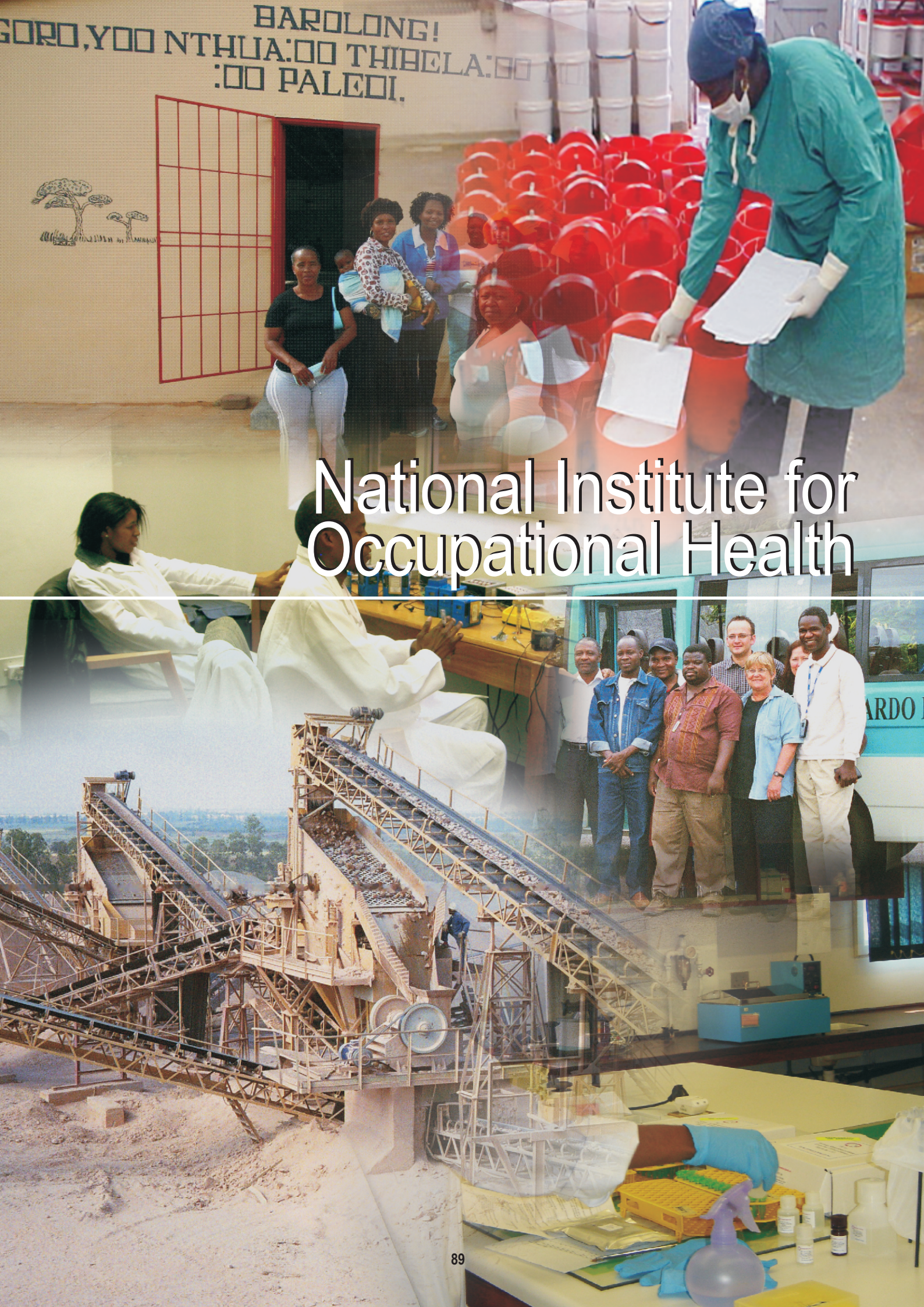


National Institute for Occupational Health

National Institute for

Occupational Health

Executive Director: **Prof Mary Ross**

Overview

This year was a momentous one for the National Institute for Occupational Health (NIOH). We celebrated our 50th anniversary, having developed from a pneumoconiosis research institute for miners' occupational lung diseases in 1956 to a multidisciplinary World Health Organization (WHO) Collaborating Centre for Occupational Health (CC in OH) recognised for excellence in research, service, and training to support all workforces. The highlights of the year were a result of the routine activities, combined with many hours of additional effort from the staff of about 100 people to ensure a series of jubilee memories within our main role to develop and support effective occupational health services in South Africa.

Highlights

The focus for this jubilee year was the development of sustainable occupational health services within the provinces and to assess the national value of the NIOH. A major collaboration with the national Department of Health, which is the primary funder of the Institute, rekindled the partnership with the provincial occupational health units. NIOH participated in the Department of Health national workshop and then hosted a NIOH-based workshop for provincial occupational health co-ordinators. This has led to a number of province-based initiatives such as risk assessment training, specific topic and section-based advisory services, and occupational health service planning support. Apart from the national and provincial health departments, the NIOH serves the State in its broader context of central and provincial government departments and academic institutions. The successful format of the two-day workshop was extended to host central and provincial staff from the Department of Minerals and Energy, with which NIOH has important areas of collaboration such as the pathology service for deceased mineworkers, involvement in research, and dust measurement. A second workshop was held for the national and provincial health departments with collaborators from the University of British Columbia, Canada, to plan the pilot phase of a healthcare worker surveillance programme for the provincial institutions plus the NHLS. The year ended with a workshop for the Department of Labour, attended by 100 members of the provincial and central health and safety inspectorates. They were introduced to the various services of the NIOH, so forging links for future collaboration and training.

A partial economic analysis for the NIOH based on the 2006-2007 budget and the 2006 outcomes demonstrated that overall, the costs of the institute are matched by its economic value-add. This interactive exercise has been invaluable for staff in highlighting the means to maximise the use of existing resources and the strategic areas for improvement, development and growth.

The NIOH staff excelled themselves in organising and hosting a series of jubilee events: the jubilee function for NIOH staff to celebrate achievements of the 50 years and share the vision for the future was combined with the retirement function for the Corporate Services Manager, Ms Engela Venter; a course and workshop on hazard risk assessment by Prof Elaine Faustman and Dr Patricia Cirone from the USA; the South African Society for Occupational Medicine national congress on ergonomics; the Forensic Toxicology and Legal Workshop; two train-the-trainer spirometry courses and a day seminar conducted by a NIOSH (USA) team led by Dr Lu-Ann Beeckman Wagner from the USA as part of the Memorandum of Understanding (MoU) between NIOSH and NIOH; and the biennial NIOH Research Day which was opened by the Chief Executive Officer, Mr John Robertson, and showcased the wide spectrum of research conducted. The jubilee programme culminated with the Webster Day Seminar on Health of Health Care Workers at which Dr Joan Wagner gave a personal account of her association with NIOH and its predecessors over the 50 years and revealed that her husband, Prof Ian Webster, had himself been a victim of occupational tuberculosis. The jubilee events served as the platform to air the short historical jubilee video on NIOH which was compiled under the direction of Prof Anthony Cantrell and Ms Venter and with the help of Ms Jemima Cantrell, the longest serving member of staff who has been with NIOH and its predecessors for 43 years.

The major international event was the centenary anniversary of the International Commission for Occupational Health (ICOH) which was marked with a conference in Milan, the acknowledged origin of the discipline of occupational medicine. NIOH was well represented by scientists presenting papers and preparing for our role in the ICOH2009 conference in Cape Town. NIOH also had the honour of the Director being selected as one of the seven member Advisory Committee of the Global Network for the WHO Collaborating Centres for Occupational Health and her being a signatory to the Declaration on Workers' Health. Ms Claudina Nogueira was selected to be the permanent global manager for the Communications and Networking Activity Area, and Prof David Rees the Deputy Manager for the Global Situation Analysis Activity Area of the Global Agenda in Occupational Health Research. Later in the year, Mr Rob

Prof Ross signing the Declaration of Workers' Health

Ferrie was inducted as the President of the International Occupational Hygiene Association, which represents 22000 occupational hygienists throughout the world.

