
Strategy and implementation of the programme for the prevention and control of pneumoconiosis in Thailand

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Abstract

Pneumoconiosis is one of the most prevalent occupational diseases in Thailand. The most common forms of the disease are silicosis and asbestosis, and other asbestos-related diseases. The aims of the study are to review the situation of these diseases and describe national strategic and action plans to prevent and control them.

At least 200,000 workers in 8,000 workplaces are exposed to silica at work each year. The industry that is most affected is concrete and cement manufacturing (approximately 4,000 enterprises with 70,000 workers). Because of its severity, silicosis was selected to be one of the eight occupational diseases under the national surveillance programme in 1981. It was also the first occupational disease to be selected for elimination at the national level, under the Silicosis Elimination Programme, in 2001. The objectives of this programme were to describe the situation of the disease, identify particular problems, develop an information system on risk groups and promote control of the disease through cooperation among relevant organizations, in order to reduce new cases to zero within ten years. The programme involved the cooperation of all relevant organizations at the international, national and local levels. At the international level, international agencies, such as the International Labour Organization (ILO) and the World Health Organization (WHO), cooperated with the Ministry of Public Health of Thailand to conduct many activities. These included policy support, capacity building for local staff and technical support. A major focus was a training course on reading the chest X-rays of individuals exposed to dusts in accordance with the ILO International Classification of Radiographs of Pneumoconioses.

Asbestos has been imported into Thailand for more than 40 years. Currently, the country ranks in the world's top five importers and users of asbestos. Almost all imported raw asbestos is used in cement manufacture. To date, very few cases of asbestos-related diseases have been reported to the national surveillance schemes. However, all relevant organizations contributed to the establishment of a national policy and plan for the prevention and control of asbestos-related diseases, which was set up in 2007. The plan has been supported by the international agencies such as the WHO and the ILO. Its aims were to control, reduce and eventually ban asbestos use within five years (2007–12) and to prevent and control asbestos-related diseases. The plan covered: (1) the protection of workers and the public; (2) the prevention, control and ban of asbestos use in industries; (3) the improvement of the diagnosis and surveillance of asbestos-related diseases; and (4) the collaboration of relevant organizations at all levels. In spite of the policy commitment, a ban on asbestos in the country has yet to be introduced. This is due mainly to the continuous interruption of the process by pro-asbestos agencies. For this reason, the goal of achieving a national asbestos ban is still a long way off, despite strong support from several alliances and the public.

The study shows that silicosis and asbestos-related diseases are the major occupational health problems in Thailand. The Ministry of Public Health has taken steps to prevent and control the diseases by setting up and implementing strategies and action plans, encompassing policy development, law enforcement, the provision of occupational health services, disease surveillance and the empowerment of health officers. In addition, the study shows that the capacity building of physicians in chest X-ray reading for pneumoconiosis is very important to improve diagnosis of silicosis and asbestos-related diseases. Lastly, strong collaboration between national organizations and international agencies is needed to implement the action plans efficiently.

Keywords: *Pneumoconiosis, silicosis, asbestos-related diseases, strategic plan.*

Introduction

Pneumoconiosis is one of the most prevalent occupational diseases in Thailand. The most common forms of the disease in the country are silicosis and asbestosis. According to a report by the Bureau of Epidemiology, the trend of reporting cases has been increasing since 1990 and approximately 100 cases of pneumoconiosis were reported annually during the period 2000–10.¹ Pneumoconiosis is a fatal disease and in most cases cannot be cured. Therefore, it is necessary for public health and other relevant agencies to pay attention to its prevention and control. The aims of the study are to review the situation of pneumoconiosis cases (including silicosis and asbestos-related diseases) in the country and to describe how relevant organizations, especially under the Ministry of Public Health, are trying to tackle the problems through the implementation of prevention and control measures.

