26                       |
| 30–44                    | 284   | 2,220    | 0.69| <0.01   | 0.57–0.83                       |
| 45+                      | 196   | 1,684    | 0.57| <0.01   | 0.46–0.70                       |
| Not answered             | 14    | 118      | 0.58| 0.06    | 0.33–1.02                       |
| Education                |       |          |     |         |                                 |
| ≤7 years                 | 136   | 843      | 1.00|         |                                 |
| 8–11 years               | 511   | 3,339    | 0.99| 0.92    | 0.79–1.24                       |
| High school              | 138   | 830      | 1.05| 0.72    | 0.80–1.37                       |
| Post-secondary           | 329   | 2,146    | 0.98| 0.86    | 0.78–1.23                       |
| Not answered             | 41    | 394      | 0.65| 0.03    | 0.44–0.96                       |

Odds ratios by ever and usual occupation and industry categories are shown in Tables 4 and 5, respectively. In the ever occupation/industry categories and for most major groups, a number of occupations/industries had significantly elevated ORs. In many instances, the corresponding ORs in the usual occupations/industries categories were either non-significant or had fewer than five cases. Concordance for statistically significantly increased ORs between ever and usual categories at least at significant level \( \alpha = 0.10 \) with a minimum of five cases in each category is shown in italics below.

3.1. Usual Occupation (Table 4)

In the usual occupation category, significant excess risk in the major occupation groups (two-digit codes) was only observed at \( \alpha = 0.10 \) for occupations in social sciences and related (SOC 23). Excess risks for minor groups (three-digit codes) were significant at \( \alpha = 0.05 \) for occupations in fabricating, assembling and repairing wood products (SOC 854) and at \( \alpha = 0.10 \) for occupations in other managers and administrators (SOC 113/114), bookkeeping and account-recording (SOC 413), and lodging and other accommodation services (SOC 613). Several unit occupations (four-digit codes) had significantly increased ORs at \( \alpha = 0.05 \) for: insurance sales jobs (SOC 5171), rail transport equipment mechanics and repairers (SOC 8583), brick and stone masons-tile setters (SOC 8782), ship engineering officers (SOC 9153), and at \( \alpha = 0.10 \) for: administrators in teaching and related fields (SOC 1133), financial management (SOC 1135), livestock farm workers (SOC 7183), sawmill sawyers and related (SOC 8231), cabinet and wood furniture makers (SOC 8541), and taxi drivers and chauffeurs (SOC 9173); the ORs were significantly low at \( \alpha = 0.10 \) for sales clerks and salespersons in commodities, not else classified (SOC 5135) and welding and flame cutting (SOC 8335).
### Table 4. Odds Ratios for ever and usual occupations.

| Code  | Occupation Title                              | Ever Case | OR  | P value | 95% CI   | Usual Case | OR  | P value | 95% CI   |
|-------|----------------------------------------------|-----------|-----|---------|----------|------------|-----|---------|----------|
| 11    | Managerial, Administrative and Related       | 309       | 1.12| 0.163   | 0.96     | 1.31       | 173| 1.17   | 0.122   | 0.96     | 1.43     |
| 111   | Officials and Administrators Unique to       | 40        | 1.19| 0.343   | 0.83     | 1.71       | 17 | 1.18   | 0.548   | 0.69     | 2.03     |
|       | Government                                   |           |     |         |          |            |    |        |          |          |          |
| 1113  | Administrators                               | 11        | 1.35| 0.390   | 0.68     | 2.68       | 5  | 1.37   | 0.539   | 0.50     | 3.74     |
| 1116  | Inspectors and Regulatory Officers           | 21        | 1.17| 0.524   | 0.72     | 1.90       | 11 | 1.33   | 0.402   | 0.68     | 2.59     |
| 113/114 | Other Managers and Administrators             | 157      | 1.13| 0.218   | 0.93     | 1.37       | 84 | 1.24   | 0.099   | 0.97     | 1.58     |
| 1130  | General Managers and Other Senior Officials  | 62        | 1.26| 0.130   | 0.93     | 1.70       | 28 | 1.30   | 0.226   | 0.85     | 1.99     |
| 1131  | Management, Natural Sciences Engineering     | 7         | 0.75| 0.486   | 0.33     | 1.69       | 6  | 1.27   | 0.616   | 0.50     | 3.23     |
| 1133  | Administrators in Teaching and Related Fields| 17        | 1.32| 0.325   | 0.76     | 2.29       | 10 | 1.96   | 0.076   | 0.93     | 4.12     |
| 1135  | Financial Management                          | 27        | 1.33| 0.190   | 0.87     | 2.04       | 17 | 1.59   | 0.099   | 0.93     | 2.73     |
| 1137  | Sales and Advertising Management             | 54        | 0.92| 0.597   | 0.68     | 1.25       | 20 | 0.79   | 0.331   | 0.49     | 1.29     |
| 1143  | Production Management                         | 31        | 0.94| 0.764   | 0.63     | 1.41       | 11 | 0.96   | 0.904   | 0.49     | 1.86     |
| 1145  | Management, Construction Operations          | 9         | 0.57| 0.109   | 0.29     | 1.13       | 6  | 0.93   | 0.873   | 0.38     | 2.27     |
| 1147  | Management, Transport, Communication Operations| 25      | 1.43| 0.120   | 0.91     | 2.24       | 9  | 1.05   | 0.895   | 0.51     | 2.17     |
| 1149  | Other Managers and Administrators, NEC       | 48        | 1.26| 0.178   | 0.90     | 1.76       | 17 | 1.41   | 0.208   | 0.83     | 2.41     |
| 117   | Occupations Related to Management/Administration | 68  | 1.10| 0.504   | 0.83     | 1.46       | 25 | 0.87   | 0.538   | 0.56     | 1.36     |
| 1171  | Accountants, Auditors and Other Financial Officers | 46  | 1.15| 0.410   | 0.83     | 1.60       | 23 | 1.02   | 0.934   | 0.64     | 1.63     |
| 21    | Natural Sciences, Engineering and Mathematics| 84        | 0.94| 0.632   | 0.73     | 1.21       | 35 | 0.79   | 0.210   | 0.55     | 1.14     |
| 214/215 | Architects, Engineers and Community Planners| 25        | 0.90| 0.642   | 0.58     | 1.40       | 13 | 0.95   | 0.869   | 0.52     | 1.75     |
| 216   | Other Occupations in Architecture and         | 40        | 1.11| 0.555   | 0.79     | 1.57       | 11 | 0.91   | 0.781   | 0.47     | 1.77     |
|       | Engineering                                  |           |     |         |          |            |    |        |          |          |          |
| 23    | Social Sciences and Related                  | 19        | 1.23| 0.429   | 0.74     | 2.05       | 14 | 1.74   | 0.077   | 0.94     | 3.21     |
| Code | Occupation Title                                      | Ever | Usual |
|------|------------------------------------------------------|------|-------|
|      |                                                      | Case | OR    | P value | 95% CI | Case | OR    | P value | 95% CI |
| 234  | Law and Jurisprudence                                | 10   | 1.47  | 0.298   | 0.71   | 3.04 | 8     | 1.56   | 0.282 | 0.69   | 3.51   |
| 2343 | Lawyers and Notaries                                 | 10   | 1.88  | 0.095   | 0.90   | 3.94 | 7     | 1.72   | 0.221 | 0.72   | 4.10   |
| 25   | Religion                                             | 11   | 1.05  | 0.886   | 0.54   | 2.05 | 9     | 1.30   | 0.505 | 0.60   | 2.81   |
| 2511 | Ministers of Religion                                | 11   | 1.10  | 0.785   | 0.56   | 2.18 | 9     | 1.30   | 0.505 | 0.60   | 2.81   |
| 27   | Teaching and Related                                 | 52   | 0.88  | 0.441   | 0.64   | 1.22 | 24    | 0.79   | 0.308 | 0.50   | 1.24   |
| 271  | University Teaching and Related                      | 12   | 1.05  | 0.879   | 0.56   | 1.97 | 8     | 1.08   | 0.847 | 0.49   | 2.36   |
| 2711 | University Teachers                                  | 10   | 0.99  | 0.977   | 0.50   | 1.95 | 8     | 1.18   | 0.680 | 0.54   | 2.59   |
| 273  | Elementary and Secondary School Teaching            | 28   | 0.78  | 0.242   | 0.51   | 1.18 | 13    | 0.70   | 0.251 | 0.38   | 1.29   |
| 2733 | Secondary School Teachers                            | 14   | 0.81  | 0.473   | 0.46   | 1.44 | 6     | 0.69   | 0.408 | 0.29   | 1.66   |
| 31   | Medicine and Health                                  | 31   | 0.81  | 0.299   | 0.54   | 1.21 | 22    | 0.83   | 0.436 | 0.52   | 1.33   |
| 311  | Health Diagnosing and Treating                       | 16   | 1.19  | 0.535   | 0.69   | 2.06 | 16    | 1.24   | 0.458 | 0.70   | 2.19   |
| 3111 | Physicians and Surgeons                             | 12   | 1.41  | 0.297   | 0.74   | 2.69 | 12    | 1.19   | 0.286 | 0.86   | 1.64   |
| 33   | Artistic, Literary, Recreational and Related         | 36   | 1.02  | 0.916   | 0.71   | 1.47 | 15    | 1.36   | 0.294 | 0.77   | 2.42   |
| 331  | Fine and Commercial Art, Photography and Related     | 9    | 0.80  | 0.539   | 0.39   | 1.63 | 8     | 1.53   | 0.290 | 0.70   | 3.36   |
| 41   | Clerical and Related                                 | 195  | 1.00  | 0.912   | 0.85   | 1.21 | 54    | 0.99   | 0.948 | 0.73   | 1.34   |
| 413  | Bookkeeping, Account-recording                       | 65   | 1.08  | 0.597   | 0.81   | 1.44 | 20    | 1.66   | 0.052 | 1.00   | 2.77   |
| 4130 | Supervisors                                          | 10   | 1.09  | 0.807   | 0.55   | 2.18 | 5     | 2.33   | 0.125 | 0.79   | 6.87   |
| 4131 | Bookkeepers and Accounting Clerks                   | 42   | 1.19  | 0.325   | 0.84   | 1.68 | 5     | 0.86   | 0.761 | 0.33   | 2.28   |
| 415  | Material Recording, Scheduling and Distributing     | 61   | 0.78  | 0.075   | 0.59   | 0.03 | 11    | 0.67   | 0.223 | 0.35   | 1.28   |
| 4155 | Stock Clerks                                        | 22   | 0.64  | 0.065   | 0.40   | 1.03 | 6     | 0.95   | 0.910 | 0.39   | 2.31   |
| 417  | Reception, Information, Mail, Message Distribution   | 28   | 0.90  | 0.611   | 0.60   | 1.35 | 8     | 0.72   | 0.398 | 0.34   | 1.54   |
| 419  | Other Clerical and Related                          | 73   | 1.25  | 0.100   | 1.00   | 1.61 | 13    | 0.97   | 0.920 | 0.54   | 1.75   |
| 51   | Sales                                               | 279  | 1.09  | 0.264   | 0.94   | 1.27 | 104   | 0.94   | 0.585 | 0.75   | 1.17   |
| 513/514 | Sales, Commodities                       | 196  | 0.98  | 0.815   | 0.83   | 1.16 | 70    | 0.81   | 0.115 | 0.62   | 1.05   |
Table 4. Cont.