It was a very successful year in terms of staff academic achievement and professional recognition. Prof Mary Gulumian was awarded a readership at the University of the Witwatersrand; Prof Mary Ross was awarded Fellowships from both the Faculties of Public Health and Occupational Medicine of the Royal College of Physicians (UK), the newly formed Faculty of Travel Medicine of the Glasgow College of Physicians and Surgeons and a Fellowship by peer review from the College of Public Health Medicine (SA); Ms Adri Spies graduated with a Masters in Public Health (Occupational Health) from the University of the Witwatersrand and also passed the examinations for registration as an occupational hygienist with the South African Institute for Occupational Hygiene (SAIOH); Mr Nego Baker passed the occupational hygiene technology examination with SAIOH; Dr Sizwe Gazi obtained a Diploma in Occupational Health from the University of Pretoria; Sr Beauty Senabe obtained the University of the Witwatersrand certificate of competence in travel medicine; Dr James Phillips became a National Research Foundation-rated researcher; Ms Tanusha Singh was awarded a two-year MRC research grant; Ms Estelle Garton won the prize for best poster at the Society for Medical Technologists of South Africa eGoli Branch congress; Ms Cronje won a best oral presentation prize in anatomical pathology at the 46th Conference for the Societies for Pathology; Ms Tanusha Singh, Ms Kerry Downs and Ms Onnicah Mabe won prizes for best posters at the NIOH Research Day; and Dr Spo Kgalamono was elected as Chairperson of the Gauteng Provincial Medical Advisory Panel for the Compensation Commissioner. Dr Delene Bartie was guest editor for a jubilee edition of *Occupational Health Southern Africa*, which contributed substantially to a record NIOH publication rate of three reviewed papers per month. NIOH publications in this reporting period included further landmark findings on mortality from the unique HIV seroconversion cohort research with which Prof Jill Murray has been involved for over a decade.

Major activities

NIOH continued its longstanding associations with a number of international organisations through both formal agreements and informal collaboration (eg. WHO, ILO, NIOSH (USA), the HSL (UK), the University of Birmingham Institute of Occupational and Environmental Medicine (UK), the Swedish National Institute for Working Life (NIWL), the Swedish National Institute of Public Health (NIPH) and the Fogarty International Center (FIC, USA). The formal MoU between NIOSH (USA) and NIOH was renewed in Geneva in October 2006.

Research and outreach

The new research activities centred around the projects submitted to the network of WHO Collaborating Centres for Occupational Health as part of the global plan for occupational health research. Research projects and oversight within the Work and Health in Southern Africa (WAHSA) Programme, funded by the Swedish International Development Cooperation Agency (Sida) for the SADC countries, continued. The Director of NIOH was appointed as Chair of the WAHSA steering committee. Within WAHSA, specific NIOH activities were conducted on silica, silicosis, tuberculosis and dust control with Zambia, Mozambique and Lesotho. As a follow up to his WAHSA audit of the NIOH Clearing House and Resource Centre, the Swedish National Institute for Working Life (NIWL) librarian, Mr Peter Lindgren, spent two weeks conducting intensive training for NHLS staff in preparation for the expanded electronic library function at NHLS and the research/ outreach of NIOH.

Other ongoing research collaborations included: the Fogarty International Centre/University of Michigan training programme in southern Africa; the WHO/ILO African Joint Effort; the ILO/WHO Global Elimination of Silicosis Programme and the Mine Health and Safety Council projects. Many new local and international contacts for surveillance, research and training were made with

organisations such as: Safety Commission of Australia, Indian Association of Occupational Health, Ditsela (the Development Institute for Training, Support and Education of Labour), Department of Environmental Sciences at UNISA, Faculty of Health Sciences of North West University and a number of alumni to establish a sentinel surveillance network for occupational diseases in different industries.

Information dissemination of research findings was achieved through publications and participation by staff at international, national and local conferences organised externally (see publications and conference presentations).

Training and capacity building

The NIOH contributed significantly to training and capacity development within the service activities of the Institute, the formal education system and informal training of a wide variety of groups and individuals plus continuous professional development for occupational health professionals. During the past year, the NIOH staff supervised 48 postgraduate research projects, and taught and examined postgraduate and undergraduate students at various tertiary institutions throughout South Africa.

A number of other prestigious international experts visited and gave presentations within the NIOH continuing professional development programme for staff and affiliated health professionals, namely Dr Jock McCulloch (renowned Australian asbestos historian), Prof Jouni Jaakkola and Dr Maritta Jaakkola (Institute of Occupational and Environmental Medicine at the University of Birmingham, UK), Prof Elliot Kagan (Uniformed Services University of Health Sciences, Bethesda, USA), Prof Fred Pooley (University of Cardiff, Wales), Dr Marilyn Fingerhut (Deputy President of the International Commission for Occupational Health) and Prof Francis Green (Canadian expert in occupational lung pathology).

Service

NIOH staff provided strategic service and advice on occupational health and safety for: Department of Health Forensic Laboratories and National Health Information Systems of South Africa; Department of Minerals and Energy on the mining occupational diseases database (SAMODD); the parliamentary committee considering the Tobacco Amendments Control Bill; occupational hygiene input for the SANDF workforce to complement the analytical activities conducted within the service level agreement; Gautrain project; as well as internal risk assessments and advice to the NHLS and the bid committee to obtain the International Union of Toxicology conference in 2010.

Internal processes

The new facilities commissioned included the computer training laboratory and the infra-red analyser for silica measurement. The major capital project to relocate the Pathology Division combined with refurbishment of the electrical infrastructure was largely completed, and further refurbishment to improve the safety and appearance of the Institute continued. The DISA laboratory information system was installed for Analytical Services to run in parallel with LIMS until group reporting can be incorporated into DISA. The NIOH revamped its website early in 2007 to cater for increased traffic, the electronic web-based information system and making material and publications available to distance-based visitors.

The NIOH continued to realign functions, organisational structure and operation to develop a core communications and liaison capacity and a financial and administrative management in line with the National Institute for Communicable Diseases, with which it now shares a Business Manager. Within the NIOH, health and safety, and quality assurance were targeted with the appointment of a coordinator for accreditation. The NIOH immunology and microbiology, and analytical laboratories were to be assessed by South African National Accreditation System (SANAS) in March 2007 to complement their existing compliance with international quality control schemes, but this has been delayed until international opinion is obtained on which standards to use for NIOH laboratories. Two occupational falls requiring hospitalisation highlighted the need to accelerate the renovations of the old medical school building, which houses the NIOH, to reach an acceptable safety standard. The monthly Research Forum continued to showcase new research initiatives from different sections and particularly encouraged presentation by junior researchers.

Vision for the year ahead

We end the year with involvement in a number of exciting ongoing activities. NIOH is facilitating the development of occupational medical standards and an accreditation system at the request of the mining industry; evaluating, training and offering support for the national mining disease surveillance system which complements our role in the post mortem surveillance system; involvement with the implementation and oversight of the WHO global plan for occupational health and developing a surveillance system for healthcare workers.

PATHOLOGY DIVISION

Head: **Prof J Murray**

The Pathology Division conducts research, is involved in teaching and training and offers services in two broad areas, namely histopathology and electron microscopy. Prof Murray is an associate professor in the School of Public Health, University of the Witwatersrand.

Histopathology, Mortuary Services and Surveillance

Acting Head: **Prof J Murray**

In terms of the Occupational Diseases in Mines & Works Act (Act 78 of 1973), the Pathology Division continues to carry out the statutory requirement of examining the cardio-respiratory organs of deceased miners. The post mortem service is utilised by 80% of families of men who die while in the mining service.

During 2006, 1720 cases (1665 cardiopulmonary and 55 whole body) came to autopsy, compared with 1876 cases in 2005, 2056 cases in 2004, 2318 in 2003 and 2518 in 2002. The low number of cases in 2006 is thought to reflect both the decline in the number of mine workers employed and the decreased mortality due to the availability of anti-retroviral therapy within the industry. In an attempt to increase the utilisation of the autopsy service by all communities, an outreach programme was initiated in 2006. A dedicated new staff member was appointed to develop the outreach programme, nationally, to hospitals, funeral homes and mines, in order to promote the autopsy service.

The pathological examination forms part of the compensation process for miners and involves the Medical Bureau for Occupational Diseases and the Compensation Commissioner. Information from the service is made accessible by the pathology database (PATHAUT). The database, with 100,000 records, contains unique information about disease trends in the mining industry. It is an important tool for disease surveillance and has been utilised in international collaborative studies. A detailed report of the database giving demographic data and disease rates is produced annually. The PATHAUT database is a national resource.