The situation of silicosis in Thailand

Silicosis is an occupational lung disease caused by exposure to silica dust. The high-risk occupations include those in the rock grinding and crushing, ceramic and sandblasting industries. The first reported case of silicosis in the country concerned a worker from Wulfam mine in 1954.² Since then, a number of cases have been diagnosed and reported. At first, all reported cases were from mining industries. For example, 25 cases were reported from Wulfam mine during the period 1975–84. After that, cases involving other types of occupations were also identified. A survey of active cases showed that the highest prevalence rate of silicosis among workers classified by types of industry involved sandpaper workers (46 per cent). The other figures on silicosis prevalence included mortar workers (15–35 per cent), brick makers (28 per cent), workers in quarries and stone-grinding industries (8–19 per cent), concrete pipe makers (4 per cent) and miners (2 per cent).

At least 200,000 workers in 8,000 workplaces are exposed to silica at work each year. The industry that is most affected is concrete and cement manufacturing (approximately 4,000 enterprises with 70,000 workers). The other affected industries include quarry and stone grinding (650 enterprises with 12,000 workers), ceramic production (600 enterprises with 43,000 workers) and foundries (500 enterprises with 30,000 workers).³ Because of its

¹ Bureau of Epidemiology: *Annual epidemiological surveillance report 2010*, July 2011.

² W. Jiamjarasungsri: *Situation and trend of occupational diseases in Thailand*, Division of Occupational Health, Department of Health, 1995, pp. 3–12.

³ N. Angkasuvapala, W. Jeungprasert and N. Opasri: “Silicosis and pulmonary TB in stone grinding factories”, in *Journal of The Medical Association of Thailand* (1995, 78(12)), pp. 247–252.

severity, silicosis was selected to be one of the eight occupational diseases under the national surveillance programme in 1981. It was also the first occupational disease to be selected for elimination at the national level.

The national Silicosis Elimination Programme

Out of concern for the health of workers in these industries, in 2001 the Bureau of Occupational and Environmental Diseases introduced an intensive national surveillance programme to eliminate silicosis in Thailand.⁴ The objectives of this Programme were to describe the situation of silicosis, identify particular problems, develop an information system on risk groups and promote control of the disease through cooperation among relevant organizations, in order to reduce new cases to zero within ten years. The Programme involved the cooperation of all relevant organizations at the international, national and local levels. At the international level, international agencies such as the ILO, the WHO and international academic institutions cooperated with the Ministry of Public Health to conduct many activities. These included policy support, capacity building for local staff and technical support. A major focus was a training course on reading the chest X-rays of individuals exposed to dusts in accordance with the *ILO International Classification of Radiographs of Pneumoconioses*.

At the national level, the Bureau of Occupational and Environmental Diseases enhanced its cooperation with the Department of Mineral Resources, under the Ministry of Industry, and the Department of Labour Protection and Welfare, under the Ministry of Labour. When the Programme was launched in 2001, all three agencies agreed, in a Memorandum of Understanding, to work together to implement action plans.⁵ The meetings among responsible staff of these agencies were held to clearly identify each organization's roles, functions and responsibilities in the prevention and control of silicosis. For example, the activities under the Ministry of Industry and Ministry of Labour focused on law enforcement, technology transfer for dust control, and support for workplace surveillance and monitoring. The Bureau of Occupational and Environmental Diseases was responsible for developing the guidelines for occupational health service provision, including health screening in workplaces, health education and treatment. After developing the medical guideline, the Bureau of Occupational and Environmental Diseases arranged training courses for medical doctors, nurses and health officers in programme implementation. Health screening in high-risk workplaces involves such measures as taking a worker's medical history, chest X-ray, lung function measurement and sputum analysis for tuberculosis (TB), if indicated. If physicians identified workers with suspected signs and symptoms of silicosis or with abnormal chest X-ray results according to the *ILO International Classification of Radiographs of Pneumoconioses* (starting from subcategory 0/1), they had to notify the Programme of these cases.

At the local level, relevant local organizations and authorities followed the national action plan. Activities included law enforcement, workplace surveys, and implementation of preventive and control measures. The local teams under the Ministry of Public Health included health officers from regional health centres and provincial health offices, and medical staff from general hospitals. At the beginning of the Programme, quarry and stone-grinding factories were the main target workplaces because of their high number of workplaces and workers and high levels of dust exposure. Before starting the activities, the

⁴ Division of Occupational Health: "Silicosis Elimination Programme in Thailand", Newsletter, Vol. 1, 2001.

