

NATIONAL OCCUPATIONAL MORBIDITY DUE TO EXPOSURE TO RESPIRATORY AND SKIN SENSITIZERS AND BIOLOGICAL AGENTS

Dr. Adriana Todea, dr. Aurelia Ferencz – Institute of Public Health București

INTRODUCTION

Occupational medicine is the medical discipline studying the physiological and pathological relationship between the human organism and work, in order to recommend the remedies that allow occupational activities to be performed in physiologic and hygienic conditions that sustain a high level work capacity, prevent occupational diseases and work related diseases.

In a new perception, occupational medicine is a multidisciplinary science that studies the effect of work upon workers' health, as well as the effect of workers' health upon work capacity. It's main target is prevention, but it was and continues to be involved in identifying, inquiring and treating occupational diseases.

Occupational health and safety (OHS) is a modern concept, the result of both individual and group values, capacities, competencies, behaviors, habits governing the employment, style and efficiency of OHS programs. A good OHS culture at company level implies communication based upon mutual trust, common perception of OHS's importance and confidence in the efficacy of preventive remedies.

Nowadays, the present concept is extended to that of "occupational health and safety and protection of the surrounding environment" and it's viewed as the employers' liability and responsibility (Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work, The Law of Labor Protection no. 90/1996 and General Norms of Labor Protection/2002).

The idea for the paper started from a message sent by the European Agency for Safety and Health at Work from Bilbao, which under the title: "*Dangerous Substances Handle with care*" started in 2003, in Europe, the campaign for prevention of the risks of occupational exposure to dangerous substances such as:

- Respiratory sensitizers
- Skin sensitizers
- Biological agents

Centralizing the data received from the occupational physicians from the county centers of public health (BP₂ forms) the conclusion was that, in Romania, the exposure to these type of agents have an impact upon health, resulting in medical leaves, thus the need to implement extended prophylactic programs.

Occupational diseases in Romania

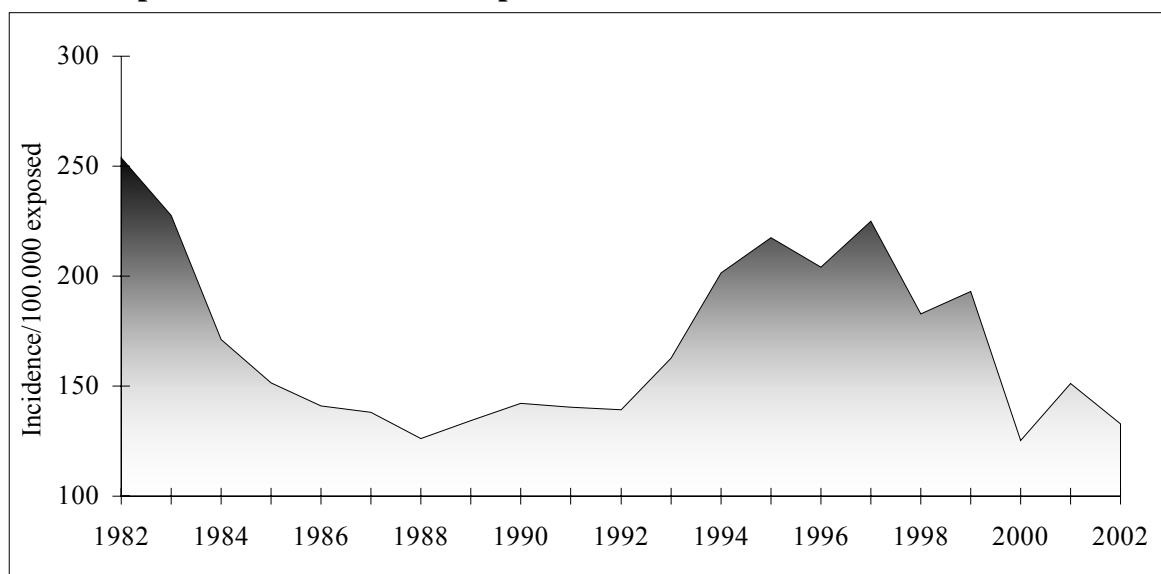
The knowledge regarding occupational morbidity is very important because it is the result of occupational exposure to noxious conditions in the work place and, once established, can be alleviated through technical-organizational and medical remedies.