Examining diseased lungs

Teaching is a major function. These activities include the training of pathology registrars, supervising MPH students and teaching on the DOH courses of the Universities of Pretoria and the Witwatersrand. Groups of nurses and occupational hygienists are taught and numerous lectures and workshops are presented to healthcare professionals in the provinces. A monthly clinico-pathology meeting is held with respiratory physicians from teaching hospitals in Gauteng.

Electron Microscopy

Head: **Dr JI Phillips**

A service is provided for occupational disease and environmental monitoring. Tissues, dusts, fumes and fibres are analysed to determine possible adverse health effects. Analyses are performed for other sections of the NIOH, government departments, hygienists and private industries. The number of analyses carried out increased from 366 in 2005 to 482 for the 2006/7 reporting period. This was due to an increased demand for the analysis of bulk samples for the presence of asbestos, and research projects. The unit has maintained a satisfactory rating in the Asbestos in Materials (AIMS) international quality assurance scheme coordinated by the Health and Safety Laboratory (HSL, UK).

Research

Research is a vital focus for the division. The projects are relevant to South African workers and are therefore of national importance. Several projects involve collaboration and the division continues to forge links between the NIOH and scientists and institutions in South Africa and other countries.

National and international Institutions and collaborators currently include: University of Pretoria; Schools of Pathology, Public Health and Clinical Medicine at the University of the Witwatersrand; University of Stellenbosch; Council for Scientific and Industrial Research (CSIR); HSL (UK); Occupational and Environmental Lung Injury Centre, Sheffield University (UK); University of Wales (UK); Brooklyn College, City University of New York (USA); Mount Sinai Medical School, New York (USA); National Institute for Occupational Health and Safety (NIOSH, USA); Dokkyo University School of Medicine (Japan); London School of Hygiene and Tropical Medicine (UK); Clinical Trials Unit, Medical Research Council (UK); University of Edinburgh Medical School, Edinburgh (UK), and Institute fur Umweltmedizinische Forschung gGmbH, Dusseldorf (Germany).

The NIOH staff establishment and outputs are supplemented by personnel and visiting researchers funded by a number of local and international organisations. Current research funders include the Colt Foundation (UK), International Environmental Research Foundation (USA), NIOSH (USA) and the Mine Health and Safety Council (MHSC), South Africa.

The results of completed studies have been made available through national and international publications and reports. Information obtained from research projects has been disseminated to the relevant industries and healthcare professionals through booklets and compact discs (CDs). In addition, seminars and launches have been held for the various stakeholders.

Completed and ongoing research projects include:

Adverse health effects of noise and vibration in the South African mining industry
This collaborative project with the CSIR, Stellenbosch University, University of Pretoria and the HSL (UK) was completed in 2005. In 2006, a CD of best practice guidelines, relevant legislation and links to pertinent web sites was compiled, and disseminated widely; it was also included in the special September/October 2006 issue of the journal *Occupational Health Southern Africa*, which showcased the 50th anniversary of the NIOH.

The effect of HIV on morbidity and mortality in South African gold miners: a retrospective cohort study
A second paper on the results of this unique cohort study was published early in 2007, in the journal *AIDS*. The results showed a median survival of 10.5 years overall: 11.5 years for those aged 15-24 at seroconversion, 10.5 for those aged 25-34, 9.5 for those aged 35-44, and 6.3 for those aged 45+ years. The relative mortality rate compared to HIV-uninfected miners increased quickly, reaching 13 for those HIV-infected for ≥9 years, and did not vary by age group. Excess mortality increased with age and duration of infection to >10% per year. Adjusted to age 25-29 at seroconversion, five-year survival was 89% and 10-year 62%. This survival pattern was similar to that seen in the West before antiretrovirals.

Intrapulmonary lymph nodes in South African miners: an autopsy survey
Knowledge on intrapulmonary lymph nodes (IPLNs) is still limited. Progress in imaging techniques has enabled easier, more frequent visualisation of IPLNs so that a more comprehensive understanding of these nodes is necessary. Microscopic slides of lung tissue from 2337 dust-exposed South African miners, autopsied in 1975, were reviewed to identify IPLNs. The prevalence of IPLNs was calculated and histopathological changes in IPLNs and the surrounding lung parenchyma were described. Pathological changes of IPLNs were correlated with those of the surrounding pulmonary parenchyma. IPLNs were found in 86 of the miners (3.7%). Silicotic nodules were seen in IPLNs in 32 of the 86 cases (37.2%), in the majority of which (21/32; 65.6%) the surrounding lung parenchyma was almost normal. In conclusion, IPLNs are not uncommon among dust-exposed individuals. Silicotic fibrosis of IPLNs appears to precede pulmonary parenchymal disease.

Respiratory disease in South African platinum miners: an autopsy study
This study is looking at silicosis and risk factors in platinum miners who have not been exposed to dust while working in other industries. More than 100,000 workers are currently employed in the platinum mining industry in South Africa, comprising 27% of miners in all commodities. Although the health effects of platinum refining have been researched, there is a paucity of data on the occupational respiratory health of platinum miners. In 2005, the prevalence of silicosis in autopsied platinum miners was 39 per 1000, compared to 295 per 1000 in autopsied gold miners. Cases of silicosis have also been found radiologically in platinum miners during life. It has been suggested that the silicosis in platinum miners is caused by previous exposure in the gold mining industry, but this has not been formally studied. As commodity-specific statistics are calculated for workers who have spent most of their working lives employed in a particular commodity, rather than those who have been exposed exclusively to a single commodity, the premise may hold true.

A review of Transvaal gold miners' medical records: Chinese indentured miners (1904-1910)
Gold was discovered in South Africa in the late 1800s and boosted the economy. The Anglo-Boer (South African) War (1899-1902) resulted in a virtual standstill of mining activities. When the war ended, there was a critical shortage of unskilled labour on the gold mines. It was therefore decided to import men from China to make good the shortfall. A historical review of the records of indentured Chinese mine workers which were found at the Adler Museum at the University of the Witwatersrand was published in 2006. These men underwent medical examinations for possible repatriation in 1905. The records tell of high proportions of social disorders, respiratory diseases, musculoskeletal disorders, opium addiction and injury. These reflect the social and physical conditions to which these men were exposed on the mines. The comment on this article from the Curator's desk reads: "… the files of the Chinese miners brought to South Africa in 1904 tell an important and interesting story and (the authors) have again captured that moment in time and immeasurably enhanced our understanding and importance of these files which have been in the Museum's archives for decades. If museums also curate social values … then this article is a critical record of the value placed on miners (people) by mine officials at the time".

A review of Transvaal gold miners' medical records: black migrant miners (1907-1913)
In the early 20th century, black men were recruited to work on the mines from South Africa and other southern African countries as far north as Tanzania. Tuberculosis was not a common disease in these countries prior to colonial times. There is some evidence that the conditions in the gold mines were largely responsible for the introduction of tuberculosis into the indigenous population and its wide spread into the rural areas of southern Africa. However, while tuberculosis was recognised to be a factor in the high mortality of miners,

much of the evidence is based on clinical diagnosis in living miners. Due to the scarcity of diagnostic facilities, this could have resulted in underestimation of the true prevalence of the disease. The medical records of black mine workers, found at the Adler Museum, are being examined in more detail. These men came from outside South Africa, died on the Witwatersrand mines and had an autopsy (commissioned by the Witwatersrand Native Labour Association) in the first decade of the 20th century.

The development of silicosis in a cohort of South African gold miners: a radiological and autopsy-based study

During the years 1968 to 1971 a cohort of 2260 white gold miners who started mining in 1940 was established for a study of respiratory disease. A follow up process of the cohort at various intervals has extended into retirement. A number of papers have been published looking at various health effects, including the effects of silica dust and tobacco smoking on chronic obstructive pulmonary disease-associated mortality, the risk and latency of silicosis in terms of cumulative dust exposure, the correlation between radiological and pathological diagnoses, the risk of pulmonary tuberculosis, and lung cancer. The last cohort update utilising the autopsy (PATHAUT) data was in 1995. Further analysis is underway to show the development of silicosis from the start of employment until death and its relation to exposure. The results of this study will have a potential high impact as they will clarify dose-response relationships in a cohort with 33 years of follow up. The objectives are to: describe the onset and progression of silicosis in terms of exposure patterns (cumulative exposure, calendar period of mining) and age; characterise the onset and progression of silicosis once dust exposure has ceased (after retirement); and compare radiological and autopsy findings for silicosis.