| Code | Occupation Title | Ever | Usual |
|------|------------------|------|-------|
|      |                  | Case | OR   | 95% CI | P value | Case | OR   | 95% CI | P value |
| 5130 | Supervisors      | 85   | 0.85 | 0.169  | 0.67    | 1.07 | 35   | 0.85 | 0.397  | 0.58    | 1.24  |
| 5133 | Commercial Travellers | 49   | 1.25 | 0.181  | 0.90    | 1.73 | 15   | 1.30 | 0.374  | 0.73    | 2.32  |
| 5135 | Sales Clerks and Salespersons, Commodities, NEC | 89   | 0.86 | 0.196  | 0.68    | 1.08 | 17   | 0.64 | 0.099  | 0.38    | 1.09  |
| 517  | Sales, Services  | 72   | 1.39 | 0.021  | 1.05    | 1.84 | 24   | 1.29 | 0.273  | 0.82    | 2.04  |
| 5171 | Insurance Sales  | 31   | 1.81 | 0.006  | 1.19    | 2.76 | 9    | 2.22 | 0.043  | 1.02    | 4.81  |
| 5172 | Real Estate Sales | 26   | 1.13 | 0.574  | 0.74    | 1.73 | 9    | 1.65 | 0.190  | 0.78    | 3.49  |
| 519  | Other Sales      | 26   | 0.88 | 0.548  | 0.58    | 1.34 | 8    | 1.19 | 0.669  | 0.54    | 2.64  |
| 5193 | Route Drivers    | 20   | 1.02 | 0.936  | 0.63    | 1.65 | 6    | 1.21 | 0.684  | 0.48    | 3.03  |
| 61   | Services         | 365  | 0.96 | 0.581  | 0.83    | 1.11 | 79   | 0.95 | 0.688  | 0.74    | 1.22  |
| 611  | Protective Services | 260  | 0.98 | 0.815  | 0.83    | 1.16 | 35   | 0.89 | 0.542  | 0.61    | 1.29  |
| 6111 | Firefighters     | 9    | 0.95 | 0.889  | 0.40    | 2.25 | 7    | 1.14 | 0.756  | 0.50    | 2.60  |
| 6112 | Police Officers and Detectives, Government | 16   | 1.03 | 0.913  | 0.61    | 1.75 | 6    | 0.79 | 0.596  | 0.33    | 1.89  |
| 6116 | Commissioned Officers, Armed Forces | 44   | 0.88 | 0.465  | 0.63    | 1.24 | 8    | 0.94 | 0.876  | 0.43    | 2.04  |
| 6117 | Other Ranks, Armed Forces | 195  | 1.06 | 0.530  | 0.88    | 1.27 | 7    | 0.76 | 0.499  | 0.349   | 1.68  |
| 612  | Food and Beverage Preparation and Related | 55   | 0.91 | 0.532  | 0.68    | 1.22 | 11   | 0.67 | 0.202  | 0.36    | 1.24  |
| 6121 | Chefs and Cooks  | 24   | 1.06 | 0.797  | 0.68    | 1.65 | 5    | 0.70 | 0.454  | 0.28    | 1.78  |
| 613  | Lodging and Other Accommodation Services | 28   | 0.82 | 0.346  | 0.54    | 1.24 | 8    | 2.00 | 0.099  | 0.89    | 4.56  |
| 6130 | Supervisors      | 23   | 0.81 | 0.371  | 0.51    | 1.29 | 8    | 1.90 | 0.128  | 0.83    | 4.34  |
| 619  | Other Service    | 63   | 1.12 | 0.440  | 0.84    | 1.49 | 18   | 1.09 | 0.749  | 0.64    | 1.85  |
| 6190 | Supervisors      | 13   | 2.01 | 0.037  | 1.04    | 3.87 | 5    | 2.05 | 0.180  | 0.72    | 5.85  |
| 6191 | Janitors, Charworkers and Cleaners | 46   | 1.09 | 0.603  | 0.79    | 1.51 | 11   | 0.81 | 0.524  | 0.42    | 1.55  |
| 71   | Farming, Horticultural and Animal Husbandry | 308  | 0.92 | 0.282  | 0.79    | 1.07 | 95   | 1.06 | 0.647  | 0.83    | 1.36  |
| 711  | Farmers          | 182  | 1.00 | 0.919  | 0.83    | 1.22 | 79   | 1.13 | 0.353  | 0.87    | 1.46  |
| 7113 | Livestock Farmers | 46   | 1.22 | 0.247  | 0.87    | 1.71 | 19   | 1.30 | 0.323  | 0.77    | 2.19  |
| 7115 | Crop Farmers     | 46   | 1.09 | 0.619  | 0.78    | 1.53 | 16   | 0.96 | 0.886  | 0.55    | 1.68  |
| Code    | Occupation Title                                           | Ever  | Usual  |
|---------|------------------------------------------------------------|-------|--------|
|         |                                                            | Case  | OR    | P value | 95% CI | Case  | OR    | P value | 95% CI |
| 718/719 | Other Farming, Horticulture and Animal Husbandry          | 63    | 0.84  | 0.234   | 0.63   | 1.12  | 6     | 1.02  | 0.965   | 0.43   |
| 718     | Livestock Farm Workers                                     | 31    | 1.00  | 0.961   | 0.68   | 1.51  | 5     | 2.58  | 0.077   | 0.90   |
| 7195    | Nursery and Related Workers                                | 21    | 1.19  | 0.485   | 0.73   | 1.94  | 6     | 1.47  | 0.420   | 0.58   |
| 7199    | Other Farming, Horticulture and Animal Husbandry, NEC     | 80    | 0.86  | 0.228   | 0.67   | 1.10  | 7     | 0.88  | 0.754   | 0.40   |
| 73      | Fishing, Trapping and Related                              | 47    | 1.20  | 0.278   | 0.86   | 1.67  | 13    | 0.93  | 0.814   | 0.51   |
| 7313    | Net, Trap and Line Fishing                                 | 44    | 1.25  | 0.198   | 0.89   | 1.76  | 12    | 0.91  | 0.766   | 0.49   |
| 75      | Forestry and Logging                                      | 121   | 1.01  | 0.924   | 0.82   | 1.24  | 31    | 1.30  | 0.198   | 0.87   |
| 7510    | Foremen/women                                              | 21    | 1.09  | 0.724   | 0.68   | 1.76  | 6     | 1.14  | 0.778   | 0.46   |
| 7513    | Timber Cutting and Related                                 | 64    | 1.07  | 0.646   | 0.80   | 1.43  | 13    | 1.39  | 0.294   | 0.75   |
| 77      | Mining and Quarrying                                      | 71    | 0.88  | 0.327   | 0.68   | 1.14  | 16    | 1.36  | 0.294   | 0.77   |
| 7717    | Mineral Cutting, Handling and Loading                      | 34    | 0.79  | 0.235   | 0.54   | 1.17  | 8     | 1.40  | 0.405   | 0.63   |
| 81/82   | Materials Processing                                      | 54    | 0.78  | 0.096   | 0.58   | 1.05  | 74    | 1.02  | 0.881   | 0.79   |
| 813/814 | Metal Processing and Related                              | 18    | 0.82  | 0.435   | 0.50   | 1.35  | 5     | 0.96  | 0.933   | 0.37   |
| 821/822 | Food, Beverage and Related Processing                     | 47    | 1.31  | 0.113   | 0.94   | 1.83  | 12    | 1.03  | 0.926   | 0.55   |
| 8215    | Slaughtering, Meat Cutting, Canning, Curing, Packing       | 25    | 1.29  | 0.259   | 0.83   | 2.01  | 11    | 1.55  | 0.221   | 0.77   |
| 823     | Wood Processing (Non-Pulp and Paper Production)           | 132   | 1.13  | 0.247   | 0.92   | 1.39  | 41    | 1.28  | 0.173   | 0.90   |
| 8231    | Sawmill Sawyers and Related                                | 43    | 1.19  | 0.306   | 0.85   | 1.66  | 16    | 1.77  | 0.053   | 0.99   |
| 8238    | Labouring                                                  | 51    | 1.11  | 0.520   | 0.81   | 1.53  | 7     | 0.93  | 0.861   | 0.41   |
| 8239    | Wood Processing, Non-Pulp and Paper, NEC                  | 40    | 1.23  | 0.241   | 0.87   | 1.74  | 8     | 1.50  | 0.327   | 0.67   |
| 825     | Pulp and Paper Production and Related                     | 21    | 0.85  | 0.504   | 0.53   | 1.37  | 5     | 0.74  | 0.524   | 0.29   |
| 83      | Machining and Related                                      | 117   | 1.05  | 0.650   | 0.85   | 1.30  | 31    | 0.73  | 0.106   | 0.50   |
| 831     | Metal Machining                                            | 51    | 1.27  | 0.145   | 0.92   | 1.75  | 15    | 1.09  | 0.771   | 0.61   |
| 8313    | Machinist and Machine Tool Setting-up                     | 37    | 1.14  | 0.497   | 0.78   | 1.66  | 6     | 0.58  | 0.219   | 0.24   |
Table 4. Cont.

