

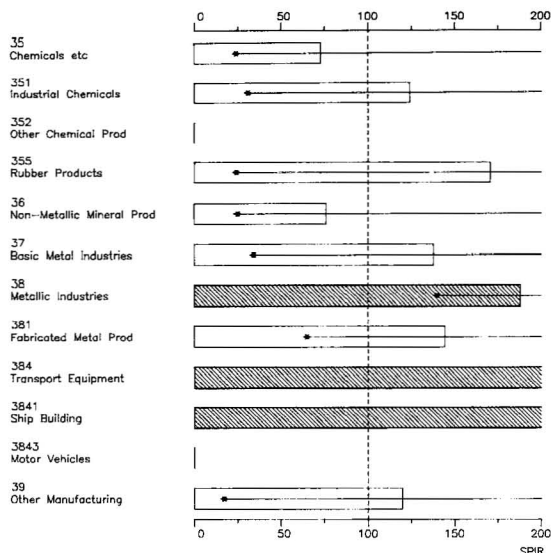


Figure 15.4. Risk of mesothelioma among the men.

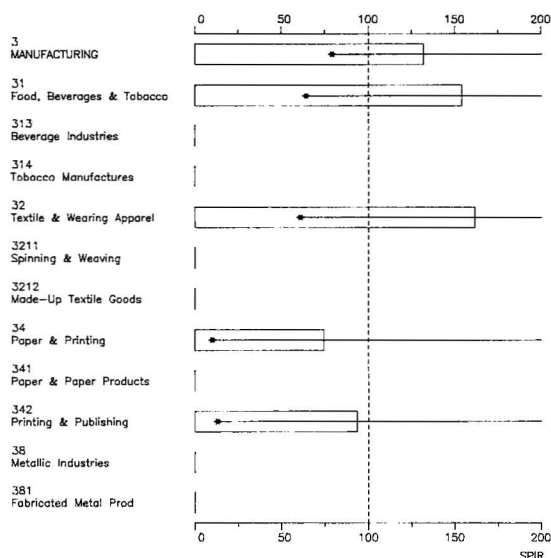


Figure 15.5. Risk of mesothelioma among the women.

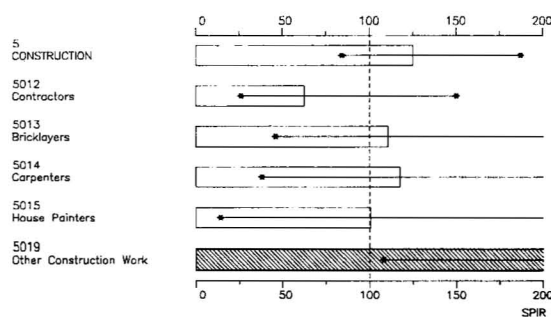


Figure 15.6. Risk of mesothelioma among the men.

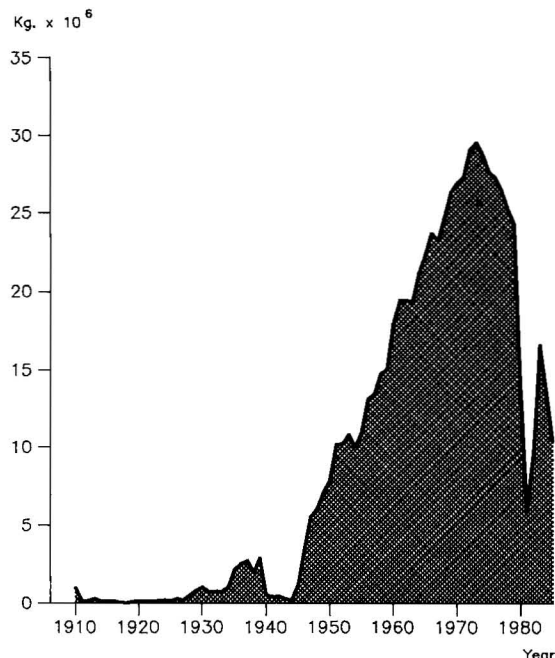


Figure 16. Annual import of raw asbestos to Denmark, 1910–1985.

genic to the lung (56). The risk of lung cancer is elevated among copper smeltery workers (exposed to arsenic trioxide), among vineyard workers exposed to arsenical insecticides, and among workers who have handled arsenic in the manufacture of pesticides and herbicides (56, 105, 117).

An excess risk of lung cancer has been reported in several occupational groups heavily exposed to soot, tars and mineral oils, polycyclic hydrocarbons having been implicated as the carcinogenic substances. Excess risks have been described for gas workers, roofers exposed to asphalt and pitch, workers exposed to tars in the aluminum smelting industry, and chimney sweeps. The lung cancer risk is increased among men with scrotal tumors associated with exposure to mineral oils (52, 68, 69, 98).

Uranium mining, mustard gas production, and vinyl chloride production are also associated with increased lung cancer risks (7, 25, 193). In some studies, an increased risk was observed among rubber workers, workers exposed to beryllium and ferric oxide dust, and workers in lead and cadmium smelteries (12, 39, 134, 195); however, these associations have not been confirmed.

Findings. A total of 21 039 cases of cancer of the lung and trachea was included in the study, of which 14 376 (in 12 166 men and in 2 210 women) had been included in the Supplementary Pension Fund (table 4).