⁵ Department of Health: Memorandum of Understanding on cooperation for the national Silicosis Elimination Programme, Dec. 2000.

Bureau of Occupational and Environmental Diseases also set indicators within five years in order to assess an achievement of the Programme. The indicators focused on five relevant factors which would lead to effective measures for prevention and control of silicosis. These included coverage of high-risk workplaces under the Programme (at least 25 per cent of high-risk workplaces attended), effective dust control in working environments (at least 50 per cent of workplaces had dust levels within normal limits), workers' use of personal protective equipment (at least 60 per cent of workers used such equipment), and prevention and control of silicosis complications (no TB in high-risk workers or all detected TB cases were under treatment).

After the implementation of the Programme, both central and local health authorities carried out the project according to the plans. The outcomes of the programme implementation were conducted simultaneously by local health teams. The results showed that 246 target enterprises, employing 5,224 workers, participated in the project in 2002,⁶ or 48 per cent and 58 per cent of the total target groups, respectively. A total of 99 of these enterprises (40 per cent), employing 925 workers (18 per cent), reported using respiratory protection devices. In the same year, the results of working environment monitoring showed five of 234 respirable dust samples and 58 quartz samples to be over the standard. In addition, 17 of 134 total dust samples and 24 quartz samples were over the standard. As part of the health monitoring programme, 3,263 workers were given chest X-rays, which identified 35 cases of pulmonary TB and 34 cases of silicosis. Lung function tests performed on 4,204 workers revealed 1,633 cases of abnormal lung function.

Although the Programme had been conducted continuously for ten years, the results of the final evaluation showed that the goal could not be achieved. New cases of silicosis were still being reported and high-risk workplaces were still being identified. The Programme faced many obstacles and problems, with poor cooperation by employers and workers constituting a major problem. Some health officers reported difficulties in gaining access to workplaces. Furthermore, no suitable and low-cost control measures were available for enterprises to implement in order to reduce dust levels. At the national level, the Bureau of Occupational and Environmental Diseases was unable to allocate funds for provincial health offices and hospitals to conduct the Programme as a result of changes to government budgetary policy. This led to a decrease in the coverage of workplace attendance. Despite many difficulties, the Bureau of Occupational and Environmental Diseases has continued to perform its activities and has a plan to revise and improve programme implementation in cooperation with other national agencies.

The development of a basic occupational health service model for the prevention and control of silicosis

Although the Silicosis Elimination Programme focuses on the protection of workers in high-risk enterprises, many workers are exposed to silica dusts in the informal economy. Almost all such workers are self-employed and are unable to access occupational health services because of the characteristics of their work – scattered worksites, frequent mobilization and lack of any budget to invest in occupational safety and health. In Thailand, stone sculptors and stone-carving workers working in communities are either homeworkers or self-employed and are in a high-risk group for developing silicosis. For this reason, the Bureau of Occupational and Environmental Diseases also designated these workers as a target group for disease prevention and control. An example of a case study

⁶ Division of Occupational Health: *Report of silicosis situation in Thailand*, unpublished paper, 2002.

for the implementation of basic occupational health services for homeworkers who are exposed to silica dust is presented below.

Since 2004, the Bureau of Occupational and Environmental Diseases has cooperated with the ILO and the WHO to develop basic occupational health services for workers in the informal economy by integrating occupational health services into the general health service system within primary health-care units.^{7, 8} The aim of this project was to explore the outcomes of the study by integrating basic occupational health services into pilot primary health-care units. One unit was selected to conduct the study to develop basic occupational health service provision for stone sculptors in order to prevent and control silicosis among this working population. The selected site consists of two communities in a province in the north of the country that have been involved in stone-carving work for over 200 years. At least 200 people from the two villages work in stone carving and produce at least 380 stone mortars a day. Most of the workers form groups under responsible chiefs and the current ten groups have access to more funding and more advanced machines. The work process involves digging stone from mountains, then cutting it into small pieces and carving and polishing it. In both villages there is a history of several generations of men passing away at a young age from unknown causes, earning the villages the name of “widow villages”. The first reported case of silicosis was identified by a general hospital in the province seven years ago. Since then, public health officers and networks have started implementing preventive occupational safety and health and control measures. This was a starting point for the development of the basic occupational health service model in the project.