OCCUPATIONAL MEDICINE AND EPIDEMIOLOGY DIVISION

Head: **Prof D Rees**

The division comprises three sections: Epidemiology & Surveillance; Immunology & Microbiology; and Occupational Medicine. Prof Rees is jointly appointed at the University of the Witwatersrand as Professor of Occupational Medicine in the School of Public Health.

The work accomplished by the division during 2006 focused on the contribution to the development of occupational health services for healthcare workers, including the establishment of surveillance programmes; the ongoing research, teaching and training functions, particularly aimed at occupational health professionals (practitioners and hygienists), through postgraduate courses and registrarships; interventions and surveys conducted at various southern African workplaces, as part of the Work and Health in Southern Africa (WAHSA) Programme; the commissioning of a tuberculosis laboratory with a bioaerosol chamber, and the identification of biomarkers of effect in workers exposed to silica, in conjunction with other sections of the NIOH. Collectively, the division submitted a number of research projects which were accepted into various activity areas of the current WHO CC in OH Global Network Plan (2006 -2010).

The provision of specialist occupational medicine referral services remained a strong focus during 2006, particularly with regard to occupational respiratory disorders, occupational allergies, metal exposure, dermatitis and musculoskeletal problems. Besides the value that the referral services bring to individual patients, each case of occupational disease may be a sentinel event, requiring intervention to protect co-workers, and the occupational exposure histories constitute a valuable database of hazardous industries and enterprises.

Occupational Medicine Section

Head: **Dr S Kgalamono**

The section consists of two units: the Occupational Medicine Referral Clinic and the Ergonomics Unit. In fulfilling the five major functions of the NIOH, the section has participated in information and capacity building, research, clinical service provision and teaching and training. There is a reciprocal relationship with other sections of the NIOH, providing support for their routine services and research, and utilising their expertise in specialised areas when required.

There are three honorary lecturers who are involved in coordinating courses and giving lectures, at both under- and postgraduate level, at the Universities of the Witwatersrand, Pretoria and Free State. Informal teaching consisted of training for Public Health registrars on their six-month rotation at the NIOH, workshops to provincial occupational health staff and *ad hoc* occupational health topics to nurses at local metro clinics.

In collaboration with the University of Auckland's Occupational Medicine Unit, New Zealand, an occupational medicine registrar spent six weeks of practical training time in the section.

Dr Kgalamono, was elected by the Director General of the Department of Labour as Chairperson for the Provincial Medical Advisory Panel (PMAP), which is in the process of being established in Gauteng. The PMAP in South Africa has its legal basis in Section 70 (1) of the Compensation for Occupational Injuries and Diseases Act, 1993 (Act No. 130 of 1993 [COID Act]), which requires the establishment of regional medical advisory panels to allow for decentralisation of services provided by the Compensation Commissioner for

speedy and efficient resolution of COID claims. Two PMAPs are already well established in the Western Cape and KwaZulu Natal; the third one will be in Gauteng.

Occupational Medicine Referral Clinic

A total of 293 patients were assessed at the clinic for occupational diseases, including occupational asthma, asbestos-related diseases, silicosis, hand-arm vibration syndrome and dermatitis. Of these, 70 cases were submitted for compensation, as follows: dermatology 21; occupational asthma 24; asbestos-related disease 11; mesothelioma 3; chronic obstructive airway disease 3; silicosis 4; manganese poisoning 3, and latex allergy 1.

The clinic benefited from reporting of chest radiographs by an experienced occupational chest radiologist. In support of the National Elimination of Silicosis Campaign, mobile chest x-ray surveys were focused on brick manufacturers to assess the prevalence of silicosis in workers with more that 10 years' exposure to silica dust. The prevalence is lower than that seen in ceramic industries. In addition, to enhance the contribution of NIOH towards occupational health in a variety of industries, the radiological service was broadened to report on x-rays of clients other than those assessed at the clinic.

In support of a need for an occupational health service for NIOH employees, models for a comprehensive service that would include medical surveillance and HIV management have been developed for consideration. Currently, *ad hoc* medical surveillance is done for high risk laboratory staff only, focusing on hepatitis B immunisation, post-exposure prophylaxis, baseline x-rays and lung function tests for those individuals considered to be at high risk.

Ergonomics Unit

Since its inception in 2005, the unit has been involved in research related to ergonomics, teaching and training of occupational health practitioners and ergonomics risk assessments, which are followed by the submission of recommendations to reduce or eliminate the identified risks.

The unit published a paper in *Occupational Medicine*, on hand-arm vibration syndrome in South African gold miners; this research was done in collaboration with the HSL, UK.

The unit participated in the Art and Science of Ergonomics Congress, which it also co-organised, with the South African Society of Occupational Medicine; the congress was part of the NIOH's 50th anniversary celebrations.

A West African communications company requested an ergonomic risk assessment of their operations. Recommendations were submitted, and the results of the assessment will be presented at an international conference in 2007.

Ergonomics assessments being performed

Research in the section

Completed projects are:

Prevention of needle stick injury in healthcare workers
This was a collaborative project with the WHO and the International Council of Nurses. The main objective was to prevent needle stick injuries which may lead to the transmission of hepatitis B, hepatitis C and HIV infections. Specifically, it aimed at raising awareness amongst healthcare workers on the risks of sharps-related HIV and hepatitis B and C transmission, assessing the frequency of unsafe injections, determining if the facilities meet the requirements for equipment, supplies and waste disposal, identifying unsafe practices that may lead to infections, assessing policy gaps, and implementing and evaluating the impact of the WHO toolkit. The toolkit was implemented in two health facilities in Gauteng. Training of healthcare workers at Pretoria Academic Hospital has been completed and a project proposal titled 'Prevention of needle stick injuries in healthcare workers' was accepted into Activity Area 4 (education, training & technical materials), of the current WHO CC in OH Global Network Plan (2006 -2010).

An ergonomics audit in a South African public hospital in Gauteng: a pilot study
This project was initiated by the then Chief Director of the Non-Personal Health Services Cluster of the national Department of Health, Mr Sekobe, and the WHO. This study was the first of its kind in South Africa, and hence it was necessary to conduct a pilot study for feasibility; the pilot was carried out at Helen Joseph Hospital, and aimed at preventing or minimising the occurrence of work-related musculoskeletal problems among nurses. The pilot study identified work-related ergonomic risk factors for both nurses and administrative staff. The recommendations made for the improvement of working conditions, health and efficiency of nurses have been submitted to the CEO of the hospital and will be used to create information sheets for healthcare workers in 2007.

The following three new projects were initiated in 2006:

An evaluation of occupational health services provision by provincial health departments in South Africa
The project was initiated because current and ex-workers lack access to occupational health services in the workplace and at public institutions. It is common knowledge that workplace occupational health services are not adequate for all employees. The State has the responsibility for offering accessible occupational health services to its employees and other groups, particularly for small and medium-sized enterprises, the public, and retrenched and retired employees. This study has two main aims: investigating occupational health services offered by the occupational health units in nine provincial health departments, and identifying factors which affect the provision of services. It is envisaged that the study outcomes will contribute to the formulation of recommendations to support and improve occupational health service provision in South African provinces.

Musculoskeletal disorders and associated factors in nurses, bank and postal workers in South Africa
This study is part of a multinational project, currently involving 14 participating countries. The multinational project is called Cultural and Psychosocial Influences on Disability (CUPID). The main aim of CUPID is to determine if work-related musculoskeletal symptoms and resultant disability are influenced by cultural beliefs and expectations, as well as by physical activities and mental health. South Africa is an ideal place to conduct this research because of its multicultural population. Three occupational groups have been selected for CUPID: nurses who are involved in patient handling tasks, office workers who use computers, and postal workers who sort the mail manually. These three occupational groups were selected because their jobs entail physical demands known to be linked with musculoskeletal pain and disability. The information collected is expected to increase the current body of knowledge about these disorders and will be a catalyst to generate appropriate preventive strategies for musculoskeletal disorders.