The status of occupational morbidity in Romania, between 1973 and 2002 is shown in the following table:

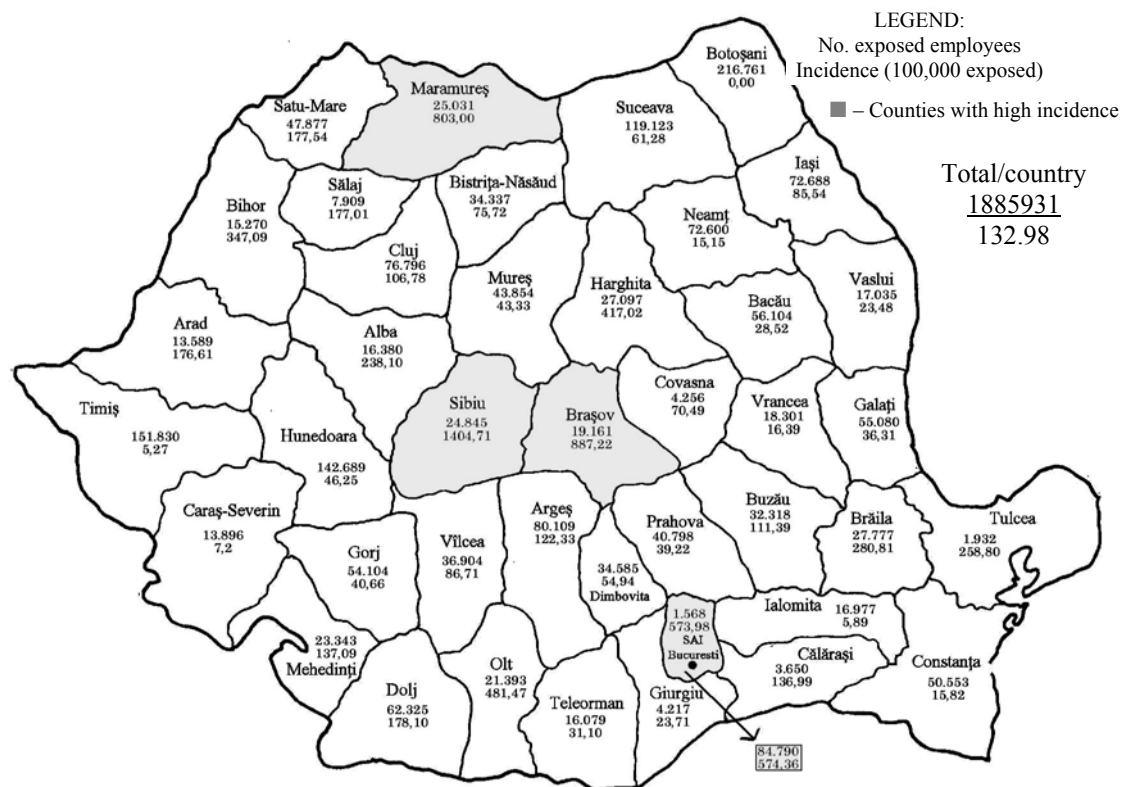
Table 1 The evolution of occupational diseases' incidence between 1973 and 2002

Year	No. of new cases	Incidence (100.000 exposed)	Year	No. of new cases	Incidence (100.000 exposed)
1973	3101	391.9	1988	1294	126.1
1974	3044	357.7	1989	1423	134.4
1975	2828	330.0	1990	1470	142.1
1976	2894	325.2	1991	1414	140.4
1977	2498	285.2	1992	1506	139.1
1978	2766	299.8	1993	1562	162.9
1979	2832	291.1	1994	1875	201.5
1980	2310	240.7	1995	2031	217.3
1981	2568	264.8	1996	2015	204.2
1982	2464	253.8	1997	2060	225.0
1983	2231	227.5	1998	1828	182.79
1984	1683	171.3	1999	1802	192.92
1985	1498	151.5	2000	1576	125.19
1986	1426	141.0	2001	2238	151.28
1987	1384	138.2	2002	2508	132.98

Graph 1 The evolution of occupational diseases' incidence between 1981 and 2002



The occupational morbidity in the last 11 years (1992-2002) maintains almost on the same level as in the period 1986-1989, with an obvious increase in the period 1992-1997.



In the period 1998-2000, we witnessed a decrease of the occupational incidence, with a slight increase in 2001.

Table 2 New cases of occupational diseases in the period 1992-2002

Disease	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
<i>Total no. of cases</i>	<i>1506</i>	<i>1562</i>	<i>1875</i>	<i>2031</i>	<i>2015</i>	<i>2060</i>	<i>1828</i>	<i>1802</i>	<i>1576</i>	<i>2238</i>	<i>2508</i>
Occupational noise-induced hearing loss	56	50	56	159	337	395	211	386	386	696	890
Poisoning	405	419	362	372	355	392	338	287	184	288	432
-with lead	266	310	241	232	248	273	237	238	129	187	324
-with carbon monoxide	45	11	24	33	17	34	16	12	17	35	29
Silicosis	611	586	795	787	594	582	735	649	530	501	411
-silicosis	583	561	781	747	566	519	680	635	521	498	408
-silicotuberculosis	28	25	14	40	29	63	52	14	6	8	3
Bronchial asthma	199	170	259	252	250	265	199	118	120	144	197
Occupational diseases due to vibrations	11	21	16	55	121	120	100	106	74	141	65
Skin diseases	74	78	143	172	147	89	64	36	48	45	64
Chronic bronchitis						84	43	44	60	48	61
Infectious, parasitic diseases	20	17	49	14	28	39	44	35	34	232	212
Repetitive trauma, out of which:	10	7	6	12	15	27	21	14	39	50	60
- larynx									4	9	0
- musculoskeletal system									21	34	31
- eyes									14	0	5
- neuropsychological and sensorial									0	2	6
Asbestosis	0	4	1	11	26	21	6	55	5	2	6
Byssinosis				6	28	26	16	32	17	10	0

Disease	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Nasal septum ulcer and perforation (due to chromium exposure)	19	11	8	47	15	5	13	11	9	7	9
Occupational neoplasms	1	6	5	0	5	3	3	2	1	2	6
Allergic Rhinitis	14	12	19	12	14	6	6	3	5	4	18
Eye diseases	11	6	4	6	9	2	4	1	3	17	22
Other occupational diseases	85	186	158	120	139	4	25	24	61	51	55

The analysis of the number of cases by type of production shows that in our country, the highest number of cases is reported in metallurgy (554 new cases – 22,12% of total number of reported occupational diseases), in car manufacturing (432 new cases – 17,25%) and nonferrous ore extraction (267 new cases – 10,66%).

In metallurgy occupational poisoning prevails (308 new cases, out of which 299 due to lead, 8 due to arsenic and 3 due to carbon monoxide), followed by occupational noise-induced hearing loss (182 new cases) and silicosis (173 new cases); in nonferrous ore extraction silicosis is the leader with 173 new cases, followed by occupational noise-induced hearing loss (47 new cases), almost the same as occupational vibration-induced trauma (41 new cases).

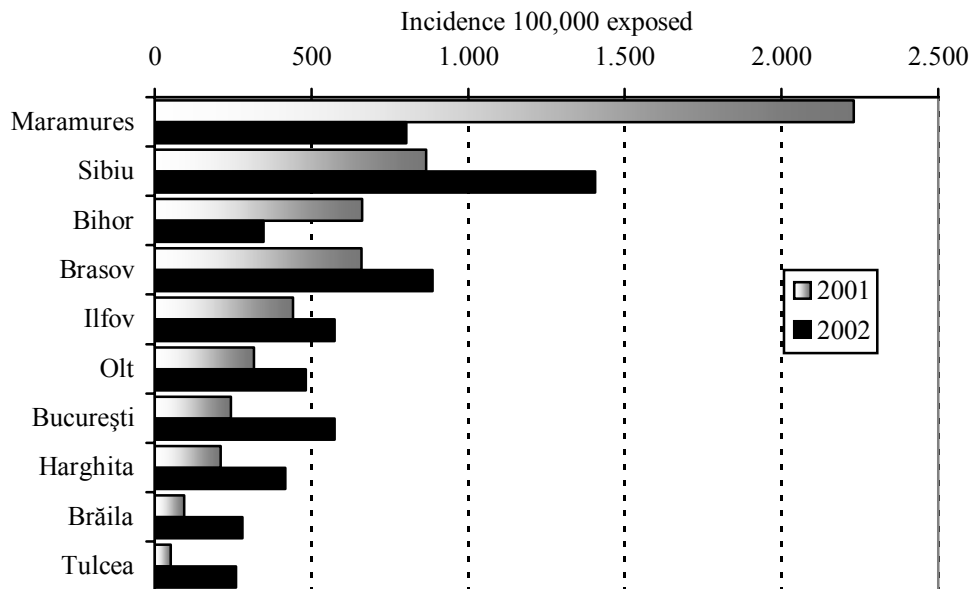
As presented, through the number of new cases, the descriptive epidemiology of occupational diseases in Romania represents a picture regarding the “classic” occupational diseases, well defined and known due to obvious cause (work place risk) – effect (diseases) relationship.

The number of occupational diseases by county reported in 2002 is shown in the table below:

Table 3 The incidence of occupational diseases by county in 2002

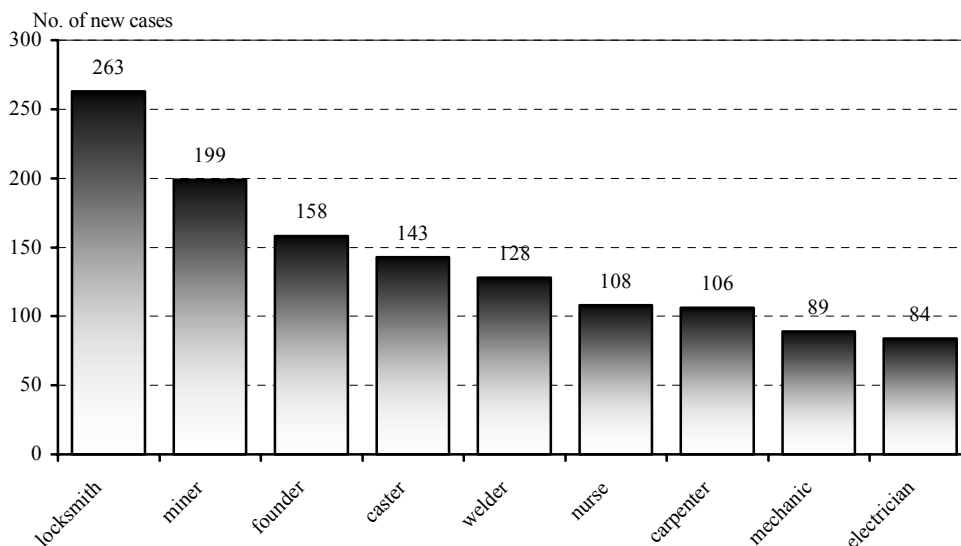
County	No. new cases	No. exposed	Incidence 100,000 exposed)	County	No. new cases	No. exposed	Incidence 100,000 exposed)
Sibiu	349	24845	1404.71	Iași	60	72688	82.54
Brașov	170	19161	887.22	Bistrița	26	34337	75.72
Maramureș	201	25031	803.00	Covasna	3	4256	70.49
București*	487	84790	574.36	Suceava	73	119123	61.28
Ilfov	9	1568	573.98	Dâmbovița	19	34585	54.94
Olt	103	21393	481.47	Hunedoara	66	142689	46.25
Harghita	113	27097	417.02	Mureș	19	43854	43.33
Bihor	53	15270	347.09	Gorj	22	54104	40.66
Brăila	78	27777	280.81	Prahova	16	40798	39.22
Tulcea	5	1932	258.80	Galați	20	55080	36.31
Alba	39	16380	238.10	Teleorman	5	16079	31.10
Dolj	111	62325	178.10	Bacău	16	56104	28.52
Satu-Mare	85	47877	177.54	Giurgiu	1	4217	23.71
Sălaj	14	7909	177.01	Vaslui	4	17035	23.48
Arad	24	13589	176.61	Vrancea	3	18301	16.39
Mehedinți	32	23343	137.09	Constanța	8	50553	15.82
Călărași	5	3650	136.99	Neamț	11	72600	15.15
Argeș	98	80109	122.33	Caraș	1	13896	7.20
Buzău	36	32318	111.39	Ialomița	1	16977	5.89
Cluj	82	76796	106.78	Timiș	8	151830	5.27
Vâlcea	32	36904	86.71	Botoșani	0	216761	0.00
				Total	2508	1885931	132.98

