TASK FORCE 4: ELIMINATION OF SILICOSIS

Co-Chairs: Igor Fedotov, ILO (fedotov@ilo.org) and Gerry Eijkmans, WHO (eijkmansg@who.int)

The ILO/WHO Joint Committee on Occupational Health launched in 1995 a Global Programme on the Elimination of Silicosis from the world by 2030. The objective of this Task Force is to further develop and implement this programme, to encourage every country to develop its own national silicosis elimination programme, and to provide a knowledge base for countries that wish to launch a national programme. Prevention of pneumoconioses other than silicosis may be included as part of the programmes at the regional and country levels, because occupational exposures to different kinds of dusts are widespread and the prevention and control activities for various pneumoconioses are to some extent related.

Documentation of methodologies and iconographical materials related to Phase contrast light microscopy and powder diffractometry

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Keywords: asbestos, silica, X-ray diffraction (XRD), Phase Contrast Optical Microscopy (PCOM).

Target group: occupational Health Physicians, industrial hygiene professionals, researchers, laboratory technicians.

An atlas and a CD-Rom have been published in Italian with legends translated in English (La Medicina del Lavoro 2001; vol. 92 (suppl), Casa Editrice Mattioli, Fidenza).

The Atlas presents the evolution of research activity in the last 50 years on solid airborne contaminants originating mainly from the industrial treatment of silica, silicate and asbestos materials, and the methodologies adopted in the Toxicology and Industrial Hygiene Laboratory (Clinica del Lavoro “L. Devoto”) for the characterization of crystalline free silica, asbestos and substitutive fibres. It offers a wide documentation of technical schedules, diffractograms and microphotographs (using Phase Contrast Optical Microscopy with the Dispersion Staining Method). It mostly covers the results of scientific studies made in the last 60 years at the Institute of Occupational Health, now Department of Occupational Health, of the Clinica del Lavoro “Luigi Devoto” of the University of Milan, although ample space is also given to the results of studies performed by well known research workers in Italy and from all over the world.

The first chapter concerns sampling, measurement and analysis of various types of silica and silicate materials, either raw or in the form of airborne dusts in the working environment, with special attention to determination via chemical, diffractometric and microscopic techniques of free crystalline silica in its various allotropic forms, according to the methods used in the Laboratory of Industrial Hygiene and Toxicology of the Clinica del Lavoro of Milano.

Chapter 2 describes the evolution of sampling and counting methods of airborne fibres of various types of asbestos, and also the methods of identification and qualitative discrimination of fibres used as a substitute for asbestos which were developed in the mentioned Laboratory.

Chapter 3 consists of a photomicographic and diffractometric atlas illustrating the results of analyses of materials and dusts containing silica, asbestos and asbestos substitute fibres.

Project start date: January 2000
Project completed: February 2003

Caratterizzazione di polveri e fibre aerodisperse con particolare riguardo alla silice ed agli amianti

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Parole chiave: silice, amianti, diffrattometria per polveri, microscopia ottica a contrasto di fase, fotomicrografia

Utenza destinatana: Medici del Lavoro, Igienisti Industriali, Ricercatori e Tecnici di Laboratorio.
Development of conventional technologies of dust measurement and control and training occupational hygienists in developing countries

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Keywords: X-ray diffraction method (XRD), work environment, silica dust, occupational hygienists, developing countries

Target group: 1) National Institute for the Improvement of Working Conditions and Environment (NICE) that is an agency under the Department of Labour Protection and Welfare, Ministry of Labour and Social Welfare, Thailand. 2) National Institute of Occupational Safety and Health (NIOSH) in Malaysia.

The purpose of the project is the development of conventional methods of silica measurement that can be used for the control of work environment in developing countries. 2) Introducing the methods to occupational hygienists in developing countries.

Crystalline silica dust is a main causative material for silicosis of miners, tunnel and construction workers, etc. Measurement of silica dust in work place is the first step to control silicosis. XRD and IR methods are most effective for evaluation of silica dust, but the techniques are sometimes difficult and expensive for beginners. The first objective of this project is to develop some cheap and convenient techniques of XRD and Infrared (IR) method which are required in many countries, especially in developing countries.

The second objective of this project is to teach the developed methods to occupational hygienists and environmental measurement experts in developing countries.

The developed XRD method was tested for three forms of crystalline silica; quartz, cristobalite and tridymite, and confirmed for the availability. The types of crystalline silica formed from rice husk ash, a major residue of rice production in South Asian countries, were identified and quantified using the XRD and other methods. Final evaluation is in progress.

Under the joint project supported by JICA (Japan International Cooperation Agency), an instrument of XRD was introduced in NICE and NIOSH, 2000 and 2001, respectively, and we have conducted the training courses. Technical support has been continued via Internet communication with a trained hygienist in NIOSH since 2002. By sharing information obtained by XRD analysis, it becomes easy to advise the definite analytical method that can be used for the control of work environment.

Project start date: April 2000
Prevention of asbestos-related disorders in Asia
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Keywords: asbestos, Asia, global asbestos epidemic, descriptive statistics, country reports

Target group: Though formulated mostly by the scientific community the message needs to be directed to administration, politicians, employers and employees as well as society at large.