Investigating the extent of medical follow up and compensation of workers diagnosed with asbestos-related diseases (ARDs) in the non-mining industry at the NIOH Clinic
The study aims at investigating the extent to which workers with ARDs in the non-mining industry undergo medical surveillance and receive due compensation. The objectives of the study are to: describe the extent to which workers with ARDs in the non-mining industry receive medical follow up, determine the compensation status of these workers according to the COID Act, determine whether the compensable cases received compensation during life or after death, and make recommendations to address the identified problems in medical follow up and compensation of workers diagnosed with ARDs.

Epidemiology and Surveillance Section

Head: **Dr D Kielkowski**

Collaboration with various NIOH sections and other institutions was encouraged to support strategic development and research into nationally important needs, such as women and reproductive health.

In addition to teaching of occupational epidemiology as a component of the Diploma in Occupational Health, training in the disciplines of epidemiology and biostatistics was offered. This was the second presentation of the specialised training course, due to popular demand. In the future, the section aims to offer similar courses to users and clients outside the NIOH and the NHLS. The section also offered two training courses on EPI-INFO (epidemiology information open software) to researchers within the NHLS. Collaboration with other partners in research and surveillance has been growing.

Surveillance and research

A surveillance programme Reporting of Occupational Disease in Industry in South Africa (RODISA) was piloted in 2006. Due to limited participation by the practitioners involved, a new strategy has been developed to transform the programme into a sentinel surveillance of key industries. Marketing of RODISA, to strengthen the surveillance focus, will include a web-based electronic reporting system, in addition to the conventional paper method already in use.

A new initiative to develop a surveillance programme for healthcare workers and laboratory personnel was launched in 2006. This is a large collaborative project with the University of British Columbia, Canada, in conjunction with the national and provincial health departments of South Africa. The project will adapt Canadian surveillance systems for healthcare workers to South African needs, and it will be piloted in 2007 in the NHLS.

A pilot research project with the University of the North West was conducted in Potchefstroom and Ganyesa to test a new reproductive health questionnaire and methods for the collection and storage of samples acquired for the investigation of biomarkers of pesticide exposure.

In this pilot study, 180 women participated, providing blood and urine samples. The pilot identified numerous factors that can lead to poor quality data. The initial phase of the project was to test the logistics of recruiting, interviewing and sampling study subjects, to investigate their reproductive health. It was established that even though subjects were willing to provide information on their reproductive health, specific parts of the questionnaire were not completed adequately. In some instances this was due to cultural differences in interpreting questions. As a result, the initial questionnaire and proposed

methods of data collection have been refined for the main study, which is the basis for two research projects. The main study will commence in 2007 and data will be collected on approximately 1500 women in Potchefstroom.

Consultation to government departments

Work continues on strengthening health information systems through participation in the National Health Information Systems in South Africa (NHISSA) Committee of the national Department of Health, and providing support in an advisory capacity to Statistics SA, on improving quality of data and ICD10 coding.

A workshop was held to improve coding of causes of infant death in South Africa. The Death Notification BI 16 form is under review to improve public health information, such as occupation and industry. A consultation and review of the occupational disease surveillance in mines SAMODD data were conducted for the Mining Occupational Health Advisory Committee (MOHAC).

Collaboration with other institutions

The section supports research in all other sections of the NIOH, and contributions have been made to various projects: statistical assistance was offered to the Analytical Services Section, for the collaborative study with the Environmental Epidemiology Unit of the Medical Research Council (MRC), investigating tooth lead levels in children. The section submitted a project titled "Occupational disease surveillance and other indicators of occupational health practice", which was accepted into Activity Area 2 (Evidence for action to support national policies and delivery plans) of the current WHO CC in OH Global Network Plan (2006 - 2010). Research into occupational reproductive health continues, in collaboration with the University of the North West.

Immunology and Microbiology Section

Head: **Ms T Singh**

The section is composed of three units: Bioaerosol Monitoring Unit, Occupational Allergy Unit and Occupational Microbial Unit. Many of the services are provided in collaboration with other sections of the NIOH (eg. Occupational Medicine and Occupational Hygiene).

The Immunology Section

Services and production

In 2006, the section tailored its business plans with regard to the services provided by the Occupational Microbial Unit, the main objective being the optimum use of resources. Hence, all routine Legionella testing will be sent to the NHLS and the section's staff will provide the added value (eg. research input, consultation, recommendations etc.). External quality assurance and proficiency testing are being carried out as these are pertinent to future research projects. The unit has participated in the Legionella Action Group's activities and will contribute to research and training materials. The focus on bioaerosols mainly involved tests for research projects. The biological agents investigated were endotoxins, latex, *Mycobacterium tuberculosis* (MTB) and fungi. One of the aims of these projects is to provide these tests routinely. The Allergy Unit produced a latex information leaflet, aimed at patient use. The section was also involved in risk assessments for hazardous biological agents and is in the process of developing a risk assessment tool for hazardous biological agents that will be easy to implement.

Apart from the section's core business in terms of services relating to bioaerosols, allergies and infectious diseases, the staff also addressed key issues such as team building, costing, lack of human resources and medical surveillance of staff, and saw the appointment of a new staff member in the area of respiratory allergens. The medical surveillance of the NIOH staff was successful with regard to immunisations against hepatitis B.

Tests and samples processed during 2006:

- Bioaerosols: tests - 1738; number of samples - 1188
- Waterborne pathogens (legionella and amoeba): number of samples - 50
- Allergy testing: A total of 82 patients were seen for possible skin prick or patch tests. Of the patch tests done, 16 were

diagnosed as having irritant contact dermatitis and 12 had acute or occupational contact dermatitis. Many patients were assessed but not tested as the allergens may not have been occupational or their skin reaction at the time of testing was severe, resulting in the test not being done.

Advisory function

The section continued to provide an advisory service to its target audiences, and presentations on the section's services were also given on an *ad hoc* basis to visitors to the NIOH (eg. regional provincial health coordinators, representatives from the national and provincial labour departments and of minerals and energy, and a health and safety inspector from the Lesotho Department of Labour). A tour of the specialised laboratories and short demonstrations of certain tests followed the formal presentations. Presentations done outside the NIOH included the SA National Defence Force in Green Point, Sizwe Hospital and the Gauteng Department of Health's Tshwane Metsweding region. Presentations on various topics were given by the section's staff members, and these focused on research areas and marketing the section.

The section launched the NIOH Discussion Forum internally.

Research consultation

The section's research profile included investigations into exposure to soy beans, MTB, endotoxins, latex and methods in fungal identification, with a particular emphasis on improving working conditions of healthcare workers, among others.

The section is steadily building capacity in the field of bioaerosols by establishing appropriate methods for the collection of various biological agents. A major achievement was the completion of the bioaerosol chamber to be used for aerosolising MTB and other microbial agents in the future. The new method will be used to detect airborne MTB, to determine if control measures are effective in the workplace.

The research projects are multidisciplinary and involve expertise from the various disciplines: occupational medicine, occupational hygiene and epidemiology. The projects have both national and international collaboration: the University of Cape Town (SA); NIOSH (USA); University of Michigan (USA): Institute for Risk Assessment, University of Utrecht (Netherlands); BGFA (Germany); HSL (UK). Funders include the Allergy Society of South Africa (ALLSA); the Medical Research Council (MRC, SA); HSL (UK); NHLS (K-funding) and the University of Michigan: Fogarty International Center Southern African Program in Environmental and Occupational Health.

Teaching and training

Teaching activities targeted occupational health nurses, and students enrolled for the Diploma in Occupational Health and the Masters in Public Health (Occupational Hygiene) degree. The training included presentations to the specific groups on occupational allergies and infectious diseases. Staff participated in the World TB day hosted by the NHLS. A workshop on latex allergy in the Limpopo province was also facilitated.

The section's staff members are actively developing education materials including: brochures on skin diseases, bioaerosols, latex allergy and Legionella; a book on occupational contact dermatitis; a practical guide to the prevention and treatment of legionellosis; and an electronic booklet on the impact of hazardous biological agents on indoor air quality.

Quality Assurance and Health and Safety

Quality Assurance Manager: **Ms T Singh**
Health and Safety Committee Chair: **Ms K Fitchet**

The Quality Committee was revived and ensures that the quality systems are implemented in the various sections. Progress included the Analytical Services Section going live on the DISA system and the addition of the NIOH tests to a database (laboratory handbook) for ease of accessibility.