To promote the development of basic occupational health services, the Bureau of Occupational and Environmental Diseases set the basic occupational health service guidelines, developed a training curriculum for health officers and provided basic occupational health services for workers in the target primary health-care units as a pilot project. Upon completion of the training course, the health officers began the provision of basic occupational health services by establishing a network of collaboration with the hospital, the provincial health office, the local authority, village representatives and other relevant government agencies. The provision of services included both outpatient services at the units and proactive services at community worksites, including identifying basic information, conducting workplace surveys using checklists, holding focus group discussions for risk analysis and risk communication, performing health assessments and implementing suitable control measures.

The study showed that the primary health-care unit was able to provide basic occupational health services for target groups. The activities performed at the unit included education in occupational health, improvement of silicosis recognition, outpatient department (OPD) card rearrangement and disease reporting through an established system. Activities implemented in communities included workplace surveys, health screening with the support of general hospitals, and communication of results to workers and local authorities to permit joint problem solving. Implemented preventive and control measures included training and health education, identifying occupational health volunteers, providing personal protective equipment (including funding for such equipment), providing suitable low-cost dust control measures and providing health books

⁷ S. Siriruttanapruk et al.: *Integrating occupational health services into public health systems: A model developed with Thailand's primary care units*, Informal Economy, Poverty and Employment, Thailand Series, No. 2, International Labour Office, 2006.

⁸ S. Siriruttanapruk, K. Wada and T. Kawakami: *Promoting occupational health services for workers in the informal economy through primary care units*, ILO Asia-Pacific Working Paper Series, ILO Subregional Office for East Asia, Sep. 2009.

for workers. Following the programme evaluation, the project increased awareness of the importance of occupational health measures for high-risk workers among health authorities and officers at provincial and local levels. Occupational safety and health for underserved workers can be integrated effectively into the general health service system at the primary health-care unit level, with unit staff increasing their understanding and knowledge of basic occupational health services. The project also influenced workers' attitudes to their health and work. Despite the project's achievements, local health officers reported numerous problems. The obstacles included no supportive policy from the top policy-makers, budgetary constraints, lack of staff and resources, lack of advance knowledge on occupational health, insufficient law enforcement, and ineffective use of information for further prevention and control of occupational diseases. These issues must be solved in order to improve occupational health service provision for underserved workers.

The situation of asbestos-related diseases in Thailand

Asbestos has been imported into Thailand for more than 40 years and the country currently ranks in the world's top five importers and users of asbestos. It is used in several industries throughout the country, with 90 per cent of the imported raw material being used in cement manufacture to produce such articles as roof tiles and cement pipes. A further 8 per cent is used in brake and clutch production and the remaining 2 per cent in the production of vinyl floor tiles, gaskets and heat-insulating materials.⁹ Since asbestos can cause severe illnesses, such as asbestosis, lung cancer and malignant mesothelioma, asbestos-related diseases will be among the most important public health problems in the near future.

Since there are no asbestos mines in Thailand, it is imported from several countries for manufacturing purposes. Nowadays, only chrysotile asbestos is allowed to be used in the country. The trend of importing the raw material increased gradually until reaching its peak (181,348 tonnes) in 2002, after which it began an abrupt decline to its current level.¹⁰ According to data from the Thai Customs Department, 74,181 tonnes of asbestos were imported in 2011. Most asbestos is imported from the Russian Federation, followed by Brazil and Canada. Recent data from the Department of Industrial Work at the Ministry of Industry confirm the registration of 16 asbestos-using factories employing approximately 1,800 workers. These workers constitute one of the high-risk groups for occupational asbestos-related diseases in the country.

