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OCCUPATIONAL DISEASES IN POLAND, 2001

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Abstract. The Central Register of Occupational Diseases keeps the records of all reported and certified occupational diseases in Poland. In this paper the incidence of occupational diseases in Poland in 2001 is discussed on the basis of the data provided by the Register. The changes in the incidence pattern over the recent 30 years are also shown.
In 2001, 6007 cases of occupational diseases were registered, with the incidence rate of 63.2 per 100 000 employees. The highest incidence rates were noted for seven categories of diseases: the vocal organ diseases, noise-induced hearing loss, pneumoconioses, contagious and invasive diseases, dermatoses, chronic diseases of bronchi, and vibration syndrome. Altogether these diseases covered 5239 cases (87.2% of all registered cases). Mining and quarrying, agriculture, hunting and forestry, education, health and social works were the economy activities with the highest incidence of occupational diseases. The majority of occupational diseases (93.9%) have developed after a long-term (over 10 years) exposure to particular harmful factors. As much as 58.5% of cases were recorded in males. The predominant occupational diseases in males were occupational hearing lesions, while in females chronic vocal organ diseases, most common in teachers, were most frequently recognized.
In Poland, the diseases of the vocal organ poses a serious problem from the medical and socio-economic points of view. These pathologies show the highest dynamics of the incidence among all registered occupational diseases. Over the last five years the vocal organ diseases have moved upwards to the top in the ranking, both with respect to the number of cases and the incidence rate.
Since 1998, the incidence of occupational diseases has been continuously showing a downward tendency. Four categories of occupational diseases have accounted mostly for this decline: noise-induced hearing loss, chronic diseases of vocal organ, contagious and invasive diseases, and dermatoses (a decrease by 64%, 54%, 40%, and 51%, respectively). The decreased incidence has been also noted for "classical pathologies": chronic poisonings, pneumoconioses and vibration syndrome. At least three most important explanatory factors have to be pointed out: a) the decrease in employment and liquidation of industrial plants with the highest health risk; b) the modernization of plants and improvement of working conditions; and c) effective prevention.

Key words:
Occupational diseases, Incidence, Register, Epidemiology

INTRODUCTION

In Poland, a disease is regarded as an occupational disease if it has been caused by health hazard(s) present in the work environment and is included in the list of occupational diseases, which is the Annex to the Ordinance of the Council of Ministers [1]*. A uniform system for notification of the disease, as well as for the collection, processing and retrieval of data on occupational diseases was developed in 1975. Every case of ascertained occupational disease is registered at the Central Register of Occupational Diseases, located at the Nofer Institute of Occupational Medicine in Łódź. The system ensures proper registration and completeness of data on each ascertained case.

The paper presents the epidemiological data on occupational diseases registered in Poland in 2001. The changes in the incidence over the recent 30 years are also presented. The data on occupational diseases are published regularly in a series of publications and Bulletins issued annually [2–9].

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* In September 2002, a new list of 26 occupational diseases became obligatory in Poland according to the European Union Recommendation 90/326/EEC of May 1990 to the Member States concerning adoption of European schedule of occupational diseases, OJ No L 160, 26.6.1990 p.39.
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MATERIALS AND METHODS

Every case of diagnosed and ascertained occupational disease in Poland is reported on a single form forwarded by a local sanitary inspector to the Central Register of Occupational Diseases. The form includes the following: the data allowing to identify the worker and company (industries coded according to PKD*), worker's job, exposure – cause of the disease, exposure duration, and the disease entity.

To calculate the incidence rates, the data on all newly identified and certified cases of occupational diseases, during a specified period, were utilized. The statistics on the number of workers employed in the national economy, according to the classification of the Central Statistical Office were used as denominators. The data apply only to workers with formal employment via work contract, appointment or nomination. Workers on maternity leave, or unpaid vacations longer than 3 months, company owners or co-owners, agents, outworkers, clergy and people working for foundations and associations were not considered.

RESULTS

In 2001, 6007 cases of occupational diseases were registered, with the incidence rate of 63.2 per 100 000 employees. The highest incidence rates were noted for seven categories of occupational diseases: the vocal organ diseases, noise-induced hearing loss, pneumoconioses, contagious and invasive diseases, dermatoses, chronic diseases of bronchi and vibration syndrome. In total, these diseases covered 5239 cases (87.2% of all registered cases) (Table 1).