Another initiative from the quality assurance (QA) team was the introduction of weekly accreditation lectures to train staff on various quality issues. The highlight for 2006 was the successful quality assessment and recommendation by the QA Division of the NHLS that the Immunology and Microbiology and Analytical Services sections of the NIOH apply for a SANAS audit, which will take place later in 2007.

The NIOH Health & Safety Committee underwent a restructuring process to comprise a more focused group which would be representative of the various divisions within the NIOH. Key issues addressed included fire drills; gas cylinders; electricity regulations and maintenance guidelines; training of health and safety representatives (first aiders, fire marshals); medical surveillance and the injury on duty process.

OCCUPATIONAL HYGIENE AND ANALYTICAL SERVICES DIVISION

Head: **Mr R Ferrie**

The division comprises three sections: Occupational Hygiene, Analytical Services, and Toxicology and Biochemistry.

Occupational Hygiene Section

Head: **Mr R Ferrie**

The section offers professional occupational hygiene services to prevent or reduce work-related illnesses or adverse health conditions. This includes advice, occupational health risk assessments, monitoring of hazards, teaching and training, and applied research. The emphasis is on providing these services to government institutions and provincial structures. In addition, the section provides support for occupational health and safety inside the NIOH.

Members of staff of the section have been involved in various technical committees and standard-generating groups. Mr Ferrie represents southern Africa on the Board of the International Occupational Hygiene Association (IOHA) and during the year was appointed as their President.

During 2006, the section developed its capacity in measuring exposure to respirable crystalline silica and asbestos fibres. New state-of-the-art laboratory equipment such as a Fourier Transform Infra Red Spectrophotometer and a phase contrast microscope were purchased and a highly experienced asbestos expert was contracted to strengthen capacity in these important areas.

Carrying out occupational hygiene surveys

The section was contracted by the Mine Health and Safety Council (MHSC) to manage the measurement and analysis of silica track of a five-year research project into the elimination of silicosis. A staff member of the section was also commissioned by the MHSC to research health hazards in the clay brick industry. A research project into the preliminary evaluation of an assessment tool for silica exposure in sand and stone quarries was also completed during the year. The section's expertise also contributed to a number of other research projects during the year, including the cleaning of asbestos cement roofs, latex and endotoxin exposure in dental laboratories, and Project 7 of the WAHSA Programme entitled "Action on Silica, Silicosis and TB".

One member of staff was awarded a Masters in Public Health (Occupational Hygiene) from the University of the Witwatersrand and two others passed the entrance examinations of the Southern African Institute for Occupational Hygiene (SAIOH): one has been registered as an occupational hygienist and the other as an occupational hygiene technologist.

A considerable amount of time and effort was expended on training and teaching activities. Teaching and practical support for the Masters programme in Occupational Hygiene and the Diploma in Occupational Health at the University of the Witwatersrand was carried out throughout the year. The annual programme of training visits by students from the various universities and technikons was continued. Training in occupational hygiene techniques was also given to individuals.

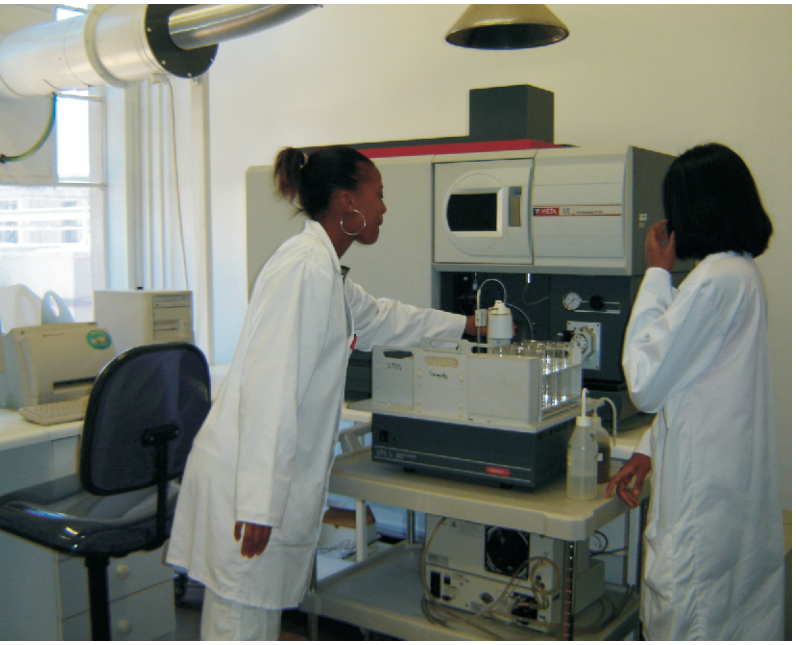
The section maintained its registration as a Department of Labour Approved Inspection Authority (AIA) for occupational hygiene stressors. Occupational hygiene surveys were carried out at a number of facilities including the National Institute for Communicable Diseases (NICD), the Haematology Laboratory at the Wits Medical School, the Forensic Ballistic Unit in Pretoria, the Diepkloof Mortuary, the Potchefstroom Hospital, the Pretoria Teaching Hospital, the SANDF's firing range at Zeerust, the Sci-Bono Science Centre, the Ekuhureleni Metro Municipality and a veterinary clinic in Mpumalanga. A number of contract jobs for private clients were also carried out. These included surveys at a call centre in Nigeria and at a mining group's medical clinic. Professional advice was also given to a building contractor doing renovations for the Department of Trade and Industry, and to a contractor to the Gautrain project.

Liaison and collaboration with local and international partners is a key necessity in the rapidly developing field of occupational hygiene. One member of staff attended the board meeting of the IOHA in Leiden, Holland, and represented IOHA at the annual meeting of the Italian Occupational Hygiene Institute in Milan. This staff member also attended the International Congress on Occupational Health in Milan and visited the HSL in Buxton, UK, for discussions on occupational hygiene issues, particularly the measurement and analysis of silica. A member of staff met with the staff of the Institute of Occupational Medicine in Edinburgh to discuss the measurement and analysis of asbestos. Two members of the section presented papers at the SAIOH Annual Conference in Cape Town. Another member of staff made representations on the effect of second-hand smoke on restaurant staff in the hospitality industry to the Parliamentary Portfolio Committee responsible for the draft Tobacco Control Amendment Bill.

Analytical Services Section

Head: **Ms I Naik**

The Analytical Services Section continued to provide specialised analytical services in environmental and biological monitoring, taught and trained under- and postgraduate students, and conducted independent and collaborative research. The laboratories were upgraded and renovated and the staff continued working towards preparing for SANAS ISO 15189 accreditation. Implementation of the DISA laboratory information system took place in the latter part of the year; this enabled the section to join the electronic referral network operating between the NHLS laboratories nationwide. The section continued the quality assurance scheme for blood lead and cadmium for laboratories countrywide.



Analytical Services

Routine analysis

Samples analysed, both for routine diagnostic purposes and for research projects, included blood, urine, tissues, bulk samples, filters, water, soil, and samples requiring processing using charcoal absorption tubes. Assays were requested mainly for the following metals: aluminium, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, vanadium and zinc, in biological and/or air samples. Mercury and lead in blood were the most requested tests. Organic assays were carried out for acetone, benzene, ethyl benzene, dichloromethane, formic acid, 1-hydroxypyrene, mandelic acid, MEK, methyl hippuric acid, naphthol, o-cresol, phenol, pentachlorophenol, thiocyanate, trichloroethylene, trichloroacetic acid, toluene, toluene diisocyanate and xylene.

A total of 8000 analyses were performed during the year under review; 14 tests in the section were certified by international proficiency testing schemes.

New developments

A number of new methods were developed and introduced as routine tests. These are methods to estimate the arsenic concentration in urine, and beryllium and barium in filter samples. In the Organic Chemistry Unit, methods were developed to measure butoxyacetic acid, ethoxyacetic acid and methoxyacetic acid in urine.

A new Inductively Coupled Plasma Mass Spectrophotometer (ICP-MS) was purchased during the year, to increase the section's analysis capacity for biological samples. The ICP-MS has a high sensitivity and can detect a number of elements simultaneously at pica gram (pg) levels. Part of the commissioning of this instrument included staff training by an application specialist from the supply company.

