

SICKNESS ABSENCE IN A RUBBER PLANT IN POLAND*

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Abstract. The disease-related temporary incapacity for work, its causes and duration are essential factors in the assessment of health status of the occupationally active population. The aim of the present study was to investigate the main causes of work disability among the rubber industry workers, with special regard to sickness absence among workers directly engaged in manufacture. The study was performed in 1995 on a sample of 973 workers (456 males and 517 females) at a plant producing rubber footwear. The number of days of work disability from a particular disease, frequency and duration per year were examined. The analysis concerned such parameters of sickness absence as the lost time rate, average duration of absence, and percentage of workers on a sick-leave. The results revealed that during the period under study the main medical causes of the sickness absence included: a) for males – cardiovascular diseases (48% of the total sickness absence), respiratory diseases (18%), gastrointestinal diseases (8%) and the nervous system and sense organs diseases (8%); b) for females – cardiovascular diseases (24%), respiratory diseases (16%), pregnancy, childbirth and puerperium complications (11%) and neoplasms (10%). The sickness absence of workers directly involved in the manufacture appeared to be by 72% higher than that noted for workers of other departments, with the age- and gender-standardized lost time rate of 4.74. The differences can be related mainly to a higher percentage of the sick in the group of 'production workers' (43%) as compared to the 'non-production' ones (28%). The findings of our study indicate that in the rubber industry workers a high rate of absence due to some groups of diseases may be associated with exposure to hazardous agents in their work environment.

INTRODUCTION

The data on the disease-related temporary incapacity for work, its causes and duration, are a major source of information about the health status of the occupationally active population. Permanent disability, whose dynamics in Poland has been on the increase, is almost always preceded by prolonged temporary incapacity for work. This tendency brings about numerous consequences, both in social and economic terms.

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As evidenced by the research conducted so far, the temporary work disability from sickness is determined by several factors which may either have a direct impact on its level, cause and dynamics, or may influence them indirectly through general changes in the health state of the population (1,11,12). Among the most essential non-medical factors responsible for the sickness absence in a given country are the economic conditions (eg, the level of unemployment), social insurance, and the work disability certification system (2,8,9). The ongoing social economic transformations which began in Poland in 1990, may have contributed to the present rate of the sickness absence (4,5). Particularly, the enactment of new regulations in 1995, concerning sickness benefits, might have had an impact on the patterns of morbidity and, consequently, on the sickness absence at the workplace level (3).

The rubber industry is a typical example of working conditions which are particularly strenuous (6). There are two basic characteristics of this industry: the wide use of a large number of existing chemicals, and the generation of new ones with chemical structures and properties not yet fully recognised. The aim of the present study was to investigate the main causes of work disability among the rubber industry workers, with special regard to the sickness absence among workers of the manufacture department.

MATERIALS AND METHODS

The subjects of the study were rubber plant workers employed in the footwear manufacture. The population examined comprised 456 males and 517 females. Among male subjects 49% were directly engaged in the manufacture while in females the respective value was 68%. This population was observed for the number of cases of sickness absence, medical causes, rate and duration of absence throughout 1995. The data on sickness absence were elicited from sick-leave certificates and workers' personal files. The analysis of the age distribution revealed a high percentage (58%) of females aged 40–49 years and a relatively high proportion of males in the age group above 50 (Table 1).

Table 1. Population examined by age and gender

Age group	Men		Women		Total	
	n	%	n	%	n	%
– 29	65	14.2	54	10.4	119	12.2
30 – 39	129	28.3	113	21.9	242	24.9
40 – 49	175	38.4	300	58.0	475	48.8
50 –	87	19.1	50	9.7	137	14.1
Total	456	100.0	517	100.0	973	100.0

The analysis of temporary work disability was based on the lost time rate* standardized by age, number of days of absence due to particular groups of diseases,

*lost time rate =
$$\frac{\text{number of days of incapacity for work}}{\text{average number of employees} \cdot 365} \cdot 100\%.$$



average duration of a spell of absence* and the percentage of the sick. For standardization, the average lost time rate in the national economy for 1995 was used. The sickness absence in the examined and general population was compared using the lost time rate standardized by age.

RESULTS

In the analysis of sickness absence the following parameters were considered: non-standardized lost time rate, percentage of the sick, average duration of spell, average duration of work disability per 1 sick person, and lost time rate standardized by age and gender. Moreover, the sickness absence was also examined for the contribution of the absence due to particular diseases to the level of total absence.