The objective of this project is to assess the overall situation of each country and region regarding asbestos issues using descriptive status on exposure and disease status. Macro-indicators considered allow comparison within the region as well as with Western countries. The goal is first to collect information, summarize in a comparable form, and then share it globally. The synopsis of the results foreseen will be presented in variable forms. There is a possibility that a follow-up meeting will be organized.

An "Asbestos Symposium for the Asian Countries" was organized with support from WHO-WPRO and ILO, which brought together over 25 delegates from 11 countries from the Asian region and 5 delegates from Europe. This was a joint effort by UOEH and FIOH, co-sponsored by ICOH-SC on Respiratory Disorders and supported by WHO and ILO. In this Symposium, in addition to the keynote lecturers from Finland, Sweden, and Japan, there were Country Reporters (at least two from each country) to discuss the relevant country situations of China, East Timor, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Thailand, and Viet Nam. An international delegate participated via an Internet video conference. Through the exchange of experiences in both developed and developing countries, an initiative was developed to "map" the overall situation in the region as well as to formulate possible solutions to cope with the health hazards of asbestos. Country reports were produced for 11 countries. Printing of Proceedings has now been completed. The conference was co-organized by the Finnish Institute of Occupational Health, and supported by WHO-WPRO, ILO, and ICOH-SC on Respiratory Disorders.

A speech was delivered by Takahashi at the Asian Conference of Occupational Health in Taiwan, Nov 1-4 2002.

Asbestos related disorders in Serbia and Montenegro
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Keywords: asbestos, exposure assessment, asbestosis, lung function, epidemiology

Target group: asbestos exposed workers

The purpose of the project is to study the effects of occupational exposure to asbestos in the factory manufacturing asbestos fibers two cross-sectional studies were performed with the lag of 14 years.

For exposure assessment the surrogate indices (duration of exposure in years, working places and cumulative exposure in fiber/m6 and mg/m3) were included in the originally designed model.

Questionnaires for respiratory symptoms, lung function tests, chest X-Ray and other clinical and laboratory tests were used to investigate the lung status. The symptoms, the parameters of lung function as well as the frequency of ventilation impairment and fibrosis of lung and pleura as health outcomes were analyzed.

In all exposed workers, significantly lower values of expiratory flows in small airways (p<0.001) were found, irrespective of gender and smoking habit. The decrement of all parameters of lung ventilation in 14-year period was significantly higher than expected. The incidence rate of the lung function decrements was 24.7/1000 person-years at risk in 14-year period (1984-1998) of follow-up. The estimated risk for development of lung function impairment was 34.5% for 14 years of exposure.

The incidence rate of small irregular opacities of 1/0 in exposed workers and more was 13.1 on 1000 person-years at risk for 14-year period of follow-up. The main factor that predicted the progression of SIO was cumulative exposure to asbestos expressed in fibres. The estimated risk for each exposed worker to develop lung asbestosis was 18.4% for 14 years of exposure.

The results explain some problems of the uncontrolled use of asbestos in our country and pointed out the health effects due to the high levels of occupational exposure to asbestos studying non-malignant lung outcomes. The results can be used in the risk assessment of the occupational asbestos exposure, particularly for fibrosis of lungs and pleura.
Facilitating interaction between Collaborating Centres and providing information on dust control technologies

Paul Schulte, NIOSH, USA (pschulte@cdc.gov)

The objective of this project is to facilitate interaction between Collaborating Centre, NIOSH divisions and the United States Silicosis Prevention Initiative partners (OSHA, MSHA, National Industrial Sand Association) to provide information on simple and effective dust control technologies, including best practices, and to contribute materials from the silicosis prevention initiative, such as educational materials and dust sampling strategies. Funding for this on-going project is in place. NIOSH maintains a "Silica Topic Page" on its website. See www.cdc.gov/niosh/topics/silica/default.html

Inquiry on silicosis in Tunisia

Habib Nouaigui and Leila Daly, Institute of Health and Security at Work, Tunisia

Keywords: silicosis, mines.

Target group: miners of lead, zinc and iron mines

The objective of this project is to determine the prevalence of silicosis in Tunisia. It is a comprehensive and exhaustive epidemiological study aiming to determine the prevalence of silicosis in iron, lead and zinc mines in the North West of Tunisia.

Tracking was done by first taking X-rays of the thorax (10 X 10). Standard X-rays were then asked for in cases of suspected silicosis, with spirometry, questionnaire and clinical checkup for respiratory reasons. The inquiry was made in collaboration with the pneumonology services of the Ariana Hospital of Tunis, during the period 2001/2002. The X-ray tracking involved 79% of the 571 workers of the mining society.

In 99 cases, a standard X-ray of the thorax was requested. It identified 11 cases of silicosis (prevalence = 2.4%). The characteristics of the touched population are: average age = 56 yrs; average exposure time = 23 years in depth; 8/11 occupied a job in drilling. The X-ray image observed was very advanced in one case (3/3 pp UML), advanced in 7 cases (1/2, 2/1, 2/2 ppUML) and just beginning in 3 cases (1/1 pp). In two cases, effects of tuberculosis were present. The silicotics were banished from exposure.

This inquiry, which is registered in the framework of tracking silicosis undertaken regularly at national level since the 1970s, shows a definite regression of this pathology in the mines of the North West with a prevalence which decreased from 7% in 1984 to 2.4% in 2002.

