

Health effects of occupational exposure to asbestos dust

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The major health effects of workers' exposure to asbestos dust include asbestosis, lung cancer and pleural mesothelioma, which have also been categorised as occupational diseases. Over the period of 1976-2010 in Poland, 2801 cases of asbestosis, 280 of pleural mesothelioma; and 537 of lung cancer were recorded as deriving from occupational exposure to asbestos dust -

Table 1

Table 1. Asbestos-related occupational diseases recorded in Poland: 1976-2010

Year	Number of cases		
	asbestosis	lung cancer	pleural mesothelioma
1976	10	-	1
1977	11	-	-
1978	28	1	-
1979	24	2	-
1980	33	1	1
1981	74	2	-
1982	129	2	-
1983	118	1	-
1984	56	1	-
1985	81	4	-
1986	77	2	4
1987	86	9	2
1988	76	13	3
1989	52	7	3
1990	42	12	3
1991	76	11	4
1992	82	4	7
1993	87	12	7
1994	61	12	6
1995	65	32	4
1996	46	26	7
1997	76	23	6
1998	86	18	6
1999	57	23	9
2000	66	12	13
2001	173	36	18
2002	111	28	10

2003	151	27	12
2004	163	30	17
2005	119	32	19
2006	108	32	30
2007	105	28	25
2008	112	29	14
2009	92	35	17
2010	88	29	31
Total	2801	537	279

Asbestosis, or interstitial pulmonary fibrosis, constitutes the main occupational disease of the workers exposed to asbestos dust. The remarkable growth in the number of asbestosis cases recorded in 1981-1983 was associated with an increased detectability of new cases through the clinical examinations of asbestos workers. These examinations were carried out within a research project conducted by the institutes of occupational medicine in selected asbestos-processing plants. Likewise, the increase in the number of cases diagnosed from 2001- may be associated with the implementation of the Amiantus Project.

According to the official statistics, *pleural mesothelioma* is a rather rare type of cancer in Poland. With the rate of about 4 cases per 1 million people, Poland is classified among the countries with a low incidence of this disease in the general population. However, since 1980, a slight increase in the incidence of pleural mesothelioma has been observed both among males and females. Over the period of 1976-2010, a total of 280 cases of pleural mesothelioma were classified to be of occupational origin (Table 1). As shown in Table 3, the cases recorded in 1980-1996 (when pleural mesothelioma was considered in the national statistics) accounted for as little as 2.4% of the total number of cases of pleural mesothelioma diagnosed at that time in the general population (32% in males, 15% in females). These data suggest that the knowledge of asbestos as a causal agent of mesothelioma is inadequate among the clinicians and that they fail to complete the work history records.

A number of factors need to be taken into account when one considers the relatively low total number of mesotheliomas in the general population, as well as of the occupational mesotheliomas. These include:

- difficulties in diagnosing this rare cancer;
- long period of latency (30-40 years) for mesothelioma. The disease usually develops in elderly people, above 60-65 years of age, and thus may not be associated with previous occupational exposure. The large industrial plants processing considerable quantities of blue asbestos started operating in the 1960s-1970s; therefore, the presently recorded

increase in the number of deaths from pleural mesothelioma may be due to this long latency;

- low cumulative dose of asbestos dust due to short periods of employment: a high proportion of asbestos workers were employed for a short period of time;
- small number of workers employed at workplaces with high asbestos dust concentrations;
- predominant use of chrysotile asbestos

Table 2. Number of deaths from pleural mesothelioma in the general population and cases of pleural mesothelioma registered as an occupational disease in Poland: 1980-1996

Year*	Male		Female	
	number of deaths	occup. disease	number of deaths	occup.disease
1980-1989	574	9	476	4
1990	76	2	66	1
1991	70	2	61	2
1992	78	7	60	-
1993	84	5	62	2
1994	98	4	68	2
1995	91	4	70	-
1996	103	4	59	3
Total	1174	37	922	14
Age (x ± s)	61.7±3.2	56.3±10.7	64.7±12.5	56.0±8.0

*Before 1980 and since 1997 there are no separate statistical data available on deaths from malignant pleural mesothelioma in the general population

Lung cancer. Some of the hypothetical causes of the relatively low number of pleural mesotheliomas in Poland, including those of occupational aetiology, refer also to asbestos-related lung cancers. In spite of the low number of diagnosed cases of occupational lung cancer due to asbestos exposure, they accounted for as much as 40% of the total cases of occupational lung cancer recorded in 1978-2008 (fig. 1). It should be noted that in Poland, every case of lung cancer with documented exposure to asbestos dust is compensated as an occupational disease, no matter whether asbestosis had been diagnosed beforehand and whether the patient had reported a smoking habit.