In the rubber factory under study the sickness lost time rate was found to be 4.41. The main causes of absence included:

- cardiovascular diseases (33.6%),
- respiratory diseases (17.2%),
- gastrointestinal diseases (9.1%),
- nervous system and sense organs diseases (8.6%).

The level of absence due to cardiovascular diseases resulted both from a high percentage of the sick (8.9%) and the average duration of spell (42 days). As for the respiratory diseases, the percentage of sick workers was 17.3%, and the average duration of spell 10.5 days. Considering the gastrointestinal and nervous system diseases, we found a lower percentage of the sick by 5% in each group but the average spell duration was relatively long, 20 days a year.

Male sickness absence, with the lost time rate of 3.63, was about 29% lower than the female one. In males the absence was mainly due to cardiovascular diseases, recorded in 10.3% of the population and accounted for 48% of the total absence. This high percentage derives from the long duration of absence spells, 45.5 days and the average duration of 62 days of work disability per 1 sick person. The second among major causes of male absence were respiratory diseases, found in 14.7% workers and accounting for 18% of the total absence (Tables 2 and 4).

The analysis of absence by age groups (Fig. 1) indicated that in males under 39 years of age the primary cause of work disability were respiratory diseases, 37% of the total absence in the age group below 29 years, and 29 in the 30–39 age group. In males below 29 years the second-rank cause of absence were the nervous system diseases, 31% of the total sickness absence. For workers aged 30 years or more the cardiovascular diseases became the second main cause for which the highest absence, with the ratio of 2.73, applied to the 40–49 age group and reached 72% of the total absence in this group age. The average number of days of absence per 1 male worker from this age group amounted to 73 days yearly.

* A spell of sickness absence is a continuous period of work disability from a given disease, irrespective of the number of sickness certificates issued in connection with this particular disease.

Table 2. Percentage of the sick and average spell duration by medical causes

Medical causes of absence	Male		Female	
	Percentage of the sick (%)	Average duration of spell (days)	Percentage of the sick (%)	Average duration of spell (days)
Infectious and parasitic diseases	0.7	12.0	0.6	18.3
Neoplasms	0.4	20.4	2.1	79.0
Endocrine, nutritional and metabolic diseases, and immunity disorders	0.7	92.0	1.0	44.3
Diseases of the blood and blood-forming organs	0.2	59.0	0.6	37.0
Mental disorders	1.3	9.5	2.1	13.2
Diseases of the nervous system and sense organs	3.9	20.0	6.2	24.2
Diseases of the circulatory system	10.3	45.5	7.7	38.2
Diseases of the respiratory system	14.7	10.7	19.5	10.4
Diseases of the digestive system	5.3	14.7	4.6	27.6
Diseases of the genitourinary system	2.2	15.1	6.0	14.5
Complications of pregnancy, childbirth, and the puerperium	—	—	2.1	42.2
Diseases of the skin and subcutaneous tissue	1.1	13.8	0.8	14.8
Diseases of the musculoskeletal system and connective tissue	2.0	24.5	3.7	26.1
Other diseases	0.0	0.0	0.4	16.0
All diseases	32.0	22.1	41.8	23.3

As regards female workers, the lost time rate approximated 5.09 and the percentage of the sick reached 41.8%. The main causes of absence included: cardiovascular diseases (24%), respiratory diseases (16%) and pregnancy, childbirth and puerperium complications (11%). Although only 7.7% of women workers accounted for the absence due to cardiovascular diseases, the case duration was rather long, 38.3 days and the average number of days of absence per 1 worker was as high as 58.4 days. The respiratory diseases were the cause of absence in 19.5% of workers, with the average spell duration of 10.4 days. Long-term absence, of as many as 96 days per worker could be noted in pregnancy complications; however, the percentage of the sick was rather low, 2.1% (Table 2).

The analysis by age revealed that in women workers below 39 years of age, the primary cause of absence were pregnancy complications (62% of the total absence in the age group below 29 years and 16% in the 30–39 age group). These were followed by respiratory and gastrointestinal diseases. In women aged 40 years or more, cardiovascular diseases were the main cause of absence, constituting 29% of the total absence in the 40–49 age group, and 46% in the age group above 50 years. It should be stressed that in the latter group the musculoskeletal diseases became one of the major causes of absence. They made 13% of the total absence for this age group (Fig. 1).