Enquête sur la silicose en Tunisie

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Mots clés: silicose, mine.

Cible: mineurs (mines of plomb, zinc et fer)

L’objectif de ce projet est de déterminer la prévalence de silicose en Tunisie. Il s’agit d’une enquête épidémiologique exhaustive et transversale visant à déterminer la prévalence de silicose dans les mines de fer, de plomb et de zinc au nord-ouest de la Tunisie. Un dépistage a été effectué par des radiographies du thorax 10 x 10, puis des radiographies standards ont été demandées pour les suspicions de silicose, avec spirométrie, questionnaire et examen clinique à visée respiratoire.

L’enquête a été effectuée en collaboration avec les services de pneumologie de l’hôpital Ariana de Tunis, durant la période 2001/2002. Le dépistage radiographique 10x10 a intéressé 79% des 571 travailleurs de la société minière. Dans 99 cas, une radiographie standard du thorax a été demandée. Elle a permis de retenir 11 cas de silicose (prevalence = 2,4%). Les caractéristiques de la population atteinte sont : âge moyenne =
Establishment of a national silicosis elimination programme in countries with silicosis exposure with the help of a model programme

Igor Fedotov, ILO and Gerry Eijkemans, WHO

A national action programme involves governmental agencies, industry and trade unions in collaborative action and establishes a sound infrastructure to combat silicosis. It provides a knowledge base and support to ensure systematic programme development for surveillance and preventive activities. A feasible prevention strategy requires a thorough knowledge of local conditions and the national situation, proven safety measures, and opportunities for innovations. The elements of a national programme include: laws and regulations, enforcement of occupational exposures and technical standards, governmental advisory services, an effective system of inspection, and a well-organized reporting system. Assistant to counties is provide by ILO and WHO upon request.

Spanish-language ILO radiology course

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The course is complete and ready to be used for teaching professionals in the region. All the training material is ready and has been used several times.

The host country or Institution is required to provide the funds to support local arrangements and provide the facilities for the teaching. The Occupational Society of Argentina had requested for the course to be conducted. However the current situation in Argentina led to a postponement of the course. It is planned to provide the course in Chile. This event could be financed by a copper company. Other countries and institutions are invited to contact the project team for new courses.

The WHO/ILO Joint Effort in Occupational Health in Africa and practical steps towards the elimination of silicosis

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Keywords: African Joint Effort, disease elimination, silicosis, airborne dust

Target group: Policy makers, occupational health and safety staff in different government departments, Trade Unions, training and research institutions, representatives from industries where there is a risk of exposure to silica dust.

South Africa is one of the countries that are fortunately well placed to embark on a realistic national programme to eliminate silicosis. Challenges include:

- high prevalence of dust related lung diseases among miners, ex-miners and workers in non-mining silica dust industries
- known link between silica dust exposure and tuberculosis (TB)
- high prevalence of TB in South Africa as well as the increasing risk of TB because of the HIV/AIDS pandemic
- link between silica dust exposure and cancer as confirmed by the International Agency for Research on Cancer (IARC)
- ongoing exposure to silica dust and efforts to control this
- the need for one standard with regards to silica exposure limits
- gender concerns in silicosis
- collaboration among role-players on preventive measures

Strengths include:
• an enabling constitution
• host to the October 2002 World Summit on Sustainable Development (WSSD)
• the existence, since 1994, of a strengthened occupational and environmental health and safety legislative framework
• rich experience of trade unions working towards better occupational and environmental health and safety
• participation of government in multi-stakeholder projects to reduce occupational and environment risks (e.g. Asbestos Summit 1998)
• capacity and willingness within industry to reduce dust levels and implement medical surveillance programmes
• academic institutions with sound experience in teaching as well as participatory and intervention research

The purpose of the project is to raise awareness among health service providers concerning the important relationship between silica dust exposure and the development of Tuberculosis; to assist with the coordination of multi-stakeholder workshops to share information and experience with regards to the elimination of silicosis; to assist with the co-ordination of the training of health service providers in the use of the ILO Standard X-rays for the diagnosis of pneumoconiosis.

The following progress has been made:
• The Advisory Council for Occupational Health (ACOHS) discussed the elimination South Africa inits 2002 meetings.
• A multi-stakeholder planning meeting to discuss the elimination of silicosis took place on 22 January 2003. Information was exchanged and plans made to take the process forward in a participatory way.
• At the International Union Against Tuberculosis and Lung Diseases (IUATLD) Africa Region conference in Durban in June 2002, a paper presented on the elimination of silicosis in the prevention of TB resulted in nurses in some TB clinics asking about silica dust exposure among their TB patients
• Meetings with members of the National Institute of Working Life (NIWL) in Sweden concerning a pilot course they designed on airborne dust control resulted in the hosting of 2 pilot workshops on airborne dust for participants from Southern Africa.
• At the October 2002 meeting of the Global Health Research Forum of WHO, a paper was presented on the role of the WHO/ILO Joint Effort in OHS in Africa with a focus on silica dust elimination
• In July 2004, a National Plan to Eliminate Silicosis was announced jointly by the Ministries of Labour, Health and Minerals. National efforts are ongoing.