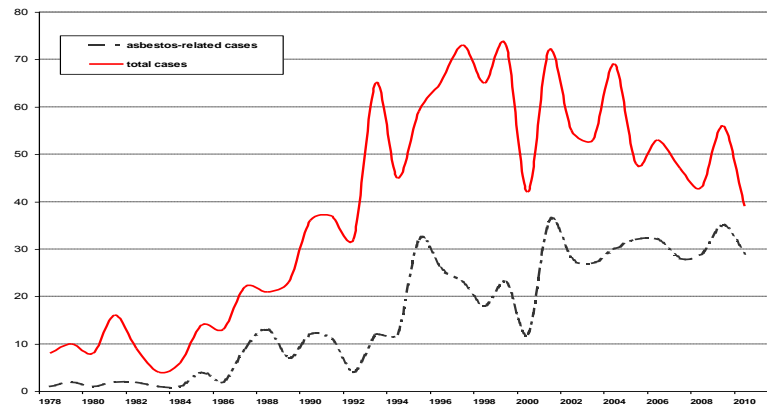


Fig. 1. Total registered cases of occupational lung cancer vs. asbestos-related lung cancer in Poland, 1978-2010

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The procedure for diagnosing and medical certification of occupational diseases and the list of occupational diseases are specified in current regulations. The procedure comprises three stages: (1) reporting a suspected occupational disease (2) diagnosis and medical certification of occupational disease; and (3) administrative decision whether or not the case can be regarded as an occupational disease.

According to these regulations, the reporting of a suspected case of occupational disease may concern a current or former worker. The case should be reported to relevant sanitary inspector and labour inspector, depending on workplace location. The case can be reported by the employer or an occupational physician.

The legislation specifies the institutions with the first- and second-level capacity for certifying occupational diseases as well as the qualification requirements for a physician to be authorised to issue medical certification. The first-level units are the clinics of occupational diseases in regional occupational health centres and in-patient clinics at medical universities. The second-level institutions include research and development units in the field of occupational medicine. Once the decision has been made that a given case can or cannot be diagnosed as an occupational disease, it is forwarded to the State Sanitary Inspectorate (SSI), the employer and the worker in whom the occupational disease was suspected.

An employee who does not agree with the decision issued may appeal to the SSI and apply for a new examination to be performed by a second-level certifying institution. When the procedure for medical certification is completed, a competent State Sanitary Inspector issues a decision that a given case can or cannot be deemed an occupational disease. This decision can be appealed to the Administrative Court

Every certified case of occupational disease is registered, and information on the case, on a special form, is forwarded by the local sanitary inspector to the Central Register of Occupational Diseases located at the Nofer Institute of Occupational Medicine in Łódź.

The current list of occupational diseases includes asbestosis, diffuse thickening of pleura or pericardium, diffuse plaques of pleura or pericardium, pleural exudate, chronic obstructive bronchitis, and lung cancer, as well as pleural and peritoneal mesothelioma as the pathologies caused by exposure to asbestos.

Over the period of 1976-2010 in Poland, 4 253 cases of diseases were recorded as deriving from occupational exposure to asbestos dust. The most prevalent were asbestosis (64%), lung cancer (12.2%), diseases of pleura (9.7%) and pleural mesothelioma (6.4%). The growing tendency in the number of cases of occupational asbestos-related diseases and asbestos-related pathologies is presented in Table 1. The exceptions from the general tendency are ‘other non-malignant diseases’ and ‘other neoplasms’, which is associated with the changing over time contents of the list of occupational diseases as well as the new regulations concerning the cause-effect relationship between asbestos exposure and ‘other diseases’.

Table 3. Asbestos-related occupational diseases recorded in Poland in 1976–2010

Period	Cases (n)						total
	asbestosis	lung cancer	pleural mesothelioma	diseases of pleura or pericardium*	other neoplasms	other non-malignant diseases	
1976–1980	106	4	2	–	1	–	113
1981–1990	771	54	15	–	29	13	882
1991–2000	702	173	69	–	82	54	1 080
2001–2010	1 222	306	193	427	18	12	2 178
Total	2 801	537	279	427	130	79	4 253

* Listed among occupational diseases since 2002

Asbestosis, or interstitial pulmonary fibrosis, constitutes the main occupational disease diagnosed among workers exposed to asbestos dust. The first cases of asbestosis were registered in 1970. The remarkable growth in the number of cases recorded in 1981-1983 was attributable to increased detectability of new cases thanks to the clinical examinations of asbestos workers. The examinations were carried out under research projects conducted by the institutes of occupational medicine in selected asbestos-processing plants. Likewise, the increased number of cases diagnosed since 2001 is linked to the implementation of the AMIANTUS Programme for prophylactic examinations of former asbestos workers.

According to official statistics, *pleural mesothelioma* is a rather rare type of cancer in Poland. With the rate of about 6 cases per 1 million people, Poland is classified among the countries with a low incidence of this disease in the general population. However, since 1980, a slightly increasing incidence has been observed both among males and females. The first case of occupational pleural mesothelioma was noted in 1976. Over the period of 1976-2010, a total of

280 cases of pleural mesothelioma were classified to be of occupational origin. The cases recorded in 1980-1996 (when this disease was considered as a separate item in the national statistics) accounted for as little as 2.4% of the total cases of pleural mesothelioma diagnosed at that time in the general population (3.2% in males, 1.5% in females). In Poland, this extremely low level of diagnosing pleural mesotheliomas with occupational background is an essential problem in the monitoring of health effects of occupational exposure to asbestos. For comparison, in other European countries and in Canada, the 40% rate of occupational mesotheliomas that can be claimed for compensation is considered a gross underestimation .