The highest incidence was recorded for vocal organ diseases (17.7). They constituted 28% of all occupational diseases and applied mainly to teachers. The most prevalent among these pathologies were vocal cords paresis and hypertrophic changes in larynx (54.6% and 37.4%, respectively). These diseases were found to be the most frequent among women (57.8% of all cases in females).

Noise–induced occupational hearing loss (20.1% of all occupational diseases) was the second most frequent occupational disease, with the incidence rate of 12.7.

This was followed by:

- pneumoconioses (13.7% of all occupational diseases), in this pneumoconioses induced by mixed dust – pneumoconioses of coal miners (480 cases – 58.5% of all registered pneumoconioses cases); silicosis (16.2%); asbestosis (21.1%);
- contagious and invasive diseases (11.9%) with most prevalent viral hepatitis (42.6% of this group): type C – 159 cases and type B – 132 cases; borreliosis (247 cases – 34.6%); tuberculosis (100 cases – 14.0%); brucellosis (32 cases – 4.5%); and toxoplasmosis (11 cases – 1.6%);
- dermatoses (6.2 %), among which allergic dermatitis prevailed (91.5 % of all registered dermatoses); exposure to chromium compounds was the most frequent causative agent (29.3%);
- chronic diseases of bronchi with asthma as the leading pathology (88.7% of cases in this group, incidence rate – 2.5); exposure to organic dust of animal or plants origin induced 81% of asthma cases;
- vibration syndrome (3.4%), including impairments due to local vibration (94.1% of all vibration syndrome cases); in the clinical terms, the vasoneural form was diagnosed in 50.7% of cases, the osseous form in 30.7%, and the mixed form in all the other cases.

The remaining 13 groups of occupational diseases registered in 2001 constituted as little as 12.8% of all cases.

Occupational intoxications were reported in 136 (2.3%) cases. This category was the most diverse with respect to causes and clinical symptoms. Acute poisonings, regarded as poisonings due to exposure within a single workshift, covered 32.4% of all cases of intoxication. However, the majority of poisonings resulted from long-term exposure to toxic agents, mostly to carbon disulphide, carbon monoxide, lead and its inorganic compounds and mercury. These chemicals were found to be the cause of 57.4% of all the poisonings.

* PKD - Polish Classification of Activities compiled on the basis of the Statistical Office of the European Committee EUROSTAT "Nomenclatures des Activités de Communite Européenne"- NACE rev. I.

Table 1. Occupational diseases in Poland by nosologic units, 1998 and 2001

Occupational diseases	Number of occupational diseases in		Number of occupational diseases per 100 000 employees in	
	1998	2001	1998	2001
Total	12017	6007	117.3	63.2
Acute and chronic intoxications with chemical substances and their sequelae	294	136	2.9	1.4
Pneumoconioses	988	820	9.6	8.6
Chronic diseases of bronchi induced by substances causing paroxysmal bronchospasms and pneumopathies with inflammatory proliferative reactions	315	238	3.1	2.5
Chronic bronchitis induced by toxic substances, irritant aerosols – in case of insufficiency of respiratory system	194	85	1.9	0.9
Pulmonary emphysema in glassblowers and musicians of brass bands – in case of pulmonary insufficiency	1	1	0.0	0.0
Chronic atrophic, hypertrophic and allergic inflammation of mucous membranes of nose, pharynx, larynx and trachea	260	169	2.5	1.8
Chronic diseases of vocal organ related to excessive voice effort	3654	1680	35.7	17.7
Diseases induced by ionizing radiation including malignant neoplasms	22	15	0.2	0.2
Malignant neoplasms induced by carcinogens present in working environment, except for those mentioned above	122	121	1.2	1.3
Dermatoses	766	375	7.5	3.9
Contagious and invasive diseases	1187	715	11.6	7.5
Chronic diseases of locomotor system related to the way the job is performed	284	124	2.8	1.3
Chronic diseases of peripheral nervous system caused by pressure on the nerve trunks	166	99	1.6	1.0
Diseases of the eye induced by occupational chemical or physical factors	31	18	0.3	0.2
Noise-induced hearing loss	3385	1206	33.0	12.7
Vibration syndrome	345	205	3.4	2.2
Diseases induced by work at increased or decreased atmospheric pressure	1	0	0.0	0.0
Diseases induced by gravity load (accelerations)	0	0	0.0	0.0
Diseases of central nervous system, heart stimulating and conducting system and gonads induced by electromagnetic fields	2	0	0.0	0.0
Heat hyperpyrexia syndrome and its sequelae	0	0	0.0	0.0

