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Work-related diseases and health-related compensation claims, Northeastern Brazil, 2000

ABSTRACT

OBJECTIVE: To estimate the contribution of work-related diseases to sick leaves due to general and occupational health problems.

METHODS: Sociodemographic, occupational and health data from 29,658 records of temporary disability benefits, granted on account of health problems by the Instituto Nacional do Seguro Social (National Institute of Social Security) in the state of Bahia (Northeastern Brazil), were analyzed. All constant ICD-10 clinical diagnoses were taken into consideration, except for those referring to external causes and factors that influence contact with health services. The link between diagnosis and occupation was based on the ICD-10 code and whether the type of compensation was due to a "work-related accident/disease" or not.

RESULTS: From all the benefits, 3.1% were granted due to work-related diseases: 70% were musculoskeletal system and connective tissue diseases, while 14.5% were related to the nervous system. In general, benefits granted at more than two times the expected frequency were as follows: tenosynovitis in the manufacturing sector (Proportion Ratio-PR=2.70), carpal tunnel syndrome in the financial intermediation sector (PR=2.43), and lumbar disc degeneration in the transportation, postal service and telecommunications sectors (PR=2.17). However, no causal connection could be established for these diseases, in these activity sectors, in a significant percentage of benefits.

CONCLUSIONS: Results suggest the existence of possible occupational risk factors for diseases in these fields of activity, as well as the underreporting of the link between diseases and work, thus disguising the responsibility of companies and the perspective of prevention through work reorganization.

DESCRIPTORS: Occupational Diseases. Causality. Diseases Registries. Insurance Benefits. Social Security. Occupational Health.

INTRODUCTION

Despite the fact that work-related diseases (WRD) are recognizably avoidable, they are responsible for most of workers' morbidity and, may cause disability and even death.[8] In Brazil, WRD claims have increased from 5,025 in 1988 to 30,334 in 2005, among workers under the *Regime Geral da Previdência Social* (Social Security General System),[a] resulting in an increment of occupational

[a] Ministério da Previdência Social. Anuário Estatístico da Previdência Social. Suplemento Histórico, 2005. Available from http://www.mpas.gov.br/docs/pdf/suphist2005.pdf [cited 2006 Sep 1]

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Received: 7/13/2007
Reviewed: 2/11/2008
Approved: 3/19/2008

benefits for lost wage compensation. On the other hand, there has been a decreasing tendency for the occurrence of these diseases in developed countries. In the United States, the 2002 Bureau of Labor Statistics[a] registered 294,500 WRD claims, a number that dropped to 242,500 in 2005.[b] In Ontario, Canada, the estimated WRD rates, based on benefit payments, decreased by approximately 50% in the last decade.[10]

The causes suggested for the decrease in WRDs are many, from underreporting[9] to macro-economic factors, such as demographic changes in the workers' population and in the employment distribution among economic trades.[10] Another determinant factor could be the primary prevention in the workplace. Controversies over explanations for these changes in the occupational morbidity profile have been observed worldwide and sparked debates about the required changes in the approach towards workers' healthcare and prevention.

Overall, information on the WRD magnitude and the establishment of diagnoses come from governmental institutions. In developed countries, despite restrictions, the most frequently used sources to learn about WRDs are the Workers' Compensation Insurance data, a specific type of insurance to compensate workers' lost wages when affected by work-related diseases/accidents. Driscoll et al[5] mention that one of the advantages of these databases is the existence of standard systems to confirm cases and register information. On the other hand, they have important limitations: they only include employees; they may exclude trades such as the armed forces and agriculture workers, who are usually self-employed; and also WRD underreporting, due to the difficulty to establish an occupational causal connection.

In Brazil, workers under the *Regime Geral da Previdência Social* who may be granted WRD benefits are employed workers, self-employed professionals, and special insurance holders. The specialized medical doctors from the *Instituto Nacional do Seguro Social* – INSS (National Institute of Social Security), a governmental institution linked to the Ministry of Social Security, are the ones responsible for establishing a causal connection between diseases and work. Among employed workers, this only happens in case of harmful situations involving sick leaves longer than 15 days, when the INSS pays for those unable to work. The establishment of a causal connection is based on the expert's clinical and epidemiological knowledge, according to a WRD list prepared by the Ministry of Social Security. Until March of 2007, the *INSS* required that a *Comunicação de Acidente de Trabalho* (CAT – Work-related accident communication) was issued to characterize a work-related disease. However, beginning in April of 2007, the causal connection is also established based on the *Nexo Técnico Epidemiológico* (Epidemiological-Technical Connection), which means, an excess of risk related to the workers' industrial trade, regardless of the CAT[c] being issued.

