Occupations with increased risk of pancreatic cancer in the Swedish population

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Aims: To identify occupations with increased risk of pancreatic cancer in the Swedish population gainfully employed in 1970 over the period 1971–89.

Methods: The base population was made up of Swedish men (1 779 646) and Swedish women (1 101 669) gainfully employed at the time of the 1970 census and were still alive and over age 24 on 1 January 1971. Information was drawn from two data sets: the Swedish cancer environment register and a background population register. After 19 years of follow up, 4420 men and 2143 women were diagnosed with histologically confirmed incident pancreatic adenocarcinoma. Log linear Poisson models were fitted, allowing for geographical area and town size. Risk estimators were also calculated for workers reporting the same occupation in 1960 and 1970.

Results: Among women, a statistically significant risk excess of pancreatic cancer was observed for "educational methods advisors", "librarian, archivist, curator", "motor vehicle driver", "typographer, lithographer", "purser, steward, stewardess", "other housekeeping and related workers", and the groups of occupations of "electrical, electronic, and related" and "glass, pottery, and tile workers". Men showed a higher incidence of pancreatic cancer among "technical assistants", "travelling agents", "other metal processing workers", "baker and pastry cook", "docker and freight handler", and "waiters".

Conclusions: This study does not indicate that occupational factors play an important role in the aetiology of pancreatic cancer in Sweden. Few occupations were at increased risk of pancreatic cancer in both men and women, and the associations observed are in accordance with some previous studies from Western countries.

Pancreatic cancer is a highly lethal malignancy whose aetiology is largely unknown. The only firmly established and modifiable risk factor is cigarette smoking, but it explains only a fraction of cases. Factors suspected of causing moderate increases in risk include diabetes, chronic pancreatitis, and some dietary components. The association between occupational exposures and pancreatic cancer remains controversial. A meta-analysis on occupation and pancreatic cancer suggested that some occupational exposures—chromium, nickel, silica, organic solvents, polycyclic aromatic hydrocarbons, and organochlorine insecticides—may increase the risk of this neoplasm. Other specific agents pointed out as candidates to increase the risk of pancreatic malignancies include asbestos, ionising radiations, and some anilines. Some specific occupations have putatively been associated with pancreatic cancer: dry cleaners, leather tanners, farmers, mechanics, metallurgic workers, and rubber, printing, petrol, and chemical industries. However, occupational studies have often been negative, and no single occupation has consistently been shown to increase the risk of this malignancy. Incidence and mortality rates of pancreatic cancer in Scandinavian countries have been reported to be consistently higher than in the rest of Europe. It is unknown to what extent such increase is related to the accuracy of death certification, differences in lifestyle, or other environmental factors.

Record linkage between the Swedish cancer register and a population register comprising all individuals in the 1970 census—with information on occupation and residence in 1970, occupation in 1960, and date of death—allowed us to construct a retrospective cohort that was followed up over a 19 year period. The goal of the present study was to estimate occupation specific risk of pancreatic cancer among the population in this cohort.

MATERIALS AND METHODS

The base population for this historical cohort study was comprised of all Swedish men and women who were gainfully employed at the time of the 1970 census, were present in the country during the 1960 census, and were still alive and over age 24 as of 1 January 1971. This encompassed 1 779 646 men and 1 101 669 women, aged 25–64 years at the beginning of the study and subsequently followed up for 19 years until the end of 1989. The total of 31 668 842 person-years among men
after 19 years of follow up ended with 5620 newly diagnosed pancreatic cancer cases. Among women, these figures were 20 087 479 person-years and 2657 cases. The resulting standardised rates were 18.4 and 13.8 cases per 100 000 person-years, using the standardised European population as reference, respectively among men and women, while the cumulative risk for ages 25–79 were 1.4% among men and 1.1% among women. After excluding histological pancreatic tumours other than adenocarcinoma of the pancreas, we ended with 4420 cases of pancreatic adenocarcinoma in men and 2143 in women, the case population used for this study.