A thermal desorber was purchased for the Organic Chemistry Unit to augment the analytical capacity for environmental sample monitoring of organic substances. In addition, the installation of a diode array detector for HPLC and head space autosamplers increased the scope of analysis. The section also received a donation of a set of 12 digestion vessels from the Environmental Health Research Unit of the MRC.

A contract with the SANDF was drafted, and agreements for service level, increase in scope of service, and future research collaboration were finalised between the section, the Coastal Region of the NHLS, and the Area Military Health Unit (AMHU) Regional Occupational Health and Safety (OHS), Western Cape management.

The pathology and biological monitoring service needed for a medical surveillance programme for the SANDF in Gauteng was established jointly by the section and the Northern Region of the NHLS, in consultation with the AMHU, OHS Centre in Gauteng.

Research projects

Data were analysed on 1200 teeth samples collected on 956 children for the project titled "Lead concentration in teeth of children living in rural areas in South Africa."

Training and networking

During the course of 2006, the staff members of the section were involved in teaching and training activities for various stakeholders and as part of academic and in-service training programmes, and attended a number of conferences, workshops and skills courses as part of their continued professional development.

The head of section, Ms Naik, was invited as a guest speaker to the National Conference of the Indian Association of Occupational Health (IOHA) and associated meetings, thus forging a collaboration link between the NIOH and India.

Two staff members of the section attended training courses in Norway on the analysis of persistent organic pollutants and ICP-MS method development for analysis of toxic elements, as part of the project "Levels of persistent toxic substances in blood and urine from pregnant women from selected areas of South Africa" - a North-South collaborative initiative between Norway (Arctic Monitoring and Assessment Programme [AMAP]) and South Africa (NIOH and the Environmental Health Research Unit, MRC).

Toxicology and Biochemistry Section

Head: **Prof M Gulumian**

Prof Gulumian was awarded a readership at the University of the Witwatersrand.

A highlight for the section was a course on hazard risk assessment which was co-ordinated at the University of the Witwatersrand by Prof Gulumian who also organised a 50th jubilee health risk assessment workshop, attended by 70 people at the NIOH with presentations by the visiting experts from the USA, Dr Patricia Cirone and Prof Elaine Faustman and local expert, Prof Henk Bouwman. At both events, the historical video of NIOH from its evolution to its incorporation into NHLS was well received by the audiences.

Teaching and training activities included general in-service training of students, and project training of postgraduate students from the Universities of Johannesburg and the Witwatersrand.

Established methods were used to provide services in the assessment of the toxicology and genotoxicity of medicinal plants investigated at the University of Pretoria. In addition, the levels of DNA damage were investigated in a number of diseases as contracted research.

Research on particles continued to feature prominently in the research programme of the section. It included projects on biomarkers of silicosis and surface activity of crystalline silica dust collected from the South African gold mines. In addition, two new projects initiated in 2005 continued to investigate inflammation and apoptosis induced by crystalline silica as well as protection offered by South African herbal extracts with antioxidant activity against silica-induced genotoxicity. Further progress was made in a project investigating the role of silica in the increased susceptibility to infection by *Mycobacterium tuberculosis*.

Information Services Section

Head: **Prof A Cantrell**

A modern computer laboratory has been set up within the Institute. It comprises 12 Pentium IV computers networked to give individual access to the Internet. The laboratory is used for computer-based training on and off line. This included the training of laboratory staff during the introduction of DISA, postgraduate students on the Diploma in Occupational Health on Internet searching for OH&S data, research personnel on the use of Epi-Info, and an extended spirometry training course. The latter two initiatives involved both internal and external participants and were a first for the NIOH in that they were operated on a cost recovery basis. The WAHSA Programme sponsored the visit of an information specialist from the Swedish National Institute for Working Life who used the facility for training NHLS, NICD and NIOH library and information staff.

Training in the computer lab

A Query Answering Tool was developed to manage technical queries reaching the NIOH. Developed in-house on a modified help desk model, it records details of queries reaching the various divisions. Its value lies in the ability to track queries for QA purposes, and to record the input of all staff into this important service. Reports are extracted to follow monthly traffic and topic searches done to identify FAQs and emerging areas of interest that can be developed to improve the information service.

In March 2007, the NIOH launched a new look website [www.nioh.ac.za]. Added features include a complete list of NIOH staff publications since 1953, the NIOH Laboratory Test Handbook, and substantially augmented information on the composition and activities of the Institute.

Training, Liaison and International Collaboration Section

Head: **Ms C Nogueira**

This section provides a support function to the NIOH, and the main objectives are the promotion of occupational health and safety and the development of human resources in the Southern African Development Community (SADC) Region, through international training and outreach programmes. The section coordinates training programmes run by the NIOH, organises programmes for foreign visitors and facilitates the continued professional development of the NIOH staff, as well as certain human resource management functions. Additionally, the section works in close collaboration with other sections of the NIOH with shared objectives, eg. Information Services, Management, IT, and Support Services.

Outreach to the SADC Region

A number of activities linked to the Sida-WAHSA (Work and Health in Southern Africa) Programme were carried out in SADC countries, in fulfilment of the outreach function of the NIOH. The overall purpose of the WAHSA Programme is to contribute to poverty reduction by social and economic development in the SADC Region, through improvements in occupational safety and health.

The Centre for Industrial Studies, Safety and Environment (CEISA), at the Faculty of Engineering, Eduardo Mondlane University, Maputo, Mozambique, became a collaborative partner in WAHSA Project 7: Action on Silica Silicosis and TB. CEISA joins the other partner institution which has been part of the Resource Complex for Project 7 since the launch of the WAHSA Programme in October 2004, namely the Occupational Health, Safety & Research Bureau (OHSRB) in Kitwe, Zambia. The partner institutions in South Africa for Project 7 are the NIOH and the School of Public Health of the University of the Witwatersrand.

A training seminar on silica dust control and measurement, jointly organised and facilitated by the NIOH and CEISA, was held in Mozambique for inspectorates and enforcement agencies. The training seminar was attended by 14 Mozambican participants (representing the Ministries of Labour and Health, CEISA and the local quarry industry), and two NIOH staff members were part of the training team. A major success was that individuals who received training at this dust control seminar would be available to support subsequent quarry intervention activities; some dust measurement equipment had been supplied to CEISA after the seminar and support networks had been established for dust measurement in the country.

Risk assessments were subsequently conducted in quarries in Lesotho, Mozambique and Zambia. The overall goal of these activities is to improve dust control in the quarries in the SADC Region, by designing, implementing and evaluating recommended dust control solutions; successful solutions will be published and disseminated to enforcement agencies and the quarry industry sector in southern Africa. The expert teams constituted to conduct the quarry interventions in the three countries had members from South Africa and practitioners from the participating country, as well as regional experts selected by the Project 7 planning team at the NIOH, because of the need for specific skills and knowledge.

A visit to a quarry in Mozambique

Other accomplishments of WAHSA Project 7 include the compilation of an Instructor's Guide (with course content, exercises and practical field work) for training inspectors appropriate for the Region; the completion of an information package (with CDs, DVDs and a separate hardcopy publication) aimed at practitioners; and the completion of a publication for quarry managers and health and safety representatives to promote dust control in the Region.

The University of Michigan/Fogarty International Center Program for Research and Training in Environmental and Occupational Health has over the last 10 years (1996-2006; in two five-year cycles) contributed extensively to the enhancement of efforts in research training and capacity building and sustainability in the SADC Region. The Programme has funded short-term training, postgraduate studies and research projects, and has served as a catalyst for a variety of other related initiatives in the region, by dovetailing with other programmes. A submission for a third five-year cycle of the grant was made in mid-2006, and the outcome of the application is expected by mid-2007.