**Intervention study to reducing risk of respiratory diseases among foundry workers**

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*Keywords:* respirator, foundry, silicosis, respiratory, worker education, standard, intervention

*Target group:* academic institutions, Agency for standard and qualitative measurement, Occupational medicine center for industry

The main objective of this project is to reduce the risk of respiratory diseases among foundry workers. Funds have been secured by WHO.

**Pneumoconiosis in Ukrainian coal miners**

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*Keywords:* coal mine, pneumoconiosis, respirable dust, silica, spirometry, bodyplethysmography.

*Target group:* miners and ex-miners of underground coal mines

The objectives of this project are to:

1. Evaluate concentrations of respirable coal dust and silica in Ukrainian mines.
2. To develop a surveillance program to determine the prevalence of pneumoconiosis in a random sample of 500 coal miners and 500 ex-miners of Donetsk region.

3. Gather occupational, smoking and clinical history, demographic and diagnostic information for miners.

4. Evaluate the prevalence and severity of pneumoconiosis in a random sample of coal miners.

5. Make recommendations to improve current surveillance programs for occupational lung diseases and assist the appropriate agencies/programs in implementing these recommendations.

6. Investigate the genetic predisposition to CWP using PCR.

Progress on the project includes the following accomplishments:

- Work conditions were investigated at 3 underground coal mines in Ukraine including analysis of respirable dust and silica in personal sampling.
- Occupational, smoking, and clinical history was gathered in the group of 500 active miners and 500 ex-miners.
- Prevalence and severity of lung function impairment using standardized spirometry testing was determined.
- Prevalence of respiratory symptoms using a standardized questionnaire was determined.
- Determination of the prevalence of chest radiograph positive pneumoconiosis in the sample population.
- Investigation of lung volumes and DLCO in active coal is started in 2004.
- Investigation of genetic markers of CWP by PCR method
- The project has generated numerous products to date and is still ongoing:


Conferences:
- Conference of American Thoracic Society, 2002, 17-22 May, Atlanta, USA
- Training courses
- NIOSH Approved Pulmonary Function Testing Course was provided for the staff of the project by Great Lakes Center for Occupational & Environmental Safety & Health (University of Illinois, Chicago, USA) in September 2000.
- Fogarty International Training in Occupational Pulmonology for the staff of the project was provided by Great Lakes Center for Occupational & Environmental Safety & Health (University of Illinois, Chicago, USA) in May 2001.

Project start date: July 2000
Project end date: July 2005
Training of occupational health physicians and other experts working in industries with the risk of silicosis

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Target groups: Medical officers working in mining and surface industries with risk of silicosis and other dust related occupational lung diseases. Medical officers practicing near the high risk industry.

The purpose of the project is to develop man power for the diagnosis of silicosis and dust related occupational diseases. This project is the part of National Silicosis Elimination Programme which has following components.

- Identification of industries with high risk of silicosis through literature survey, and field survey.
- Develop strategy for prevention and control of silicosis and other silica exposure related health problems which will consist of (a) Generation of awareness; (b) Development of dust control system (c). Development of trained man power.

So far a training programme has been organized for the medical officers at Ahemdabad (NIOH), Jodhpur (DMRC) and Dhanbad (for medical officers working in mines by Director general mines safety in collaboration with ILO and Indian Association of Occupational Health).

Other Centres collaborating on the project are the Director General Mines Safety, Government of India; Desert Medicine Research Centre (DMRC), Jodhpur, India; Chief Inspectors of Factories Gujarat and Rajasthan State.

A National action plan on silicosis prevention and elimination in Vietnam

Nguyen Thi Hong Tu, Ministry of Health, Vietnam (hongtu@netnam.vn)

Keywords: Silicosis, prevention, elimination, workers, silica dust, medical surveillance, detection, training

Target group: decision-makers at Ministries, employers’ organizations, academic institutions

The objective is to reduce annual incidence of silicosis and eliminate silicosis in Viet Nam by the year 2020.

The programme was started in 1999 at ministry level. With the multi-sectoral implementation mechanism, the programme has achieved the response and active participation of employers, employees, as well as support from governmental and international organizations (ILO, WHO, SIDA-Sweden, Washington University). In 2002, the programme was recognized as a National Programme of Silicosis Elimination.

A mechanism for the elimination of silicosis at the enterprise level will be institutionalized in the legislation. This will require that employers increase their investment in reducing dust in the work environment and take care of workers’ health.

Fund have been secured by ILO, Vietnam Government, but the programme on silicosis prevention needs further support from international organization and industries in order to reach the new goals of the programme in the coming years.

Preparation of a brochure to publicize the global programme on elimination of silicosis for mobilizing the international donor communities

Igor Fedotov, ILO (fedotov@ilo.org) and Gerry Eijkemans, WHO (eijkemansg@who.int)

Keywords: brochure, disease elimination, silicosis, global programme

Target group: decision-makers, planners and managers, and occupational health staff in Departments of Health, Departments of Labour, and Trade Unions in all countries with a known or suspected silicosis risk.

Directors, managers, team leaders and occupational health staff of companies and enterprises associated with a risk of silicosis.