At least three governmental agencies play a major role in controlling asbestos. The Department of Industrial Work regulates and controls the import, use and storage of asbestos. Up to now, crocidolite and amosite asbestos have been banned under the Hazardous Substance Act since 1995 and 2001, respectively. In addition, asbestos is also regulated under the Ministry of Labour's Labour Protection Law. The legislation indicates a standard level for occupational exposure to asbestos in order to protect workers' health. As mentioned earlier, the Bureau of Occupational and Environmental Diseases has a duty to provide occupational safety and health guidelines and services for the control of asbestos-related diseases. These illnesses are among the eight occupational diseases covered by an active health surveillance scheme run by the Bureau of Occupational and Environmental Diseases. However, most of the scheme's work has been focused on

⁹ S. Theptrakarnporn and S. Siriruttanapruk: "Asbestos in Thailand", in *Journal of Health Promotion and Environmental Health*, 2002. Available at: <http://advisor.anamai.moph.go.th/252/25204.htm>.

¹⁰ Thai Customs Department: Import and export statistics, 1987–2011.

silicosis and lead poisoning because of a larger target population, and very little information about asbestos-related diseases is available from the scheme.

Up to now, few cases of asbestos-related diseases have been reported to the national surveillance schemes. The first survey was carried out in 24 factories in 1987¹¹ and showed that 13 out of 701 workers had pleural thickening on standard chest X-rays. Eight of the 13 had worked for more than ten years. Unfortunately, they received no further follow-up as health officers had other urgent occupational health problems to focus on at that time. A further two studies conducted later revealed no cases of asbestos-related diseases despite high exposure levels.^{12, 13, 14, 15} Recently, four cases of asbestos-related malignant mesothelioma and nine cases of asbestosis were diagnosed and reported,^{16, 17} however, they have not been reported to the country's Workmen's Compensation Fund. The problem of the under-reporting of cases may be due to the long latency period of the diseases, the high turnover rates of workers, lack of awareness of the diseases among physicians and ineffective systems for the follow-up of exposed workers.

National strategic plan and action for prevention and control of asbestos-related diseases

Although only a few cases of asbestos-related diseases have been detected or reported in the country, the prevention and control of the diseases is very important. Since asbestos has been widely used in Thailand for a long time, the number of cases is definitely expected to be high in the near future. Relevant organizations have been set up and have collaborated to establish a national policy and plan for the prevention and control of asbestos-related diseases. The plan has been supported by international agencies such as the WHO and the ILO. The first plan was set up in 2007 and aimed to control, reduce and finally ban asbestos use within five years (2007–12), and to prevent and control asbestos-related diseases. The framework for the development of the national strategic plan was based on the Bangkok Declaration calling for the prohibition of the use of asbestos and the elimination of asbestos-related diseases issued at the first Asian Asbestos Conference in 2006.¹⁸ The plan addressed: (1) the protection of workers and the public; (2) the

¹¹ C. Husbumrer, W. Sengkisiri, R. Chomsuan et al.: "Project on asbestosis surveillance in Thailand", in *Annual Research Report of the Division of Occupational Health*, 1987, pp. 202–229.

¹² C. Husbumrer, W. Sengkisiri, R. Chomsuan et al.: "Project on asbestosis surveillance in Thailand", in *Annual Research Report of the Division of Occupational Health*, 1988, pp. 15–44.

¹³ National Institute for the Improvement of Working Conditions and Environment: *Study on working environment and health impact in asbestos-use factories*, 2000.

¹⁴ S. Uttayopas: *Project on management and safe use of asbestos*, Department of Industrial Works, Ministry of Industry, 2001.

¹⁵ Bureau of Occupational and Environmental Diseases: *Surveillance and investigation of asbestos-related lung diseases* (Bangkok, 2008).

¹⁶ S. Wongwitvichot, W. Jiamjarasrungsri and W. Sri-ulanpong: Case report, "Occupational malignant mesothelioma in Thailand", in *Journal of Health Science* (2009, 18(2)), pp. 155–162.

¹⁷ P. Subhannachart, N. Dumavibhat and S. Siriruttanapruk: Case report, "Asbestos-related diseases in Thailand and review literature", in *Journal of Medical Association in Thailand* (2012, 95 Supplement 8), pp. 71–75.

¹⁸ Department of Disease Control: "Protecting people from asbestos", Proceedings of Asian Asbestos Conference, 26–27 July 2006, Bangkok, Thailand.

prevention, control and ban of asbestos use in industry; (3) the improvement of diagnosis and surveillance of asbestos-related diseases; and (4) the collaboration of relevant organizations at all levels.