| Code | Occupation Title                                      | Ever |  | Usual |  |
|------|-------------------------------------------------------|------|---|-------|---|
|      |                                                       | Case | OR | P value | 95% CI | Case | OR | P value | 95% CI |
| 833  | Metal Shaping and Forming, Except Machining           | 62   | 1.08 | 0.597 | 0.81 | 1.44 | 15   | 0.71 | 0.217 | 0.41 | 1.22 |
| 8335 | Welding and Flame Cutting                            | 36   | 0.99 | 0.957 | 0.69 | 1.42 | 7    | 0.49 | 0.081 | 0.22 | 1.09 |
| 85   | Product Fabricating, Assembling and Repairing         | 274  | 1.05 | 0.508 | 0.91 | 1.21 | 114  | 1.08 | 0.487 | 0.87 | 1.34 |
| 853  | Electrical, Electronic Equipment                      | 56   | 1.36 | 0.506 | 1.00 | 1.85 | 13   | 0.69 | 0.219 | 0.38 | 1.25 |
| 8533 | Electrical Equipment Installing, Repairing, NEC       | 33   | 1.38 | 0.111 | 0.93 | 2.05 | 8    | 0.80 | 0.554 | 0.38 | 1.68 |
| 854  | Fabricating, Assembling and Repairing: Wood Products  | 23   | 1.30 | 0.269 | 0.82 | 2.07 | 9    | 2.29 | 0.045 | 1.02 | 5.15 |
| 8541 | Cabinet and Wood Furniture Makers                    | 15   | 1.48 | 0.195 | 0.82 | 2.68 | 6    | 2.51 | 0.063 | 0.95 | 6.64 |
| 858  | Mechanics and Repairers, NEC                         | 159  | 1.10 | 0.319 | 0.91 | 1.33 | 69   | 1.11 | 0.437 | 0.85 | 1.44 |
| 8581 | Motor Vehicle Mechanics and Repairers                | 63   | 1.08 | 0.597 | 0.81 | 1.44 | 20   | 0.87 | 0.572 | 0.54 | 1.41 |
| 8582 | Aircraft Mechanics and Repairers                     | 24   | 1.35 | 0.211 | 0.84 | 2.16 | 5    | 1.15 | 0.783 | 0.43 | 3.10 |
| 8583 | Rail Transport Equipment Mechanics and Repairers     | 11   | 3.84 | <0.001 | 1.82 | 8.11 | 6    | 6.06 | 0.001 | 2.04 | 18.00 |
| 8584 | Other Industrial Equipment Repairers                 | 64   | 0.96 | 0.774 | 0.73 | 1.27 | 28   | 1.03 | 0.888 | 0.68 | 1.55 |
| 8589 | Other Mechanics and Repairers, NEC                   | 13   | 0.98 | 0.948 | 0.54 | 1.79 | 6    | 2.02 | 0.147 | 0.78 | 5.22 |
| 859  | Other Product Fabrication, Assembling, Repairing      | 49   | 0.93 | 0.658 | 0.67 | 1.28 | 11   | 1.17 | 0.643 | 0.60 | 2.27 |
| 8592 | Marine Craft Fabricating, Assembling, Repairing      | 36   | 1.01 | 0.958 | 0.70 | 1.46 | 9    | 1.65 | 0.198 | 0.77 | 3.54 |
| 87   | Construction Trades                                  | 273  | 0.90 | 0.184 | 0.77 | 1.05 | 110  | 0.85 | 0.137 | 0.69 | 1.05 |
| 871  | Excavating, Grading, Paving                         | 63   | 0.94 | 0.671 | 0.71 | 1.25 | 15   | 0.66 | 0.130 | 0.39 | 1.13 |
| 8711 | Excavating, Grading and Related                      | 31   | 1.02 | 0.922 | 0.69 | 1.52 | 9    | 0.80 | 0.539 | 0.39 | 1.63 |
| 873  | Electrical, Wire Communications Installing/Repair     | 42   | 1.03 | 0.867 | 0.73 | 1.46 | 18   | 1.00 | 0.999 | 0.60 | 1.71 |
Table 4. Cont.