To be aware of the contribution of WRDs to the sum of leaves due to general and occupational health problems, as well as their distribution among the several economic trades and respective, most frequent diagnoses, may subsidize decisions aimed towards the adoption of preventive measures. Moreover, this will help to promote public debate over the impact of these health problems on social insurance.

The objective of the present study was to estimate the proportion of temporary disability compensation claims on account of work-related diseases.

METHODS

This is a cross-sectional study that used records of benefits granted by the INSS due to general and work-related health problems which led to temporary disability, in the state of Bahia, in 2000. These records were obtained from the INSS' *Sistema Único de Benefícios* (SUB – Unified System of Benefits). A total of 29,663 benefits were granted on account of temporary occupational disability in this state. Of these, five were excluded from the analysis as they did not include the clinical diagnosis. The total number of benefits studied was 29,658.

The benefits granted due to work-related accidents and diseases are coded as B91 by the INSS; whereas those due to health problems that are not related to work are coded as B31. The total study population involved all insured workers in the period who were eligible to receive these two types of benefits. They were, thus, under the *Regime Geral da Previdência Social*, from which domestic workers, individual contributors (self-employed professionals), civil servants and non-contributing workers are excluded. The study observation units were all paid B91 and B31 benefit records, except for the clinical diagnoses corresponding to chapter XV of the ICD-10 (pregnancy, childbirth and puerperium).

[a] Bureau of Labor Statistics. Washington: United States Department of Labor; 2003. Workplace injuries and illness in 2002. Available from: http://www.bls.gov/iif/oshwc/osh/os/osnr0018.pdf [cited 2007 May 9]

[b] Bureau of Labor Statistics. Washington: United States Department of Labor, 2006. Workplace injuries and illness in 2005. Available from: http://www.bls.gov/iif/oshwc/osh/os/osnr0025.pdf [cited 2007 May 9]

[c] Decreto n° 6.042, de 12 de fevereiro de 2007. Altera o Regulamento da Previdência Social, aprovado pelo Decreto no 3.048, de 6 de maio de 1999, disciplina a aplicação, acompanhamento e avaliação do Fator Acidentário de Prevenção - FAP e do Nexo Técnico Epidemiológico, e dá outras providências. Diário Oficial da União. 12 fev 2007. Available from: http://www010.dataprev.gov.br/sislex/paginas/23/2007/6042.htm [cited 2007 May 1]

The SUB is the INSS' data registry system, processed by the DATAPREV, the Ministry of Social Security's technology and information company, where each social security event is registered, thus originating the concession of a benefit. These registers include the company's and the employee's data: company's trade, according to the *Classificação Nacional de Atividade Econômica* (CNAE – National Economic Activity Classification); health problem diagnosis, according to the 10th revision of the International Classification of Diseases (ICD-10); and data on the beginning, duration and type of benefit.

The disease variable was created (1=yes, 0=other diagnoses), defined as all the ICD-10 clinical diagnoses, except for those that characterize accidents, included in chapters XIX (injuries, poisoning, and certain other consequences of external causes) and XXI (factors influencing health status and contact with health services), which were considered as other diagnoses. Diseases were classified in accordance with ICD-10 groups. Three specific diagnoses were taken into consideration in the analysis, the carpal tunnel syndrome (G56 and G56.0), tenosynovitis (M65, M65.8, M65.9) and intervertebral disc degeneration (M51). Other variables analyzed were as follows: type of benefit, whether it was related to work (B91) or not (B31), and company's trade (according to the *CNAE*).

Proportion comparisons were performed, but statistical inference was not, as all benefits were taken into consideration, rather than a sample. To calculate the proportion ratios (PR), the sum of benefits was considered as reference. Prevalence was not estimated because denominators were the sum of benefits, instead of the population from which cases come from. The databases were provided by the Ministry of Social Security and the analysis was performed using the SAS 8.1 statistical software. There were no individual identification data about beneficiaries or companies. As the data were administrative in nature, the study protocol was not submitted to a Research Ethics Committee.