The objective of this project is to raise awareness among decision-makers in Departments of Health, Departments of Labour, Trade Unions, companies and enterprises associated with a risk of silicosis on the magnitude of the silicosis problem, and to demonstrate that the elimination of silicosis is a worthwhile and feasible objective, now being pursued by a global coalition, that they should support. A brochure will be prepared which will cover an introduction to silicosis, the global silicosis situation in developed and developing countries, a brief review of the established approaches to prevention, and a brief history of the global programme to eliminate silicosis with a list of programme elements.
A draft outline of the proposed brochure has already been prepared, with content and format defined, and is now under review. Suitable photographs to illustrate the text are being sought. Funding for the project is in place. It is scheduled to be completed by December 2003.

**Development of simple dust control technologies widely applicable to various industries, in developing countries in particular**

Berenice Goelzer, International Occupational Hygiene Association (IOHA), Brazil (berenice@goelzer.net), David Zalk, IOHA, USA (zalk1@llnl.gov), Yuxin Zheng, National Institutes in Occupational Health and Poison Control, China (yxzheng@163bj.com)

**Keywords:** Preventative Technologies Toolbox pneumoconioses, occupational hygiene, work-related illness, Dust Control Toolkit, training, technologies.

**Target group:** All interested CCs over and beyond those who have currently expressed interest, managers, team leaders and miners, and occupational health and safety staff in two coal enterprises associated with a risk of silicosis and coal miners’ pneumoconiosis.

The objective of this project is to disseminate knowledge on the principles and prevention of dust generation and control, and to promote the application of this knowledge into practical control solutions, by trade and occupational sector, applicable in developing countries and countries in transition. The dissemination is to include managers, technical teams and miners in two coal mines aiming at elimination of silicosis and coal miners’ pneumoconiosis. The aim is to develop these technologies to be included as a Dust Control Toolkit in the Preventative Technologies Toolbox. This process will include control banding principles, substitution, clean technologies, and other practical solutions.

The progress so far has been the coordination of two-day symposia on silicosis to focus on practical solutions and dust control principles, to be presented in association with the ICOH Congress in February 2003. The culmination of the information associated with this symposium will be a starting point for ongoing collaboration between IOHA and WHO in the collecting of practical solutions and case studies. This process will enrich the WHO document through practical experience acquired through the IOHA and the expertise found within.

A pamphlet of practical control technologies, by trade and occupational sector, for use in developing countries and countries in transition, has been prepared. Training courses on the application of simple dust control technologies in two coal mines are planned. A project proposal has just been approved by the funding body.

The centres collaborating on this project are: Japan (NIIH), China (Dept OH + IOM), Viet Nam (NIOEH), Chile (ACHS), Thailand (NICE + Dept. of Ph), Russia (SCIOH), Bulgaria (NCHM), Serbia and Montenegro (IOPH), South Africa (NCOH) and India (NIOH).

**Contributing information on interventions to reduce silica exposure**

Charles Levenstein, University of Massachusetts at Lowell (chucklev@aol.com)

Substantial progress has been reported in relation to 3 initiatives:

1. **Development of Measures of Silica Exposure in Construction**

Dr. Susan Woskie, Associate Professor of Industrial Hygiene in the Work Environment Department is undertaking a continued study of silica exposure of construction workers on the “Big Dig” in Boston, Massachusetts.

2. **Policy Approaches to Silicosis Prevention**

This initiative is led by Dr. Beth Rosenberg, Assistant Professor of Occupational Health at Tufts University School of Medicine (in collaboration with Prof. Charles Levenstein). Dr. Rosenberg’s petition to the Massachusetts Toxins Use Reduction Institute to list crystalline silica as a toxic substance has been successful. The effort has been aimed at reducing substantially, if not totally eliminating, the use of silica in abrasive blasting in private sector manufacturing in Massachusetts. In addition, all firms producing substantial amounts of hazardous waste in the state will be required to report data on use of crystalline silica. The Tufts-Lowell Silicosis Prevention Advisory Board, composed of public health officials, academic researchers and trade union representatives will be discussing next steps.

Dr Rosenberg is examining economic and ergonomic aspects of using alternatives to silica in abrasive blasting. This project, now in progress, focuses on case studies of economic aspects of replacement of
silica with substitutes in abrasive blasting, as well as changes in ergonomic stressors in using alternative technologies. The target audience is abrasive blasters.

3. Cost Effectiveness of Silicosis Prevention Initiatives

Dr Surpiya Lahiri, Professor of Economics at University of Massachusetts Lowell (in collaboration with Dr. Rosenberg and Professor Levenstein) conducted for WHO a review of available data on effectiveness of silicosis prevention interventions, including substitution, engineering and administrative controls, use of personal protective equipment, training, and policy approaches. The project also includes estimations of costs of various programmes, and extrapolation of available data to make national and global estimates of cost effectiveness. An article has been prepared for publication in 2005.

Project start date. January 2002

Updating WHO guidelines on health surveillance of silica-exposed workers

Gregory Wagner, NIOSH, USA (GWagner@cdc.gov)

Keywords: silicosis; screening; secondary prevention; surveillance; pneumoconiosis

Target group: physicians, public health workers, ministries of health, employers, employee organizations, trade associations

The objective of this project is to assist in updating the WHO guidelines on health surveillance of silica-exposed workers. It aims to continue to assist WHO and ILO in training occupational health physicians to recognize silicosis.