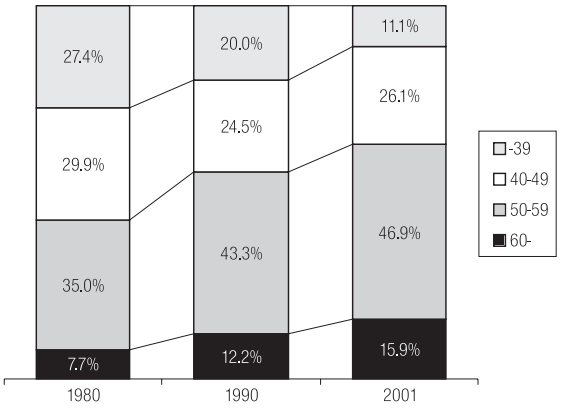

Fig. 1. Cases of occupational diseases by age 1980, 1990, 2001.

There were cases of diseases that although having a low incidence rate posed a serious health problem in clinical terms. These included malignant neoplasms, pathologies caused by ionizing radiation and chronic bronchitis with respiratory insufficiency. Maligant neoplasms constituted only 2.1% of all occupational diseases (128 cases, including 7 due to ionizing radiation). The most frequent were: lung cancer (70 cases), mesothelioma (18 cases), laryngeal cancer (13 cases) and urinary tract cancer (10 cases). Most of the cancer cases were detected in men (85.1%). Less pronounced health effects resulted from relatively frequent cases of chronic inflammation of the nasal, oral, pharyngeal and tracheal mucosa induced by irritative and sensitizing agents; diseases of the locomotor system related to the way the job is performed and excessive physical workload; and diseases of the peripheral nervous system caused by pressure on the nerve trunks.

Some of the diseases, including those induced by work at increased or decreased atmospheric pressure and gravity load, diseases of the central nervous system, heart stimulating and conduction system and gonads induced by electromagnetic fields and heat hyperpyrexia syndrome did not occur at all and only one case of pulmonary emphysema was reported. The last of these 13 groups of diseases were the diseases of the eye induced by occupational physical and chemical agents, but they did not pose a significant clinical problem either.

Most occupational diseases were developed by a long-term exposure to pathogenic factors occurring in the occupational environment. An analysis, after excluding contagious and invasive diseases and allergies, which are not related to exposure duration, showed that as much as 93.9% of occupational diseases were generally manifested after a 10-year period of exposure to a given hazardous agent. Additional exclusion of acute poisoning cases makes this percentage slightly higher (94.7%). The majority of occupational diseases occur in the older workers: 88.9% in workers over 40 years, and 46.9% in the 50-59 years age group (Figs. 1 and 2).

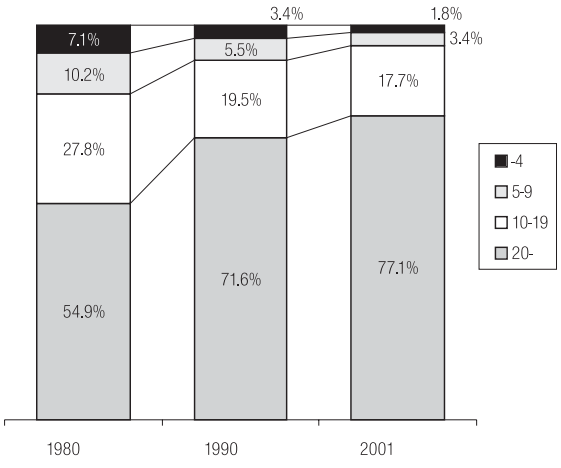

Fig. 2. Cases* of occupational diseases by exposure duration, 1980, 1990, 2001.

* Cases of contagious and infectious diseases, allergies and acute poisonings are excluded.