Geographical differences show, primarily, the differences between the types of production, but also the aggressiveness of risk factors which, frequently exceed the limit values. We can't deny, though, that the concern of occupational physicians for tracking and reporting occupational diseases induced an increase in the number of cases in those counties.



Graph 2 Counties with highest incidence of occupational morbidity

Analyzing the distribution of new cases by occupation (graph 3), we notice that the leaders, with the highest number of reported occupational diseases are: locksmiths (263 new cases), miners (199 new cases), founders (158 new cases), casters (143 new cases), welders (128 new cases), nurses (108 new cases), carpenters (106 new cases) and mechanics (89 new cases).



Graph 3 New cases of occupational diseases by occupation in 2002

Details regarding the content and significance of the study

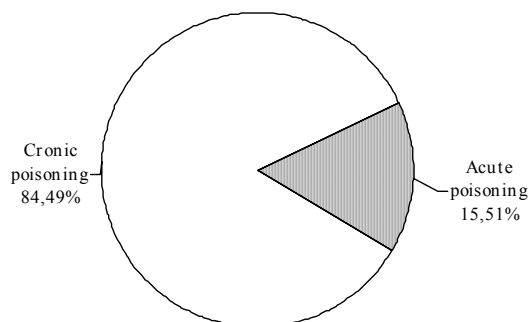
- Which is Romania's status from Europe's actions to point out these risks stand?
- How big is the impact upon exposed employees?
- What's the ratio of these diseases in the general morbidity?
- These are questions that the study answers through registered data.

Occupational poisoning

Occupational poisoning occupy the second place in the structure of causes of new cases of occupational diseases in Romania. In 2002 there have been reported 432 new cases of occupational, representing 17.22 percent out of the total number of occupational diseases in Romania.

Table 4 The evolution of the number of new cases of occupational poisoning in the period 1991-2002

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
No. cases	405	419	362	372	355	392	338	285	184	288	432



Graph 4 Distribution of poisoning cases by clinical aspects in 2002

Table 5 Distribution of poisoning cases by agents

Agent	No. cases
Lead	324
Chromium	32
Carbon monoxide	29
Organic solvents	16
Metals (arsenic, zinc, manganese)	10
Benzene and compounds	8
Carbon tetrachloride	4
Perchlorethylene	3
Irritant gases and vapors	3
Cyanide compounds	1
Hydrogen sulfide	1
Carbon disulfide	1

In 2002 we registered 324 lead poisonings, mean period of exposure for the registered cases being 13.71 years.

Organic solvents

These are substances that, from structural point of view, belong to different classes of chemicals, but which, in total have some common characteristics, especially chemical, that justify their distribution in the same frame. These substances are volatile liquids issuing vapors at normal temperature, which pervading the organism, especially by respiratory routes, with toxic effects upon organism.

Due to this exposure, in 2002 we registered 31 cases of chronic poisoning with organic solvents and 8 new cases of chronic poisoning with benzene and compounds.