RESULTS

Of all the benefits, 17,282 (58.3%) were granted due to diseases; 6,499 (21.9%) due to injuries, poisoning and other external causes; and 5,877 (19.8%) due to factors that influenced health status and contact with health services, according to the ICD-10th Review.

Work-related diseases represented 3.1% (935) of all the temporary disability benefits granted on account of health problems in general. In terms of trade, this percentage varied from 1.2%, referring to undeclared CNAE, to 7.4% in the manufacturing trade, where the proportion of benefits per WRD was more than

Table 1. Proportion of benefits for work-related diseases in the sum of temporary disability benefits due to general and work-related health problems per trade. State of Bahia, Northeastern Brazil, 2000.

Trade*	WRD benefits** N	Benefits for general health problems N_1	WRD proportion (N/N_1) P_1(%)	CNAE PR P_1/P total	Benefits granted on account of work-related problems N_2	WRD proportion (N/N_2) P_2(%)	CNAE PR P_2/P total
Agriculture, cattle raising, silviculture, fishing, gathering activities	47	842	5.6	1.75	162	29.0	1.05
Manufacturing	158	2,132	7.4	2.31	575	27.5	0.99
Construction, electricity, gas	69	1,668	4.1	1.28	388	17.8	0.64
Retail, storage, food	72	2,658	2.7	0.84	453	15.9	0.57
Transportation, postal services, telecommunications	57	1,168	4.9	1.53	198	28.8	1.04
Financial intermediation, real estate, leases, services, public administration	264	3,662	7.2	2.25	494	53.4	1.93
Education, recreational, cultural and sport activities	44	851	5.2	1.62	120	36.7	1.30
Health and social services	24	663	3.6	1.12	88	27.3	0.98
Undeclared CNAE	200	16,014	1.2	0.37	908	22.0	0.79
Total	935	29,658	3.2	1.00	3.386	27.6	1.00

WRD: work-related diseases
PR: proportion ratio
* According to the *Classificação Nacional de Atividade Econômica* – CNAE (National Economic Activity Classification);
** Diseases with occupational causal connection established by the *Instituto Nacional do Seguro Social* – INSS (National Institute of Social Security)

double the expected rate (PR=2.31). Similarly, the trade entitled "financial intermediation, real estate, leases, services and public administration" showed 7.2% of WRDs (PR=2.25). Workers in the retail, storage and food trades showed the lowest percentages of WRDs (2.7%), among the benefits related to health problems in general. A low percentage of WRDs (2.7%) was also observed among benefits with undeclared CNAE (54%, 16,014) (Table 1).

Of all the temporary disability benefits granted due to work-related accidents and diseases, the WRDs contributed with 27.6%. Only in the "financial intermediation, real estate, leases, services and public administration" trade did the WRDs comprise the majority of benefits (53.5%), a percentage almost two times greater than the total (PR=1.93). The group entitled "retail, storage and food trades" had the lowest WRD proportion (17.8%). The percentage of undeclared CNAE for benefits on account of work-related health problems was significant (26.8%) (Table 1).

Only 935 (5.4%) temporary disability benefits granted due to diseases were related to work. The ICD-10 groups that ranked high in the sum of benefits were the following: musculoskeletal system and connective tissue diseases (37.2%), diseases of the circulatory system (19.3%) and behavioral and mental disorders (10.9%). By analyzing WRD benefits exclusively, it could be observed that musculoskeletal system and connective tissue diseases (70%) ranked high, followed by diseases of the nervous system (14.5%) (Table 2).

Table 3 shows the proportion of both types of benefits, granted to people suffering from carpal tunnel syndrome, tenosynovitis, and lumbar intervertebral disc degeneration, out of the sum of benefits granted due to temporary disability, according to the industrial trades. The proportion of benefits for tenosynovitis varied from 1.2% in the "construction, electricity, and gas" activity group to 6.2% among workers from the manufacturing trade. By taking the proportion of benefits for tenosynovitis from the total number of benefits granted on account of diseases (2.3%) as reference, almost three times more benefits for tenosynovitis were given to the manufacturing trade (PR=2.70) than what was expected. Important estimates were also calculated among workers from the financial intermediation, real estate, leases, services, and public administration trades (PR=2.09); transportation, postal service, and telecommunications trade (PR=1.61); and health and social service trade (PR=1.61). Groups from the "construction, electricity and gas" and "retail, storage, and food" trades showed the smallest proportions of benefits for tenosynovitis, 1.2% and 2.2%, respectively.