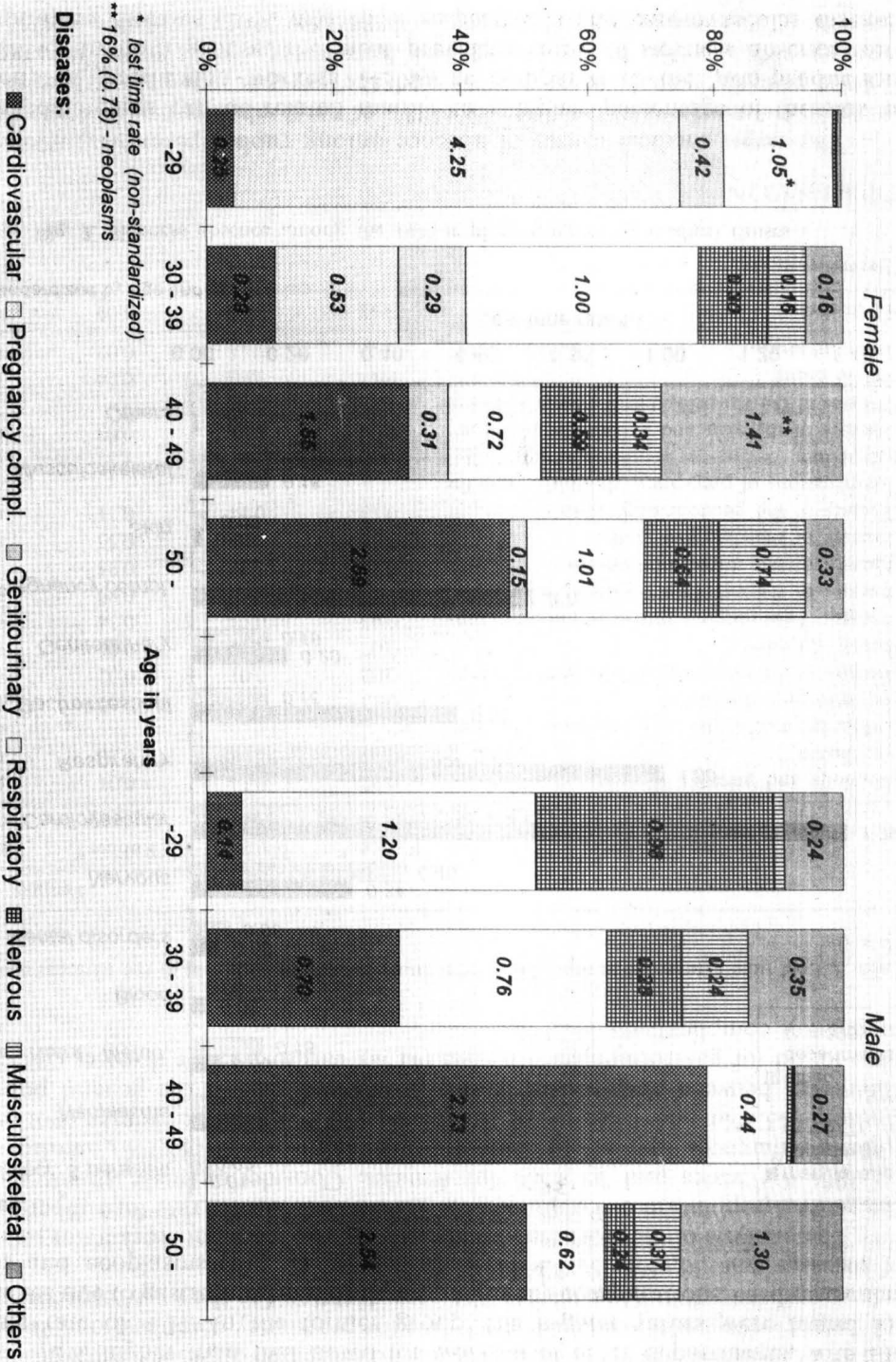
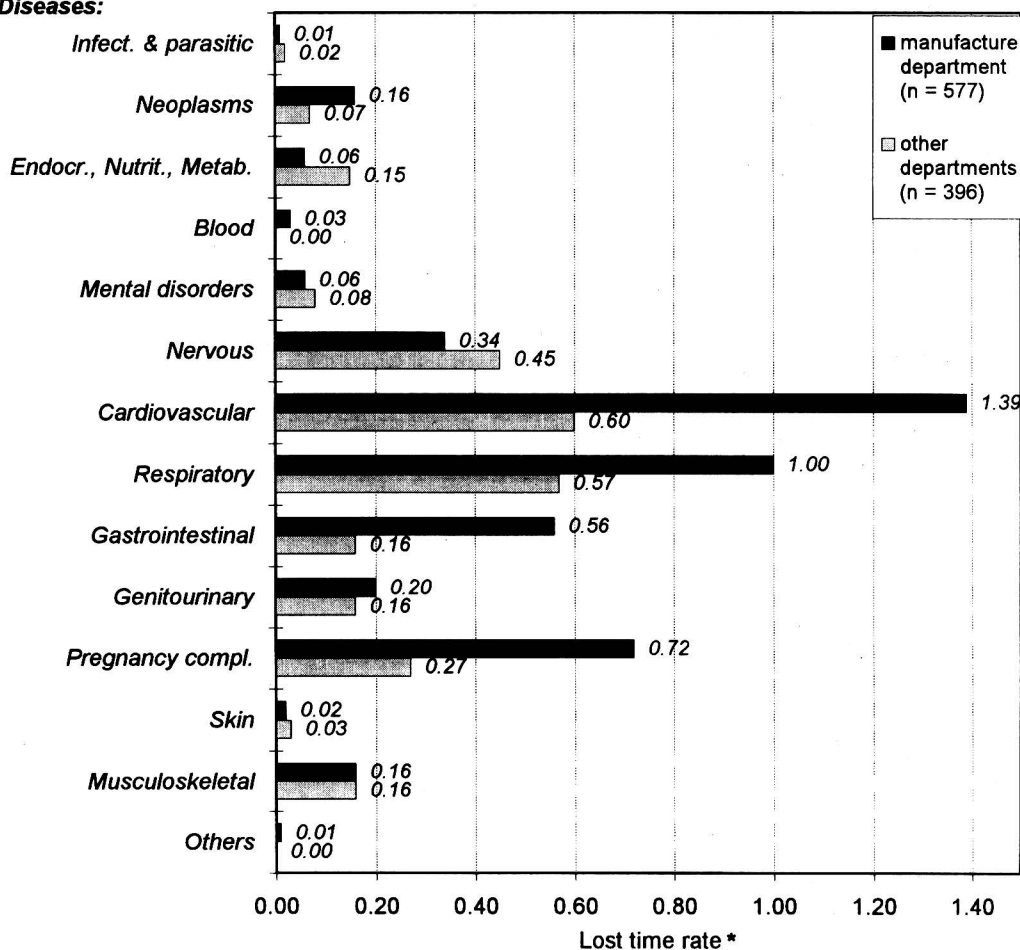


Fig. 1. Main causes of sickness absence among the rubber plant workers by age.

The sickness absence of workers directly involved in the manufacture appeared to be by 72% higher than that noted for workers of other departments, with the lost time rate of 4.74. In the former group, the highest values were found for the absence due to gastrointestinal diseases, pregnancy complications, cardiovascular diseases and neoplasms (Fig. 2).

Diseases:



* standardized by age and gender

Fig. 2. Sickness absence among the rubber plant workers by medical causes.

The differences can be related mainly to a higher percentage of the sick in the group of 'production workers' (43%), as compared to the 'non-production' ones (28%). In both groups, the most prevalent cause of sickness absence were the respiratory diseases (20% and 13%, respectively) and cardiovascular diseases (11% and 6%).



The average spell duration was found to be longer in the production workers and amounted to 44 days for cardiovascular diseases, 63 days for neoplasms, 50 days for endocrinological disorders and 45 days for pregnancy complications. In workers from non-production departments, the case duration for the four respective groups of diseases was 38, 59, 19, 32 days.

The analysis of the sickness absence among rubber plant workers in relation to the general population of Poland (Table 3), revealed a lower rate for rubber workers, by 39% for males and by 15% for females. Considering male absenteeism, the highest differences applied to endocrinological disorders (85.7%), cardiovascular diseases (43.7%) and diseases of the blood (100%). As for women workers, the differences between absenteeism in this group and that in the general population were found for gastrointestinal diseases (41%), cardiovascular diseases (20.3%) and pregnancy complications (63.1%).