Carbon monoxide

There are many industrial sources of carbon monoxide, including all the operations resulting in incomplete combustion (for the purpose of obtaining heat or energy) or powerful heating, materials containing carbon (coal, wood, natural gases, fuel oil, gas or any other organic substance).

Regarding combustion, the risk arises when the combustion is incomplete, due to insufficient oxygen intake.

In 2002 we registered 26 new cases of acute poisoning and 3 cases of chronic or subacute poisoning with carbon monoxide.

Chromium

Occupational exposure is the main source of chromium contamination. Chromium and its compounds can be found in the working area as follows: chromate, dichromate and pigments manufacture, kip tanning, metal covering, production of refractory materials.

Better known are the clinical aspects and pathological changes due to chromium VI. Effects on skin and mucous membranes, pulmonary and gastrointestinal systems, oncogenic and mutagenic effects are the most important changes induced by chromium ions in the organism.

Occupational diseases induced by the exposure to chromium (47 cases) are 1.87 percent out of total number of occupational diseases in Romania in 2001, with an incidence of 1942.95 for 100,000 exposed employees.

Occupational diseases induced by vegetal dust and fibers

Occupational bronchial asthma

The clinical studies confirm that bronchial asthma is reported more frequently in work places with exposure to dust, fumes and vapors.

The total number of occupational bronchial asthma, in 2002 in Romania shows a slight increase compared to previous years.

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
No. cases	199	170	259	252	250	265	199	118	120	144	197

Most frequent cases have been caused by repeated exposure to agents such as:

Group of agents	Type of agent	No. cases
Irritant fumes and vapors	Fluoride and compounds	98
	Mixture of different irritant fumes and vapors	20
	Mineral oil and cooling liquid	11
	Welding fumes	5
	Formaldehyde	2
	Resins	2
	Fungi, moulds	1
Irritant and allergenic organic dust	Iodophors, antibiotics, disinfectants	1
	Flour	23
	Wood dust	3
	Feathers, dust, animal hair	3
	Tobacco	2
Starch	1	

Group of agents	Type of agent	No. cases
	Fungi	1
Textile dust	Textile dust – mixture	8
	Wool	1
Other types of dust	Cement, lime, gypsum, limestone	3
	Drugs	1
	Unspecified dust, mineral wool	1
Organic solvents	Organic solvents	4
Cyanide compounds	Polyurethane	1
Chromium	Chromium	4
Nitro- and amino-compounds of aromatic hydrocarbons	Asphalt mixture	1

Allergic rhinitis

Allergic rhinitis is a form of debut of the bronchial asthma. In 2002 there have been 16 new cases of allergic rhinitis (0.64% out of total number of cases of occupational diseases), which is a low number compared to the real one.

Occupational skin diseases

Under occupational circumstances, the skin is the most exposed organ to different physical, chemical and biological agents in the work place, resulting in a high frequency of occupational skin diseases compared to other diseases induced by the same agents.

Occupational dermatitis are induced by direct, repeated, daily exposures to different substances that come in contact with the organism at the work place.

The occupational nature of the disease is established not only by proofing the occupational circumstances that induced the disease and the causing agent, but also by the clinical-evolutive features of the disease. Thus, the correct diagnosis is the result of the cooperation between the occupational physician and dermatologist and the enquiry of the work place offers objective elements of occupational exposure to the responsible agent/agents.

In the general picture of occupational diseases in Romania, skin diseases have a 2.47 percent out of total number of diseases, thus maintaining on the same decreasing tendency as in the last years, compared to the beginning of the 90's.

Table 6 The annual distribution of new cases of occupational skin diseases

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
No. cases	74	78	143	172	147	89	64	36	48	45	62

There is a great variety in the etiologic agents inducing ortoergic and allergic occupational skin diseases. The occurrence, in 2002, of a number of 62 cases of occupational dermatitis induced by agents such as: oils, chromium, dichromate, antibiotics lead to useful conclusions in improving the practice of occupational health.