In 1996, the WHO published a monograph providing guidance on "Screening and Surveillance of Workers Exposed to Mineral Dusts." The monograph was the result of an extensive, extended collaborative process reflecting a high level of cooperation between the WHO and the ILO and of involving experts from over a dozen countries. One of the primary goals of the current task is to update the guidelines laid out in the monograph to reflect experience using the guidelines and scientific developments since its production. In addition, there is a continuing effort to train physicians and other public health workers in approaches and techniques, reflecting current guidance, that will improve screening and surveillance of workers exposed to crystalline silica as part of the overall effort to develop and implement national programmes for silicosis elimination.

Scientific research likely to lead to improved recommendations is continuing. The revision of the ILO system for classification of radiographs for pneumoconiosis, a central part of the guidelines, has been completed and is publicly available. There is continuing participation in national Training Courses in silicosis prevention sponsored by the ILO and WHO, most recently in Viet Nam in April 2002.

Funding is in place. The project will be completed by December 2005.

A hazard review document on silica

Faye Rice, NIOSH, USA (FRice@cdc.gov)

Target Group: workers, occupational health and safety scientists, physicians, epidemiologists, regulators, policy makers, industrial hygienists, analytical chemists, and all who need knowledge of the adverse health effects of respirable crystalline silica.

The aim of this project is to contribute a hazard review document on silica and perform a number of quantitative risk assessments. The NIOSH Hazard Review examines the health risks and diseases associated with occupational exposure to respirable crystalline silica, discusses findings from recent epidemiological studies, and suggests areas for further research to help answer ongoing questions about the hazards of exposure. Quantitative risk assessments will examine excess lifetime risks of lung cancer and lung disease other than cancer in a cohort of U.S. diatomaceous earth workers.

The NIOSH Hazard Review was published May 2002, the Risk Assessment for lung diseases other than cancer in January 2002 and the Lung Cancer Risk assessment in January 2001. The two quantitative risk assessments were published in *Occupational and Environmental Medicine* Volumes 58 (lung cancer) & 59 (lung disease other than cancer). The risk assessment of radiographic silicosis in three pooled cohorts is in progress. The foreseen date for completion and publication of that risk assessment is December 2004. Funding for this project is in place.

Project start date. October 1997
The Evaluation of Silica Exposure in the Foundry
Youngman Roh, Catholic Industrial Medical Centre, Korea (ymroh@catholic.ac.kr)

Keywords: silica, foundry, exposure, pneumoconiosis, silicosis

The objective of this project is to evaluate the silica exposure level for foundry workers and to provide the appropriate control strategy. The project will cover the 30 foundries located in Incheon Area, Korea. The airborne silica levels are evaluated for the process of melting, coremaking, moulding, and finishing. The appropriate control strategy will be provided for the high-risk group.

The first survey was started jointly with the Korean Occupational Safety and Health Agency (KOSHA) and is now undertaking a first report.

Research on silica dust, lung function and silicosis, and a model programme for integrated prevention of dust exposure and surveillance of respiratory health
Jonny Myers, University of Cape Town, South Africa (jmyers@iafrica.com or Myers@cormack.uct.ac.za)

Keywords: lung function, silicosis, surveillance, longitudinal tracking

Target group: occupational health practitioners on the mines including medical, nursing, occupational hygiene and environmental engineering personnel. Also personnel in the public sector inspectorates and compensation authorities.

The purpose of this project to develop longitudinal lung function tracking software for surveillance programmes on mines that is more sensitive for prevention of silicosis and other lung diseases among mineworkers, and to evaluate current respiratory and dust surveillance programmes on the mines with a view to optimising their functioning in the service of prevention.

Surveillance systems will be studied for dust and respiratory disease. Cross-sectional data for lung function will be analysed with respect to exposures in the gold and platinum sectors. Longitudinal data for lung function will be analysed against dust exposures for same. Data sources will be routine surveillance and also special surveys set up to investigate exposure response relationships. Software tracking lung function changes over time in miners based on longitudinal data generated by unexposed workers will be used to develop adaptive reference ranges making best use of repeat longitudinal surveillance data to detect abnormal deterioration in lung function as early as possible.

Currently data available from routine and special survey sources is being analysed with a view to establishing exposure response relationships in the gold and platinum sectors. Information about surveillance systems for dust and respiratory health is being sought internationally in order to identify effective and efficient systems that integrate the two components in a meaningful manner.

Provision of a model national programme with indicators addressing the size of the silicosis problem and progress of the national programme
Yuxin Zheng, National Institutes in Occupational Health and Poison Control, China (yuxzheng@163bj.com)

Keywords: dust monitoring, health surveillance, diagnosis of silicosis, control technologies, training

Target group: decision-makers, planners and managers, occupational health personnel

The objective of this project is to provide a model national programme which aims at the elimination of silicosis and coal miners’ pneumoconiosis. Based on the magnitude of the silicosis problem and given that the elimination of silicosis is a worthwhile and feasible objective, now being pursued by a global coalition, a model national programme aiming at elimination of silicosis is being developed. The important indicators of a model national programme will be selected to address the magnitude of the problem of silicosis and coal miners’ pneumoconiosis, and the progress of dust control. A project proposal has been approved by the funding bodies, the Chinese Ministry of Health and the Chinese Ministry of Science and Technology.