Figure 14.1 shows the risk of lung cancer among the male employees in the nine main branches of indus-

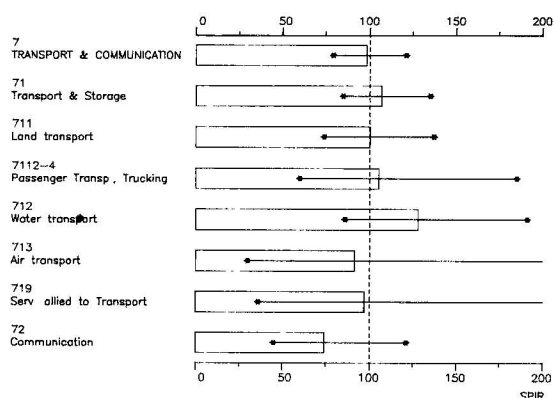


Figure 13.7. Risk of laryngeal cancer among the men.

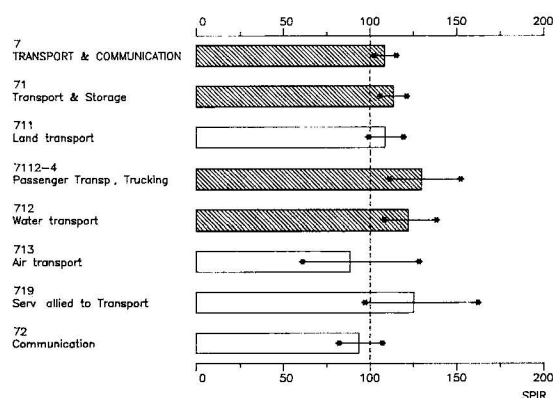


Figure 14.7. Risk of lung cancer among the men.

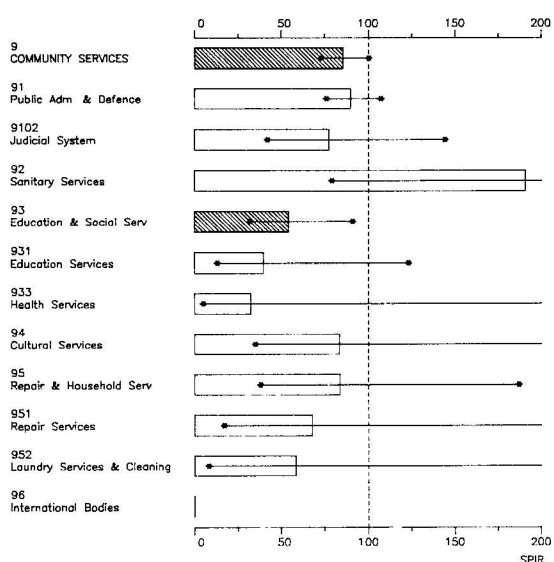


Figure 13.8. Risk of laryngeal cancer among the men.

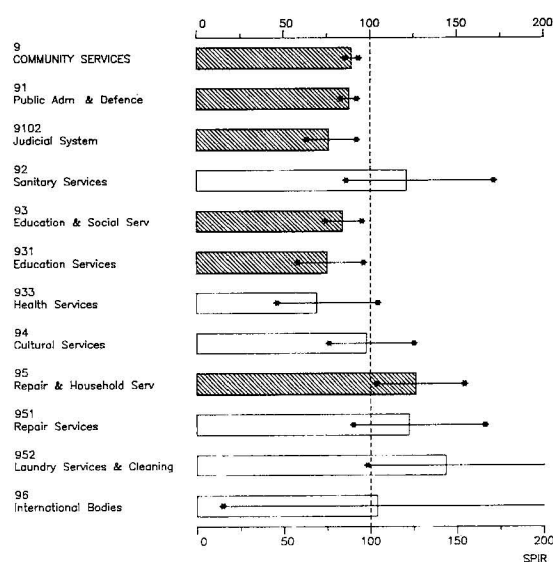


Figure 14.8. Risk of lung cancer among the men.

try. The risk was significantly below expectancy in agriculture, forestry and fishing (SPIR 84), with 256 lung cancer cases observed compared to 306.0 expected (95 % CI 74—95), and in community, social and personal services (SPIR 89), with 1 907 cases observed and 2 139.9 expected. A nonsignificantly reduced risk of lung cancer was seen in mining and quarrying (SPIR 85) and in the supply of electricity, gas and water (SPIR 89). Lung cancer risks slightly but significantly above average were determined for the men in manufacturing (SPIR 106, 3 280 observed lung cancers), construction (SPIR 107, 1 098 observed lung cancers), and transport, storage and communication (SPIR 108, 1 034 observed cases).

Among female employees (figure 14.2), a significant deficit of lung cancer cases was seen in agriculture, forestry and fishing (SPIR 61), with 23 cases observed and 37.7 expected (95 % CI 41—92) and in community, social and personal services (SPIR 85), with 689 lung cancers observed and 807.5 expected (95 %

CI 79—92). An excess risk was detected in manufacturing (SPIR 120), with 411 lung cancer cases observed and 343.4 expected (95 % CI 109—132). In contrast to the results of the men, deficits were observed among the women in construction (SPIR 86) and in transport, storage and communication (SPIR 94), but both were nonsignificant.

Figures 14.3 and 14.4 show the risks of lung cancer among the men employed in selected subgroups of manufacturing. The significant excess risks observed in food, beverages and tobacco manufacturing were due mainly to an increased risk in tobacco manufacturing (SPIR 142), with 37 cases observed and 26.1 expected (95 % CI 103—196) (figure 14.3). A significantly elevated risk was also detected among the male employees in metal industries (figure 14.4), which could be explained in part by the 441 cases of lung cancer seen among employees in the shipbuilding industry (SPIR 117) compared to 378.4 expected (95 % CI 106—128). Finally, a significant excess of cases was

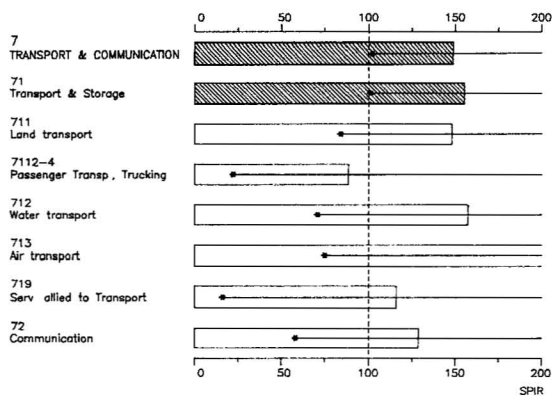


Figure 15.7. Risk of mesothelioma among the men.