Benefits for carpal tunnel syndrome represented 1.4% of those granted for diseases in general. The proportions of benefits for this syndrome, regardless of the relationship with work, were greater than those from the comparison group in the following trades: "financial intermediation, real estate, leases, services, and public administration" (PR=2.43), "health and social services" (PR=2.43), "education, and recreational, cultural and sport activities" (PR=1.86), "manufacturing trade" (PR=1.78), "retail, storage, and food" (PR=1.28), and

Table 2. Distribution of temporary disability benefits granted due to diseases, according to ICD-10 chapter and type of benefit. State of Bahia, Northeastern Brazil, 2000.

ICD-10 chapter	B31 benefit (disease not related to work)		B91 benefit (disease related to work)		Total	
	N	%	N_1	%	N_2	%
Certain infectious and parasitic diseases	1,345	8.2	1	0.1	1,346	7.8
Neoplasms	752	4.6	1	0.1	753	4.4
Diseases of the blood and blood-forming organs	75	0.5	9	1.0	84	0.5
Mental and behavioral disorders	1,865	11.4	20	2.1	1,885	10.9
Diseases of the nervous system	929	5.7	136	14.5	1,065	6.2
Diseases of the eye and adnexa	576	3.5	41	4.4	617	3.6
Diseases of the ear	115	0.7	15	1.6	130	0.8
Diseases of the circulatory system	3,337	20.4	7	0.7	3,344	19.3
Diseases of the respiratory system	517	3.2	25	2.7	542	3.1
Diseases of the digestive system	557	3.4	-	-	557	3.2
Diseases of the skin and subcutaneous tissue	369	2.3	19	2.0	388	2.3
Diseases of the musculoskeletal system and connective tissue	4,997	30.6	654	70.0	5,651	32.7
Others	913	5.6	7	0.7	920	5.3
Total	16,347	94.6	935	5.4	17,282	100.0

"transportation, postal service, and telecommunications" (PR=1.14). Only workers from the "construction, electricity and gas trades" and the "undeclared CNAE" group had smaller proportions for carpal tunnel syndrome than what was expected, 0.5 and 0.7, respectively (Table 3).

Of the three health problems assessed, benefits due to lumbar intervertebral disc degeneration had the greatest contribution: 3% of the sum of temporary disability benefits granted on account of diseases. In the "transportation, postal service, and telecommunications" trade, the proportion of benefits on account of this disorder was greater (6.5%). Other trades showed proportions that were a little above the comparison group, except for "financial intermediation, real estate, leases, services, and public administration", which had estimates of 2.4%, and "undeclared CNAE", with 2.7% (Table 3).

Table 4 shows the proportions of temporary disability benefits granted on account of carpal tunnel syndrome, tenosynovitis, and lumbar intervertebral disc degeneration, per type of benefit and trade. Only in four situations were greater proportions of work-related benefits observed, compared to those that were not related: carpal tunnel syndrome in the "financial intermediation, real estate, leases, services and public administration" group of activities (69.5%), and tenosynovitis among workers from the "manufacturing trade" (60%), "transportation, postal service, and telecommunications" (53.8%) and "financial intermediation, real estate, leases, services, and public administration" trade groups (65.8%). Even in these situations, at least one third of benefits were granted as not work-related.

DISCUSSION

The findings from the present study must be viewed with caution because of database limitations. One piece of evidence of such limitations is the great number of benefits without a record of the company's economic trade, which varied from 54% for temporary disability benefits related to health problems in general to 26.8% for those related to work. In addition, these benefits correspond to leaves from work longer than 15 days, which presume greater severity of the diseases studied. Thus, diseases that do not potentially lead to leaves from work and those involving shorter leave periods are not entitled to benefits.

Another limitation to the study was that information on possible risk factors for health was not available. Such information, which includes age, sex, time of employment and occupational background, could interfere with the CNAE registered when the benefit was granted.