The onset of the disease, clinical findings, the evolution of skin injuries after the interruption of exposure, are of major importance in establishing the occupational nature of the disease and in confirming the ortoergic or allergic nature of the dermatitis.

Infectious occupational diseases

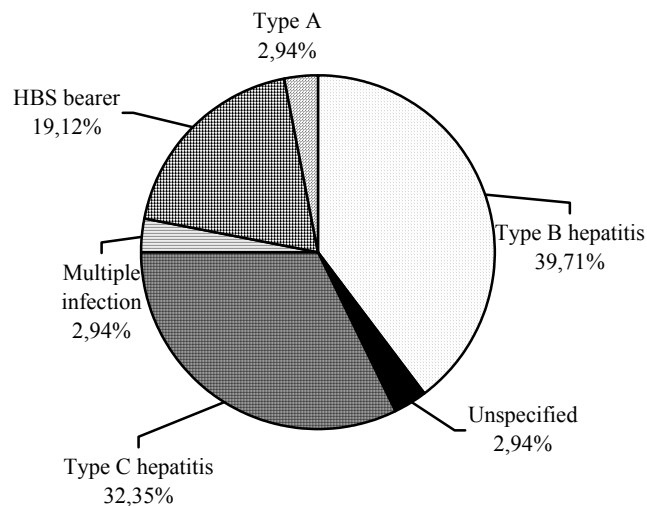
These are those infectious diseases occurring in exposed persons coming in contact with different sources of infection, mostly in medical personnel attending infectious patients.

In 2002 have been recorded 214 cases of infectious diseases with an incidence of 296.99/100,000 exposed, in amazing increase (!) compared to previous years, due to the special concern of occupational diseases in reporting the new cases.

Acute viral hepatitis

The infestation with hepatic viruses appears discontinuous, endemic-epidemic, even epidemic sometimes, especially among the persons who received blood or blood derivatives, as well as in medical personnel coming in contact with blood or blood products from patients.

In our country, in 2002 have been reported 68 new cases of viral hepatitis in medical personnel, in this area also being reported 38,334 exposed employees (incidence by activity being, thus, 177.38/100,000 exposed).



Occupational leptospirosis

Leptospirosis belongs to the zoonosis category. The most frequent exposure occurs in persons working in flooded and swamped areas, in rice paddies etc., where leptospira has a greater ability to live (peasants, miners), as well as in workers that come in contact with sick animals (zoo technicians, vets, workers in slaughterhouses, caretakers of lab animals). Men are more frequently affected because of the working conditions (80% of the cases).

The favorite season of the disease, in temperate areas is summer-autumn. Rainy season and flooding accommodate the spreading of the leptospira.

In 2002 have been reported 9 new cases of occupational leptospirosis.

Occupational tuberculosis

In the infectious environment from hospitals and sanatoriums, occupations such as physician, coroner, lab worker, nurse etc., come in contact with the patient are exposed to the risk of occupational tuberculosis.

Epidemiological studies have shown that medical personnel in tuberculous environment have a two-three folded risk of falling sick with tuberculosis than the population mean.

Results and conclusions

The study of occupational morbidity in Romania shows some general as well as specific features leading to the following conclusions:

1. The accurate identification of occupational risks and their surveillance at work place represent the main area of activity for occupational physicians.
2. The occupational physician is the employers' counselor in health issues, member of the occupational health and safety committee, with the duty to point out and communicate occupational risks, in order to undertake forward technical-organizational and medical remedies.
3. The occupational physician plays also a role in occupational rehabilitation and reinstatement of workers accounted with occupational diseases or chronic diseases under active surveillance and also in restoring patients' working capacity.

Ranking the number of occupational diseases induced by these dangerous agents falling under the theme of European Week for Occupational Safety and Health in 2003 we ascertain that on top three there are: diseases due to exposure to biological agents (212 cases), bronchial asthma (197 cases) and skin diseases (64 cases).

National morbidity data show a high interest of occupational physicians to report diseases induced by the exposure to biological agents, and also the fact that in Romania, as well as in Europe, medical sector is one of the most dangerous sectors with respect to occupational diseases.