Information was drawn from two data sets. The first source of data was the Swedish cancer environment register, comprising all cancer cases including information on occupation, residence, etc.
and different demographic variables from the 1960 and 1970 censuses. This register was used to compute specific rate numerators, with pancreatic cancer defined as any case with the exact number of person-years calculated using Clayton’s algorithm. Age standardised incidence ratios for occupation for the whole period were computed using the age distribution of the European population as standard. Standardised incidence ratios (SIR) were calculated for men and women separately in each occupation. SIRs were adjusted by year of birth, date of death (five year age group, from 25–29 to 75–79), and calendar period (1971–75, 1976–80, 1981–85, and 1985–89).

The exact number of person-years was calculated using Clayton’s algorithm. Age standardised incidence rates per occupation for the whole period were computed using the age distribution of the European population as standard. Standardised incidence ratios (SIR) were calculated for men and women separately in each occupation. SIRs were adjusted by age and calendar period using the whole cohort to provide the reference rates. On the assumption that the observed number of cases was distributed in each stratum as a Poisson variable, we fitted log linear Poisson models, comparing occupations against others in the general cohort, adjusting for geographical risk area and town size. Given that the expected number was computed on the basis of the age and period specific reference rates, relative risk (RR) for each occupation was likewise age and period adjusted.

Counties were grouped into three SIR based categories (<90, 90–110, and >110). To take into account the relation between social class, lifestyle (mainly tobacco consumption), and occupation, the same analysis was carried out for the selected occupations, but this time solely taking other occupations in the same major group (that is, those with the same first digit) as reference.