| Code | Occupation Title                                      | Ever |            | Usual |            |
|------|------------------------------------------------------|------|------------|-------|------------|
|      |                                                      | Case | OR        | P value | 95% CI     | Case | OR        | P value | 95% CI     |
| 8733 | Electricians and Repairers                           | 24   | 1.07      | 0.771   | 0.68       | 1.69 | 1.37      | 0.336   | 0.72       | 2.60      |
| 878/879 | Other Construction Trade                        | 112  | 0.84      | 0.116   | 0.68       | 1.04 | 0.85      | 0.319   | 0.62       | 1.17      |
| 8780 | Foremen/women                                       | 20   | 0.92      | 0.728   | 0.58       | 1.47 | 0.96      | 0.927   | 0.40       | 2.31      |
| 8781 | Carpenters and Related                              | 70   | 0.86      | 0.260   | 0.66       | 1.12 | 27 0.80   | 0.303   | 0.52       | 1.22      |
| 8782 | Brick and Stone Masons, Tile Setters               | 9    | 1.29      | 0.493   | 0.62       | 2.67 | 7 2.97    | 0.018   | 1.20       | 7.34      |
| 8791 | Pipefitting, Plumbing and Related                   | 27   | 0.99      | 0.964   | 0.64       | 1.52 | 17 1.20   | 0.499   | 0.71       | 2.04      |
| 8798 | Labouring                                           | 44   | 0.94      | 0.717   | 0.67       | 1.31 | 5 0.75    | 0.550   | 0.29       | 1.93      |
| 8799 | Other Construction Trade, NEC                       | 10   | 0.80      | 0.507   | 0.41       | 1.55 | 5 1.79    | 0.256   | 0.66       | 4.89      |
| 91   | Transport Equipment Operating                       | 246  | 1.15      | 0.077   | 0.99       | 1.34 | 86 1.15   | 0.279   | 0.89       | 1.48      |
| 911  | Air Transport                                       | 24   | 1.51      | 0.084   | 0.95       | 2.41 | 10 1.39   | 0.359   | 0.69       | 2.81      |
| 9111 | Air Pilots, Navigators and Flight Engineers         | 16   | 1.29      | 0.368   | 0.74       | 2.25 | 7 1.24    | 0.618   | 0.53       | 2.89      |
| 913  | Railway Transport                                   | 23   | 1.14      | 0.570   | 0.73       | 1.79 | 12 1.29   | 0.440   | 0.68       | 2.46      |
| 9131 | Locomotive Operating                                | 8    | 0.71      | 0.387   | 0.33       | 1.54 | 6 1.40    | 0.480   | 0.55       | 3.56      |
| 9133 | Conductors and Brake Workers, Railway               | 13   | 1.79      | 0.073   | 0.95       | 3.38 | 6 2.05    | 0.146   | 0.78       | 5.40      |
| 915  | Water Transport                                     | 51   | 1.17      | 0.325   | 0.86       | 1.60 | 16 1.17   | 0.573   | 0.68       | 2.02      |
| 9151 | Deck Officers                                       | 13   | 0.88      | 0.678   | 0.48       | 1.61 | 6 0.94    | 0.890   | 0.39       | 2.26      |
| 9153 | Engineering Officers, Ship                          | 10   | 1.56      | 0.219   | 0.77       | 3.17 | 7 4.80    | 0.002   | 1.81       | 12.71     |
| 917  | Motor Transport, Other Transport Equipment           | 157  | 1.10      | 0.319   | 0.91       | 1.33 | 46 1.01   | 0.952   | 0.73       | 1.40      |
| 9171 | Bus Drivers                                         | 20   | 0.84      | 0.479   | 0.52       | 1.36 | 7 0.80    | 0.593   | 0.36       | 1.77      |
| 9173 | Taxi Drivers and Chauffeurs                         | 30   | 1.54      | 0.045   | 1.01       | 2.25 | 6 2.25    | 0.088   | 0.89       | 5.71      |
| 9175 | Truck Drivers                                       | 124  | 1.08      | 0.460   | 0.88       | 1.33 | 32 0.93   | 0.716   | 0.63       | 1.38      |
| 93   | Material Handling and Related, NEC                  | 101  | 1.04      | 0.734   | 0.83       | 1.30 | 26 0.99   | 0.963   | 0.64       | 1.52      |
| 9313 | Longshore Workers, Stevedores and Freight Handlers  | 48   | 1.13      | 0.462   | 0.82       | 1.57 | 16 1.33   | 0.320   | 0.76       | 2.33      |
| 9315 | Material Handling Equipment Operators, NEC          | 21   | 0.93      | 0.759   | 0.59       | 1.48 | 5 0.94    | 0.896   | 0.37       | 2.39      |
| 95   | Other Crafts and Equipment Operating                | 68   | 1.11      | 0.460   | 0.84       | 1.46 | 29 1.02   | 0.925   | 0.67       | 1.55      |
| 953  | Stationary Engine, Utilities Equipment Operating    | 37   | 1.16      | 0.432   | 0.80       | 1.68 | 16 1.22   | 0.477   | 0.71       | 2.11      |
| 9539 | Stationary Engine, Utility Equipment, NEC           | 25   | 1.03      | 0.892   | 0.67       | 1.58 | 12 1.18   | 0.612   | 0.62       | 2.24      |
| 955  | Electronic Communications Equipment, NEC            | 19   | 1.46      | 0.158   | 0.86       | 2.47 | 9 1.75    | 0.159   | 0.80       | 3.82      |
Table 5. Odds Ratios for ever and usual industries.