A number of activities have been conducted since the establishment of the plan. In order to increase awareness in industry and among the general public, several programmes were arranged to provide information about asbestos and its harmful effects on health, about preventive measures for workers in high-risk industries and for the public, and to enhance capacity building about asbestos. The activities included training courses for workers, the publication of brochures and making information available through the media. In 2009, a project entitled “Mobilization of stakeholder support and willingness to respond to the development of the coalition for the prevention and control of asbestos-related diseases” was conducted with funding support from the WHO. The project aimed to strengthen occupational health service providers and to increase workers’ and public awareness. The project reported good results with a high number of participants, including 1,000 workers and safety officers, 500 mainly small and medium-sized factories and enterprises, and 154 governmental health officers in nine provinces that adopted the programmes.

The WHO also supported the Bureau of Occupational and Environmental Diseases in conducting a study entitled “Strengthening national capacities for sound management of priority industrial carcinogens in Thailand” under the Strategic Approach to International Chemicals Management – Quick Start Programme (SAICM–QSP). The aim was to review and analyse evidence and data about industrial carcinogens, especially asbestos. The report of the study offers valuable technical information to support policy development. Furthermore, the Ministry of Public Health also hosted an inter-agency awareness-raising workshop on the sound management of industrial chemicals, with special emphasis on asbestos. The workshop was organized by the secretariat of the Rotterdam Convention (United Nations Environment Programme), the ILO, and the WHO. The purpose of the workshop was to scale up the prevention of asbestos-related diseases in the Asia–Pacific region. These activities showed strong commitment and good collaboration among national and international agencies towards the elimination of asbestos-related diseases.

One notable achievement of national policy implementation was the enactment of legislation requiring the labelling of warning signs on asbestos-containing products as ordered by the Consumer Protection Board in 2009. In addition, in order to reduce asbestos use and to promote the use of substitutes, the development of other policies using taxation strategies was proposed. The price of asbestos-containing products, such as roof tiles, is currently lower than that of non-asbestos-containing products because the cost of raw materials that can be used as substitutes for asbestos is higher. One reason is that the tax rate for imported asbestos is zero, while the tax rate for imported substitution materials, such as polyvinyl alcohol, is 5 per cent, and consequently it is too difficult to convince asbestos-using factories to replace their products with other substitutes. In order to persuade companies to produce non-asbestos products and help them to sell those products easily, taxation policy must be improved, for example by increasing the tax rate for imported asbestos or providing tax relief for the substitute product. However, this proposed policy was not feasible because of the free trade agreement on certain chemicals, including asbestos, in force between Thailand and other countries.

At the beginning of the policy movement, only the governmental health sectors and academia participated in activities to ban asbestos. Recently, non-governmental organizations, especially the Thailand Ban Asbestos Network (T-BAN), have been involved in activities to ban asbestos. In 2009, the Foundation for Consumers hosted a meeting for approximately 100 representatives of non-governmental consumer organizations from all over the country to develop a workplan to ban asbestos-containing products. In 2010, the goal “Measures to make Thai society free from asbestos” was

selected to be one of the nine agendas in the Third National Health Assembly. The National Health Assembly is one of the most powerful tools for national health policy development. The process of shaping health policy on the basis of resolutions emanating from the National Health Assembly is similar to that of the World Health Assembly. Under the “asbestos” agenda, the resolutions were very similar to the previous national workplan. The main resolutions recommended all relevant government agencies to conduct all appropriate measures to control, reduce and ban asbestos use within two years (2010–12). After submission, the Thai Cabinet agreed with all recommendations and ordered all relevant government agencies to take action accordingly.

In spite of policy commitments by the previous Government, the deadline for banning asbestos in the country has been postponed on a number of occasions. There are many reasons for the delays in the banning process, including the fact that all relevant government agencies do not agree on the health effects arising from exposures to asbestos. Some government agencies, such as the Ministry of Industry, disagree with the policy to ban asbestos, and the Ministry of Public Health is not the main authority responsible for legalizing the ban on asbestos. On top of that, the continuous interruption of the process by pro-asbestos agencies (both international and local) is a major obstacle. Consequently, despite considerable support from several alliances and the public, making the national asbestos ban a reality is still a long way off.

The training course on chest X-ray reading for pneumoconiosis according to the *ILO International Classification of Radiographs of Pneumoconioses*

As already mentioned, the Ministry of Public Health has established a national policy and strategy to prevent and control pneumoconiosis, with the support of international agencies such as the ILO and the WHO. One of the principal tasks is to improve the diagnosis and surveillance of the diseases. To date, very few cases of asbestos-related diseases have been reported in Thailand. This is because Thai doctors do not possess enough knowledge of asbestos-related diseases and lack the skills needed to diagnose them. With the support of the ILO and other international agencies, such as the United States National Institute for Occupational Safety and Health and the University of Fukui in Japan, measures have been taken to empower Thai physicians in the reading of chest X-rays for pneumoconiosis, which is an important step for pneumoconiosis prevention and control.

The first training course on chest X-ray reading for pneumoconiosis according to the *ILO International Classification of Radiographs of Pneumoconioses* was organized in Thailand in 1995 with the sole support of the ILO.¹⁹ After that, two more courses were held in the framework of collaboration between the Thai Ministry of Public Health and the ILO in 2000 and 2004, respectively. These courses trained Thai physicians in the diagnosis of pneumoconiosis and in monitoring the health of workers exposed to dust. The success of the course was evident from the increase seen in the number of cases of pneumoconiosis reported in the years following the training course. The number of cases reported increased from ten in 1995 to 30 in 1996, and the number of cases reported in 2005 represented a 10 per cent increase over the number in 2004. Through training activities carried out in conjunction with the ILO, the Ministry of Public Health has built up the capacity of its trainers and started to conduct regular training courses at the Central Chest Institute. In addition to the advanced ILO courses, the Ministry of Public Health organized a “training

¹⁹ Chest X-ray reading for pneumoconiosis according to the *ILO International Classification of Radiographs of Pneumoconioses*. Available at: http://www.ilo.org/safework/info/WCMS_108548.

for the trainer” course in 2008. The objective was for ILO experts to share their knowledge and experience with Thai physicians in training them on the use of the *ILO International Classification of Radiographs of Pneumoconioses*.

Since it was necessary to upgrade the skills of Thai physicians in the reading of chest X-rays, the experienced Thai specialists have also cooperated with Japanese experts to set up the Asian Intensive Reader of Pneumoconiosis Project (AIR Pneumo).²⁰ The aim of the project is to upgrade the skills of occupational physicians and other physicians in relevant disciplines in developing countries, especially in Asia, on the use of the *ILO International Classification of Radiographs of Pneumoconioses*. The core activities of the project include setting up syllabuses for training, preparing standard films for teaching and examination, and developing an examination system. In addition, some Thai specialists also applied for and passed the United States National Institute for Occupational Safety and Health B Reader examination and this qualification as core experts enabled them to set up the national training course and examination system. Several short basic training courses have now been conducted by the Thai trainers. In addition, approximately 250 Thai medical doctors have received certification for attending training courses organized either with the support of the ILO or by the Thai Ministry of Public Health alone. Both the ILO training course and the AIR Pneumo project have now been expanded and are being implemented in many countries to assist health professionals in the prevention of occupational respiratory diseases.

Conclusions

Silicosis and asbestos-related diseases are major occupational health problems in Thailand and the trend of reported cases is increasing. The diseases affect not only workers’ health, but also represent an economic burden for the country. The Ministry of Public Health has taken measures to prevent and control the diseases by setting up and implementing strategic and action plans with the support of international agencies, including the ILO and the WHO. The plans focus on policy development, law enforcement, occupational health service provision, disease surveillance and empowerment of health officers. In addition, the study emphasized the importance for the improved diagnosis of silicosis and asbestos-related diseases of increasing the capacity of physicians to read chest X-rays for pneumoconiosis. Lastly, strong collaboration between national organizations and international agencies is needed to implement the action plans efficiently.

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²⁰ Available at: <http://airp.umin.jp/index.html>.