Table 3. Lost time rate in the rubber plant under study compared with that in the national economy in Poland

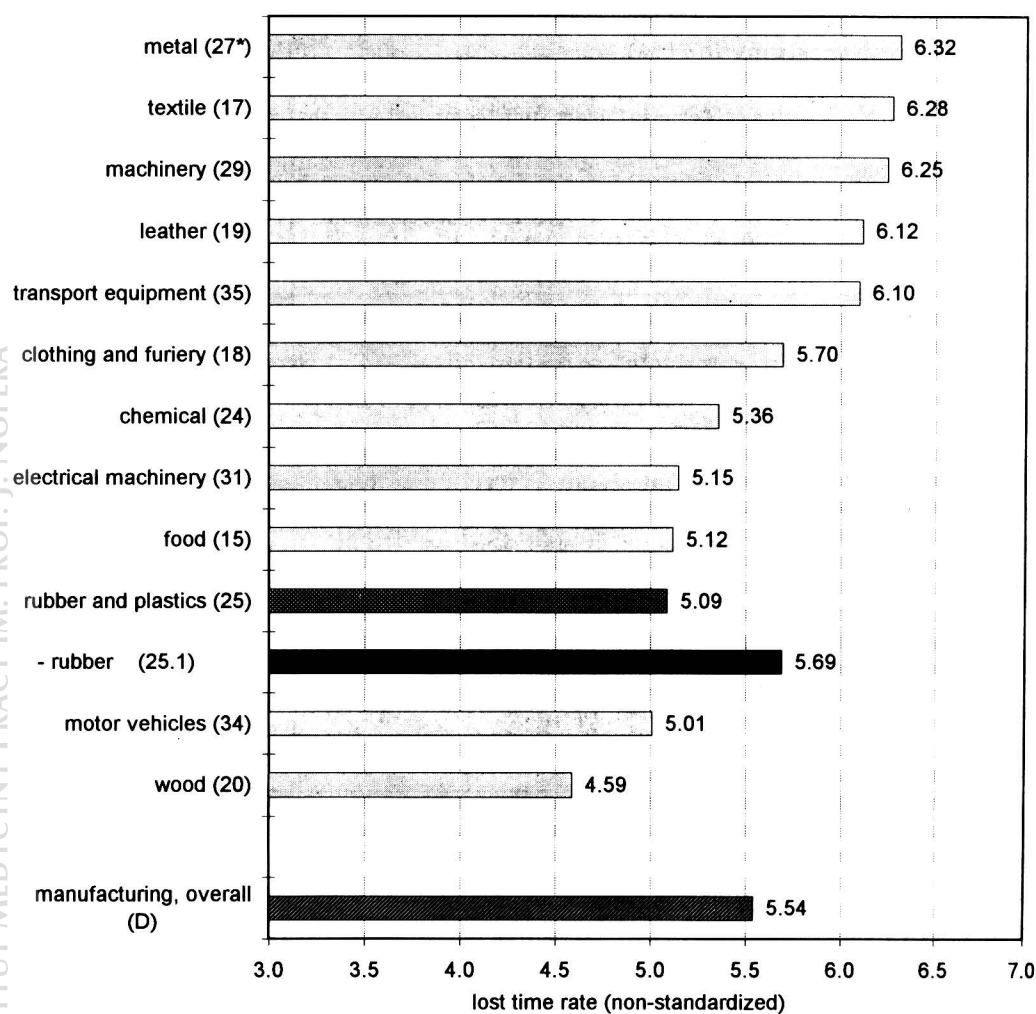
Causes of absence	Male		Female	
	Rubber* plant	National economy	Rubber* plant	National economy
Infectious and parasitic diseases	0.02	0.11	0.01	0.06
Neoplasms	0.05	0.08	0.20	0.21
Endocrine, nutritional and metabolic diseases, and immunity disorders	0.13	0.07	0.09	0.14
Diseases of the blood and blood-forming organs	0.02	0.01	0.02	0.03
Mental disorders	0.07	0.19	0.06	0.26
Diseases of the nervous system and sense organs	0.43	0.94	0.34	0.65
Diseases of the circulatory system	1.25	0.87	0.89	0.74
Diseases of the respiratory system	0.80	1.21	0.95	1.04
Diseases of the digestive system	0.35	0.65	0.55	0.39
Diseases of the genitourinary system	0.13	0.14	0.31	0.49
Complications of pregnancy, childbirth, and the puerperium	—	—	1.37	0.84
Diseases of the skin and subcutaneous tissue	0.04	0.18	0.03	0.12
Diseases of the musculoskeletal system and con- nective tissue	0.16	1.03	0.24	0.89
Other diseases	0.00	0.18	0.02	0.14
All diseases	3.44	5.66	5.09	6.00

*standardized by age

DISCUSSION

The major medical causes of absence among rubber plant workers included: in males — cardiovascular diseases (48% of total absence); respiratory diseases (18%); gastrointestinal diseases (8%) and the nervous system and sense organs diseases (8%); while in females — cardiovascular diseases (24%); respiratory diseases (17%); pregnancy, childbirth and puerperium complications (11%); and neoplasms (10%).