| Code | Industry Title                                      | Ever Case | OR  | P value | 95% CI  | Usual Case | OR  | P value | 95% CI  |
|------|-----------------------------------------------------|-----------|-----|---------|---------|------------|-----|---------|---------|
| 01   | Agriculture                                         | 296       | 0.90| 0.184   | 0.77    | 1.05       | 87 | 1.00    | 0.999   | 0.78    | 1.31 |
| 011  | Livestock Farms (except Animal Specialities)        | 72        | 1.13| 0.377   | 0.86    | 1.48       | 22 | 1.53    | 0.085   | 0.94    | 2.48 |
| 0111 | Dairy Farms                                         | 49        | 1.39| 0.046   | 1.01    | 1.92       | 8  | 1.13    | 0.757   | 0.52    | 2.45 |
| 0112 | Cattle Farms                                        | 13        | 0.88| 0.678   | 0.48    | 1.61       | 6  | 1.33    | 0.556   | 0.52    | 3.43 |
| 0114 | Poultry and Egg Farms                               | 17        | 1.56| 0.116   | 0.90    | 2.72       | 6  | 3.52    | 0.016   | 1.26    | 9.81 |
| 013  | Field Crop Farms                                    | 49        | 0.96| 0.806   | 0.69    | 1.33       | 9  | 0.98    | 0.958   | 0.46    | 2.09 |
| 0131 | Wheat Farms                                         | 34        | 0.95| 0.792   | 0.65    | 1.39       | 6  | 0.92    | 0.861   | 0.36    | 2.34 |
| 015  | Fruit and Other Vegetable Farms                     | 35        | 1.04| 0.837   | 0.72    | 1.51       | 9  | 0.95    | 0.889   | 0.46    | 1.95 |
| 0151 | Fruit Farms                                         | 32        | 1.04| 0.844   | 0.71    | 1.54       | 9  | 1.07    | 0.856   | 0.52    | 2.22 |
| 017  | Livestock, Field Crop, Horticultural Combination    | 179       | 0.87| 0.157   | 0.72    | 1.06       | 45 | 0.93    | 0.674   | 0.66    | 1.31 |
| 03   | Fishing and Trapping                                | 49        | 1.08| 0.631   | 0.79    | 1.48       | 14 | 0.90    | 0.725   | 0.50    | 1.62 |
| 031  | Fishing                                             | 46        | 1.15| 0.410   | 0.83    | 1.60       | 13 | 0.91    | 0.758   | 0.50    | 1.66 |
| 0311 | Salt Water Fishing                                  | 42        | 1.14| 0.463   | 0.80    | 1.61       | 12 | 0.87    | 0.656   | 0.47    | 1.61 |
| 04   | Logging                                             | 135       | 0.99| 0.920   | 0.81    | 1.20       | 38 | 1.13    | 0.515   | 0.78    | 1.63 |
| 06   | Mining                                              | 95        | 0.87| 0.260   | 0.68    | 1.11       | 21 | 0.89    | 0.627   | 0.56    | 1.42 |
| 061  | Metal Mines                                         | 71        | 0.83| 0.181   | 0.63    | 1.09       | 17 | 0.90    | 0.693   | 0.53    | 1.52 |
| 0614 | Silver-Lead-Zine Mines                              | 23        | 1.10| 0.682   | 0.70    | 1.74       | 5  | 0.95    | 0.920   | 0.35    | 2.59 |
| 0631 | Bituminous Coal Mines                               | 28        | 1.08| 0.719   | 0.71    | 1.64       | 5  | 1.25    | 0.662   | 0.46    | 3.40 |
| 10   | Food                                                | 86        | 1.08| 0.537   | 0.85    | 1.38       | 22 | 0.96    | 0.863   | 0.60    | 1.53 |
| 101  | Meat and Poultry Products                           | 18        | 0.92| 0.748   | 0.55    | 1.53       | 5  | 0.73    | 0.514   | 0.28    | 1.88 |
| 1011 | Meat and Meat Products (Except Poultry)             | 18        | 1.01| 0.970   | 0.60    | 1.71       | 5  | 0.77    | 0.599   | 0.29    | 2.04 |
| 104  | Dairy Products                                      | 21        | 1.34| 0.239   | 0.82    | 2.18       | 8  | 2.02    | 0.091   | 0.90    | 4.56 |
| 1041 | Fluid Milk                                          | 13        | 1.45| 0.242   | 0.78    | 2.70       | 5  | 2.08    | 0.173   | 0.73    | 5.96 |
| 11   | Beverage                                            | 13        | 1.24| 0.482   | 0.68    | 2.26       | 6  | 2.25    | 0.084   | 0.90    | 5.64 |
| 113  | Brewery Products                                    | 8         | 1.99| 0.090   | 0.90    | 4.41       | 5  | 3.71    | 0.015   | 1.29    | 10.66 |
Table 5. Cont.

| Code | Industry Title                                                                 | Ever |   | Usual |   |
|------|--------------------------------------------------------------------------------|------|---|-------|---|
|      |                                                                                 | Case | OR| P value | 95% CI | Case | OR| P value | 95% CI |
| 25   | Wood                                                                           | 189  | 1.07 | 0.461 | 0.89 | 1.28 | 67  | 1.10 | 0.504 | 0.83 | 1.46 |
| 251  | Sawmill, Planing Mill and Shingle Mill Products                               | 153  | 1.02 | 0.838 | 0.84 | 1.23 | 56  | 1.15 | 0.370 | 0.85 | 1.56 |
| 2512 | Sawmill, Planing Mill (Except Shingles and Shakes)                             | 147  | 1.03 | 0.773 | 0.84 | 1.26 | 54  | 1.18 | 0.295 | 0.87 | 1.61 |
| 252  | Veneer and Plywood                                                             | 22   | 1.25 | 0.356 | 0.78 | 2.01 | 9   | 1.18 | 0.656 | 0.57 | 2.45 |
| 2522 | Softwood Veneer and Plywood                                                    | 20   | 1.43 | 0.161 | 0.87 | 2.36 | 9   | 1.55 | 0.248 | 0.74 | 3.26 |
| 26   | Furniture and Fixtures                                                         | 16   | 1.14 | 0.639 | 0.66 | 1.97 | 6   | 1.52 | 0.366 | 0.61 | 3.77 |
| 261  | Household Furniture                                                            | 14   | 1.19 | 0.569 | 0.65 | 2.17 | 5   | 1.46 | 0.450 | 0.55 | 3.907 |
| 27   | Paper and Allied Products                                                      | 49   | 0.89 | 0.451 | 0.66 | 1.21 | 19  | 0.81 | 0.393 | 0.50 | 1.31 |
| 271  | Pulp and Paper Production                                                      | 45   | 0.87 | 0.407 | 0.63 | 1.21 | 18  | 0.80 | 0.394 | 0.48 | 1.34 |
| 2711 | Pulp Industry                                                                  | 35   | 0.79 | 0.210 | 0.55 | 1.14 | 16  | 0.87 | 0.617 | 0.50 | 1.50 |
| 28   | Printing, Publishing and Allied                                                | 24   | 0.81 | 0.348 | 0.52 | 1.26 | 8   | 0.52 | 0.082 | 0.25 | 1.09 |
| 281  | Commercial Printing                                                            | 10   | 0.93 | 0.832 | 0.48 | 1.82 | 5   | 0.89 | 0.811 | 0.34 | 2.31 |
| 29   | Primary Metal                                                                  | 48   | 0.77 | 0.106 | 0.56 | 1.06 | 16  | 0.78 | 0.358 | 0.46 | 1.33 |
| 299  | Other Rolled, Cast, Extruded Non Ferrous Metal Products                        | 24   | 0.92 | 0.717 | 0.59 | 1.45 | 10  | 0.98 | 0.954 | 0.49 | 1.95 |
| 30   | Fabricated Metal Products (Non Machinery, Transport)                           | 69   | 1.13 | 0.377 | 0.86 | 1.48 | 19  | 0.92 | 0.748 | 0.55 | 1.53 |
| 308  | Machine Shops                                                                 | 28   | 1.49 | 0.068 | 0.97 | 2.29 | 6   | 1.18 | 0.715 | 0.49 | 2.87 |
| 31   | Machinery (except Electrical)                                                  | 28   | 1.63 | 0.025 | 1.07 | 2.50 | 8   | 1.57 | 0.262 | 0.71 | 3.46 |
| 319  | Other Machinery and Equipment                                                  | 24   | 1.82 | 0.012 | 1.14 | 2.90 | 8   | 1.86 | 0.135 | 0.83 | 4.20 |
| 3192 | Construction, Mining Machinery, Materials Handling                             | 7    | 1.88 | 0.146 | 0.80 | 4.41 | 5   | 3.66 | 0.023 | 1.19 | 11.22 |
| 32   | Transportation Equipment                                                       | 115  | 0.98 | 0.852 | 0.79 | 1.21 | 19  | 0.93 | 0.777 | 0.56 | 1.54 |
| 327  | Shipbuilding and Repairs                                                       | 73   | 0.95 | 0.705 | 0.73 | 1.24 | 12  | 1.01 | 0.975 | 0.54 | 1.88 |
| 33   | Electrical and Electronic Products                                             | 21   | 1.23 | 0.401 | 0.76 | 1.99 | 6   | 0.95 | 0.907 | 0.40 | 2.25 |
Table 5. Cont.

| Code | Industry Title                                           | Case | OR   | P value | 95% CI  | Case | OR   | P value | 95% CI  |
|------|----------------------------------------------------------|------|------|---------|---------|------|------|---------|---------|
| 36   | Refined Petroleum and Coal Products                     | 16   | 1.29 | 0.368   | 0.74    | 2.24 | 7    | 1.61   | 0.288   | 0.67    | 3.88   |
| 361  | Refined Petroleum Products                              | 13   | 1.17 | 0.615   | 0.63    | 2.16 | 7    | 1.61   | 0.297   | 0.66    | 3.94   |
| 3611 | Refined Petroleum Products(Non Lubricating Oil, Grease) | 13   | 1.17 | 0.615   | 0.63    | 2.16 | 7    | 1.61   | 0.297   | 0.66    | 3.94   |
| 37   | Chemical and Chemical Products                          | 31   | 1.42 | 0.091   | 0.95    | 2.13 | 10   | 1.15   | 0.695   | 0.57    | 2.31   |
| 40   | Building, Developing and General Contracting            | 130  | 0.93 | 0.497   | 0.75    | 1.15 | 42   | 0.94   | 0.717   | 0.67    | 1.31   |
| 401  | Residential Building and Development                    | 29   | 0.93 | 0.728   | 0.62    | 1.40 | 8    | 1.00   | 0.999   | 0.46    | 2.23   |
| 4011 | Single Family Housing                                   | 26   | 1.00 | 0.964   | 0.65    | 1.56 | 8    | 1.25   | 0.583   | 0.56    | 2.78   |
| 41   | Industrial and Heavy Construction                       | 53   | 0.78 | 0.096   | 0.58    | 1.05 | 15   | 0.72   | 0.228   | 0.42    | 1.23   |
| 412  | Highway and Heavy Construction                          | 44   | 0.82 | 0.243   | 0.59    | 1.14 | 13   | 0.78   | 0.400   | 0.44    | 1.39   |
| 4121 | Highways, Streets and Bridges                           | 29   | 0.93 | 0.728   | 0.62    | 1.40 | 9    | 0.99   | 0.978   | 0.48    | 2.39   |
| 42   | Trade Contracting                                       | 109  | 0.90 | 0.342   | 0.72    | 1.12 | 48   | 0.90   | 0.514   | 0.66    | 1.23   |
| 422  | Structural and Related Work                             | 20   | 0.90 | 0.669   | 0.56    | 1.46 | 6    | 0.73   | 0.481   | 0.30    | 1.75   |
| 423  | Exterior Close-In Work                                  | 14   | 1.18 | 0.582   | 0.66    | 2.13 | 8    | 1.79   | 0.150   | 0.81    | 3.96   |
| 4231 | Exterior Close-In: Masonry Work                         | 5    | 1.10 | 0.846   | 0.42    | 2.88 | 5    | 3.02   | 0.045   | 1.03    | 8.89   |
| 424  | Plumbing, Heating, Air Conditioning Mechanical          | 23   | 1.18 | 0.484   | 0.74    | 1.88 | 12   | 1.07   | 0.834   | 0.57    | 2.01   |
| 4241 | Plumbing                                                | 13   | 0.90 | 0.734   | 0.49    | 1.65 | 6    | 0.75   | 0.519   | 0.31    | 1.80   |
| 426  | Electrical Work                                         | 23   | 1.26 | 0.334   | 0.79    | 2.01 | 10   | 1.48   | 0.285   | 0.72    | 3.04   |
| 427  | Interior and Finishing Work                             | 21   | 0.69 | 0.112   | 0.44    | 1.09 | 6    | 0.44   | 0.051   | 0.19    | 1.01   |
| 45   | Transportation                                          | 282  | 1.21 | 0.011   | 1.05    | 1.40 | 106  | 1.08   | 0.513   | 0.86    | 1.36   |
| 451  | Air Transport                                           | 24   | 1.26 | 0.320   | 0.80    | 1.99 | 12   | 1.07   | 0.834   | 0.57    | 2.01   |
| 4511 | Scheduled Air Transport                                 | 16   | 0.96 | 0.882   | 0.56    | 1.65 | 10   | 1.03   | 0.933   | 0.52    | 2.04   |
| 453  | Rail Transport and Related Service                      | 78   | 1.10 | 0.459   | 0.86    | 1.42 | 35   | 1.17   | 0.419   | 0.80    | 1.71   |
| 4531 | Railway Transport                                       | 77   | 1.10 | 0.459   | 0.86    | 1.42 | 34   | 1.16   | 0.449   | 0.79    | 1.70   |
| 454  | Water Transport                                         | 54   | 1.36 | 0.051   | 1.00    | 1.85 | 9    | 0.70   | 0.316   | 0.35    | 1.41   |
| 4541 | Freight and Passenger Water Transport                   | 42   | 1.52 | 0.020   | 1.07    | 2.16 | 5    | 0.68   | 0.419   | 0.27    | 1.73   |
| 455  | Services Incidental to Water Transport                  | 25   | 1.46 | 0.109   | 0.92    | 2.32 | 11   | 1.33   | 0.413   | 0.67    | 2.63   |
Table 5. Cont.

| Code | Industry Title                                              | Ever | Usual |
|------|-------------------------------------------------------------|------|-------|
|      | Case OR | P value | 95% CI | Case OR | P value | 95% CI |
| 4551 | Marine Cargo Handling                                      | 15   | 1.24  | 0.458  | 0.70   | 2.19   | 10   | 1.54  | 0.232  | 0.76   | 3.13   |
| 456  | Truck Transport                                            | 72   | 1.02  | 0.881  | 0.79   | 1.32   | 22   | 0.93  | 0.759  | 0.59   | 1.48   |
| 4561 | General Freight Trucking                                  | 50   | 1.01  | 0.950  | 0.74   | 1.37   | 11   | 0.59  | 0.096  | 0.32   | 1.10   |
| 4562 | Used Goods Moving and Storage                             | 7    | 1.92  | 0.133  | 0.82   | 4.50   | 5    | 7.14  | 0.002  | 2.11   | 24.13  |
| 457  | Public Passenger Transit Systems                          | 26   | 0.91  | 0.659  | 0.60   | 1.38   | 8    | 0.83  | 0.629  | 0.39   | 1.77   |
| 4571 | Urban Transit Systems                                     | 16   | 0.82  | 0.474  | 0.48   | 1.41   | 5    | 0.78  | 0.610  | 0.30   | 2.03   |
| 458  | Other Transportation                                      | 28   | 1.58  | 0.038  | 1.03   | 2.43   | 5    | 1.90  | 0.209  | 0.70   | 5.17   |
| 4581 | Taxicab                                                    | 26   | 1.52  | 0.070  | 0.97   | 2.39   | 5    | 1.90  | 0.209  | 0.70   | 5.17   |
| 48   | Communications                                             | 54   | 1.06  | 0.709  | 0.78   | 1.44   | 25   | 0.91  | 0.673  | 0.59   | 1.41   |
| 481  | Telecommunication Broadcasting                            | 9    | 1.30  | 0.486  | 0.62   | 2.72   | 5    | 1.55  | 0.398  | 0.56   | 4.29   |
| 4821 | Telecommunication Carriers                                | 26   | 1.33  | 0.203  | 0.86   | 2.06   | 13   | 1.16  | 0.629  | 0.64   | 2.12   |
| 484  | Postal and Courier Services                               | 20   | 0.79  | 0.354  | 0.48   | 1.30   | 7    | 0.53  | 0.122  | 0.24   | 1.18   |
| 4841 | Postal Service                                            | 18   | 0.74  | 0.253  | 0.44   | 1.24   | 7    | 0.53  | 0.122  | 0.24   | 1.18   |
| 49   | Other Utility                                              | 34   | 0.95  | 0.782  | 0.66   | 1.37   | 18   | 1.11  | 0.692  | 0.66   | 1.86   |
| 4911 | Electric Power Systems                                    | 19   | 0.83  | 0.456  | 0.51   | 1.36   | 10   | 0.91  | 0.789  | 0.46   | 1.61   |
| 51   | Petroleum Products, WH                                     | 15   | 0.87  | 0.631  | 0.49   | 1.54   | 6    | 0.74  | 0.492  | 0.31   | 1.75   |
| 521  | Food, Beverage, Drug and Tobacco, WH                      | 29   | 1.29  | 0.230  | 0.85   | 1.96   | 7    | 0.69  | 0.369  | 0.31   | 1.55   |
| 55   | Motor Vehicle, Parts and Accessories, WH                  | 15   | 1.40  | 0.256  | 0.78   | 2.50   | 7    | 2.92  | 0.019  | 1.20   | 7.13   |
| 56   | Metal, Hardware, Plumbing, Heating, Building Material, WH | 40   | 1.26  | 0.211  | 0.88   | 1.81   | 12   | 0.99  | 0.975  | 0.52   | 1.87   |
| 563  | Lumber and Building Materials, WH                         | 25   | 1.24  | 0.334  | 0.80   | 1.92   | 11   | 1.44  | 0.297  | 0.73   | 2.86   |
| 5631 | Lumber, Plywood and Millwork, WH                          | 15   | 1.37  | 0.278  | 0.78   | 2.42   | 5    | 1.23  | 0.679  | 0.46   | 3.28   |
| 57   | Machinery, Equipment and Supplies, WH                     | 45   | 1.23  | 0.223  | 0.88   | 1.72   | 19   | 1.24  | 0.406  | 0.75   | 2.06   |
| 579  | Other Machinery, Equipment and Supplies, WH               | 12   | 0.99  | 0.975  | 0.53   | 1.83   | 5    | 1.26  | 0.639  | 0.48   | 3.31   |
| 59   | Other Products, WH                                        | 25   | 0.87  | 0.519  | 0.57   | 1.33   | 6    | 0.68  | 0.380  | 0.29   | 1.61   |
| 60   | Food, Beverage and Drugs, Retail                          | 55   | 0.85  | 0.291  | 0.63   | 1.15   | 23   | 1.01  | 0.966  | 0.64   | 1.59   |
| Code | Industry Title                                      | Ever |       |       |       |       |       |       |       |
|------|----------------------------------------------------|------|-------|-------|-------|-------|-------|-------|-------|
|      |                                                    | Case | OR    | P     | 95% CI | Case | OR    | P     | 95% CI |
| 601  | Food Stores                                        |      |       |       |       |       |       |       |       |
|      | Groceries Food Stores                              | 48   | 0.92  | 0.597 | 0.68  | 1.25  | 19    | 1.15  | 0.591 | 0.69  | 1.91  |
| 6011 | Specialty Food Stores                              | 29   | 0.79  | 0.260 | 0.52  | 1.19  | 8     | 0.68  | 0.319 | 0.32  | 1.45  |
| 6012 | Specialty Food Stores                              |      |       |       |       |       |       |       |       |       |
| 62   | Household Furniture, Appliances, Furnishing,       | 86   | 0.95  | 0.688 | 0.74  | 1.22  | 28    | 0.81  | 0.324 | 0.53  | 1.23  |
|      | Retail                                             |      |       |       |       |       |       |       |       |       |
| 63   | Auto Vehicle, Parts, Accessories, Sale and Service| 23   | 1.17  | 0.497 | 0.74  | 1.84  | 11    | 1.40  | 0.333 | 0.71  | 2.77  |
| 631  | Automobile Dealers                                 |      |       |       |       |       |       |       |       |       |
| 6311 | Automobile (New) Dealers                          | 23   | 1.25  | 0.341 | 0.79  | 1.98  | 11    | 1.52  | 0.227 | 0.77  | 3.00  |
| 635  | Motor Vehicle Repair Shops                         | 48   | 0.96  | 0.806 | 0.69  | 1.33  | 13    | 0.72  | 0.273 | 0.40  | 1.30  |
| 6351 | Motor Vehicle Repair Garages (General Repairs)     | 42   | 0.97  | 0.860 | 0.69  | 1.36  | 8     | 0.50  | 0.064 | 0.24  | 1.04  |
| 64   | General Retail Merchandising                       |      |       |       |       |       |       |       |       |       |
| 641  | General Merchandise Stores                         |      |       |       |       |       |       |       |       |       |
| 6411 | Department Stores                                  | 36   | 0.91  | 0.612 | 0.63  | 1.31  | 14    | 1.02  | 0.948 | 0.56  | 1.85  |
| 65   | Other Retail Stores                                | 36   | 0.93  | 0.703 | 0.64  | 1.35  | 9     | 0.64  | 0.202 | 0.32  | 1.27  |
| 70   | Deposit Accepting Intermediaries                   | 19   | 0.72  | 0.183 | 0.44  | 1.17  | 11    | 0.98  | 0.953 | 0.50  | 1.91  |
| 702  | Chartered Banks, Other Banking-Type Intermediaries | 14   | 0.64  | 0.118 | 0.37  | 1.12  | 8     | 0.92  | 0.828 | 0.43  | 1.95  |
| 7021 | Chartered Banks                                    | 13   | 0.66  | 0.172 | 0.36  | 1.20  | 7     | 0.87  | 0.737 | 0.39  | 1.96  |
| 73   | Insurance Underwriters                             | 27   | 1.63  | 0.032 | 1.04  | 2.55  | 9     | 1.12  | 0.759 | 0.54  | 2.31  |
| 733  | Property and Casualty Insurers                     | 14   | 1.46  | 0.219 | 0.80  | 2.67  | 7     | 1.51  | 0.342 | 0.65  | 3.53  |
| 7339 | Other Property and Casualty Insurers               | 13   | 1.38  | 0.309 | 0.74  | 2.57  | 6     | 1.25  | 0.633 | 0.50  | 3.12  |
| 76   | Insurance and Real Estate Agencies                 | 54   | 1.26  | 0.146 | 0.92  | 1.72  | 26    | 1.67  | 0.024 | 1.07  | 2.60  |
| 77   | Business Services                                  | 79   | 1.09  | 0.508 | 0.85  | 1.41  | 30    | 1.03  | 0.888 | 0.68  | 1.55  |
| 773  | Accounting and Bookkeeping Services                | 10   | 0.82  | 0.572 | 0.41  | 1.63  | 5     | 0.98  | 0.968 | 0.37  | 2.62  |
| 775  | Architectural, Engineering and Other Services      | 37   | 1.17  | 0.402 | 0.81  | 1.69  | 14    | 0.97  | 0.920 | 0.54  | 1.75  |
| 7752 | Offices of Engineers                               | 20   | 1.20  | 0.473 | 0.73  | 1.98  | 6     | 0.75  | 0.519 | 0.31  | 1.80  |
Table 5. Cont.

| Code | Industry Title | Ever | | | | Usual | | | |
|------|----------------|------|---|---|---|------|---|---|---|
|      |                | Case | OR | P value | 95% CI | Case | OR | P value | 95% CI |
| 7759 | Other Scientific and Technical Services | 16 | 1.14 | 0.639 | 0.66 | 1.97 | 6 | 1.21 | 0.684 | 0.48 | 3.03 |
| 81   | Federal Government Services | 348 | 1.12 | 0.131 | 0.97 | 1.30 | 86 | 1.24 | 0.099 | 0.97 | 1.58 |
| 811  | Defence Services | 316 | 1.11 | 0.168 | 0.96 | 1.29 | 66 | 1.41 | 0.018 | 1.06 | 1.88 |
| 815  | Economic Service Administration | 17 | 1.00 | 0.971 | 0.59 | 1.74 | 6 | 0.70 | 0.417 | 0.30 | 1.66 |
| 82   | Provincial and Territorial Government Services | 45 | 1.11 | 0.538 | 0.80 | 1.55 | 20 | 1.24 | 0.406 | 0.75 | 2.06 |
| 822  | Protective Services | 15 | 1.09 | 0.764 | 0.62 | 1.91 | 6 | 1.12 | 0.803 | 0.46 | 2.73 |
| 826  | Human Resource Administration | 10 | 2.34 | 0.024 | 1.11 | 4.89 | 7 | 4.72 | 0.002 | 1.79 | 12.46 |
| 83   | Local Government Services | 33 | 0.84 | 0.345 | 0.59 | 1.20 | 18 | 0.96 | 0.878 | 0.57 | 1.62 |
| 8323 | Police Services | 8 | 1.17 | 0.692 | 0.54 | 2.54 | 6 | 1.85 | 0.193 | 0.73 | 4.67 |
| 8324 | Firefighting Services | 9 | 1.50 | 0.289 | 0.71 | 2.17 | 7 | 1.83 | 0.168 | 0.78 | 4.32 |
| 85   | Educational Services | 88 | 1.05 | 0.704 | 0.82 | 1.35 | 48 | 1.01 | 0.952 | 0.73 | 1.40 |
| 851  | Elementary and Secondary Education | 63 | 1.08 | 0.597 | 0.81 | 1.44 | 33 | 1.02 | 0.919 | 0.70 | 1.50 |
| 853  | University Education | 21 | 1.17 | 0.524 | 0.72 | 1.90 | 11 | 1.07 | 0.843 | 0.55 | 2.09 |
| 86   | Health and Social Services | 55 | 0.98 | 0.896 | 0.72 | 1.33 | 28 | 0.98 | 0.925 | 0.65 | 1.49 |
| 861  | Hospitals | 24 | 0.75 | 0.196 | 0.49 | 1.16 | 9 | 0.64 | 0.224 | 0.31 | 1.31 |
| 8611 | General Hospitals | 18 | 0.68 | 0.124 | 0.42 | 1.11 | 6 | 0.47 | 0.082 | 0.20 | 1.10 |
| 865  | Offices: Physicians, Surgeons and Dentists, Private | 15 | 1.31 | 0.368 | 0.73 | 2.36 | 13 | 1.27 | 0.455 | 0.68 | 2.38 |
| 8651 | Offices: Physicians, General Practice | 7 | 1.48 | 0.371 | 0.63 | 3.49 | 6 | 1.57 | 0.341 | 0.62 | 3.98 |
| 91   | Accommodation Services | 48 | 0.91 | 0.554 | 0.67 | 1.24 | 15 | 1.39 | 0.259 | 0.78 | 2.46 |
| 911  | Hotels, Motels and Tourist Courts | 46 | 0.95 | 0.749 | 0.69 | 1.30 | 13 | 1.26 | 0.464 | 0.68 | 2.34 |
| 9111 | Hotels and Motor Hotels | 35 | 0.88 | 0.488 | 0.61 | 1.26 | 9 | 1.09 | 0.812 | 0.54 | 2.22 |
| 96   | Amusement and Recreational Services | 27 | 0.97 | 0.888 | 0.64 | 1.48 | 6 | 0.97 | 0.946 | 0.40 | 2.36 |
| 97   | Personal and Household Services | 19 | 0.85 | 0.522 | 0.52 | 1.40 | 9 | 0.93 | 0.843 | 0.46 | 1.90 |
| 98   | Membership Organizations | 39 | 1.57 | 0.017 | 1.08 | 2.28 | 16 | 1.78 | 0.058 | 0.98 | 3.23 |
| 981  | Religious Organizations | 15 | 1.17 | 0.595 | 0.66 | 2.09 | 8 | 1.20 | 0.658 | 0.54 | 2.69 |
| 99   | Other Services | 27 | 0.65 | 0.040 | 0.43 | 0.98 | 8 | 0.69 | 0.327 | 0.33 | 1.45 |
3.2. Usual Industry (Table 5)