### Table 2: Pancreatic cancer risk for occupations with at least four observed cases and a 10% excess risk; women

<table>
<thead>
<tr>
<th>Sector codes and job titles</th>
<th>Observed</th>
<th>SIR*</th>
<th>RR†</th>
<th>95% CI‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector 0 Professionals and technicians</td>
<td>343</td>
<td>91.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>057 Educational methods advisors</td>
<td>6</td>
<td>238.2</td>
<td>2.58</td>
<td>(1.15 to 5.80)</td>
</tr>
<tr>
<td>093 Librarian, archivist, curator</td>
<td>14</td>
<td>159.3</td>
<td>1.74</td>
<td>(1.02 to 2.97)</td>
</tr>
<tr>
<td>096 Staff officer</td>
<td>8</td>
<td>165.8</td>
<td>1.79</td>
<td>(0.83 to 3.82)</td>
</tr>
<tr>
<td>098 Other professionals and technicians</td>
<td>4</td>
<td>173.9</td>
<td>1.88</td>
<td>(0.70 to 5.04)</td>
</tr>
<tr>
<td>Sector 1 Administrators and managers</td>
<td>21</td>
<td>87.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sector 2 Bookkeepers and clerical workers</td>
<td>352</td>
<td>104.4</td>
<td>0.99</td>
<td>(0.88 to 1.11)</td>
</tr>
<tr>
<td>201–09 Cashiers and bank workers</td>
<td>104</td>
<td>118.1</td>
<td>1.21</td>
<td>(0.96 to 1.52)</td>
</tr>
<tr>
<td>204 Bookkeeping and cashier workers</td>
<td>70</td>
<td>116.6</td>
<td>1.16</td>
<td>(0.89 to 1.51)</td>
</tr>
<tr>
<td>205 Cashier retail store and restaurant</td>
<td>30</td>
<td>129.0</td>
<td>1.27</td>
<td>(0.88 to 1.85)</td>
</tr>
<tr>
<td>291 Computer operator</td>
<td>12</td>
<td>179.4</td>
<td>1.71</td>
<td>(0.96 to 3.05)</td>
</tr>
<tr>
<td>296 Insurance rater, claims adjuster</td>
<td>12</td>
<td>174.1</td>
<td>1.59</td>
<td>(0.89 to 2.84)</td>
</tr>
<tr>
<td>297 Employee in national insurance office</td>
<td>6</td>
<td>153.6</td>
<td>1.51</td>
<td>(0.67 to 3.38)</td>
</tr>
<tr>
<td>Sector 3 Sales workers</td>
<td>293</td>
<td>100.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>331 Commr. traveller, buyer, dealer</td>
<td>16</td>
<td>153.2</td>
<td>1.53</td>
<td>(0.92 to 2.55)</td>
</tr>
<tr>
<td>Sector 4 Agriculture, forestry, and fishing workers</td>
<td>109</td>
<td>81.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>413 Livestock workers</td>
<td>18</td>
<td>120.0</td>
<td>1.48</td>
<td>(0.89 to 2.46)</td>
</tr>
<tr>
<td>Sector 5 Mining and quarrying</td>
<td>1</td>
<td>425.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sector 6 Transport and communications</td>
<td>70</td>
<td>101.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>632 Motor vehicle driver, train driver</td>
<td>9</td>
<td>222.9</td>
<td>2.50</td>
<td>(1.24 to 5.07)</td>
</tr>
<tr>
<td>Sector 7–8 Production</td>
<td>300</td>
<td>114</td>
<td></td>
<td></td>
</tr>
<tr>
<td>718 Other sewing workers</td>
<td>15</td>
<td>137.7</td>
<td>1.31</td>
<td>(0.78 to 2.20)</td>
</tr>
<tr>
<td>731–39 Metal workers</td>
<td>5</td>
<td>200.9</td>
<td>1.82</td>
<td>(0.75 to 4.42)</td>
</tr>
<tr>
<td>761–69 Electronic related workers</td>
<td>26</td>
<td>192.1</td>
<td>1.72</td>
<td>(1.15 to 2.57)</td>
</tr>
<tr>
<td>764–68 Electronic related workers</td>
<td>25</td>
<td>186.5</td>
<td>1.66</td>
<td>(1.10 to 2.51)</td>
</tr>
<tr>
<td>768 Other electrical and electronic workers</td>
<td>23</td>
<td>177.5</td>
<td>1.55</td>
<td>(1.01 to 2.39)</td>
</tr>
<tr>
<td>771–79 Carpenters</td>
<td>8</td>
<td>116.1</td>
<td>1.13</td>
<td>(0.56 to 2.29)</td>
</tr>
<tr>
<td>772 Bench carpenter and cabinet maker</td>
<td>5</td>
<td>124.3</td>
<td>1.31</td>
<td>(0.54 to 2.19)</td>
</tr>
<tr>
<td>801–09 Printing workers</td>
<td>15</td>
<td>151.7</td>
<td>1.12</td>
<td>(0.66 to 1.88)</td>
</tr>
<tr>
<td>801 Typographer, lithographer</td>
<td>7</td>
<td>276.3</td>
<td>2.29</td>
<td>(1.08 to 4.86)</td>
</tr>
<tr>
<td>804 Other printing workers</td>
<td>10</td>
<td>251.0</td>
<td>2.39</td>
<td>(1.27 to 4.49)</td>
</tr>
<tr>
<td>819 Non-specif. glass, pott., tile workers</td>
<td>4</td>
<td>376.9</td>
<td>3.84</td>
<td>(1.42 to 10.4)</td>
</tr>
<tr>
<td>828 Other food processing workers</td>
<td>4</td>
<td>205.2</td>
<td>1.96</td>
<td>(0.73 to 5.25)</td>
</tr>
<tr>
<td>858 Other production workers</td>
<td>5</td>
<td>120.1</td>
<td>1.12</td>
<td>(0.46 to 2.71)</td>
</tr>
<tr>
<td>861 Unskilled manual workers</td>
<td>5</td>
<td>131.5</td>
<td>1.18</td>
<td>(0.49 to 2.85)</td>
</tr>
<tr>
<td>Sector 9 Services and military workers</td>
<td>654</td>
<td>103.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>911 Catering supervisor</td>
<td>32</td>
<td>119.9</td>
<td>1.17</td>
<td>(0.82 to 1.67)</td>
</tr>
<tr>
<td>912 Cook</td>
<td>36</td>
<td>116.1</td>
<td>1.14</td>
<td>(0.82 to 1.60)</td>
</tr>
<tr>
<td>917 Purser, steward, stewardess</td>
<td>6</td>
<td>535.5</td>
<td>5.17</td>
<td>(2.31 to 11.6)</td>
</tr>
<tr>
<td>918 Other housekeeping and related workers</td>
<td>6</td>
<td>298.9</td>
<td>2.85</td>
<td>(1.28 to 6.37)</td>
</tr>
<tr>
<td>942 Bath attendant</td>
<td>6</td>
<td>143.0</td>
<td>1.38</td>
<td>(0.62 to 2.09)</td>
</tr>
</tbody>
</table>

* SIR, age and period standardised incidence ratio using the whole cohort as reference.  
† RR, relative risk adjusted by age, period, geographical category, and town size, using other occupations in the same sector as reference.  
‡ CI, confidence intervals for the RR.

