

ASBESTOS-ASSOCIATED DISEASES IN SWEDISH SHIPYARD WORKERS

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Asbestos has been extensively used in Swedish shipyards, but its use has come to an end in the early 1970s. Asbestos-related diseases are still common. There are many cases of pleural plaques, strongly related to age. The risk ratio of lung cancer was about 2 among shipyard workers compared to the general population. It has decreased during recent years. The actual incidence of mesothelioma is about 0.5 per 1 000 person-years. Severe asbestosis is rare.

The shipyard industry was one of the big users of asbestos for insulation in Sweden. In the 1960s the Swedish shipyards were among the largest in the world and consequently many workers were occupationally exposed to asbestos. Gothenburg was the major location of the shipyard industry. The annual use of asbestos at shipyards shows a considerable variation with time. Asbestos was replaced by other insulation materials around 1972. Today, the shipyard is considerably smaller. In 1972 there were about 15 000 manual workers hired by the shipyard industry in Gothenburg compared to about 2 000 today. In addition to employed workers there were undertakers who may have been as many as those employed by the shipyards. The workers were exposed to asbestos directly, by handling of asbestos, and indirectly, by dust from other sources. Spraying of asbestos was common during the 1950s and 1960s and was done by undertakers. They were not included in this study as they were also exposed to asbestos in the construction industry and elsewhere. Chrysotile was the most common asbestos variety. Amosite was used for spray application and a few naval ships in the 1950s were insulated with crocidolite.

CANCER

The risk of cancer in shipyard workers has been investigated in two epidemiological studies (1, 2). One study includes deaths between 1960 and 1979 and the other reports

Table 1
*Relative risk of lung and gastrointestinal cancer in Swedish shipyard workers between 1960 and 1979
and between 1978 and 1983 (1, 2)*

	No of cases	Risk ratio
1960–1979		
Lung cancer (162.1) ^a	28	2.3 ^b
Gastrointestinal cancer (150–159) ^a	38	1.4 ^b
Mesothelioma	3	—
1978–1983		
Lung cancer (162.1) ^a	11	1.1 ^c
Gastrointestinal cancer (150–159) ^a	11	0.65 ^c
Mesothelioma	4	—

a) ICD 8; b) Mortality odds ratio; c) Standardized incidence ratio

on cancer morbidity in 1978 through 1983 in male workers who were employed in the late 1970s. The etiological fraction of deaths from lung cancer and mesothelioma due to asbestos exposure was about 5% in the 1960s and 1970s (1). The risk ratio of lung cancer was about 2 among shipyard workers compared with the general population (Table 1). A follow-up of about 3 787 workers who were included in the health control programme in the late 1970s showed no increased risk of lung cancer in the 1978–1983 period (2). This indicates either that the risk decreased after the exposure to asbestos had come to an end or that exposure to asbestos had been rather low. This might also have been a random event as a 95% confidence interval of the rate ratio for lung cancer in that study was 0.6–2.0. There seems to have been no excess of gastrointestinal cancers in those workers. In the 1960s and early 1970s there were rather few mesotheliomas (three of a total of 383 deaths), but in the above mentioned follow-up (2) the mesotheliomas accounted for 5% of the mortality (four of a total of 86 deaths). This indicates that mesotheliomas may be the most important asbestos-associated tumour among shipyard workers in the future. As the latency period for mesotheliomas is long, cases of the disease caused by asbestos will be appearing in the early 2000s. Extrapolation of the current incidence of mesothelioma in that group of shipyard workers (assuming a constant mortality rate) leads to conclude that about 0.5 deaths per 1 000 men/year will be due to mesothelioma in men with a latency time of at least 20 years.

We know of no effective method to screen or prevent mesotheliomas in workers whose asbestos exposure has ceased. However, the risk of lung cancer decreases if a smoker stops smoking whether or not he has been exposed to asbestos. Therefore there have been strong anti-smoking campaigns among shipyard workers and a considerable number of workers have stopped smoking. In a sample of 118 shipyard workers in 1985 there were 31% of smokers, 42% of ex-smokers and 26% of non-smokers. Screening

with chest x-ray and cytological analysis of the sputum are not considered to be feasible tests for an early detection of curable lung cancer as the sensitivity of chest x-ray and the specificity of cytological tests are too low.

ASBESTOSIS AND PLEURAL PLAQUES

The asbestos dose in the shipyards has been too low to cause fatal asbestosis in any considerable extent. The analysis of 655 deaths in 1960–1979 in retired and active shipyard workers who had a group life insurance showed that one man died of asbestosis according to the death certificate. In a health control programme of 3096 males in 1977–1980, 57 men were classified as having suspected or certain asbestosis (3). Of these 23 men had forced vital capacity below the lower reference limits indicating that several cases were mild or subclinical. Pleural plaques, on the other hand, were quite common among those shipyard workers (Table 2). Considering the low sensitivity of chest radiographs to detect pleural plaque it can be argued that the majority of shipyard workers will have pleural plaques after 40 years or more have elapsed since the onset of exposure (4).

Table 2

Prevalence of pleural plaques in active shipyard workers in the late 1970s

Year of birth	No of workers	Frequency of pleural plaques (%)
1910–1919	608	50.5
1920–1929	1008	37.0
1930–1939	723	20.1
1940–1949	548	2.9

To summarize, asbestos-associated diseases have been and still are a considerable health problem among Swedish shipyard workers. Although no asbestos is used at the shipyards since the early 1970s, epidemiological data indicate that mesotheliomas are going to be the most important disease attributable to asbestos in the future.

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Sažetak

BOLESTI VEZANE UZ RAD S AZBESTOM U ŠVEDSKIM BRODOGRADILIŠTIMA

U švedskim brodogradilištima azbest se mnogo upotrebljavao sve do ranih sedamdesetih godina. Šezdesetih i sedamdesetih godina rizik pojave karcinoma pluća bio je gotovo dvostruk u ovih radnika, no čini se da se otada polako smanjuje. Međutim, s druge je strane vrlo česta pojava mezotelioma. Od 1978. do 1983. godine incidencija pleuralnih mezotelioma bila je oko 0,5 na 1000 osoba, s vremenom latencije od 20 godina. Pleuralni plakovi su česti i prevalencija među muškarcima rođenim od 1920. do 1929. godine iznosi 37%. Pojavljuju se slučajevi azbestoze, ali je teška azbestoza rijetka. Među radnicima je provedena vrlo jaka propaganda protiv pušenja. Godine 1985. bilo je 31% pušača, 42% bivših pušača, a 26% radnika nikada nije pušilo. Nema redovnih zdravstvenih pregleda radi ranog otkrivanja karcinoma pluća.

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