Occupational diseases in Poland during the years 1980–2001

To assess the dynamics of the incidence of occupational diseases, the data for the years 1980–2001 were ana-

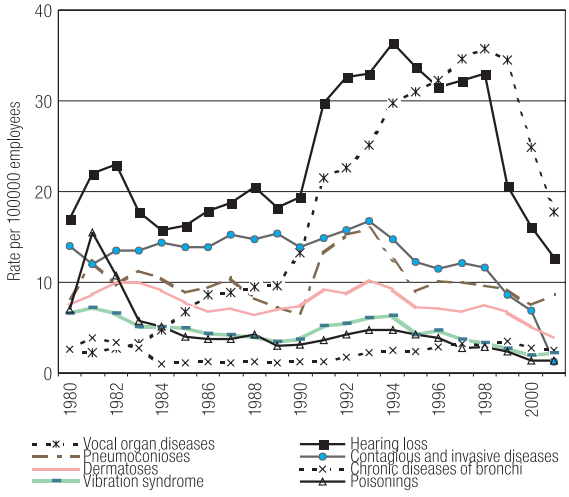

Fig. 3. Major categories of occupational diseases, 1980–2001.

Table 2. Major categories of occupational diseases diagnosed in 1967 and 2001

	1967			2001	
	N	%		N	%
Chemical intoxications generally	1400	31.2	Vocal organ diseases	1680	28.0
Pneumoconioses	1130	25.2	Noise induced hearingloss	1206	20.1
Noise-induced hearing loss	741	16.5	Pneumoconioses	820	13.7
Dermatoses	452	10.1	Contagious and invasive diseases	715	11.9
Vibration syndrome	304	6.8	Dermatoses	375	6.2
Total	4485	100	Total	6007	100

lyzed (Fig. 3). The increased incidence in the early 1990s was mainly due to increase in noise-induced hearing loss, chronic vocal organ diseases and pneumoconioses cases. A considerable decrease in the total number of cases has been noted since 1998. The crude number of registered cases decreased by 6010 cases, and the incidence rate declined from 117.3 in 1998 to 63.2 in 2001 (Table 1).

Four categories of occupational diseases have accounted mostly for this decline: (a) noise-induced hearing loss; (b) chronic vocal organ diseases; (c) contagious and invasive diseases; and (d) dermatoses. The number of cases decreased by 2179, 1974, 472 and 391, respectively. Before 1996, occupational noise-induced hearing loss showed the highest incidence rate, but for the last five years this pathology has been left behind the vocal organ diseases, though it still poses a serious occupational problem.

Pneumoconioses, showed the increase in incidence in the early 1990s. Although, the decrease in the incidence and the number of pneumoconioses registered after 1993 could have been observed. They still have to be regarded as primary occupational pathologies in Poland. The highest dynamics of the incidence was found for vocal organ diseases. An enormous outburst of the vocal organ diseases has been recorded among teachers and other educational workers**.** A dramatic growth, by almost hundred times, has been observed in the number of cases, from just 37 cases in 1975 to as many as 3654 in 1998; a subsequent decrease to 1680 cases was observed in 2001.

Changes in the occupational diseases profile in Poland since the 1960s

Over the recent 30 years, considerable changes have been noted in the profile of the incidence of the occupational diseases. Among the most frequent occupational diseases, reported in the 1960s there were chemical intoxications, pneumoconioses, noise-induced hearing loss, dermatoses and vibration syndrome. This pattern, however, has changed substantially (Table 2).

A decrease has been recorded in the number of cases of acute and chronic poisonings of occupational etiology, which made as much as 33% of all cases of occupational diseases registered in the 1960s. In 2001, this percentage declined to the level of 2.3%. During the period between 1967 and 2001, the number of occupational poisonings decreased ten times. The causes of poisonings have changed as well. In the 1960s, exposure to lead accounted for 40% of all registered poisoning cases while in 2001 for 6.6% only (Table 3).