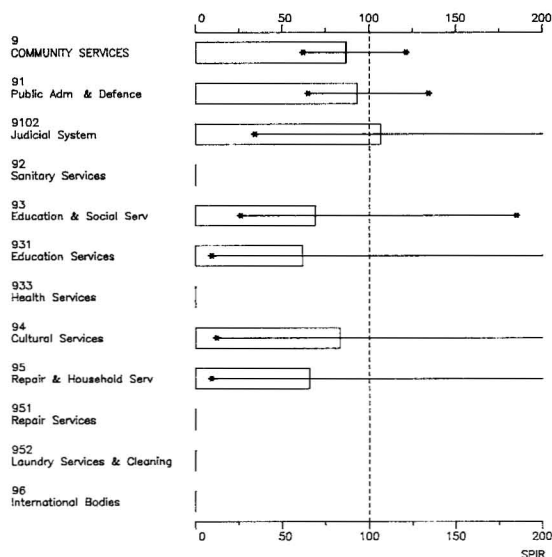


Figure 15.8. Risk of mesothelioma among the men.

seen in other manufacturing (SPIR 137), which includes the manufacture of jewellery, musical instruments, sporting and athletic goods, toys, etc. The risks of lung cancer were significantly below average among the men in textile industries (SPIR 84), with only 118 cases observed and 140.8 expected (95 % CI 70–100).

The overall excess risk among the women in manufacturing (figure 14.5) was due mainly to excess risks in the beverage industries (SPIR 197, 27 observed lung cancers, 95 % CI 135–287) and in the manufacture of tobacco (SPIR 183, 20 observed cases, 95 % CI 118–284). A significantly increased risk was also seen for the women in printing and publishing (SPIR 139) and in the manufacture of metal products (SPIR 175), with 30 cases of lung cancer observed and 17.2 expected (95 % CI 122–250) in the latter.

Figure 14.6 gives the risk of lung cancer among the men in the subgroups of construction. The significantly elevated risk observed in this main branch of industry was due primarily to a significantly excess number of

lung cancer cases among house painters (SPIR 149), ie, 79 cases observed and 53.1 expected.

Among the men employed in the transport trade (figure 14.7), an elevated risk was seen for those engaged in transport by land (SPIR 109), especially in urban, suburban and interurban highway passenger transport and freight transport by road, mainly trucking (SPIR 130), with 154 lung cancer cases observed and 118.9 expected (95 % CI 111–152), and for those engaged in transport by sea (SPIR 122), with 251 cases observed and 205.7 expected (95 % CI 108–138).

Figure 14.8 shows the risk of lung cancer among men in selected subgroups of community, social and personal services. The overall low lung cancer risk was due mainly to a significantly decreased risk among white-collar workers, ie, employees in public administration and defense (SPIR 88, 1 466 cases observed) and educational and medical, dental and other health services (SPIR 84, 244 cases observed). Among blue-collar workers, such as employees in sanitary services (SPIR 121, 32 cases observed) and in repair and household services (SPIR 126, 97 cases observed), the risks of lung cancer were above expectancy.

Mesothelioma

Malignant mesothelioma (ICD-7: partly 162.2, partly 158) is a rare neoplastic disease arising in the mesothelium, mainly in the pleura and peritoneum. The disease accounts for less than 0.3 % of the total number of malignancies in Denmark (48). The age-standardized incidence rates are 1.5/100 000 men and 0.7/100 000 women (world standard) with a male:female sex ratio of 2.3:1 (5). A substantial increase in incidence has taken place since the inception of the Danish Cancer Registry in 1942 (5).

After Wagner's demonstration of a clustering of cases of mesotheliomas among South Africans working or living near asbestos-producing industries in 1960 (194), numerous experimental and epidemiologic studies have been carried out (80) that have verified the causal association with inhalation of asbestos fibers. Other causative agents have not been found.

Findings. A total of 426 cases of malignant mesotheliomas was included in the study, of which 306 cases (in 230 men and in 76 women) had been included in the Supplementary Pension Fund (table 4).

Figure 15.1 shows that the risk of mesotheliomas among men was below expectancy in the branches of financing, insurance and real estate (SPIR 36), trade, restaurants and hotels (SPIR 74), agriculture, forestry and fishing (SPIR 87) and community, social and personal services (SPIR 87). Only in financing, insurance and real estate was the risk significantly lowered, with 4 observed mesotheliomas and 11.0 expected. Excess risks were found in the branches of construction (SPIR 125), manufacturing (SPIR 135), transport,

storage and communication (SPIR 149), and electricity, gas and water supply (SPIR 209). In manufacturing and in transport and communication, the excesses were significant, with 79 and 27 observed mesotheliomas compared to 58.4 and 18.1 expected, respectively.

Among the women in the main branches of industry (figure 15.2), a nonsignificant deficit of cases was detected in community, social and personal services. However, the numbers were generally too small to yield reasonable risk estimates. Two cases of mesothelioma were observed and 0.5 expected among the women employed in construction.