(3) Size of town of residence in 1970 (under 2000; 2000–20 000; 20 000–100 000; >100 000 inhabitants)  
(4) Five year age group, from 25–29 to 75–79  
For occupations that still showed an excess risk of at least 10%, relative risks (RRs) were calculated separately: for subjects reporting such occupations in both censuses; and for those reporting such occupations in 1970 but not in 1960. In each case, the RR was calculated taking the other occupations in the same major group as reference. Furthermore, assuming greater exposure (at least in terms of years) for individuals in the same major group as reference. In order to obtain more valid estimates, RR were adjusted for other important confounders (county and town size), and definition of occupation was further refined by means of additionally computing RRs for those participants reporting the same occupation in both censuses.

RESULTS

In our cohort, pancreatic cancer incidence varied markedly among Swedish counties. The highest SIR for men (1.33) and women (1.37) was registered in Västerbotten North Sweden and the lowest (0.63 in men and 0.62 in women) in Kristianstad South Sweden. The same was true for urban and rural areas, with the incidence rate ratio for towns with more than 100 000 inhabitants versus those with less than 2000 being 1.42 for men and 1.22 for women. These factors were potential confounders in our study, since some occupations are more predominant in urban than in rural areas, and vice versa. In general, RRs from Poisson models taking geographical area and town size into account were lower than the corresponding SIRs. The mentioned attenuation might be due to the confounding effect of these two variables.

RRs for the 10 major occupational sectors (first digit of the occupational codes) showed some differences, ranging from 0.89 among men (0.82 among women) for “administrative and managerial personnel” to 1.19 among “services and military workers” (1.17 in “production workers” among women). When comparing risk estimates as a result of intragroup comparisons (taken as reference subjects with job codes having the same first digit) versus risk estimates taking all the population as reference, attenuation of the risks towards unity was observed for intragroup comparisons in occupational sectors with lower education and socioeconomic status in both sexes. This might be due to a higher prevalence of pancreatic cancer risk factors in these main occupational sectors.

From the 279 different occupations reported among men in 1970, 140 had at least five observed cases and their RR were computed using Poisson models. Among these occupations, 69 showed a standardised incidence ratio greater than 110, of which 53 showed a relative risk for pancreatic cancer equal or higher to 1.1 (table 1). Statistically significant RRs were observed among “technical assistants”, “travelling agents”, “other metal processing workers”, “baker and pastry cook”, “dockers and freight handlers”, “store and warehouse workers” and “firefighters”. Relative risks over 1.5 were seen also among “road traffic supervisors”, “gold and silver smiths”, “telephone-telegraph install repair”, “grain mill and oil press workers”, “stone cutters and carvers”, “greasers” and “other service workers” (table 1). In most cases, when restricting the analyses to those aged under 65,
risks estimates remained unchanged (data not shown). Some occupations suspected of increasing pancreatic cancer risk showed slightly increased risks: “motor vehicle drivers”, “blacksmiths”, “watchmakers”, “butcher and meat preparer”, “chemical and laboratory”, “shoe workers”, “rubber product workers”, “cleaners”, and “hairdressers”. No excess of risk was observed among male “farmers”, “gardeners”, or “dry cleaners”.

Women reported 270 different occupations in total. About one third (n = 77) of them showed at least four pancreatic cancer cases and were considered in the following analyses. Thirty two of these occupations had standardised incidence ratio greater than 110, and 26 had a relative risk for pancreatic cancer over 1.1 (table 2). In one third of them, the increased RR reached statistical significance, although most of these were low numbers. These occupations included “educational methods advisors”, “librarian, archivist, curator”, “motor vehicle driver”, “typographer, lithographer”, “purser, steward, stewardess”, “other housekeeping and related workers”, “other electric and electronic workers”, and the groups of occupations of “glass, pottery, and tile workers”. When restricting the analyses to those aged under 65, risks estimates tended to increase slightly (data not shown). Some occupations believed to increase the risk of pancreatic cancer showed little risk: “laundress and cleaner” (RR = 1.18, 95% CI: 0.68 to 2.04) and “textile worker” (RR = 1.06, 95% CI: 0.82 to 1.37), or null risk (farming) among women.