Table 3. Occupational intoxications in 1967 and 2001 by their causes

	1967	2001
Total number of cases including (most frequent)	1400	136
lead intoxications	526	9
carbon monoxide intoxications	236	11
benzene intoxications	207	5
carbon disulphide intoxications	127	51

Table 4. Occupational diseases by activity sections (PKD classification), Poland, 2001

	Activity sections	Number of occupational diseases	Number of occupational diseases per 100 000 employees
A.	Agriculture, hunting and forestry	441	234.25
B.	Fishing	6	68.64
C.	Mining and quarrying	860	387.33
D.	Manufacturing	1706	69.29
E.	Electric energy, gas and water supply	30	12.72
F.	Construction	267	40.78
G.	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	60	4.20
H.	Hotels and restaurants	11	6.57
I.	Transport, storage and communication	125	19.20
J.	Financial intermediation	3	1.12
K.	Real estate, renting and business activities	91	13.73
L.	Public administration and defence; compulsory social security	37	7.51
M.	Education	1515	170.10
N.	Health and social work	755	87.74
O.	Other community, social and personal service activities	78	25.19

Occupational diseases in Poland according to the sections of the national economy

In terms of the public health, the most essential data are those on the prevalence of occupational diseases in particular branches of the national economy. Therefore the incidence of occupational diseases in different industries in Poland was analyzed according to the PKD classification (Table 4).

The highest incidence was found to occur in mining and quarrying (section C), agriculture, hunting and forestry (section A), education (section M), and health and social work (section N). Both the conditions of work and work performance determined the group of occupational disease. In mining and quarrying, hearing impairments and pneumoconioses were most frequent. In education, the vocal organ diseases prevailed. The health and social work sector was characterized by a high incidence of contagious and invasive diseases (mostly viral hepatitis). In agriculture, hunting and forestry, the largest number of cases was due to contagious and invasive diseases and chronic diseases of bronchi induced by substances causing paroxysmal bronchospasms and pneumopathies with inflammatory proliferative reactions.

Table 5. Occupational diseases with the highest incidence rate in male employees, 2001

	Incidence rate per 100 000 male employees	% all cases
Noise-induced hearing loss	23.9	96.1
Pneumoconiosis	15.7	93.7
Vibration syndrome	3.8	91.2
Intoxications	2.3	83.1
Malignant neoplasms	2.1	85.1
Chronic bronchitis in case of respiratory insufficiency	1.7	97.6

Table 6. Occupational diseases with the highest incidence rate in female employees, 2001

	Incidence rate per 100 000 female employees	% all cases
Chronic diseases of vocal organ	31.1	85.7
Contagious and invasive diseases	8.7	56.4
Chronic diseases of peripheral nervous system	1.6	75.8

Occupational diseases in Poland by gender

An analysis of the incidence rate of occupational diseases in the male and female working populations revealed considerable differences associated with the specific conditions of work in either group (Tables 5 and 6). Generally 58.5% of all cases of occupational diseases were diagnosed in male workers. Pneumoconioses, poisonings, vibration syndrome, hearing impairments, malignant neoplasms and chronic bronchitis with pulmonary insufficiency were found more frequently in the male than in the female population. The latter was characterized by a higher incidence of vocal organ diseases, contagious and invasive diseases and chronic diseases of the peripheral nervous system caused by pressure on the nerve trunks.

DISCUSSION

Among occupational diseases registered in Poland, those resulting from long-term exposure to occupational factor are most frequent. The majority of recently registered cases, for which the duration of exposure is essential for their development, are the delayed effects of the past exposures. Some cases are found in workers who had been exposed at workplaces, which are no longer under operation.

The decreased incidence, observed over the last three years in Poland is associated with several factors. In the 1990s, a process of the structural changes in the Polish economy took place. In those years many big state-owned enterprises (mines, manufacturing plants) were closed down. During the first phase of this process, early retirement and seeking for indemnities due to occupational diseases were in high rates. The latter resulted in a growing number of registered occupational diseases that occurred in the mid 1990s. The liquidation of plants has led to the subsequent decrease in employment. For example, employment in the mining and quarrying decreased by 218 100 between 1992 and 2000, a similar decline was observed in manufacturing plants. In the year 2000, as many as 655 state-owned enterprises were subject to liquidation due to economic reasons [10,11].

Among plants that have been closed down, those with outdated production lines, characterized by high exposures to "classical" occupational agents prevailed. The majority of plants still in operation have been modernized, frequently equipped with improved technological processes, good quality control measures and workplace hygiene facilities. Consequently the population of highly exposed workers at risk of developing occupational diseases decreased.

