## 2.7 Occupational and Environmental Diseases

According to the epidemiological surveillance of occupational diseases, significant situations can be summarized as follows:

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## 2.7.1 Pesticide Poisoning

Based on the Department of Health's cholinesterase level examinations among farmers during 1992-2006, 13-31% of farmers had abnormal enzyme levels resulting from pesticide exposure. The trend is unlikely to decline and the rate of pesticide poisoning is between 2 and 6 cases per 100,000 population (Table 5.28).

 Table 5.28
 Cholinesterase test/results and morbidity/mortality due to pesticide poisoning among farmers,

 1992-2006

	Cholinesterase test <sup>(1)</sup>			Pesticide poisoning <sup>(2)</sup>		
Year	Number (persons)	Tested abnormal (cases)	Percent	Illness (cases)	Deaths (cases)	Morbidity rate per 100,000 pop.
1992	42,471	8,669	20.41	3,599	31	6.23
1993	242,820	48,500	19.97	3,299	44	5.65
1994	411,998	72,590	17.62	3,143	41	5.32
1995	460,521	78,481	17.04	3,398	21	5.71
1996	156,315	40,520	25.92	3,196	31	5.32
1997	563,354	89,926	15.96	3,297	27	5.42
1998	369,573	77,789	21.05	4,398	15	7.16
1999	360,411	48,217	13.38	4,169	31	6.78
2000	278,612	52,604	18.88	3,109	21	5.03
2001	89,945	21,758	24.19	2,652	15	4.27
2002	115,105	33,858	29.4	2,571	14	4.11
2003	NA	NA	NA	2,342	9	3.72
2004	NA	NA	NA	1,864	9	2.98
2005	84,046	26,034	31.0	1,321	0	2.12
2006	133,255	36,776	27.6	1,183	0	1.90

**Sources:** <sup>(1)</sup> Department of Health, Ministry of Public Health.

<sup>(2)</sup> Bureau of Epidemiology, Department of Disease Control, MoPH.

## 2.7.2 Occupational Diseases in the Industrial Sector

In the industrial sector, an increasing number of workers encounter occupational diseases as evidenced by the rising percentage of disbursement rate under the Workers' Compensation Fund of the Social Security Office, i.e. from 1.2% in 1974 to 4.5% in 1996. The rate, however, has dropped to 2.4% in 2006 (Table 4.20). This is because of industrial expansion in manufacture and services with inappropriate use of new technologies, lack of training for personnel to have skills in using equipment or devices, and ineffective law enforcement measures.

Besides, there have been studies showing the importance of some specific occupational diseases as follows:

1) Silicosis (stone dust pulmonary disease). According to a report from the United States, prior to 1970, more than 1,000 people died from silicosis each year, and after 1996, the number has dropped to lower than 250. In Thailand, at present an estimated 211,796 workers in 7,845 worksites are at risk for silicosis.

Based on the silicosis surveillance in the relevant population groups according to their industrial categories, conducted by of the Department of Industrial Works and the Department of Mineral Resources during 1995-1998, the prevalence of silicosis per 1,000 population at risk increased from 16.9 in 1995 to 20.7 in 1998; and it was estimated that there were 4,393 cases of silicosis in 1998. To cope with the problem, in 2000 the Ministry of Public Health signed an agreement with the Department of Mineral Resources, Ministry of Industry, and the Department of Labour Protection and Welfare, Ministry of Labour and Social Welfare, to implement a 10-year Silicosis Prevention and Control Project (2001-2010). In 2002, physical check-ups were undertaken in 3,263 workers in industries across the country, and it was found that, based on X-ray examinations, 30 workers had silicosis, an **incidence of 9.19 per 1,000 at-risk population**.

2) Byssinosis (cotton dust disease). The then Division of Occupational Health, in collaboration with Dr. Praparn Yongchaiyudh and colleagues, in 1987, conducted a study on 229 thread-spinning workers in a textile industry in Samut Prakan Province. The study found a 19.7% byssinosis prevalence; a higher prevalence in workers with longer employment periods. Another study conducted by the Division of Occupational Health in 2002 in 43 textile industries revealed that four industries had a dust content in the air higher than the maximum permissible level. Besides, health examinations performed in 5,282 workers revealed that 86 of them had irregular symptoms; and it was found that only 21.6% (1,140) of all the workers wore a protective mask at all times while working. Another study on exposure to cotton dust in six textile industries of Malee Pongsophon and colleagues in 2002, by collecting air samples at the mixing, washing, spinning, reeling and weaving sections, revealed that all sections had cotton dust levels above the permissible level, especially in 28 (or 32.18%) out of 87 air samples.

3) Lead Poisoning. According to the 1993 study of the Department of Industrial Works, there were 558,839 workers in 14,440 workplaces nationwide that used lead in their production processes. The lead poisoning surveillance conducted in 16 industrial categories in 16 provincial areas, totally 56 workplaces, during 1990-1993 by the Division of Occupational Health demonstrated that the workplaces with a high risk of lead poisoning including those involved with battery manufacturing, ore smelting, lead mining, and lead foundries. Over 80% of the workers were found to have an elevated blood-lead level of over 40 micrograms per decilitre (mcg/dl); and over 20% of them had the lead level higher than 60 mcg/dl. Other industries with a lower risk of lead poisoning were printing press, vehicle-repairing garages, shipbuilding plants, and ornament-producing operations. Approximately 20-30% of the workers in such industrial categories had a blood-lead content of over 40 mcg/dl, and less than 5% had over 60 mcg/dl.

However, in 2002 the MoPH Division of Occupational Health conducted an occupational lead poisoning surveillance by testing for blood-lead contents in 3,876 workers. It was found that 257 workers (6.6%) had a lead content higher than 40 mcg/dl and 73 workers (1.9%) had higher than 60 mcg/dl.

4) Risks from Organic Solvents. According to a study of risks for chemical hazards by Dr. Nalinee Sripuang<sup>17</sup> in 1999 on workers in petrochemical, auto-making and electronics industries, the workers were found to be at high risk for exposure to solvents in the aromatic hydrocarbon group. And it was found that female workers had a higher urine metabolite concentration than male workers.

Another study on contacts with solvents (benzene, toluene, and xylene) in workers in three industries in the Map Taphut Industrial Estate, conducted by the Division of Occupational Health, MoPH, revealed unsafe conditions and risks of solvent poisoning among some groups of workers (of all the samples, 0.5% had a phenol content and 1.4% had a hippuric acid content higher than the maximum allowable levels).

In 2003, Dr. Nalinee Sripuang<sup>18</sup> conducted another study on impacts of occupational and environmental solvents on health in Thailand, collecting data on types of hazardous chemicals used and methods for management of chemical hazards in 62 provinces. It reveled that the major problems were found for four major groups of organic solvents resulting in three types of health problems, namely, (1) causing accidents, (2) causing illnesses, and (3) causing nuisances; and the industrial operations with a high risk for solvent exposure included washing operations, extracting operations, chemical production, fuel services, auto-repair operation, printing operation, paint production, and pesticide production, warehousing and sales.

<sup>&</sup>lt;sup>17</sup> Nalinee Sripuang. Risk Assessment of Chemical Hazards in Occupation Health Surveillance: A Case Study of Organic Solvents, 1999.

<sup>&</sup>lt;sup>18</sup> Nalinee Sripuang et al. Impact of Occupational and Environmental Solvents on Health in Thailand, 2003.



5) Hearing Loss. The Division of Occupational Health, MoPH, conducted a study in 1998<sup>19</sup> on hearing capacity of workers who encountered loud noise in industries. The study demonstrated that 69.3% of the workers had hearing impairment.

<sup>19</sup> Vikrom Sengkisiri. Comparison of Effectiveness of Hearing Measurements between 16-hr Noise Exposure Cessation and 4-hr Ear Protective Device Usage in Industrial Plants in 1998, 1999.