The major factor accounting for the underrated occupational fraction of mesothelioma is an insufficient knowledge among clinicians on the occupational aetiology of this neoplasm, and hence their failure to perform a detailed interview about the patient's work history. The age of the workers when diagnosed with pleural mesothelioma due to occupational exposure to asbestos was evidently lower than the age of individuals with this neoplasm in the general population.

A number of factors need to be taken into account when one considers the relatively low total number of mesotheliomas in the general population, as well as of the occupational mesotheliomas. These include:

- difficulties in diagnosing this rare cancer;
- long period of latency (up to 40 years) for mesothelioma. The large industrial plants processing considerable quantities of crocidolite started operating in 1960s-1970s; therefore, the presently recorded increase in the number of deaths from pleural mesothelioma may be due to this long latency;
- low cumulative dose of asbestos dust due to short periods of employment: a high proportion of asbestos workers were employed for a short time;
- small number of workers employed at workplaces with high asbestos dust concentrations.

Lung cancer. Some of the hypothetical causes of the relatively low number of pleural mesotheliomas in Poland, including those of occupational aetiology, refer also to asbestos-related lung cancers. The first case of lung cancer attributed to occupational exposure to asbestos dust was recorded in 1978. Despite the low number of the diagnosed cases of occupational asbestos-related lung cancer, they accounted for as much as 40% of the total cases of occupational lung cancer recorded in 1978-2010 . It should be noted that in Poland, every case of lung cancer with documented exposure to asbestos is compensated as an occupational disease, no matter whether asbestosis had been diagnosed beforehand, and irrespective of the smoking habit.

Compensation for occupational asbestos-related diseases

The basis for claiming compensation for an occupational disease is a legally binding administrative decision confirming the occupational etiology of the disease. The decision is made by the State Sanitary Inspector based on medical certification, epidemiologic surveillance of work environment and occupational exposure data. The types of compensation, the procedures for granting them, calculating the amount due and determining the mode of payment are regulated separately.

It should be stressed that it is the health consequences of the disease rather than the presence of the occupational disease itself that is compensated for. Indemnity benefits connected with an occupational disease are paid by the Social Insurance Agency (ZUS) from the Social Insurance Fund. The social insurance benefits pertaining to occupational asbestos-related occupational diseases include:

- sickness benefit – for the insured worker whose temporary disability for work of up to 182 days is a consequence of an occupational disease,
- rehabilitation benefit - for the insured worker who after a period of receiving sickness benefits has remained incapable for work but who is likely to regain work ability provided that the treatment or rehabilitation is continued; the maximum period of receiving this benefit is 12 months;
- top-up benefit - for the insured worker whose earnings have decreased due to permanent or long-term health impairment; the top-up benefit is due to the period of rehabilitation, but no longer than for 24 months.

Determining the degree of health impairment and whether the death of the insured worker has been related to an occupational disease is the responsibility of a physician dealing with medical certifications for the Social Insurance Agency. He/she is also obliged to find out whether the worker's disability for work, making him/her eligible for disability pension, has been the consequence of an occupational disease. When certifying permanent or long-term health impairment related to occupational disease, the physician has to refer to the decision of the State Sanitary Inspectorate confirming the occupational etiology of the disease.

Permanent damage to health is a violation of the efficiency of the organism that causes impairment of the body, which has little chance of improvement. Long-term damage to health is a reduction in the efficiency of the organism that causes impairment of the body for a period exceeding six months, which can improve. The worker who has a permanent or long-term damage to health or has become incapable for work as a consequence of an occupational disease is entitled to receive:

- one-time indemnity - for the insured worker who has experienced a permanent or long-term health impairment;
- work disability pension, for the insured who has become unable to work due to occupational disease;
- vocational training pension – for the insured worker who is unable to continue employment in his profession as a consequence of an occupational disease;
- nursing allowance - for the person eligible for pension, deemed completely incapable of work or independent existence, or who has reached the age of 75;
- medical costs reimbursement - of dental treatment and preventive vaccinations, as well as providing orthopedic care measures within the scope stipulated by the law.

The family members of the worker who has died from an occupational disease are also entitled to one-time compensation. They also receive the family pension and supplement to survivor's pension.

The degree of health impairment is determined from the effects on particular body organs or systems, and expressed as percentage, in accordance with the reference criteria for the assessment of permanent or long-term health impairments. For asbestos-related diseases, the degree of health impairment can range from 10 to 100%.

The assessment of the degree of health impairment and its relation to occupational disease should be made after the treatment and rehabilitation have been completed. A lump-sum work injury compensation is calculated, based on average gross earnings in the national economy, for each percent of the permanent or long-term health impairment.