Table 3. Proportion of benefits granted due to carpal tunnel syndrome, tenosynovitis and lumbar intervertebral disc degeneration, regardless of the relationship with work, among all of the temporary disability benefits granted on account of diseases and proportion ratio according to fields of activity. State of Bahia, Northeastern Brazil, 2000.

Trade*	Total B31 and B91 benefits N	Health problem								
		Tenosynovitis			Carpal tunnel syndrome			Lumbar intervertebral disc degeneration		
		N_1	P_1 %	PR CNAE/Total P_1/ Total	N_2	P_2 %	PR CNAE/Total P_2/ Total	N_3	P_3 %	PR CNAE/Total P_3/ Total
Agriculture, cattle raising, silviculture, fishing, gathering activities	409	13	3.2	1.39	3	0.7	0.50	16	3.9	1.30
Manufacturing	1,054	65	6.2	2.70	26	2.5	1.78	36	3.4	1.13
Construction, electricity, gas	853	10	1.2	0.52	4	0.5	0.36	28	3.3	1.10
Retail, storage, food	1,340	29	2.2	0.96	24	1.8	1.28	43	3.2	1.07
Transportation, postal services, telecommunications	696	26	3.7	1.61	11	1.6	1.14	45	6.5	2.17
Financial intermediation, real estate, leases, services, public administration	2,442	117	4.8	2.09	82	3.4	2.43	60	2.4	0.80
Education; recreational, cultural and sport activities	462	13	2.8	1.22	12	2.6	1.86	18	3.9	1.30
Health and social services	321	12	3.7	1.61	11	3.4	2.43	12	3.7	1.23
Undeclared CNAE	9,705	117	1.2	0.52	70	0.7	0.50	257	2.7	0.90
Total	17,282	402	2.3	1.00	243	1.4	1.00	515	3.0	1.00

* According to the *Classificação Nacional de Atividade Econômica* – CNAE (National Economic Activity Classification).

Table 4. Proportion of temporary disability benefits granted due to carpal tunnel syndrome, tenosynovitis, and lumbar intervertebral disc degeneration, according to the type of benefit and trade. State of Bahia, Northeastern Brazil, 2000.

Trade*	Health problem													
	Carpal tunnel syndrome					Tenosynovitis					Lumbar intervertebral disc degeneration			
	B31		B91		Total	B31		B91		Total	B31		B91	Total
	N	%	N_1	%	N_2	N_3	%	N_4	%	N_5	N_6	%	N_7	N_8
Agriculture, cattle raising, silviculture, fishing, gathering activities	3	100.0	-	-	3	9	69.2	4	30.8	13	14	87.5	2	12.5	16
Manufacturing	16	61.5	10	38.5	26	26	40.0	39	60.0	65	32	88.9	4	11.1	36
Construction, electricity, gas	4	100.0	-	-	4	6	60.0	4	40.0	10	25	89.3	3	10.7	28
Retail, storage, food	16	66.7	8	33.3	24	21	72.4	8	27.6	29	41	95.3	2	4.7	43
Transportation, postal services, telecommunications	6	54.5	5	45.5	11	12	46.2	14	53.8	26	38	84.4	7	15.6	45
Financial intermediation, real estate, leases, services, public administration	25	30.5	57	69.5	82	40	34.2	77	65.8	117	53	88.3	7	11.7	60
Education, recreational, cultural and sport activities	6	50.0	6	50.0	12	9	69.2	4	30.8	13	18	100.0	-	-	18
Health and social services	7	63.6	4	36.4	11	8	66.7	4	33.3	12	11	91.7	1	8.3	12
Undeclared CNAE	52	74.3	18	25.7	70	84	71.8	3333	28.2	117	251	97.7	6	2.3	257
Total	135	55.6	108	44.4	243	215	53.5	187	46.5	402	483	93.8	32	6.2	515

* According to the *Classificação Nacional de Atividade Econômica* – CNAE (National Economic Activity Classification).

Work-related diseases with an occupational causal connection recognized, according to the INSS characterization, did not stand out in the group of general health problems that resulted in leaves from work, representing 3.1% of all the health problems. However, this percentage varied according to the trade assessed. The difference between the WRD percentage of the "manufacturing trade" and "financial intermediation and others" (7%) and that of "retail" and "health and social services" (4%) is probably due to distinct occupational exposures in the workplace and the workers' level of knowledge of occupational diseases, their rights and benefits. Workers' awareness of health and safety rights is one of the factors known to determine more records of occupational health problems.[13] In the state of Bahia, the bank and (chemical, oil, metal) manufacturing trade unions are recognizably more active in the area of occupational health than others.