In the usual industry category, a significant excess risk in the major industry group was noted at \( \alpha = 0.05 \) for motor vehicle, parts and accessories, wholesale (SIC 55) and insurance and real estate agencies (SIC 76) and at \( \alpha = 0.10 \) for beverage (SIC 11), federal government services (SIC 81) and membership organizations (SIC 98); ORs for printing, publishing and allied (SIC 28) industry was low at \( \alpha = 0.10 \). Excess risks were significant at \( \alpha = 0.05 \) for the following minor industry groups (three-digit codes): brewery products (SIC 113), defense services (SIC 811), and human resource administration (SIC 826) and at \( \alpha = 0.10 \) for livestock farms (except animal specialties) (SIC 011), and dairy products (SIC 104). Odds ratio was significantly low at \( \alpha = 0.10 \) for interior and finishing work (SIC 427). Several industry classes (four-digit codes) had significantly increased ORs at \( \alpha = 0.05 \) for poultry and egg farms (SIC 0114), construction, mining machinery, materials handling (SIC 3192), exterior close-in: masonry work (SIC 4231), used goods moving and storage (SIC 4562), and specialty food stores (SIC 6012). ORs were significantly low at \( \alpha = 0.10 \) for general freight trucking (SIC 4561), motor vehicle repair garages (general repairs) (SIC 6351) and general hospitals (SIC 8611).

In the validation study of the questionnaire, company job records of 81 individuals who reported having been employed in one of two large companies in BC were compared with information from their questionnaire; and the interclass correlation was 0.996 for starting year of employment and 0.971 for duration of employment.

4. Discussion

Significant associations between colon cancer and a number of occupations and industries were observed in our study. Several sedentary occupations in management, administration, bookkeeping and recording, financial management, insurance and real estate, and lodging and accommodation showed significantly increased risk of colon cancer either at \( \alpha = 0.05 \) or at \( \alpha = 0.10 \), which are consistent with findings from the previous studies [25-29].

In this study, we found some occupations and industries with significantly elevated risks of colon cancer in both ever and usual employment categories: workers working in occupations or industries with low physical activity, including insurance sales, human resource administration and membership organizations; rail transport equipment mechanics and repairers who were exposed to asbestos that has been reported to be associated with a higher risk of colon cancer; taxi drivers/chauffeurs who were exposed to engine exhaust and diesel engine emissions, a known carcinogen for colon cancer [21]; workers working in brewery products with exposure to chemicals such as ammonia refrigerant. Ammonia, potentially toxic to cells, shortens cell life span and alters DNA synthesis in various tissues including the ileum and colon [39] and is also thought to promote colon carcinogenesis in rats [40].

Elevated colon risks were also found in usual employment categories for occupations in wood products fabricating, assembling and repairing with exposure to wood dusts, a controversial agent without sufficient evidence of the association by the International Agency of Research on Cancer by far; industries of poultry and egg farms with exposure to gaseous agents such as ammonia from litter, carbon monoxide from poorly ventilated gas-fired heaters and hydrogen sulphide from liquid manure.
Also, particles of organic or agricultural dust are aerosolized from poultry house litter; livestock farms (except animal specialties) and dairy products and relevant occupations with exposure to noxious gases such as hydrogen sulfide, and ammonia and methane in the ambient barn air; sawmill sawyers and workers working in motor vehicle parts and accessory wholesale and truck transportation on used goods, with exposure to engine exhaust and diesel engine emissions [21]; workers in construction, mining machinery material handling, brick and stone masons-tile setters as well as exterior close-in masonry work, with exposure to asbestos, which was widely used prior to 1978 in many building projects to increase the strength of concrete; ship engineering officers who were exposed to exhaust gases, engine emissions and asbestos; and workers in beverage industry with exposure to chemicals in gases and vapors typically involving chemical-handling activities related to cleaning operations, disinfection of process areas and use of preservatives in long-term food storage, in addition to thermal oils in the maintenance of heating and ammonia in cooling systems.

The strengths of this study are several folds. It is population-based with ascertainment of pathology confirmed cancer incident cases and includes lifetime occupational history with the ability to control for potential confounding factors and effect modifiers. Our study has revealed a number of occupational risk factors for colon cancer. Interpretation of those findings is limited by the lack of information on occupational exposures and the possibility that statistically significant results may have occurred by chance because of multiple comparisons; also, especially for many usual occupations and industries, numbers are few. In addition, other cancer cases used as controls may not be representative of the general population. Particularly, other cancers may also have some occupational risks that are common to those of colon cancer cases; in such situation, the corresponding estimated OR’s noted in this study would underestimate the true risks. A missing value category was used in the analysis to avoid reducing the study sample size and that may yield biased results. However, since the proportion of missing data is small and it is unlikely that missing information on education and smoking is correlated with job classification, the biases if any should be relatively small. Some of the confounding factors such as measures of body-mass index and physical activities were not collected for this study. Nevertheless, our validation study demonstrates that self-reported employment history bear little recall errors in our study.

Some of the risks observed may not apply to current workers because of a potential decrease in industrial exposures. However, the results of our study are in line such as elevated colon cancer risk by exposure to asbestos and to engine exhaust and diesel engine emissions from the literature and further suggest that exposure to wood dusts and to ammonia may carry an increased risk of colon cancer. More specific studies using population controls are needed to investigate associations between occupation and exposures to chemical substances, taking into account changes in concentration levels over time.

Acknowledgements

The research was partially supported by grants from the Workers’ Compensation of British Columbia and the National Health Research and Development Program, Health Canada. We gratefully acknowledge the invaluable contribution of the research assistants, Ms. Donna Kan and Ms. Barbara
Jamieson. Finally, the authors would like to thank two anonymous reviewers and a guest editor who provided thoughtful and insightful comments that helped to improve this article.

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