The positive changes in the incidence rates of occupational diseases are also associated with effective prevention. A spectacular example of such an action is the preventive vaccination against HBV. In Poland, an extensive vaccination program against viral hepatitis type B was initiated in 1989. Since 1993, all patients prepared for surgery have also been vaccinated. In 1998 as much as 93% of health care workers were vaccinated against viral hepatitis B [12]. From 1989, the absolute number of cases of viral hepatitis recorded as occupational diseases has declined from 1469 to 304 cases.

Among occupational diseases that pose a serious problem from the medical and socio-economic points of view there are the diseases of the vocal organ. They show the highest dynamics of the incidence of all registered occupational diseases. Over the last five years, the vocal organ diseases have moved upwards to the top position in the ranking both with respect to the number of cases and the incidence rate. It has been postulated to withdraw the vocal organ diseases from the list of occupational diseases since they are not regarded as such in the developed countries,

including the USA and the European Union. However, this would be only a partial solution that would not change the fact that they remain a serious health problem among educational workers. Their high incidence has been confirmed by several epidemiological studies, conducted both by foreign and Polish researchers [13–17]. It is assumed that an inadequate medical prevention and the lack of training programs for teachers on the techniques of voice emission are the major factors contributing to the high incidence of these diseases [14]. Such a program has been initiated in Poland only recently, in 2000. The considerable differentiation between particular regions of the country with respect to the incidence of vocal organ diseases indicates an impact of other factors, e.g. the differences in the quality of laboratory equipment, inaccurate diagnostics and some liberty regarding the medical certification of occupational diseases. The enhanced incidence of vocal organs diseases has also been associated with increasing awareness of compensatable diseases and the interest in indemnities due to occupational diseases. The social pressure on physicians responsible for diagnosing and certifying a given case as an occupational disease has to be taken into consideration as well.

The level of the registered occupational diseases incidence depends heavily on the awareness among workers and physicians of the occupational etiology of a particular disease and diagnostic facilities. Analyses of Polish statistics and comparisons with data on occupational diseases assessed in other countries indicate that some of the diseases originated from occupational exposures might be underdiagnosed and eventually not registered. This problem applies in particular to occupational cancers. It is postulated that although malignant neoplasms showed a growing tendency over the 1990s, the detection rate for these pathologies still remains relatively low. The problem of occupational cancer in Poland has been described in details elsewhere [8].

To sum up, one must admit that the data of the Central Register of Occupational Diseases reflects the changes in the epidemiological situation and the risk posed to workers' health in Poland. The positive tendencies observed in recent years include the decreased incidence rate of traditional occupational diseases, e.g. acute and chronic poisonings, pneumoconioses, vibration syndrome and hearing loss. However, it can be anticipated that vocal organ diseases, noise-induced hearing loss, pneumoconioses, contagious and invasive diseases and dermatoses will remain predominant in the pattern of Polish occupational diseases.

CONCLUSIONS

1. In the general structure of occupational diseases in Poland the most prevalent are: chronic diseases of vocal organ, occupational hearing lesions, pneumoconioses, contagious and invasive diseases, dermatoses, chronic diseases of bronchi and vibration syndrome.
2. Occupational diseases in males make 58.5% of new cases with occupational hearing lesions as predominant occupational disease, whereas, in females the chronic diseases of the vocal organ are most frequently diagnosed.
3. The majority of occupational diseases in Poland (93.9%) develop after a long-term (over 10 years) exposure to particular harmful factors.
4. The highest incidence of occupational diseases occurs in mining and quarrying (section C), agriculture, hunting and forestry (section A), and education (section M).
5. A downward tendency in the incidence of occupational diseases, and "classical" pathologies in particular (chronic poisonings, vibration syndrome, pneumoconioses, and hearing loss) observed over several recent years in Poland, is associated with the decreased employment and liquidation of industrial enterprises posing the highest risk for health, on the one hand, and due to modernization of the plants and improvement of working conditions on the other.
6. In spite of preventive actions against viral hepatitis B carried out for over ten years among health care workers it has not as yet been fully eradicated.
7. Malignant neoplasms registered as occupational diseases showed a growing tendency over the 1990s, however, the detection rate for these pathologies still remains relatively low.

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