For job codes shown as having at least a 10% excess risk in the SIR, tables 3 and 4 set out the RRs for men and women reporting the same occupation in both censuses (1960 and 1970). Only those occupations with an RR over 1.1 and at least four cases are shown. Both sexes showed excess of pancreatic cancer in occupations entailing food processing, “hunt and livestock”, “metal workers”, and “electronic related workers”. Among men (table 3), most significant associations showed higher estimates except for “waiters”, and in general, RRs tended to increase. When restricting the analyses among those aged under 65 years, RRs changed slightly, although they increased notably among “other metal processing workers” (RR = 4.50, 95% CI: 1.45 to 14.0), “sheet metal workers” (RR = 1.81, 95% CI: 1.12 to 2.93), “frame, circular sawyer, and planer” (RR = 2.37, 95% CI: 0.89 to 6.35), and “rubber products workers” (RR = 2.09, 95% CI: 0.94 to 4.67). Among women, with the exception of shoe workers (RR = 1.66, 95% CI: 0.74 to 3.53), after limiting the analyses to those reporting the same occupation in both censuses (table 4) point estimates of RRs only changed slightly.

**DISCUSSION**

From the results from this study, occupation seems to play a small role in pancreatic cancer aetiology in the Swedish population. A few occupations showed an increased risk of pancreatic cancer in both men and women, and the associations observed were in accordance with previous studies.

“Gold and silver smiths” among men, and workers on electronics among both sexes showed an increased risk of pancreatic cancer. A possible exposure among those workers could be chlorinated solvents while cleaning the material they work with. A recent meta-analysis studying the association between chlorinated solvents and pancreatic cancer, reported that polychlorinated biphenyls, trichloroethylene, methylene chloride, and vinyl chloride (but not carbon tetrachloride) could be associated with pancreatic cancer. The authors of the study also point out a possible interaction between these solvents and other pancreatic carcinogens. However, due to the high correlation of exposure among those compounds, the specific responsible agent is difficult to identify. A case-control study in Shanghai reported an increased risk among workers in “electrical, electronics, and related”, and attributed the increase of risk to electric magnetic fields. Electromagnetic fields exposure has been suggested to suppress pineal gland production of melatonin, thereby promoting the occurrence of cancer. Also, it has been hypothesised to alter normal cellular growth and differentiation. Other exposures among these workers include cutting oils and PCBs.

Another occupation showing increased risk among men and women is the group of metal workers. This increase in the risk is consistent with findings of many previous epidemiological studies, but not all. PAHs might explain the risk excess among those workers. The carcinogenic properties of benz[a]pyrene are widely known; considering its presence in tobacco smoke (the only well established risk factor for pancreatic cancer) we find this excess credible. The review of the epidemiological evidence of cancer in aluminium reduction plant workers by Ronneberg and Langmark suggested an association between pancreatic cancer and potroom workers.

The increase among stone cutters in men, and glass, pottery, and tile workers among women has been also reported in other studies, including a nationwide case-control study in Finland. Inorganic dust might be the most prevalent exposure among those workers. Similarly to our study, an increased pancreatic cancer risk has been observed among workers who hold sedentary jobs, which may activate a biological pathway involving obesity. Lack of physical activity could possibly explain the results for librarian/archivist/curators, teachers, cashiers, working proprietors, managing directors, bank employees, and clerical workers. In the absence of any other exposure these associations might indicate a role for lack of physical activity in pancreatic cancer.
The observed increased risk among printing workers in women was mainly due to typographers and lithographers. Other studies have also reported increased risk of pancreatic cancer among printing workers. A study published in the early 1990s reported increased mortality from diabetes mellitus and pancreatic cancer among Swedish pulp and paper mill workers. However, other studies in northern European countries did not observe any association with pancreatic cancer among those workers.

We did not observe an excess risk among female hairdressers, but we found a slight increase in the risk of pancreatic cancer among male hairdressers. A Finnish cohort of hairdressers showed increased risks of pancreatic cancer among men and women, as did another case-control study, also in Finland. Some of the dyes used by hairdressers are aromatic amines; a number of aromatic amines have proved to be pancreatic carcinogens in animal models, and it has been suggested that they may play a role in human pancreatic cancer. An excess of pancreatic cancer has also been reported in some studies of exposure to dyes and aniline derivatives.

Although some recent publications support the association between pesticide use and pancreatic cancer in different countries, the lack of association between farming and pancreatic cancer in our study is in accordance with other reports from studies developed in Sweden among male farmers, female farmers, and pesticide applicators. Some explanations include the fact that spray seasons are short and control of toxic pesticides is probably the strictest in the world in Sweden; active ingredients are therefore restricted, exposure levels probably relatively low (except maybe in greenhouses), and cumulated exposures low because of both low levels and low time fractions of exposure. Also, while other studies reported increased risk among textile workers, we did not find indications of such an association among Swedish women. The most recent mortality analysis from a Russian cohort of shoe workers was not able to replicate the initially observed excess of pancreatic cancer. Other recent European studies have not found increased risk of pancreatic cancer among shoe workers. "Waiters and waitresses", "store and warehouse workers", "working proprietors", and "traveling agents" showed increased risk of lung and bladder cancer in our cohort. A higher consumption of cigarette smoking in these groups might explain the excess of observed cases of pancreatic cancer. Other associations putatively related to cigarette smoking would include staff officers and food processing work related occupations. A higher tobacco consumption among Swedish brewery workers was suggested as the explanation for the highest incidence of pancreatic cancer in this occupational sector. The pattern of RR between size of population and cancer observed in pancreatic cancer can be also observed in lung cancer. The fact of controlling for population size, and using as a reference population other workers within occupational sectors might provide some adjustment for tobacco consumption. The point risk estimate for waiters decreased from 2.36 to 2.08 when workers from the same main occupational sector were used as reference to compute the RRs.

Other limitations of this study include the heterogeneity of exposures within job titles (ensuing uncertainties in attributing chemical agents as explanations); the lack of adjustment from well known risk factors for pancreatic cancer, namely cigarette smoking, diabetes, chronic pancreatitis, and body mass index; and the high number of comparisons run. However, most results are consistent with international literature, thus reducing their likelihood of being chance findings. As the referent population only includes working individuals, it is unlikely to be confounding due to differences in confounding factors between the Swedish working population and the Swedish general population employed, although differences in tobacco consumption across the different occupations are probable. In Sweden the prevalence of smoking among males was around 35% during the 1980s, declining linearly to 18% at the start of the twenty first century; the corresponding figure among women during the 1980s was around 30%, declining slowly since then to 20% in 2000. A prospective study reported an RR for pancreatic cancer among female current smokers of 1.7 versus never smokers, and the relations with amount smoked daily and age at starting smoking were not pronounced. The relatively low prevalence of smoking in the Swedish population during the study follow up, the modest magnitude of association between smoking and pancreatic cancer (versus the association between cigarette smoking and cancers from the upper respiratory tract, lung, or stomach), and the fact that the point estimate for most statistically significant associations is higher than the putative RR for cigarette smoking in the Swedish population somehow limit (but do not completely remove) the potential of having confounded results from tobacco consumption in our study.

Diagnostic misclassification has been shown to seriously bias risk estimates for pancreatic cancer. While many other studies included other histology diagnoses, we only considered in our study histologically confirmed pancreatic cancer cases with adenocarcinoma of the pancreas (the most frequent pancreatic malignancy). Even though the definition of the exposure is limited in this population study, the availability of additional information about the 1960 census allowed us to increase the specificity of this definition considering the subcohort of subjects exposed in both censuses. SIRs were computed taking only age and period into account, since the reference rates proved to be unstable when stratification for geographical area and town size was attempted. As an alternative, Poisson regression analysis possesses major advantages over standardisation in controlling for confounding. However, the general theory of goodness of fit analysis in Poisson regression requires the number of expectations per stratum not to be too small. In our models, the total number of cases for any occupation was split into the corresponding categories, producing strata with very low figures. Nevertheless, the use of observed and expected values afforded the opportunity of collapsing the different strata (that is, different age groups and periods), thereby increasing their stability and rendering regression analysis more efficient.

Although occupation might play a small role in pancreatic cancer in the Swedish population, a few occupations were found to increase the risk of pancreatic cancer in both men and women, and some occupations entailing exposure to chlorinated hydrocarbons solvents and PAHs deserve further research to clarify the accuracy of and reasons for these findings.

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