Figures 15.3 and 15.4 show the risk of mesothelioma among the men in the same subgroups of manufacturing as shown for lung cancer. Only a few cases were detected in most of the subgroups, with no significant deviation from unity. However, in the subgroup of male employees in metal industries, a significantly elevated risk (SPIR 188) was found, due almost exclusively to an excess of 26 observed mesotheliomas in the manufacture of transport equipment in comparison to 8.1 expected (SPIR 322, 95 % CI 219–473). This subgroup includes shipbuilding, for which there was an incidence ratio of 379. Among women in the various subgroups of manufacturing (figure 15.5), the numbers of cases were too small to allow reasonable estimates to be made.

Two cases of mesothelioma were observed among the men in other construction work, with 0.5 expected (figure 15.6). This subgroup of construction work includes persons engaged in insulation, eg, of hotwater pipes and buildings. Figure 15.7 shows that men employed in most subgroups of transport and storage experienced an elevated risk of mesothelioma in that 21 cases were observed and 13.5 expected (SPIR 155).

Comments

Cancers of the respiratory tract are far more common among men than among women in Denmark (table 4), and their incidence has been increasing steadily since the inception of the Danish Cancer Registry in 1942. Numerous studies indicate that, next to smoking habits, occupational exposures play a major role in the causation of these malignancies.

In general, the risk of cancer of the respiratory system was below average in the main branches of industry predominated by white-collar workers and among employees in agriculture, forestry and fishing, except for a raised risk of sinonasal cancer among the latter (figures 12.1, 12.2, 13.1, 13.2, 14.1, 14.2, 15.1, and 15.2).

These findings were the most evident among the men since a larger number of cases was available for them. In contrast, above-average risks were observed in most of the branches with a preponderance of blue-collar workers. This finding may be due partly to carcinogenic exposures at industrial workplaces and partly to

the above-average tobacco consumption of blue-collar workers (150).

Among both the men and the women in manufacturing, the overall risks of laryngeal and lung cancer were significantly in excess (figures 13.3, 13.5, 14.3, and 14.5). These excesses were due mainly to excess risks of lung cancer risk in tobacco manufacturing and in the beverage industries, although the excess in the latter was not significantly in excess among the men (figures 14.3 and 14.5), and to excess risks of cancer of the larynx in the beverage industries among the men (figure 13.3) and among the women in tobacco manufacturing (figure 13.5). The most reasonable explanation for these findings is an above-average tobacco consumption, since tobacco products are provided free to employees in the tobacco industry.

For men engaged in slaughtering and preparing and preserving meat, a significantly excess risk of laryngeal cancer and a slight excess of lung cancer were found (figure 13.3 and 14.3). There was no reason to suspect that smoking habits were the cause of these excesses.

While a substantially decreased risk of lung cancer, and perhaps of laryngeal cancer, was observed among the men in the textile industries (figures 13.3 and 14.3), an excess of sinonasal cancer appeared in the subgroup of employees engaged in the manufacturing of textile goods except wearing apparel (figure 12.3). An excess of laryngeal cancer was observed among the women in the latter branch of industry (figure 13.5). Employment in textile industries thus appears to protect against cancer of the lower respiratory tract and to increase the risk of cancer of the upper respiratory tract.

Interestingly, the risk of cancer of the renal pelvis, and perhaps of the bladder, also seems to be increased among women in the textile industries. (See figures 22.5 and 23.5 in the section "Kidney.")

A significantly increased risk of laryngeal cancer and a slight but nonsignificant excess risk of lung cancer were observed among the men engaged in the manufacture of basic industrial chemicals, except fertilizers (figures 13.4 and 14.4). This occurrence may be associated with exposure to the chemicals produced. However, the nature of the chemicals involved is unknown. Among the women excess risks of laryngeal cancer and of lung cancer were revealed in the printing and publishing industries, the increase in the lung cancer rate being significant (figures 13.5 and 14.5). Correspondingly, deficits were observed in this branch for cancers of the renal pelvis and bladder. (See figures 22.5 and 23.5 under "Urinary tract.")

A significant excess of lung cancer and a nonsignificant excess of cancer of the larynx were observed among the men involved in the manufacture of transport equipment (figures 13.4 and 14.4). As suggested by the high excess risk of mesothelioma within the same industry, this excess of respiratory cancers was probably due to the large quantities of asbestos used for insulation in railroad cars and ships.

The excess risks of sinonasal cancer among the men in the manufacture of footwear and wooden furniture (figure 12.3) were anticipated, owing to the known carcinogenic potential of leather and wood dust for these sites. More surprising was the increased number of cases in the spray painting of cars, in the manufacture of motor vehicles, and in paint and lacquer manufacturing, although two earlier studies also indicated an association between sinonasal cancer and paint and lacquer manufacturing (72, 149).

The excess risk of lung cancer detected among the male employees in passenger transport by bus and coach lines and in trucking may be associated with exposure to exhaust fumes. However, above-average tobacco consumption may well be another explanation for the excesses in these occupations.

Female breast

Breast cancer (ICD-7 170) is the most frequent malignant disease among Danish women, for whom it accounts for 20.9 % of all cancers. The age-standardized incidence rate (world standard) was 62.1/100 000 women-years for 1978–1980 (158). Some 6.7 % of all women develop breast cancer before the age of 75 years.

The age-incidence curve of breast cancer is characterized by a change in age-dependence which forms a hook at around the age of 50, as first described by Clemmesen (34), who observed a rapid increase in incidence until 45–50 years of age, followed by a leveling off and then a continued increase. Since 1943, and in particular since 1960, the age-standardized incidence rates of breast cancer in Denmark has increased by some 50 %, and at least part of this increase may be regarded as real (54).