The highest lost time rate was noted among workers directly involved in the manufacture, by about 72% higher than in the group employed at other departments. The largest differences between the two groups were found with respect to gastrointestinal diseases (250%); pregnancy complications (167%); cardiovascular (132%) and respiratory (75%) diseases; and neoplasms (29%). In the population examined, the highest lost time rate, compared to that in the national economy, was relevant to the absence due to the following groups of diseases: cardiovascular (rate higher by 43.7% in males and by 20.3% in females); endocrinological (higher by 85.7% in males); of the blood (higher by 100% in males); gastrointestinal (higher by 41% in females) and pregnancy complications (higher by 63.1%).



* Number in the Statistical Classification of Economic Activities in the European Community - NACE Rev.1

Fig. 3. Sickness absence in 1995 by selected industries.

Table 4. Structure of sickness absence for 1995 in the rubber plant under study, Polish rubber industry and overall national economy

Causes of absence	Male			Female		
	Rubber plant	Manu- facture of rubber products	National economy	Rubber plant	Manu- facture of rubber products	National economy
Infectious and parasitic diseases	0.5	1.6	1.9	0.6	0.7	1.0
Neoplasms	1.7	1.2	1.4	9.8	3.2	3.5
Endocrine, nutritional and metabolic diseases, and immunity disorders	4.7	1.4	1.2	3.1	2.5	2.3
Diseases of the blood and blood-forming organs	1.1	0.2	0.2	1.2	0.7	0.5
Mental disorders	1.4	3.2	3.3	1.6	4.4	4.3
Diseases of the nervous system and sense organs	7.7	17.8	16.6	9.4	12.6	10.8
Diseases of the circulatory system	47.9	14.9	15.4	24.4	11.1	12.4
Diseases of the respiratory system	18.2	24.8	21.4	16.7	20.9	17.4
Diseases of the digestive system	8.3	9.7	11.5	9.4	6.7	6.5
Diseases of the genitourinary system	3.3	3.4	2.5	5.9	7.9	8.2
Complications of pregnancy, childbirth, and the puerperium	—	—	—	11.0	11.2	14.0
Diseases of the skin and subcutaneous tissue	1.1	4.3	3.2	0.6	2.5	2.0
Diseases of the musculoskeletal system and connective tissue	4.1	14.5	18.2	5.9	12.7	14.8
Other diseases	0.0	3.0	3.2	0.4	2.9	2.3
All diseases — lost time rate (non-standardized) = 100%	3.63	4.96	5.66	5.09	6.85	6.00

The data on sickness absence among the rubber plant workers can serve only as general indicators of the health effects of exposure to occupational hazards in this industry. They reflect specific health problems of employees of that particular plant and cannot be referred to the whole population of the rubber industry workers in Poland (over 23,000) as there are no data on their age structure available that would allow standardization of results. One can only compare the non-standardized lost time rate for this plant with respective values for the rubber industry and the overall national economy (Fig. 3). The structure of sickness absence (Table 4) indicates that in the rubber plant under study the medical causes of absence differed considerably from those determined for Polish rubber industry and the national economy. Although, occupational exposure in rubber plants has been the subject of research in several other countries, their findings are incomparable for they were obtained from mortality studies; we have not found any reports on sickness absence in the industry in question.

To sum up the results of the study, one should stress a high level of sickness absence in this plant due to cardiovascular diseases (7) and gastrointestinal diseases as well as to endocrinological and metabolic disorders. The explanation should

not be derived only from the influence of some systemic non-medical factors, as they cannot be expected to affect the sickness absence in a given plant to a higher extent than in the whole national economy. The comparison of the lost time rate in the rubber plant under study with that for the overall national economy, indicates that the factors which determine the level of absence due to pathologies specified above, may be the health hazards related to the working conditions in that particular rubber plant. This has been confirmed by the different rates of sickness absence in the group of production and non-production workers*.

The results of the analysis of work disability among the rubber industry workers are consistent with those of the cohort mortality study for this plant which revealed higher mortality rate from malignant neoplasms, cardiovascular diseases, gastrointestinal diseases, endocrinological and metabolic disorders (10). Therefore, the analysis of the sickness absence in the workplace seems to be valuable also for designing proper preventive interventions concerning working conditions of work in a given plant.

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*Detailed identification of occupational hazards at particular workposts is impossible due to combined exposure to a variety of harmful agents.