Work-related diseases represent less than 30% of all the temporary disability benefits granted on account of health problems related to work, as expected, once it is less difficult to establish a causal connection for typical accidents in relation to diseases. The only exception occurred in the "financial intermediation and others" trade, where the WRDs were the majority. In this field, risk factors for occupational diseases, such as ergonomic ones, are more prevalent in the workplace, compared to those that cause typical accidents.

The main causes of benefits granted due to diseases in general, regardless of their relationship with work, were musculoskeletal system and connective tissue diseases, diseases of the circulatory system, and behavioral and mental disorders. In a study performed with social security benefits in the city of Porto Alegre (Southern Brazil) restricted to the B31 code, the most common diseases were the same found in this study, except for the rank order, with diseases of the circulatory system in place of the behavioral and mental disorders.[2]

The WRDs that predominated (84.5%) were musculoskeletal system and connective tissue diseases and those in the nervous system, corresponding, in their majority, to cumulative trauma disorders or osteomuscular work-related diseases (CTD/OWRD): muscle, nerve, tendon, joint, cartilage and intervertebral disc dysfunctions. The proportion of CTD/OWRD found in this study is substantially greater than those from other locations where musculoskeletal disorders are also prevailing. In outpatient services for occupational health in the state of São Paulo, musculoskeletal system diseases represented the main cause of service (56%), followed by diseases of the nervous system and sense organs (20.8%).[15] However, the percentage of CTD/OWRD was greater than the 56% reported, if carpal tunnel syndrome is included, as this is a peripheral nervous system disease that could also be considered as CTD/OWRD. In Canada, data from the Workers'

Compensation System reveal that musculoskeletal diseases correspond to 54.4% of the WRDs leading to leaves from work.[6] In the United States, these diseases are also predominant, whether among those that generated insurance compensation benefits for work-related health problems (52.2%), or among the others that are registered in the Department of Labor by private companies (53.4%).[7] This difference in proportion of musculoskeletal diseases may be due, among other factors, to distinct classification criteria of disease groups. Moreover, underreporting of other types of WRDs must be considered in the state of Bahia, which would artificially raise the proportion of CTD/OWRD.

Ear diseases did not appear with a significant percentage among the causes that led to occupational disease benefits. However, they represented one of the main WRDs in a survey conducted by the INSS, using CAT data and not taking into consideration leaves from work.[a] Noise-induced hearing loss is the most common and severe work-related disease, whose treatment is limited. Workers who are thus diagnosed are usually sent to the INSS for medical evaluation. Thus, the CAT is issued without a leave and, as a result, does not generate a benefit, which explains the low reporting of this health problem observed in the present study.

Other health problems that are usually related to work and require leaves from work, such as certain respiratory system and skin diseases, appeared in smaller percentages, thus suggesting underreporting. It must be emphasized that there was one single record of benefit granted on account of work-related cancer. From a more conservative point of view, once occupational exposure is considered to be responsible for about 4% of all cancer cases,[4] a total of 30 benefits due to this health problem would be expected, instead of just one.

The findings from the present study suggest occupational risk factors for the three diseases analyzed separately. The assessment of tenosynovitis, carpal tunnel syndrome and lumbar intervertebral disc degeneration per field of economic activity revealed a relative excess among workers from certain activities in relation to the reference group. By employing a conservative estimate that diseases recorded in certain trades, with double the frequency observed in the sum of benefits, may be related to work, substantial underreporting of the relationship with work can be verified. Carpal tunnel syndrome and tenosynovitis are in the List of Work-Related Diseases, included in the Annex II of the *Regulamento da Previdência Social* (Social Security Regulation).[b] Even though it is not included in this list, lumbar intervertebral disc degeneration is present in an indirect way, once its symptomatology (dorsalgia, sciatica, lumbago with sciatica) is present. Thus, the health problems above mentioned were not characterized as work-related on account of legal impediment.