International collaborations

As a WHO Collaborating Centre (CC) in Occupational Health (OH), the NIOH was closely involved with the development and the launch of the new WHO CC in OH Global Network Plan 2006-2010, which was launched officially in June 2006, in Milan. Over and above the involvement of three NIOH staff members in a management capacity in some activity areas of the plan, the NIOH collectively submitted a total of 14 collaborative projects which were accepted for inclusion in the plan. The NIOH director is also one of the six members of the Advisory Committee of the Global Network of WHO CC in OH, which sets the global agenda for occupational health research. The research projects from various NIOH staff members which were accepted into various activity areas of the current WHO CC in OH Global Network Plan are:

- Occupational disease surveillance and other indicators of occupational health practice
- An ergonomics audit in South African public hospitals
- SA Silica Pilot Project: silica exposure reduction using control banding in quarries
- Identification and prevention of occupational risks for healthcare workers
- Silica, silicosis and tuberculosis
- Developing capacity in biological monitoring in occupational and environmental health
- Training on asbestos and its identification
- Ergonomics and musculoskeletal disorders
- Prevention of needle stick injuries in healthcare workers
- Latex allergy and asthma: risk management programme for healthcare workers
- Enhanced diagnosis and management of pulmonary TB
- The use of autopsy data as a gold standard to develop reference standard digital X-rays for silicosis
- Pilot study: establishment and development of a model for occupational health service provision
- Access to occupational health and safety information in the SADC Region

Three NIOH staff members attended the WHO CC in OH meeting in Stresa and six attended the centenary ICOH 2006 Conference in Milan, Italy, which paved the way for forging links with other WHO CC in OH and the major role of NIOH in ICOH 2009 to be held in Cape Town. Subsequent to these meetings, the NIOH renewed its MoU with NIOSH, USA, and collaborative projects were established with occupational health institutions in Brazil (Fundacentro and SENAC, both in São Paulo) and Portugal (Dr Ricardo Jorge National Institutes of Health, Oporto). The collaborative work with Brazil is a good example of South-South collaboration in occupational health and safety capacity building, and will contribute very positively to the outreach programmes planned for Mozambique, and at a later stage, Angola.

The first issue of the newsletter "Collaborating Centre Connection" of the WHO CC in OH Global Network Plan was published electronically by NIOSH, USA at the end of March 2007, and featured contributions from various activity areas; the newsletter can be accessed at the following website: www.cdc.gov/niosh/CCC/CCCnewsV1N1.html

North-South collaborative links are already well established, as the NIOH has had long-standing associations with numerous international organisations and institutes including: WHO; the International Labour Organization (ILO), the Health & Safety Laboratory (HSL) in the UK, the National Institute for Occupational Safety and Health (NIOSH) in the USA; the University of Birmingham Institute of Occupational Medicine in the UK; the Swedish National Institute for Public Health (NIPH); the Swedish National Institute for Working Life (NIWL) and the Fogarty International Center and University of Michigan in the USA.

The NIOH hosted Mr Peter Lindgren, specialist librarian from the NIWL. He conducted information training for the library staff of the NIOH, NHLS and NICD, as well as various sessions for the IT and communications staff of the NIOH. The training took the form of discussion fora and interactive sessions, as well as some open sessions which were attended by other NIOH scientific staff members involved in research. A report is to be compiled with guidelines and recommendations for the implementation of improved library and information dissemination processes at the NIOH.

Special events and visitors celebrating the 50th anniversary of the NIOH

As part of the programme for the 50th anniversary of the NIOH, an historical video showcasing the first 50 years of the NIOH was launched, and a number of commemorative activities took place throughout the year.

A workshop for provincial occupational health coordinators (10-11 May) was attended by seven coordinators and presented an overview of the NIOH within the NHLS, and possibilities for extending support in occupational health to all provinces.

A workshop for representatives from the Department of Minerals and Energy (DME) (17-18 August) was attended by 25 representatives from the provincial and national

departments and aimed at strengthening existing ties between the NIOH and the DME and developing a proposed programme for future collaborative activities, particularly with the Pathology Division and Occupational Hygiene Section.

Ms Motselisi Pelesa, an occupational health and safety inspector from the Lesotho Department of Labour, visited all the NIOH sections (4-8 September), but spent most of her time in the Occupational Hygiene Section carrying out dust measurements and finalising a report on the quarry intervention carried out in Lesotho, as part of WAHSA Project 7. She also visited the Medical Bureau for Occupational Diseases, and will be submitting a proposal for collaborative work with the NIOH.

Also in September, the NIOH hosted the Forensic Toxicology and Legal Workshop organised by the Forensic Chemistry Department of the national Department of Health, featuring international and local speakers.

During October, two spirometry courses, attended by 50 participants, were presented by academic visitors from NIOSH, USA, and a day seminar on spirometry, for 120 participants, was also held in the same week. From this training initiative came the formation of a national working group on spirometry, under the auspices of the NIOH.

The biennial NIOH Research Day (25 October), opened by the CEO of the NHLS, showcased the wide spectrum of research, by oral presentations (13) and posters (22), conducted at the NIOH, to a multidisciplinary audience of 125.

Mr Michael Schroll, from the Office of Internal Oversight Services, WHO Headquarters in Geneva, visited the NIOH (13 November) to evaluate the WHO Collaborating Centres designation process; the focus was on the relevance, effectiveness and efficiency of this WHO mechanism and to identify lessons learned.

In November, Prof Frederick Pooley from the University of Cardiff was invited to give a presentation on "Mineral dust inhalation, deposition, retention and disease".

Over the years, the NIOH has hosted very successful Webster memorial seminars in memory of one of the NIOH's directors, Prof Ian Webster, an early pioneer of lung disease research in South Africa. The theme for 2006 was "Occupational Health for Health Care Workers" and the programme had a strong emphasis on TB. The seminar, held in November, was opened by the CEO of the NHLS, and was attended by close to 170 delegates including the Webster family, with very good representation from the provincial and national health departments. External speakers included Prof Barry Schoub and Dr Lucille Blumberg from the NICD, Prof Adrian Duse (NHLS), Dr Des Martin (TOGA Labs) and Prof Annalee Yassi (University of British Columbia, Canada).

A team from the Occupational Health and Safety Agency for Healthcare (OHSAH) in British Columbia (Canada) and the University of British Columbia (Canada) visited in November to establish a collaborative project with OHSAH, the NIOH and the Department of Health of South Africa. The aim of the visit and of a workshop held was to determine the feasibility of implementing an occupational health surveillance system for healthcare workers in South Africa, and what elements should be included. Participants of the workshop included OHSAH, NIOH, Department of Health and representatives from healthcare facilities and regions throughout South Africa.

Dr Nomsa Maku, Head of Medical Inspectors at the Department of Minerals and Energy, was at the NIOH (18 January 2007) for an overview and first-hand experience of the services offered by the NIOH, with a view to initiating future collaborations.

Prof Jouni Jaakkola and Dr Maritta Jaakkola from the Institute of Occupational & Environmental Medicine, University of Birmingham, UK, visited (25 January) to teach in the first 2007 block of the Diploma in Occupational Health (DOH): Principles of Occupational Epidemiology. Over and above the course content, they delivered two open lectures, respectively, on "Occupational exposures during pregnancy and foetal development", and "Occupational asthma: Finnish and UK experiences".

Dr Marilyn Fingerhut, consultant for the National Institute for Occupational Safety & Health (NIOSH), USA and Coordinator of both the NIOSH Global Collaborations Program and the WHO Global Network of CC in OH, visited in January in her capacity of Vice President of the International Commission on Occupational Health (ICOH) and Scientific Chair of the International Conference on Occupational Health, 2009, which will be held in Cape Town. The focus of her visit was structuring the scientific programme for the 2009 Conference with Prof Mary Ross, the local scientific chair. During her visit, she delivered three open presentations: "The 2006-2010 Work Plan of the WHO Collaborating Centers in Occupational Health"; "Contribution of Occupational Risks to the Global Burden of Disease"; and "A Sector Based US National Occupational Research Agenda (NORA): Global Collaborations".

A workshop for representatives from the Department of Labour (DoL) (14-15 February) was attended by close to 100 factory inspectors from various provincial offices and clusters of the DoL. A number of presentations by NIOH staff members on the first day gave the participants an overview of NIOH functions, with particular relevance to the DoL; the presentations were followed by guided visits to the NIOH specialised services laboratories. The second day followed a more interactive format, consisting of discussion groups and feedback from rapporteurs. The main objective of the workshop was the development of a plan for the NIOH to extend its advisory, support and collaborative roles in occupational health, to the DoL.

Prof Francis Green, of Pathology and Laboratory Medicine at the University of Calgary, Alberta, Canada, visited the Pathology Division. He assisted with pathological diagnoses, and was able to further develop two or three collaborative research projects between three organisations (the Universities of Calgary and Cardiff, and the NIOH).

Publications

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