The ILO and the Chinese Ministries of Health and of Science and Technology are collaborating on the project. It is scheduled to be completed by 2005.

Training in respiratory dust monitoring at workplace
Yuxin Zheng, National Institutes in Occupational Health and Poison Control, China (yuxzheng@163bj.com)
**Keywords:** dust, training, monitoring

**Target Group:** Occupational hygienists in mineral dust exposed industries

The purpose is to train in application of personal sampling technique for respiratory dust monitoring.

This is an on-going project for the period 2002-2003. Two training courses have been held. The third training course is in the planning stage. Funding from WPRO/WHO is in place.

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**Respiratory Disease in Active and Inactive Underground Ukrainian Coal Miners**

Robert Cohen, John H Stoger Jr. Hospital of Cook County, (bobcohen@uic.edu)

**Project start date:** July 2000

**Project end date:** July 2005

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**Contribution to the organizing activities for hosting 'The Tenth International Conference on Occupational Respiratory Diseases' to be held in Beijing in 2005**

Yuxin Zheng, National Institutes in Occupational Health and Poison Control, China (yxzheng@163bj.com)

**Target Group:** Occupational health professionals

The purpose is to help ILO and the Chinese Ministry of Health in organizing the Congress.

The ILO and the Chinese Ministry of Health are responsible for the organizing activities. This Centre is involved in some preparatory work for scientific committee. Announcement: www.who.int/oeh/OCHweb/OCHweb/OSHpages/Welcome/Conference_China.pdf

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**Preparation of a guideline on health surveillance of dust exposed workers**

Dehong Li, National Institutes in Occupational Health and Poison Control, China (Dehong@263.net)

**Keywords:** health surveillance, dust exposure

**Target Group:** mineral dust exposed workers

The purpose of this project is to clarify the requirements and methods of health surveillance for workers with dust exposure. A survey on the health surveillance practice in workers exposed to various kinds of mineral dust is on-going.

Funds have been provided by the Ministry of Sciences and Technology for 2003-2005.

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**Publication in the peer reviewed scientific literature of detailed and accurate exposure-response information for risks of silicosis, on which workplace standards can be based**

Colin Soutar, Institute of Occupational Medicine, UK (Colin.Soutar@IOMHQ.org.uk)

**Keywords:** silica, risks, silicosis

The objective of this project is to disseminate exposure-response information. It includes the publication in the peer review scientific literature of detailed and accurate exposure-response information for risks of silicosis, on which workplace standards can be based.


**Project start date:** 2002

**Project end date:** 2006

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**Training for physicians in interpreting B reader X-rays**

Yuxin Zheng, National Institutes in Occupational Health and Poison Control, China (yxzheng@163bj.com)

Four training courses have been completed in 2002, with more than 200 participants. The project is funded by the Ministry of Health, China. It will be completed by 2005.

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**Monitoring of respiratory effects in workers occupationally exposed to asbestos**
Jindřiška Lebedová, National Institute of Public Health, Czech Republic (jindra.lebedova@if1.cuni.cz)

Keywords: asbestos exposure, respiratory impairment, chest X-ray

Target group: Persons occupationally exposed to asbestos in refining plants in the Czech Republic 1950 – 2002. The group mainly comprises ex-employees who were mostly exposed to chrysotile and, to a lesser extent, crocidolite.

The purpose of the project is to establish a proposal for recommendations for indication of a detailed radiological examination of persons occupationally exposed to asbestos with minimal changes visible on a frontal chest X-ray. This includes monitoring of the relationship between exposure, latency, subjective complaints and pulmonary dysfunction in persons occupationally exposed to asbestos. Data analysed in relation to findings on a frontal chest X-ray or HRCT. Results are to be used for writing recommendations for indication of a detailed radiological examination of these persons, with a view to health and economic aspects.

So far, a group of 112 people with previous occupational exposure to asbestos and without any parenchymal changes on the chest X-ray was examined. The preliminary results show that people with pleural or parenchymal changes on the HRCT had a decrease in total lung capacity (TLC), slow vital capacity (VC) and forced vital capacity (FVC), forced expiratory flow from 25-75% of the FVC (FEF25-75%), forced expiratory flow from 75% of the FVC (FEF75%), and diffusing capacity of carbon monoxide (DLCO). This effect was observed also when chest X-ray was without any pathologica changes. During the period between 2003 and 2004 we will continue with accumulating data, continuous analysis and evaluation.

The project is funded by the Ministry of Health of the Czech Republic. The Department of Occupational Medicine of the 1st Faculty of Medicine, Charles University and General Teaching Hospital, Prague, as well as the Department of Biostatistics and Informatics of the National Institute of Public Health, Prague, are collaborating on the project.

The planned outcome of the project is a publication of recommendations for the indication of a detailed radiological examination of persons occupationally exposed to asbestos, who have only minimal changes on a frontal chest X-ray.

Project start date: January 2002

Project end date: December 2005.

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Health risk assessment and development of intervention programme in cottage industries with high risk of silicosis

H.N. Saiyed (saiyedhn@yahoo.com), National Institute of Occupational Health, Ahmedabad, India.

Keywords: Agate industry, quartz grinding industry, stone quarries, dust control system.

Target groups: Policy makers, owners, workers, medical officers working in the industry, trade unions, health personnel particularly those connected with tuberculosis programmes, general public with emphasis on people living in the surrounding of the high risk industry.