Breast cancer rates are slightly higher than average among women in urban areas (26), among women of high socioeconomic status, and among unmarried

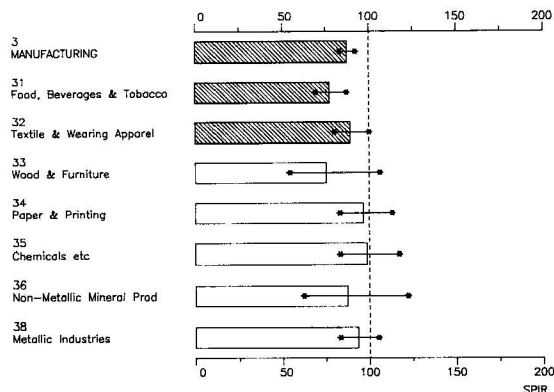


Figure 17.2. Risk of breast cancer among the women.

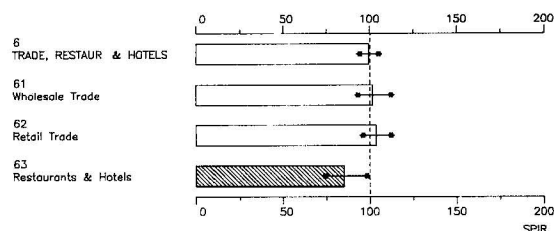


Figure 17.3. Risk of breast cancer among the women.

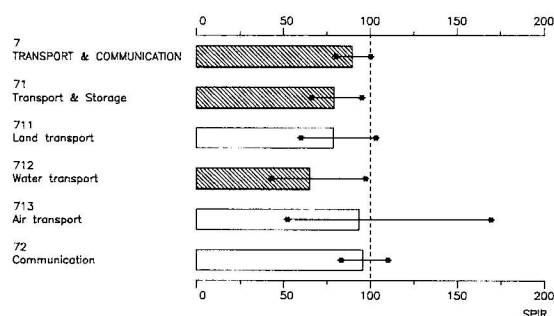


Figure 17.4. Risk of breast cancer among the women.

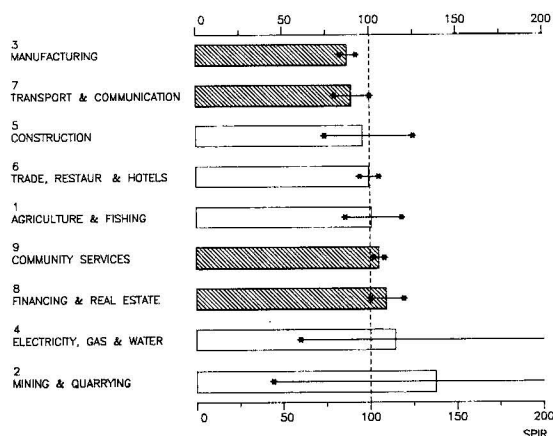


Figure 17.1. Risk of breast cancer among the women.

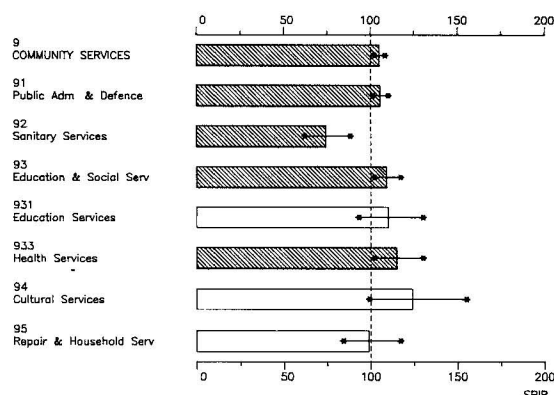


Figure 17.5. Risk of breast cancer among the women.

women (97). The risk of breast cancer is increased in relation to early age at menarche, late age at first full-term pregnancy, and late menopause. A family history of breast cancer is associated with an increased risk and so, possibly, is excess body weight and a high-fat diet (97). Exposure to ionizing radiation increases the risk of breast cancer (21). No occupational risk factors have been identified.

Findings. Altogether, 18 403 women with breast cancer were included in the study. Of these, 9 450 had been members of the Supplementary Pension Fund (table 4).

The SPIR values were significantly decreased among the women in manufacturing (SPIR 87, 95 % CI 83–92) and in transport and communication (SPIR 90, 95 % CI 80–100). Significantly increased relative risks were seen among the women in community, social and personal services (SPIR 105, 95 % CI 102–108) and in financing, insurance and real estate (SPIR 109, 95 % CI 100–119). The SPIR values for the other broad occupational groups did not differ significantly from 100 (figure 17.1).

Figure 17.2 shows that women in various branches of manufacturing generally had a decreased relative risk of breast cancer, which was statistically significant among the manufacturers of food, beverages and tobacco (SPIR 78), with 310 cases observed and 400.2 expected, and among the manufacturers of textiles, wearing apparel and leather, with a particularly low SPIR of 60 among the women employed in the spinning, weaving and finishing of textiles (30 observed cases and 50.2 expected, 95 % CI 42–85). (See the appendix.)

An SPIR of 100 was observed for the women in trade, restaurants and hotels, but the subgroup of women employed by restaurants and hotels had a significantly decreased relative risk of 85 (95 % CI 74–98) (figure 17.3). The women in transport, storage and communication had a decreased risk of breast cancer (figure 17.4), significantly so for the women in transport and storage and, in particular, water transport (SPIR 65, 95 % CI 43–97). No significant deviation was seen for the other women of this occupational group.

All of the groups of women in financing, insurance and real estate had slightly increased SPIR values (see the appendix), which were of borderline significance for the total group (figure 17.1). An increased risk of breast cancer was also observed for the women employed in community, social and personal services (figure 17.5). However, within this main group, the women in sanitary services, which includes, for example, window and office cleaning, had a significantly decreased risk of breast cancer (SPIR 74, 95 % CI 62–88).

Comments. There were only slight differences in breast cancer risk between broad occupational groups. These

differences may, however, be numerically important for this frequent cancer. The risk of breast cancer is thus, on the average, approximately 25 % higher for the women in community services and in financing, real estate and insurance than for those in manufacturing. This excess represents approximately 800 cases over a 10-year period among women in these high-risk trades. It is unlikely that single occupations are associated with these increased risks of breast cancer, as this pattern of breast cancer risk more probably corroborates the importance of factors related to life-style, including reproductive and dietary habits.

The low-risk manufacturing group is composed predominantly of blue-collar workers, while the high-risk trades employ predominantly white-collar workers in office jobs. The possible importance of socioeconomic factors as determinants of risk is further supported by the finding of a low relative risk among sanitary workers within the otherwise high-risk group of women in community services.

Female genital organs

Uterine cervix

Cancer of the cervix uteri (ICD-7 171) accounts for 5.4 % of all malignant neoplasms among Danish women. Denmark has one of the highest rates of invasive cancer of the cervix uteri in Europe, with 18.1/100 000 women-years in 1978–1982 (world standard) (158, 199). The incidence increased by 30 % between the mid-1940s and the mid-1960s, but it has since decreased by approximately 40 %. This decrease can be attributed primarily to the screening for and elimination of precancerous lesions of the cervix.

Identified risk factors for cancer of the cervix uteri are related to sexual practices. Starting sexual activity at an early age increases the risk of cervical cancer, as does multiple sexual partners; there is also evidence that multiple sexual relationships of male partners may also play a role in the subsequent development of cervical cancer in their female partners. Barrier contraceptives have consistently been shown to protect against the development of cervical cancer (42). These associations point to the role of a venereally transmitted factor as a causative agent, and particular interest has been paid to herpes simplex virus type-II infection, although its role has not been confirmed by prospective studies (192). Recently, it has been suggested that cervical cancer is related to prior infection with certain subtypes of human papilloma virus (types 16 and 18) (157), but this hypothesis still needs clarification.

Of the noncoital risk factors, tobacco smoking has been suggested to increase risk (169). A diet with a high beta-carotene content may “protect” against the development of cancer of the cervix uteri.

No occupationally related risk factor has been revealed for this tumor, except for occupations that

entail a high prevalence of the risk factors related to sexual activity. Prostitutes thus have an exceedingly high risk of cancer of the cervix, while nuns have an exceedingly low risk (35).

Findings. A total of 6 689 women with cancer of the cervix uteri were included in the study, of which 4 372 had been members of the Supplementary Pension Fund (table 4).

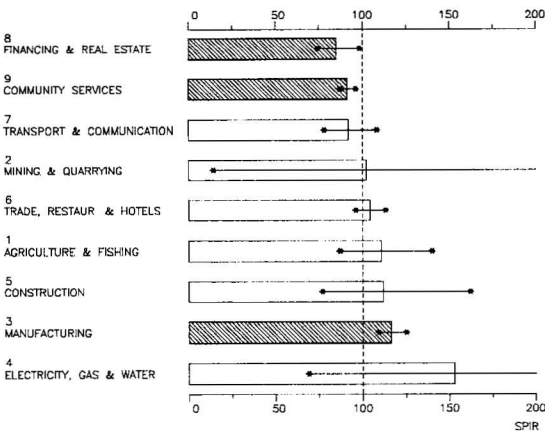


Figure 18.1. Risk of cancer of the cervix uteri.

Figure 18.1 shows the SPIR values for cancer of the cervix uteri in nine broad occupational groups. Significantly decreased relative risks were seen for the women in financing, insurance and real estate (SPIR 85, 95 % CI 74–98) and in community, social and personal services (SPIR 91, 95 % CI 87–96), while a significantly increased risk was seen for the women in manufacturing (SPIR 116, 95 % CI 109–125).

Figure 18.2 shows that women in several of the major industries within the main branches of manu-

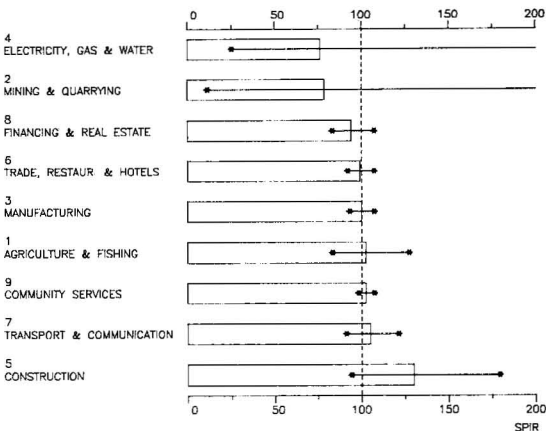


Figure 19.1. Risk of cancer of female genital organs other than cervix uteri.

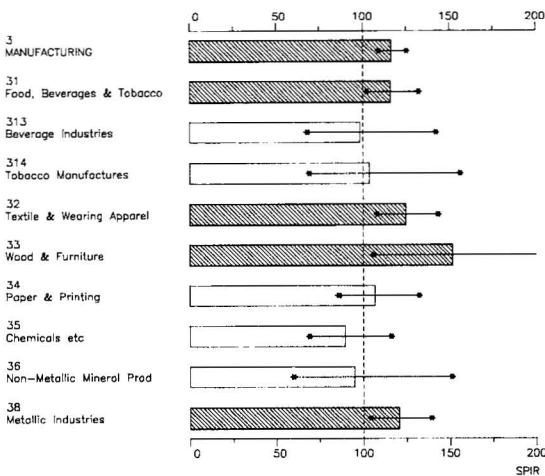


Figure 18.2. Risk of cancer of the cervix uteri.

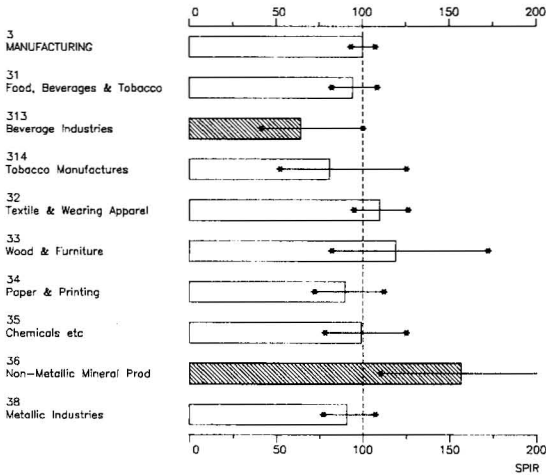


Figure 19.2. Risk of cancer of female genital organs other than cervix uteri.

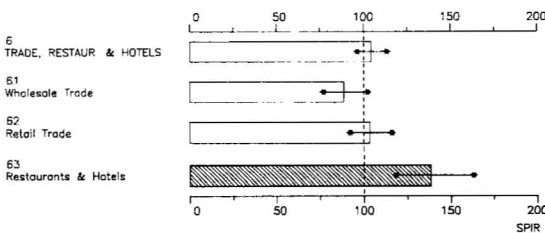


Figure 18.3. Risk of cancer of the cervix uteri.

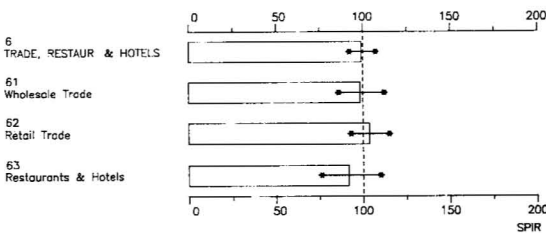


Figure 19.3. Risk of cancer of female genital organs other than cervix uteri.

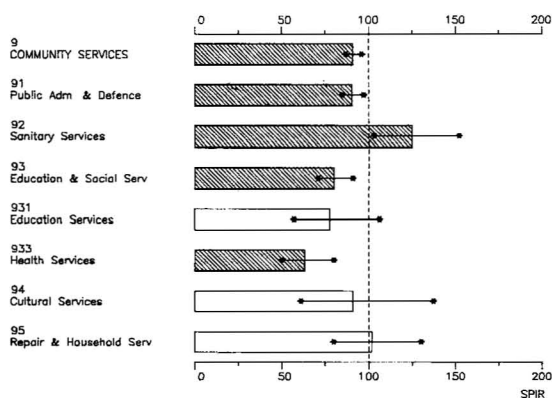


Figure 18.4. Risk of cancer of the cervix uteri.

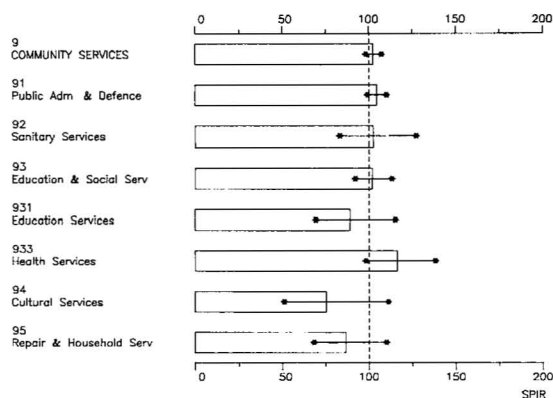


Figure 19.4. Risk of cancer of female genital organs other than cervix uteri.

facturing had significantly increased relative risks of cervical cancer, eg, the employees in the manufacture of food, beverages and tobacco (SPIR 116, 95 % CI 102—132), among whom, in particular, women in the fish industry had a high risk (SPIR 157, 95 % CI 116—212), with 42 cases observed and 26.8 expected. (See the appendix.) Increased relative risks were also seen for the women in the textile industries (SPIR 125, 95 % CI 108—143), in the manufacture of wood and wood products, including furniture (SPIR 152, 95 % CI 106—217), and in the metal industries (SPIR 137, 95 % CI 103—182). For other groups, the risks did not deviate significantly from the SPIR of 100.

Within the group of trade, restaurants and hotels (figure 18.3), personnel in restaurants and hotels had a significantly increased relative risk of cancer of the cervix uteri (SPIR 138), with 146 cases observed compared to 118 expected (95 % CI 118—163). In other major groups, the risk did not differ from that of the general population.

The significantly decreased risk found for employees in finance, insurance and real estate (figure 18.1) was reflected in all the subdivisions of this trade (see the appendix), and a significantly decreased risk also appeared for the large group of women in community, social and personal services, particularly among the women in the health services, with an SPIR value of 63 (95 % CI 50—80) (figure 18.4). This was a general feature of all the subgroups, except for sanitary services, for which the relative risk was increased (SPIR 125, 95 % CI 103—152).

Other female genital organs

The group of “other female genital organs” (ICD-7 172—176) is an inhomogeneous group of tumors consisting predominantly of cancer of the corpus uteri (ICD-7 172) and cancer of the ovary and fallopian tube (ICD-7 175.0) (which form 95 % of the total group), the remainder being chorioepithelioma and cancer of the vulva and vagina. Cancers of the corpus uteri con-

stitute 5.4 % of all the malignant tumors of women in Denmark, while 5.1 % of all cancers among women is located in the ovaries (48). The age-adjusted incidence rate/100 000 person-years is 15.1 for cancer of the endometrium and 14.6 for cancer of the ovary (world standard). Between 1.5 and 2 % of all women will develop one of these types of tumors before the age of 75 years. The incidences of cancer at both sites have increased since 1943, but the increase in the incidence of cancer of the ovary stopped in about 1970.

Cancer of the endometrium has been related to constitutional factors, reproduction and hormones. Overweight thus leads to an increased risk of cancer of the endometrium, as do nulliparity and late menopause (97). These associations are assumed to be related to endogenous estrogen formation, which affects the endometrium, and there is evidence that continued estrogen medication for menopausal symptoms leads to an increased risk of endometrial cancer. No occupational risk factor has been proposed for cancer of the endometrium.

The etiology of ovarian cancer, which is also an inhomogeneous group with regard to tissue of origin, is not well elucidated, and the only consistent risk factor that has merged is nulliparity (201). It is been suggested that asbestos and talc are associated with the development of ovarian cancer.

Findings. In total, 10 443 women with cancer of the genital tract other than cervix uteri were included in the data linkage, of whom 4 977 had been members of the Supplementary Pension Fund.

Although there is a gradient in the SPIR from 76 to 130 (figure 19.1), none of the SPIR values for the large occupational groupings was significantly different from 100. Figure 19.2 shows the SPIR values for broad subgroups of women in manufacturing. A significantly increased relative risk was seen for the women employed in the manufacture of nonmetallic mineral products (SPIR 157, 95 % CI 110—223), with

31 cases and 19.8 expected. For none of the other major subgroups was there a significant deviation of the relative risk from unity.

Figure 19.3 shows the uniform risk pattern observed for the women employed in trade, restaurants and hotels; and the same was seen (figure 19.4) for the women in community, social and personal services. None of the relative risks of these groups significantly exceeded unity. The risk of cancer of genital organs other the cervix uteri was slightly increased among the women in health services (SPIR 116, 95 % CI 98—138).

Comments

Cancers of the genital organs among women have been associated with reproductive and other life-style factors, which are likely to be determined by socioeconomic factors rather than by occupation per se. Seen in this light, the differences in relative risks for cervical cancer between occupational groups are in line with current knowledge of its etiology. The influence of screening for precancerous lesions must also be taken into account when results concerning cancer of the cervix uteri are interpreted.

The increased risk of cervical cancer among the women in manufacturing is thus likely to be a reflection of the large proportion of blue-collar workers in this group. Previous studies from Denmark have shown that cervical cancer risk increases as socioeconomic status decreases (4, 35). In addition, women in low socioeconomic groups are also least likely to participate in population-based screening programs (personal communication from E Lynge, Danish Cancer Registry), and they are probably also the least likely to have had a vaginal cervical smear taken by their general practitioner. The Danish textile industry is located mainly in Jutland (72 % of all textile workers and only 44 % of all industrial workers), an area where screening was introduced later than in the Copenhagen area. In addition, 25 % of all employees in the textile industry live in Ringkøbing County (compared to 6 % of all industrial employees), which had no population-based screening program in the 1970s (116).

The influence of socioeconomic factors on risk is further corroborated by the finding of increased SPIR values among personnel in restaurants and hotels, and by the large differences in relative risk between women in sanitary services (high) and other groups in community services (low), particularly for women in health services, with an SPIR value of 63. Most of these women may be assumed to be nurses, who may be at low risk both because a large proportion of them are unmarried and sexually inactive and because women in the health services are particularly health conscious and use the screening services.

Women at low risk of cervical cancer may be at increased risk of cancer of the endometrium and

ovaries if they remain nulliparous. It is therefore of interest to note the increased risk for cancer of other genital organs among women in health services.

The significantly increased risk among the women in nonmetallic mineral production may warrant further investigation, in view of the suggested associations between talc and asbestos and ovarian cancer.

Male genital organs

Malignancies affecting the genital organs of men are divided into cancers of the testis and other cancers of the genital organs, among which cancer of the prostate predominates.

Testis

The testicular cancer (ICD-7 178) incidence in Denmark is among the highest in the world (199), accounting for 1.9 % of all cancers among men in the country (48), with an age-standardized incidence rate of 8.2/100 000 person-years (world standard). Today, the incidence is approximately 270 % of that at the inception of the Danish Cancer Registry in 1942 (145). Men living in urban areas show a slightly higher risk than those living in the rural areas of Denmark. Most outstandingly, however, testicular cancer is a malignancy of young adults, with peak incidence in the late 20s; 50 % of these tumors appear before the age of 35 years (145).

Many studies have revealed a positive association between testicular cancer and socioeconomic status, the highest social classes having the highest risks. White-collar occupational groups have been found to have more testicular cancer than blue-collar groups; however, specific occupations have not yet been identified (172). An increased risk of testicular cancer has been reported among men who notified farming as their present occupation on their medical record (132). This finding could not be confirmed in two subsequent case-referent studies in Denmark (93) and the United States (24).

Findings. A total of 1 785 men with cancer of the testis were included in the study, of which the majority — 1 624 — had been members of the Supplementary Pension Fund (table 4).

Figure 21.1 shows that the risk of testicular cancer was close to expectancy in most of the main branches of industry. Except for a nonsignificant excess of 61 cases observed in agriculture compared to 56.9 expected, slightly increased risks of testicular cancer were detected among white-collar occupational groups, indicating the influence of socioeconomic status on the risk of having this malignancy.

Figure 20.2 shows the risks of testicular cancer among employees in selected subgroups of manufacturing. No major departure from unity appeared, and,