It is implausible to assume that these findings are restricted to the location of study, namely the state of Bahia, even if they are limited to these health problems exclusively. On the contrary, information from the Ministry of Social Security shows that in 2005, Bahia was the state with highest incidence of work-related diseases, 2.0 per 1,000 records,[c] whereas in the country it was 1.2 per 1,000 records.[d] However, as this may better reflect the register capacity and the level of implementation of occupational health practices in the country, whereas the risk of health problems would not be as well reflected, it is possible that the underreporting situation in other states could be even greater. Despite the increase in occurrence of WRDs in Brazil, underreporting of occupational health problems remains high, similarly to what has been observed in terms of typical work-related accidents due to external causes.[12] The reasons for this underreporting have already been discussed by several authors,[3,11,14] and range from the changes in the social security legislation, thus extending the period without insurance payment to 15 days, to the employer's failure to issue the CAT to avoid responsibilities, such as the employee's guarantee of stability, withdrawal from the *Fundo de Garantia por Tempo de Serviço* – FGTS (social security fund based on time of service), in addition to maintaining the company's reputation.

As regards WRDs, another factor that may increase underreporting is the controversy over causality. Unlike typical occupational accidents, whose connection with work is less subjective, it is more difficult to establish a causal connection with work when it comes to occupational diseases. Among diseases whose origin is exclusively due to work, such as asbestosis, silicosis, and mesotelioma, the difficulty to recognize the causal connection is primarily related to the very long latency period between exposure and the first disease symptoms, rather than the uncertainties about occupational causality. Currently, however, the predominant diseases in the workplace are those whose causal agent is not only work, frequently occurring in the non-working

[a] Ministério da Previdência Social. Anuário Estatístico de Acidentes de Trabalho 2005. Capítulo 57 – Brasil e Grandes Regiões. Available from: http://www.mpas.gov.br/anuarios/aeat-2005/docs/5Act57_03.xls [cited 2006 Sep 1]

[b] Decreto Nº 3.048 – De 06 de maio de 1999. Aprova o Regulamento da Previdência Social, e dá outras providências. Diário Oficial da União de 7/5/99 - Republicado em 12/05/99. Available from: http://www010.dataprev.gov.br/sislex/paginas/23/1999/3048.htm [cited 2006 Sep 1]

[c] Ministério da Previdência Social. Anuário Estatístico de Acidentes de Trabalho 2005. Capítulo 75 - Bahia. Available from: http://www.mpas.gov.br/anuarios/aeat-2005/docs/5Act75_02.xls [cited 2006 Sep 1]

[d] Ministério da Previdência Social. Anuário Estatístico de Acidentes de Trabalho 2005. Capítulo 59 - Brasil. Available from: http://www.mpas.gov.br/anuarios/aeat-2005/docs/5Act59_02.xls [cited 2006 May 1]

population as well or having non-occupational causes, such as CTD/OWRD, hearing losses, upper respiratory tract diseases, asthma, and mental disorders, among others. Thus, the causal connection for these health problems has caused conflicts to arise among companies, insurance companies, and workers all over the world. Biddle et al[1] compared compensation insurance data on work-related health problems in Michigan, United States, to occupational diseases notified by health professionals, and found that 55% of workers with these diseases did not seek insurance. Morse et al[9] observed that only 7% of work-related musculoskeletal diseases were registered in the compensation insurance records as work-related health problems in Connecticut, United States, between 1995 and 2001.

Underreporting harms workers who, by not having the disease characterized as work-related, do not have their rights recognized. On the other hand, it hinders the making of public policies to prevent occupational diseases and accidents, once there is no reliable information about these health problems available. Thus, the Ministry of Social Security's initiative to adopt the *Nexo Técnico Epidemiológico* to establish a causal connection between the health problem and work is positive. This methodology considers a health problem having higher incidence among workers of a certain trade in relation to the average morbidity of the remaining working population as the identification criterion for WRDs. The first effects of the *Nexo Técnico Epidemiológico* can already be seen when compensations due to work-related diseases or accidents are granted. In April of 2007, when the *Nexo Técnico Epidemiológico* became effective, a total of 28,594 benefits were granted all over Brazil, a number 147.8% greater than the previous month's.[a] Thus, it is expected that the making of public and private policies to prevent occupational health problems will be enhanced, based on more consistent information. Thus, studies performed after the implementation of the *Nexo Técnico Epidemiológico* could reveal the gap between what has been considered to be WRD and the actual occupational morbidity among workers covered by the *Regime Geral da Previdência Social.*

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