The purpose of the project is to generate data on silica exposure related morbidity and mortality in cottage industries with high risk of silicosis and to develop intervention programme. This project is the part of National Silicosis Elimination Programme which has following components:

- Identification of industries with high risk of silicosis through literature survey, and field surveys.
- Develop strategy for prevention and control of silicosis and other silica exposure related health problems which will consist of (a) Generation of awareness; (b) Development of dust control system (c). Development of trained man power.

So far, data has been generated on environmental conditions and morbidity due to silica exposure in (a) agate industry (b) quartz grinding industry (c) stone quarries. Dust control systems have been developed and successfully installed for the agate industry. For two other industries namely stone crushing and stone mining it is on the way. Several awareness programmes have been completed for various target groups. Brochures and video films for various target groups have been prepared and distributed. Training programmes for medical personnel and other target group have also been organized.

Other Centres that collaborate on the project are the Director General Mines Safety, Government of India; Desert Medicine Research Centre, Jodhpur, India; Chief Inspectors of Factories Gujarat and Rajasthan State; Director General, Labour Institute, Mumbai.
Assessment of actual situation of silicosis diagnosis by X-ray film1980 in Vietnam
Nguyen Thi Hong Tu, Ministry of Health, Viet Nam (hongtu@netnam.vn)
Keywords: Silicosis, diagnosis, workers, silica dust, detection, X-ray film
Target group: decision-makers at Ministries, employers’ organizations, academic institutions
The objective of this project is to identify capacity of national and provincial occupational health workers in diagnosis of silicosis using X-ray film 1980. The project will start in 2004 and funds have been secured by WHO, Vietnam Government, ILO.

Training workshop on interpreting radiographs of pneumoconiosis using ILO classification 2000
Nguyen Thi Hong Tu, Ministry of Health, Viet Nam (hongtu@netnam.vn)
Keywords: silicosis, diagnosis, workers, silica dust, detection, X-ray film
Target group: decision-makers at ministries, academic institutions
The objective of this project is to provide and improve knowledge and capacity of national and provincial occupational health workers in diagnosis of silicosis using ILO international classification of radiographs of pneumoconiosis 2000.
The project will start in 2004 and funds have been secured by WHO, Vietnam government, ILO.

Occupational lung disease in Japan, Korea and China
Yasuo Morimoto, University of Occupational and Environmental Health, Japan (yasuom@med.uoeh-u.ac.jp)
Completion date is December 2004
Funding has been secured and the project is proceeding as planned. The project will be scientifically supported by Korea-Japan-China joint conference on occupational health.

Evaluation of health effects due to occupational and environmental exposure to asbestos
Neonila Szeszenia-Dabrowska (neonila@imp.lodz.pl) and Stanislaw Tarkowski (tarko@imp.lodz.pl), Nofer Institute of Occupational Medicine, Poland
Keywords: asbestos, cancer risk, environmental exposure, occupational exposure, epidemiology
The aim of the study is to assess the risk of asbestos-related malignancies among persons with diagnosed asbestosis. According to the Act of Parliament passed in 1997, manufacture and sale of asbestos-containing materials is prohibited in Poland since 1998. Thus, problems of asbestos dust level assessment and monitoring of health condition of people employed in the majority of asbestos-processing plants shall become irrelevant. However, the problems of delayed health effects attributable to the past occupational exposures shall continue. Environmental pollution from asbestos waste landfills in the vicinity of asbestos plants and asbestos-cement plants, where considerable concentrations of asbestos fibres in the ambient air are recorded will also continue to be a serious problem.
The project consists of the following tasks:
1. monitoring of incidence of asbestos-related occupational diseases using the National Registry of Occupational Diseases as the basis: the incidence of asbestos-related occupational diseases in Poland has been monitored since 1972. In 2002, 111 cases of asbestosis, 28 cases of lung cancer and 10 cases of pleural mesothelioma were recorded.
2. observation of the cohort composed of workers compensated for asbestosis: the study covered a cohort composed of 907 men and 490 women afflicted by asbestosis, diagnosed in 1970-1997. In all, 421 deaths were registered and causes of death were retrieved for 93.3% of the deceased. Taking into account a cumulative dose of fibers, it was found that a significantly increased mortality from lung cancer and pleural mesothelioma applied to persons exposed to a dose above 25 f-y/ml.
3. observation of the cohort composed of asbestos-processing plant workers: the study revealed elevated mortality from malignant neoplasms, including lung cancer (men: 102 deaths, SMR = 126, 95%CI: 103-153; women: 18 deaths, SMR = 259, 95%CI: 153-409) and pleural mesothelioma (men: 2 deaths, SMR = 510, 95%CI: 62-1842; women: 3 deaths, SMR = 2033, 95%CI: 419-5941).
4. medical examinations (screening) among former workers of asbestos-processing plants: the data
obtained will serve as a basis for assessing the morbidity and incidence of asbestos-related diseases among persons occupationally exposed to asbestos dust in asbestos processing plants.

Preliminary results have been obtained. The final data will serve as a basis for assessing the morbidity and incidence of asbestos-related diseases among persons occupationally exposed to asbestos dust in asbestos processing plants.

Two publications were issued:
