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Dr Barry Kistnasamy
Executive Director

Key interventions in workers' health are being enhanced by NIOH inputs to the Department of Health (DoH), which has prioritised occupational health.

Director's overview

The National Institute for Occupational Health (NIOH) and the National Cancer Registry (NCR) continued to provide services, training and research to enhance workers' health in South Africa and surveillance for cancers. This work was done within the resource constraints that NHLS faced during the year under review.

We provided policy advice and technical support to the departments of Health, Labour, and Mineral Resources. Key interventions in workers' health are being enhanced by NIOH inputs to the Department of Health (DoH), which has prioritised occupational health. Many decentralised occupational health and surveillance activities are conducted with the provincial health departments, the South African Military Health Services and other national departments and public entities.

The Director-General of the DoH in 2012/2013 requested NHLS/NIOH to provide management support to the Compensation Commissioner for Occupational Health (CCOD) and the Medical Bureau for Occupational Diseases (MBOD). The aim was to enhance governance and improve

service delivery for workers and ex-workers under the Occupational Diseases in Mines and Works Act (No. 78 of 1973).

Subsequently, executive director Dr Barry Kistnasamy was appointed Commissioner for Occupational Diseases by the Minister of Health as of July 2012 and head of the Occupational Health Cluster within the DoH. Other senior members of NIOH assisted with management and service delivery within CCOD and MBOD.

Dr Muzimkhulu Zungu was appointed acting director of MBOD as of February 2013. An additional request from the Director-General of DoH included the coordination of the initiative on setting up the National Public Health Institutes of South Africa (NAPHISA), which will deal with surveillance of communicable and non-communicable diseases – including cancers – occupational health, and violence and injury prevention.

We also provided support to DoH for leadership and management training through the NHLS Learning Academy and the Albertina Sisulu Executive Leadership Programme in Health. The programme was coordinated by the universities of Pretoria and Fort Hare and Harvard University.

Senior members of NIOH worked with the Minister and the Director-General of Health and the departments of Health in the provinces of North West and Gauteng by assisting with the post-mortem examinations of workers who died in the Marikana tragedy in Rustenburg last year. We also provided health and social services support for the families of the deceased workers.

The core reference laboratories (pathology, analytical chemistry, immunology and microbiology) and the occupational hygiene section maintained their accreditation status nationally and internationally. This acknowledgement continued to enhance NIOH's ability to deliver quality services in line with good laboratory practice.

NIOH and NCR contributed significantly to training and capacity development through links with academic institutions, professional societies and national and provincial government departments. Many staff members teach in both undergraduate and postgraduate programmes at universities across South Africa.

Staff members were recognised for their contribution to occupational health and cancer surveillance by receiving awards and being invited to serve as members of national and international committees. These are detailed in the NIOH Annual Review.

A programme on HIV and TB in the workplace is now in the implementation phase in the mining sector. Key result areas in policy, legislation, management and service delivery have been formulated and will be monitored by the relevant national departments. NIOH played a critical role in service delivery for HIV and TB awareness among workers and ex-workers in pilot districts within South Africa and in neighbouring

countries. The HIV and TB interventions have been conceptualised and will include the mines, the mining communities and communities in labour supply areas.

NIOH carried out an HIV prevalence survey and a TB knowledge and attitude study within NHLS. It also co-hosted a workshop on HIV and TB with the International Labour Organisation (ILO) for trade union representatives and NHLS senior managers. This workshop led to the development of an NHLS HIV and TB policy that will support programme interventions within NHLS.

NCR has begun a pilot population-based cancer registry in a metropolitan district in South Africa. The registry will assist with surveillance in trends in cancer over time. NCR has also improved its outreach and awareness activities to public and private health facilities about the reporting requirements for cancers.

Research continues to be a strong focus, with a number of articles in accredited journals, chapters in books and presentations at conferences showcasing the research outputs of NIOH and NCR. There is ongoing research collaboration across NHLS and other local and international organisations. Within the region, support and advice are being given to the government of Namibia on setting up the Namibia Institute for Occupational Safety and Health.

Links with various multilateral and bilateral agencies has continued and NIOH contributed to the World Health Organization's Global Plan of Action on Workers' Health 2012–2017. NCR has also supported the capacity building activities of the International Atomic Energy Agency for cancer prevention, treatment and control in selected countries within the continent.

NIOH played a critical role in service delivery for HIV and TB awareness



Dr Naseema Vorajee

Acting Head

In 2012, all the laboratories within the Pathology Division maintained their accreditation status with the South African National Accreditation System (SANAS).

Pathology

The Pathology Division is involved in teaching and training, research and service work. The origins of the division lie in the Pneumoconiosis Research Unit founded in 1956. The focus remains on lung disease and the service work provides material for surveillance, teaching and research. In addition to the post-mortem services offered, the division is a referral centre for lung biopsies.

Analytical electron microscopy services are also offered. In 2012, all the laboratories within the Pathology Division maintained their accreditation status with the South African National Accreditation System (SANAS) in accordance with the recognised International Standard ISO 15189:2007. The division supports the Medical Bureau for Occupational Diseases (MBOD) and leads an initiative to create a database to register and track the service and medical histories of mine workers. These data will be analysed for surveillance. The division also assists with writing the annual reports for the MBOD.

Diagnostic services

Autopsies

In terms of the Occupational Diseases in Mines and Works Act (No. 78 of 1973), the division continues to carry out the statutory requirement of examining the cardio-respiratory organs of deceased miners. The pathological examination forms part of the compensation process for miners and involves the MBOD and the Compensation Commissioner. This service is funded by the national DoH.

Information from the service is made accessible by the division database – PATHAUT – a national resource that contains unique information about disease trends in the mining industry. It is an important tool for disease surveillance and has been used in international collaborative studies. Detailed disease surveillance reports compiled from PATHAUT that give demographic data and disease rates are produced annually. These have been made available in the public domain through the NIOH website.

1,166
autopsies were
carried out
as part of the
compensation
process

In 2012, 1,166 autopsies were carried out as part of the compensation process. To encourage the use of the autopsy service by all communities, an outreach programme was developed to inform, educate and train stakeholders in all aspects of the compensation process. Owing to financial and human resource constraints, this programme has been scaled down but presentations and workshops were given following specific requests from stakeholders throughout the reporting year.

Surgical pathology

The division has extensive experience of lung pathology and is recognised as a centre of excellence. A diagnostic service is offered to satisfy the demand for opinions on lung biopsies and bronchial washings. Diagnostic requests are received from clinicians, academic hospitals served by the NHLS and the private sector.

Electron microscopy

The electron microscopy section functions within the division and is headed by Professor JI Phillips, an NRF-rated scientist. The electron microscopy section supplements the service work of the Pathology Division by determining the asbestos fibre concentrations in lung tissue to assist with the compensation process and by assisting with diagnoses using electron microscopy techniques.

The section carries out qualitative and quantitative analyses for the presence of asbestos fibres. Analyses are performed on bulk materials or on air samples obtained from filters. These analyses are performed for other divisions of the NIOH and external clients including national, provincial and local government and non-governmental

organisations, universities and private businesses. The section participates in an external quality assurance scheme and has maintained its satisfactory rating in the Asbestos in Materials (AIMS) international quality assurance scheme coordinated by the Health and Safety Laboratory (HSL) in the UK.

The service of analysing samples for asbestos was first offered in 2003. Since then, data generated from the samples submitted for analysis have been stored and entered into a database. This database is unique in South Africa and its interrogation provides information about the legacy of asbestos in the country.

Research

Research relevant to the health of South African workers is carried out by pathology staff. Material and data from the service provide much information for research projects. Current areas of interest centre on diseases of the lung, in particular with respect to dust, especially silica and asbestos. Tuberculosis is a particular problem in the mining industry and is a focus area for research.

During the course of the year Professor J Murray and Professor JI Phillips were asked by editors of scientific journals to be peer reviewers for research articles. Staff co-authored 11 articles in peer-reviewed journals and a peer-reviewed chapter in a book.

Professor J Murray and Dr N Vorajee chaired sessions and gave presentations at the 19th International Academy of Pathology meeting held in Cape Town in September 2012. Professor JI Phillips was on the organising and the scientific committees of the NHLS Research Summit held at Sandringham in February 2013.

The division collaborates with other divisions within the NIOH as well as with local and international researchers, fostering links with local and international institutions. These were the University of Pretoria and Witwatersrand University schools of Pathology, Public Health, Clinical Medicine and Archaeology; the Health and Safety Laboratory in the UK; the Occupational and Environmental Lung Injury Centre, Sheffield University, UK; the University of Wales, UK; Harlan Laboratories, Switzerland; Dokkyo University School of Medicine, Japan; the London School of Hygiene and Tropical Medicine; University College London, UK; the University of Washington in St Louis, USA; Washington University in Seattle, USA; the University of Idaho, USA; Brooklyn College, City University of New York, USA; and the University of Vermont, USA.

The division receives visitors from local and international institutions. In this reporting year visitors from abroad included Professor K Honma (Dokkyo University, Japan); Professor B Racette (University of Washington, St Louis); Professor F Pooley (University of Wales); and Dr P Sonnenberg (University College London).

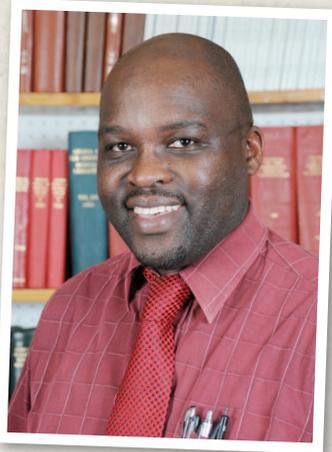
Teaching

The division plays a role in teaching and training through formal lectures to professional bodies, universities and teaching hospitals. Staff members participated in the mentoring, teaching and supervision of PhD and master's students at the universities of the Witwatersrand and Johannesburg. Teaching is also given to Diploma in Occupational Health students from the University of the Witwatersrand. Professor JI Phillips moderated examinations and chaired the Academic Advisory Committee of the University

of Johannesburg. Dr N Vorajee actively participated and presented cases at weekly clinical pathology meetings with doctors from the Johannesburg teaching hospitals. Registrars in pathology also rotate through the division as part of their specialist training. Specialised small-group training was given to healthcare professionals, organised labour, and mortuary and funeral parlour staff. In collaboration with the National Union of Mineworkers, staff conducted workshops focusing on lung disease and compensation. Professor J Murray is an associate professor in the School of Public Health at the University of the Witwatersrand; Professor JI Phillips is an associate visiting professor in the Faculty of Health Sciences at the University of Johannesburg and an honorary senior researcher in the School of Pathology at the University of the Witwatersrand.

Honours

The pathology laboratory is an accredited training centre for the Health Professions Council of South Africa's (HPCSA) intern medical scientists. Ms N Ndlovu and Mr S Milne are registered as PhD students in the School of Pathology, University of the Witwatersrand. They both hold a University of Michigan/Fogarty International Center Millennium Promise Programme Scholarship. Dr G Nelson received the Faculty of Health Sciences Prestigious Postgraduate Degree Award from the University of the Witwatersrand for research carried out in the division.



Mr Bonginkosi Duma
Quality Manager

The NIOH received an African Society for Laboratory Medicine (ASLM) award for accreditation during the ASLM congress.

Quality remains a priority at the NIOH with three laboratories (analytical services; immunology and microbiology; and pathology) maintaining their medical laboratories' quality and competency standards (ISO15189). The section conducted internal systems audits to prepare the laboratories for the annual external audit of the South African National Accreditation System (SANAS).

All the laboratories that process and test non-biological samples – the Occupational Hygiene X-ray Diffraction (XRD) laboratory, the microbiology laboratory (environmental testing), analytical services (water testing) and electron microscopy (soil testing) – will be applying for a new accreditation standard, ISO 17025, in the year ahead. Preparations have been made and they are ready for external assessment by SANAS. The Occupational Hygiene Division is currently preparing for ISO17020 accreditation, at the recommendation of the Department of Labour, which allows the division to act as an inspection laboratory.

The toxicology laboratory is in the final stages of preparing its research procedures to fall within the good laboratory practice (GLP) standards of the Organisation for Economic Cooperation and Development (OECD). This will ensure

the competence of our research methods and researchers. It also gives confidence to external funders in the quality of research that we produce. All laboratories hold monthly accreditation meetings, and internal audits are conducted at scheduled intervals throughout the year.

Professional development

An NHLS National Quality Assurance (QA) Workshop was held from 29 January to 1 February 2013 at Kromdraai, outside Muldersdrift. Mr Bonginkosi Duma attended this workshop on behalf of the NIOH. It was the first national workshop for the national QA department. The aim was to review thoroughly all QA processes with an emphasis on accreditation. This workshop had a direct impact on the strategic objectives of the organisation by reducing cost and harmonising processes within the national QA department. Regional quality managers acted as facilitators each day, with Mr Duma facilitating the last day of the workshop.

Honours

The NIOH received an African Society for Laboratory Medicine (ASLM) award for accreditation during the ASLM congress.



Professor David Rees

Head

The sub-section of immunology and microbiology continued to build its research agenda outputs, training programmes and services.

The division comprises two sections: Occupational Medicine, and Immunology and Microbiology.

Two very large surveys were done by the occupational medicine section over the year. The first was an evaluation of hearing conservation programmes in the iron and steel sector, which included an estimate of the incidence of noise-induced hearing loss, an audit of the strengths and weaknesses of activities to prevent and identify hearing loss, and the writing of reports with recommendations.

The second was an evaluation of the health of a large smelter workforce exposed to multiple hazards, arsenic prominent among them. The section continues to develop capacity in the field of occupational stress with a focus on identifying an appropriate tool for the evaluation of stressors to which South African employees are subject.

The Immunology and Microbiology section, headed by Tanusha Singh, continued to build its research agenda outputs, training programmes and services. Immunology and Microbiology

has a substantial research programme covering a range of issues of importance to South Africa, among them allergy to latex, allergy in poultry and spice workers, exposure to ultraviolet irradiation in the control of transmission of TB, and amoeba and amoeba-resistant bacteria in water sources. The supervision of postgraduate students has increased markedly, as has research output, with four peer-reviewed articles published during the year.

Occupational medicine

The section, headed by Dr S Kgalamono, is involved in teaching and training, research and service by way of clinical assessments and ergonomic risk assessments. It consists of the Occupational Medicine Referral Clinic and the Ergonomics Unit. The clinic has evolved from being mainly service-orientated to having a focus on key performance areas and quality assurance under the National Health Laboratory Service (NHLS), offering occupational medicine support and advice nationwide.

Doctors and scientists in the section continued to offer support to other sections within the NIOH and the Medical Bureau for Occupational

The clinic is the largest of the three specialist referral clinics in the country

Diseases (MBOD). The section also collaborated with the occupational hygiene section on a national project commissioned by the Department of Labour (DoL), which involved investigating hearing conservation practices in managing noise-induced hearing loss in the iron and steel industry.

Diagnostic services

Occupational Medicine Clinic

The clinic is the largest of the three specialist referral clinics in the country and receives referrals from a wide range of industries both within South Africa and from neighbouring countries. Apart from performing clinical assessments of workers referred for suspected occupational diseases and possible compensation, the clinic also provides professional consultation and advisory services on occupational health issues at a policy level and at an individual level for clinical management.

In the year under review, trade union members and small enterprises that were being targeted by the DoL to assess their health and safety practices were among the clients frequently seeking advice on occupational health issues. Clinical services remain a vital focus for the subsection and have become a source of revenue.

During the year under review, 177 new cases were assessed, of which the majority involved occupational respiratory diseases associated with various industries. Other cases concerned musculoskeletal, psychosocial and neurological disorders, mental diseases from occupational stress, and occupational skin allergies. All workers were seen as sentinel events, provoking a thorough investigation at the workplace to assess the possible causes of the diseases and to advise on changes in

the workplace to prevent exposure to other employees. Workers also were assisted with the submission of claims for compensation and medical management.

Numerous governmental entities have sought advice from the section on issues ranging from setting up an occupational health service within the public sector with limited resources to advice on specific employees' accommodation in the workplace and compensation issues.

The clinic has increased its provision of services in two strategic service areas, namely, mental health in the workplace, focusing on occupational stress, and disability assessments. These areas were identified as gaps in occupational health services within the country.

Special projects

Disability management project

A disability management referral service within the NIOH is in the process of being established in an attempt to keep up with global trends in occupational health. This service will address disability prevention strategy, rehabilitation, treatment and safe return-to-work programmes, in an effort to reintegrate people with mild to moderate disabilities back into the workplace.

The long-term objectives of this service are to improve knowledge and awareness among workers, managers and occupational health practitioners on the necessity of disability management as an integral part of occupational health. It also aims to develop a disability management service that conducts medical assessments and determines the level of disability

for mental and physical impairment. An informal situational analysis has been conducted to assess the current role players in the field of disability management and has included practitioners in the insurance industry, independent occupational health practitioners, medical practitioners in the mining industry, and occupational therapists. Lectures on the concepts of disability and disability management have been incorporated into the DoH programme as well as in the Diploma in Occupational Health curriculum for medical practitioners at the University of the Witwatersrand, to raise awareness among occupational health doctors.

Experts in the field have been identified to be members of expert panels contributing to the planning of this service. Job descriptions are being written in order to appoint the multidisciplinary team that will assist with this service. Occupational therapists with vocational training have been identified in different geographical areas in order to aid in the rehabilitation of disabled employees. The disability assessment service is targeted at employees, not covered by insurance, to assist in their re-integration into the workplace and coordination of rehabilitation.

Mental health in the workplace

Mental disorders have a high prevalence and are a leading cause of disability in many countries, including South Africa. The burden of these disorders is underestimated in low- and middle-income countries, despite the strong evidence regarding their social impact. South Africa lacks the capacity to deal with work-related mental health issues. Public health services are over-burdened and understaffed, and unable to adequately deal with mental health issues.

The NHLS, through the NIOH as a centre of excellence in occupational health, is strategically positioned within the public health system to take the lead in finding solutions for occupational health problems, strengthening the occupational health knowledge base and influencing policy decisions.

A study on occupational stress in a South African workforce is currently under way at the Chris Hani Baragwanath Hospital. In parallel with conducting research, the unit is recruiting a social worker, a psychologist and an occupational therapist with experience in mental health issues to start with policy formulation, needs analysis and intervention at the NHLS level and in the broader South African workforce. The staff in the unit will also help to strengthen human resource capacity in dealing with mental illness cases within the NHLS with assessments, management and accommodation in the workplace.

Research

Staff within the section have contributed substantially to research initiatives. Dr S Kgalamono is an editorial member of the local journal *Occupational Health Southern Africa* and has also been involved in examining a master's research project in emergency medicine for the University of the Witwatersrand.

A new research project in mental health seeks to test the reliability of an internationally recognised occupational stress tool in a local setting, to measure the prevalence and distribution of occupational stress and to analyse contextual risk factors of occupational stress. The study is being conducted at the Chris Hani Baragwanath Hospital and will be extended to the Hillbrow Community Health Centre complex within the new financial year.

Ongoing research projects are:

- Evaluation of the curriculum of the Diploma in Occupational Health for nurses;
- Evaluation of public occupational health services in South Africa;
- Evaluation of the health of about 2,000 employees of exploration and production company Namibia Custom Smelters in Namibia, who are exposed to a host of hazards, including arsenic.

Completed project:

- Evaluation of noise-induced hearing loss programmes in the iron and steel industry, in collaboration with the Occupational Hygiene Section. National data were collected and analysed and a report was presented to all stakeholders (employers, labour organisations and government). An accord was signed at a meeting at which all stakeholders committed themselves to health and safety principles with zero harm to employees.

Teaching and training

Formal and informal training activities have been used to strengthen capacity development and create awareness of occupational health within employers, workers groups and trade unions, health practitioners, government and other stakeholders.

Undergraduate

Staff at the clinic contribute to the Graduate Entry Medical Programme (GEMP) at the University of the Witwatersrand. Informal training has been conducted on specific topics for small groups of workers, union members, occupational health nurses, DoL inspectors and occupational medicine practitioners.

For example, training material was developed for targeted occupational groups such as mine medical practitioners for hand-arm vibration syndrome (HAVS), as well as for general practitioners based at several clinics within South Africa who are assessing ex-employees for asbestos-related diseases.

A programme is being developed to train primary healthcare nurses at the NHI pilot sites to recognise occupational diseases and injuries and to refer such cases to competent practitioners.

Postgraduate

The clinic, being the largest of the three occupational medicine clinics in the country, offers opportunities for the training of registrars and the refinement of clinical skills for other healthcare workers. Every year, public health registrars from the universities of Pretoria, Witwatersrand and Limpopo progress through the clinic for experiential learning in occupational health. The staff were also involved in conducting exams for specialists in occupational medicine on behalf of the Colleges of Medicine of South Africa. Three candidates from the universities of Cape Town and KwaZulu-Natal were examined at the NIOH. Other postgraduate teaching activities include teaching at the schools of Public Health at the universities of the Free State, Pretoria, Witwatersrand and KwaZulu-Natal.

Professional development

The section is currently training two full-time registrars in occupational medicine, both in their third year of training. The resident nursing sister is currently registered with the University of the Witwatersrand for the Advanced Diploma in Occupational Health Nursing.

Ergonomics Unit

The Ergonomics Unit is headed by B Nyantumbu-Mkhize and works in collaboration with the Occupational Medicine (OM) Clinic to provide clinical services for musculoskeletal disorders and hand-arm vibration syndrome. Ergonomic risk assessments are carried out as part of clinical assessments for cases referred to the OM Clinic for suspected work-related musculoskeletal disorders. The unit also engages in research and teaching and training activities. In the year under review, the unit increased its capacity by employing a medical scientist.

Services

Ergonomic risk assessments were carried out mainly in state-owned companies and computerised office environments. The requests for these assessments were reactive in nature; the workers had developed musculoskeletal problems prior to the assessments being conducted. Other ergonomic risk assessments were conducted in collaboration with other sections at the NIOH. All the suspected cases of hand-arm vibration syndrome came from the mining industry. The queries addressed came either from within the NHLS or externally from government departments and private companies.

Research

The head of the unit is an honorary lecturer at the School of Public Health at the University of the Witwatersrand and is involved in reviewing research protocols of MSc students. Ms B Nyantumbu-Mkhize also continues to be an editorial board member and reviewer for the journal *Curationis*. Two continuing research projects within the unit are: "Good

practice methods to prevent musculoskeletal disorders in South African healthcare workers"; and "Musculoskeletal disorders and associated factors in nurses and bank workers in South Africa: Cultural and psychological influences on disability".

Teaching and training

Formal and informal teaching and training on ergonomics topics are offered to occupational health practitioners, public health registrars, and undergraduate students, among other workers. Postgraduate teaching and training were offered to nurses and doctors registered for a Diploma in Occupational Health at the University of the Witwatersrand and doctors registered for a Diploma in Occupational Health at the University of the Free State.

Public health registrars on rotation in the Occupational Medicine Clinic received training in ergonomics and ergonomic risk assessment. Environmental health students from the University of Johannesburg were given practical ergonomics training. Informal teaching and training targeted workers from the NHLS, from state-owned companies and professional societies as well as DoL inspectors and mine medical practitioners. The unit conducted a workshop during the year, entitled "Ergonomics in the workplace: A proactive approach", which attracted many delegates from the private sector.

Professional development

Postgraduate candidates enrolled: one.



Dr Tanusha Singh
Manager

The division supports government's initiatives to prevent and reduce occupational diseases, functions as a resource for knowledge and expertise, and assists with relevant technical committees and programmes.

The section is headed by Dr T Singh and consists of three specialised units: Occupational Allergy, Bioaerosol Monitoring and Waterborne Pathogens. Although biological hazards in work environments have been around for more than a century, several events in the last decade, such as severe acute respiratory syndrome (SARS) and the 2009 influenza A (H1N1) pandemic, have renewed concerns for workers' safety. During the last two decades, occupationally acquired diseases have killed or debilitated thousands of workers; the exact numbers of fatal infections are not known. Work-related infection has been reported in the literature as the third-leading cause of occupational disease. The workplace is ideal for the proliferation of microorganisms and the spread of diseases as people spend approximately 90% of their time indoors. Congregate settings (e.g. prisons), poor personal hygiene habits (e.g. ignoring hand hygiene and inadequate best practices for dealing with coughing and sneezing), and the rapid spread of disease through international travel (e.g. when armed forces are posted to endemic areas) all lead to the increased likelihood of disease being introduced into the work environment. The division supports

government's initiatives to prevent and reduce occupational diseases, functions as a resource for knowledge and expertise, and assists with relevant technical committees and programmes.

Diagnostic services

The section provides a diagnostic service for occupation related respiratory and skin diseases. The clinical tests conducted have been accredited by the South African National Accreditation System (SANAS) under ISO15189:2007 since 2007 for the sixth consecutive year. The section also performs assessments of workplaces for hazardous biological agents and their monitoring in order to establish risk profiles, which provide evidence for recommendations of appropriate prevention and control strategies. Workers assessed for possible occupational respiratory or skin allergies were regarded as sentinel cases, which in some instances led to assessments to determine the source of exposure and also to establish if other workers may be similarly affected. Overall, the section increased the number of samples analysed over the previous year. Apart from the evaluations of health hazards, the section

The clinical tests conducted have been accredited by the South African National Accreditation System (SANAS)

also handled telephonic consultations ranging from information on workplace exposures to expert advice on appropriate tests to conduct hypersensitivity diagnosis. Several risk assessments for hazardous biological agents were also performed in various workplaces. The number of skin prick tests conducted increased from the previous year, with platinum being the most common allergen tested for. The section expanded its diagnostic capacity and introduced the inhibition assay of detergent enzymes.

A mobile skin allergy service was launched in Gauteng. Satellite dermatology rooms were established where patients could be tested. Apart from creating awareness of occupational skin problems through this initiative, we hope to be the testing laboratory for most dermatologists in Gauteng. The initiative is still in its infancy but is gaining in popularity. The section also provided sterility testing of nanoparticles for bacterial and fungal contamination. It is important to ensure that the nanoparticles are sterile prior to application. The section offered a new test for amoeba-resistant bacteria as part of its routine laboratory services.

These bacteria contaminate water distribution systems by bypassing treatment procedures when safely incorporated within the amoeba. The need to test the efficacy of ultraviolet germicidal irradiation (UVGI) units in reducing the TB bacilli load was identified. The section has been instrumental in providing such a service and has been working with partners from the Council for Scientific and Industrial Research (CSIR), and the universities of Pretoria and Cape Town. Feedback from patients was positive and reinforced the quality of the allergy testing service to workers.

Research

The section continued to deliver on its research agenda. This included nine NIOH-initiated research projects in the areas of occupational allergies, bioaerosols and amoeba-resistant bacteria, and one collaborative project. The section's collaboration with the University of Cape Town continued on the studies of occupational asthma in both the spice milling and the poultry industries. The section also contributed to the ultraviolet germicidal irradiation (UVGI) special project.

Occupational Allergy Unit

Concentrations of natural rubber allergens in gloves used by health professionals in South Africa

Study team: M E Ratshikhopha, T Singh, B Bello, A Wadee, M Jeebhay, A Lopata, in collaboration with NIOH, University of Cape Town, and Royal Melbourne Institute of Technology, Australia.

Natural rubber latex gloves are used by healthcare workers because of their satisfactory qualities; however, allergic reactions to the main latex allergens are commonly reported. This study demonstrated that of the 20 gloves tested, a very low proportion had the sum of Hev b 5 and Hev b 6.02 below the suggested threshold for low allergenicity.

Bioaerosol Monitoring Unit

Allergic sensitisation and work-related asthma among poultry workers in South Africa

Study team: T Singh, DO Matuka, E Ratshikhopha, P Dayal, M Jeebhay, A Lopata, K Renton, A Wadee, in collaboration with NIOH, University of the

Witwatersrand, University of Cape Town, and Royal Melbourne Institute of Technology, Australia.

Funding: Allergy Society of South Africa.

Poultry farm workers are exposed to a wide variety of agents that could cause respiratory disease. This study will examine agents that may lead to sensitisation and asthma in poultry workers. The intended benefits of the study are to educate workers on exposure as well as to make recommendations to reduce exposure in the poultry industry with the aim of lowering the prevalence of allergies and asthma.

Possibility of the occurrence and distribution of bacteria and fungi that cause skin and wound infection in the Johannesburg Forensic Pathology Services facility (collaborative project)

Study team: D Makhabela, O Matuka, T. Singh, in collaboration with the University of KwaZulu-Natal and NIOH.

The risk exists of contamination and exposure of employees and other people visiting the Johannesburg autopsy site due to biological exposure while autopsies are performed in the Forensic Pathology Service's facility. Cross-contamination from surface bacteria due to the lack of decontaminating material or improper handling or disposal of personal protective clothing such as overalls, gloves and shoe-covers may play a role. The aim of the study is to determine the presence of pathogenic bacteria and fungi in the autopsy area and their spread to other areas of the facility, and to investigate the factors affecting the presence and the numbers of these microorganisms and to determine the extent of occupational risk.

UVGI – Assessment of technology to reduce airborne MTB

Study team: T Singh, W Leuschner, P Dayal, in collaboration with NIOH and the University of Pretoria.

Despite the installation of UVGI units in many healthcare facilities, TB among healthcare workers remains a challenge. Inferior quality UVGI units have been installed in healthcare facilities without the efficacy of the units being tested. Furthermore, maintenance regimes, which are pertinent to the functioning of the units, are non-existent in many facilities. It is crucial for the matter to be studied so that an informed decision can be taken in an attempt to reduce MTB risk in health facilities and for the efficacy of these units to be established.

Ultraviolet germicidal irradiation (UVGI) in controlling transmission of *Mycobacterium tuberculosis* (TB) in the workplace

Study team: T Singh, M Zungu, B Kistnasamy, NIOH.
Funding: CDC, CSIR.

There has been increasing interest in UVGI as concern about the transmission of TB, and of multidrug-resistant (MDR) and extreme drug-resistant (XDR) TB is growing. UVGI has been adopted in congregate settings (such as hospitals and correctional facilities); however, the efficacy of the units has not been established. Preliminary work has begun in determining the ultraviolet irradiation and efficacy of a prototype unit. Discussions were held with key stakeholders and equipment suppliers in 2012 regarding the lack of standardisation as well as the maintenance and monitoring of these units. The meeting brief was to reach a resolution to the 2011 moratorium that prevented the procurement of UVGI equipment.

Waterborne Pathogens Unit

The occurrence of free-living amoeba and amoeba-resistant bacteria in water storage tanks and taps of households in five areas of Johannesburg, Gauteng province, South Africa

Study team: C Bartie, P Malaka (MTech student), in collaboration with NIOH and the University of Johannesburg.

Funding: Water Research Commission, Medical Research Council.

The NIOH is participating in the Health, Environmental and Development (HEAD) study, an initiative of the WHO Collaborating Centre for Urban Health. The aim of the study is to evaluate whether the quality of tap water used in five communities (Hillbrow, Bertrams, Hospital Hill, Riverlea and Braamfisherville) are adequate for human consumption. Confirmation tests have been conducted and the student is currently writing up his dissertation.

Investigating the occurrence and impact of amoeba-resistant bacteria in farming communities in Gauteng province, South Africa

Study team: C Bartie, C Kruger (DTech student), in collaboration with NIOH, University of Johannesburg, and Johannesburg Water.

Funding: Water Research Commission.

This aim of this study is to identify free-living amoebae and amoeba-resistant bacteria of the genera *Legionella*, *Mycobacteria*, *Vibrio*, *Salmonella* and *Shigella* as well as *E. coli* 0157 from container water and biofilms of 81 houses of farm workers in the Heidelberg area.

Potters for Peace filters will be installed in 50% of these houses, and the water quality will be monitored over time to determine whether the filters are useful in improving the quality of their drinking water.

If the filters are found to be useful, they will be installed in all the houses. The sampling has been completed and the student is busy with laboratory analysis.

An independent investigation of the purification capacity of small-scale water purification units manufactured and supplied in South Africa

Study team: C Bartie, TG Barnard, CA Robertson, MB Taylor, in collaboration with NIOH, University of Johannesburg, Water Research Commission, and the University of Pretoria.

Funding: Water Research Commission.

The aim of this study was to assess home water treatment devices sold in South Africa for their capacity to provide safe drinking water and to issue guidelines to enable consumers to make informed decisions when purchasing these units.

The study also aimed to evaluate the performance capacity of tap-mounted and jug-type purification systems currently available, particularly with regard to their ability to remove microorganisms under a variety of running conditions as prescribed by the National Standards Foundation and to compare findings with manufacturers' claims for their products.

Collaborative projects

Determinants of occupational allergy to spices among spice mill workers

Study team: M Jeebhay, A van der Walt, A Lopata, T Singh, R Baatjies, in collaboration with the University of Cape Town, the Royal Melbourne Institute of Technology, Australia, and NIOH.

Funding: Allergy Society of South Africa.

Workers in the spice-related industries are exposed to a variety of respiratory sensitisers; the aerosolisation of spice dust has been implicated in inhalant-related allergic reactions. The aim of the study was to determine the prevalence of and risk factors for allergic respiratory disease in spice mill workers. The study concluded that exposure to inhalable spice dust containing garlic and chilli pepper allergens increased the risk of allergic respiratory disease and asthma.

Teaching and training

Apart from extensive in-house training of staff in specialised techniques, the section also contributed to the development of human resource capacity by supporting the training of postgraduates, medical intern scientists and occupational hygiene students. The section also participated in an orientation and information session on its services and research on behalf of new occupational medicine registrars.

Staff actively participated in the section's journal club, which evoked constructive discussions about research methodologies. The section continued to invest in its staff,

further developing their strengths in various areas and thus improving the quality of the service provided. Staff attended several training courses both within and outside the organisation during the reporting period.

The section coordinated several formal workshops and ad hoc training for NIOH and national and international visitors including occupational health nurses, provincial coordinators, DoL inspectors, and dermatologists, and hosting lectures to undergraduate students at the universities of the Witwatersrand, Johannesburg and Pretoria.

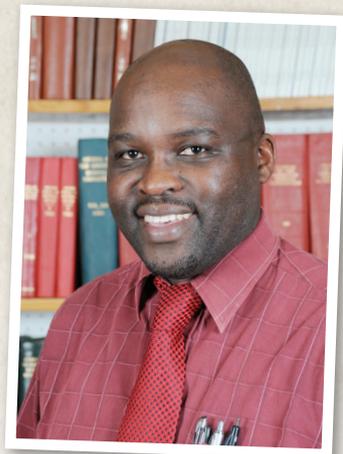
Presentations were also made to postgraduate students in the Master's in Public Health (MPH) programme at the universities of the Witwatersrand and Cape Town and in the DoH programmes at the universities of the Witwatersrand and Pretoria. Activities included facilitation, invigilation, marking of portfolios/examinations and the conducting of practicals.

The section contributed in addition to the airborne infection control course hosted by the Council for Scientific and Industrial Research and the University of Pretoria. An occupational allergy and asthma workshop was facilitated by the section in North West province and a successful workshop was conducted at the University of the Witwatersrand's dermatology department. The section also co-hosted a training workshop on personal protective equipment such as gloves and masks.

Professional development

Postgraduates enrolled: Five (one MSc, two MTech, two DTech).

Postgraduates graduated: one.



Mr Bonginkosi Duma

Head

The NHLS was invited by the ESBB to the second annual meeting, in Spain, and gave a presentation on biobanks in Africa.

The NHLS is a member of the International Society of Biobanking and Biorepositories (ISBER), represented by Bonginkosi Duma, and is part of the two working groups of ISBER. During the period under review, the NHLS made a presentation at the ISBER annual meeting in Vancouver, Canada. The NHLS is also part of the European, Middle East and African Society for Biopreservation and Biobanks (ESBB).

The NHLS was invited by the ESBB to the second annual meeting, in Spain, and gave a presentation on biobanks in Africa. The current ESBB president, Rita Lawlor, came to South Africa to visit the NHLS biobank and met with the NIOH executive and the NHLS CEO.

The NHLS is also part of the World Regions Forum (WRF), which is based within the Gauteng Premier's office. The WRF works on different projects with the Gauteng Premier, one of which involves biobanking. Bonginkosi Duma represents the NHLS on these projects. Several Biobank projects have been identified and are due to start in late 2013.

During the period under review, the NHLS Executive Committee approved the National Biobank structure and the decision was made to employ staff full-time at the Biobank. Some of the positions will be filled during the new financial year.

The NHLS Biobank is based at the NIOH and has been furnished with state-of-the-art, fully functional equipment as well as high-security measures. It has five freezers, which have a capacity of 40,000 specimens each. The freezers are already in use for a biobank storage project that is under way.

The NHLS is also part of the steering committee of the South African Biobank Network, which was established in 2012. The National Biobank Steering Committee has been tasked with creating a national biobank workshop later in the year. Terms of reference for the biobank committee were established at the meeting. The steering committee comprises representatives from the Department of Science and Technology (DST), the National Zoological Gardens, the NHLS and the Agricultural Research Council.

The NHLS Biobank has five freezers, which have a capacity of **40,000** specimens each



Ms Ina Naik

Head

The training unit contributes to the NIOH's strategic plan by providing specialised services to support the practice of occupational and environmental health

The training unit of the Occupational Health and Safety (OHS) department was established in January 2012 and is led by Ms I Naik. The training unit contributes to the NIOH's strategic plan by providing specialised services to support the practice of occupational and environmental health. Its core function is to be responsible for building capacity in the country through a variety of training programmes in occupational health and hygiene. The training conducted by the department primarily targets occupational health professionals through seminars, workshops and lectures. These programmes are meant for professionals and experts in occupational health and safety, for personnel in labour protection, and for people working in personnel administration and production.

The training offered by the NIOH strives to promote development of the work environment, work communities and organisations, to enhance the management of change, and to further occupational health and expertise in these respects in the workplace. Also included in the training are continuing education and supplementary courses that aim to maintain and develop professional skills.

The goals with regard to impact are:

- a healthy and safe work environment
- a healthy worker who works well
- a work community that supports healthy practices and well-being.

The following training courses were conducted during the reporting period.

Ergonomics in the workplace – a proactive approach

This training course was conducted in May 2012 and was held at the Sunnyside Park Hotel in Johannesburg. Sixty-five delegates attended, comprising mainly occupational health professionals, occupational therapists and physiotherapists. The lectures were given by Ms B Nyantumbu-Mkhize (head of the Ergonomics Unit, NIOH), Professor A Thatcher (associate professor of psychology, University of the Witwatersrand), Ms L Hunter (clinical physiotherapist, Netcare Rehabilitation), Dr AM van der Merwe (regional medical manager, Rand Mutual Assurance), Ms J Hutchings (director, Human Factors and Ergonomics Consulting), Mr A Todd (chairperson of the Ergonomics Society of South Africa), Ms N

Nkosi (director of Ergoworld Consulting), and Mr S Schutte (leader of the Occupational Health & Ergonomics Research Group at the CSIR), all experts in their respective fields.

Allergies in the workplace – a diagnostic approach

This workshop was held in July at the Sunnyside Park Hotel in Johannesburg and was attended by 22 delegates comprising both occupational health doctors and nurses. The lectures and demonstrations were given by staff from the Occupational Medicine and Immunology and Microbiology sections of the NIOH; Professor H Carmen (University of the Witwatersrand) presented a lecture on occupational skin diseases.

Substance abuse in the workplace

The workplace is increasingly being recognised as an important frontier in addressing substance abuse. Involvement by employers will not only help them to meet the requirements of the labour laws, but also makes good business sense as they seek to reduce costs associated with employee health, safety, productivity, decision making, employee morale, security, and organisational image and community relations.

This seminar was organised in partnership with Ms I Neate from Drug Testing Africa and held at the Sunnyside Park Hotel in August. The seminar was tailored to the occupational health setting and was attended by 67 professionals from various disciplines.

The training programmes listed above generated revenue for the NIOH from the registration fees charged.

Capacity building activities for occupational health professionals

Fundamentals in occupational health and hygiene: Hazardous biological agents and hazardous chemical substances

This seminar was organised at the NIOH for colleagues from the Department of Labour on 26–28 September 2012. The event was attended by 35 inspectors and the lectures were given by the Occupational Medicine, Occupational Hygiene, OHS, Training, and Immunology and Microbiology sections of the NIOH. Also present were Ms E Lourens (Department of Labour) and an external approved inspection authority (AIA) hygienist, Ms A Marshall.

Management of chemical exposures, simple and cost-effective solutions using Stoffenmanager as a risk assessment tool

This workshop was conducted in Delhi, India, on 28 February 2013, at the invitation of the organisers of the 1st International Conference on Occupational and Environmental Health (ICOEH). The workshop was held at the Maulana Azad Medical College in Delhi and was attended by 35 delegates from public health and occupational health disciplines.

Training support and capacity building within the NHLS

QMS lectures

During the period under review, the Training Unit developed and facilitated a series of

monthly quality management system (QMS) lectures, covering a variety of occupational health and safety related topics. The intention of these lectures was to build capacity within the NIOH and NHLS in the disciplines of occupational health and hygiene. Nine lectures were presented from May to October and included information on aspects of legislation, hazard identification and risk assessment.

HSR training online

Ms Naik also developed training material, in consultation with the OHS section, for the online health and safety representative training course, which was rolled out on the NHLS intranet during the year under review. Two hundred and sixty-five NHLS staff members registered for the course and completed assessments for the modules for which they had registered.

Strategic initiatives in occupational health

During the reporting period, Ms Naik delivered a lecture to public health professionals at the University of Pretoria on the Compensation for Occupational Injuries and Diseases Act (No. 130 of 1993 as amended).

In February 2013, Ms Naik gave a talk held at the Sunnyside Park Hotel on the “Management of chemical exposures using Stoffenmanager as a risk assessment tool”, at the invitation of the Centre for Sustainability in Mining and Industry, to a group of delegates from the Department of Labour and mine health and safety representatives.

During the last quarter, Professor L Nickels, from the National Institute for Occupational Safety and Health (NIOSH) in the United States, visited the OHS Training Unit to work on the development of the curriculum for training public healthcare nurses to identify occupation-related diseases.

During the same period, Ms Naik was invited to present a paper titled “Management of chemical exposures in the workplace: Role of a biological monitoring laboratory” at the 1st International Conference on Occupational and Environmental Health held at the National Science Academy, Delhi, India.



Mr David Jones

Manager

The occupational medicine practitioners and ergonomists at the NIOH continued to provide guidance and expert medical support to specific cases and policy development.

The NHS's occupational health, safety and environment services section successfully settled in at its new premises, the NIOH, and continued to strengthen the occupational health services for all employees within the NHS. The advantage of this arrangement is the availability of specialist support from the various sections within the NIOH, notably the occupational hygiene, occupational medicine, and immunology and microbiology sections.

The year under review saw the occupational medicine practitioner, who had been recruited by the department, "headhunted" by the mining sector. However, the post has been re-advertised and interviews are being planned. The four vacant occupational health nurse manager positions, which have never yet been filled, have also been re-advertised. All vacant safety health and environment (SHE) officer positions have been filled. The department hopes to fill these positions in the new financial year.

Clinical

The occupational medicine practitioners and ergonomists at the NIOH continued to provide guidance and expert medical support to specific cases and policy development.

The only occupational health nurse manager, who was based at the NICD Clinic, has expanded services to include the corporate head office and the NIOH. The services offered by the clinic included: risk-based pre-placement and baseline medical examinations; medical screening, which embraced spirometry and audiometric testing (partially co-ordinated through a service provider); and vaccinations and managing general and chronic patient clinic visits.

Waste generators

The National Waste Information Regulations were promulgated and came into effect on 1 January 2013. These regulations, promulgated under the National Environmental Management: Waste Act (No. 59 of 2008), imposed a requirement on the NHS to regulate the collection of data and information relating to hazardous waste generated within our facilities. To ensure compliance, the section embarked on the dissemination of an information document relating to the contents of the regulation as well as a step-by-step guide to completing the online registration process. The registration process is being driven and monitored by the SHE officers in the regions.

One of the highlights of the year was the development of a baseline survey targeting 15% of the employees of the NHLS

Special investigations and NIOH support

There was continued specialist support from the various departments in the NIOH including occupational hygiene, occupational medicine, and immunology. The expert opinion and guidance provided related to:

- A facility that had leaked and was experiencing problems with mould;
- The ongoing reduction of allergens in gloves. This process resulted in procurement being asked to remove several makes of latex gloves from the list of consumables available for use on the Oracle IT system;
- The indoor air quality of offices;
- The fit testing of N95 respirators for staff;
- Compliance with legal requirements regarding medical surveillance following a Department of Labour visit;
- Noise surveillance;
- The ongoing maintenance of an asbestos register;
- Laboratory air monitoring;
- Ergonomic assessments.

Occupational Health Information System

The health information system OHASIS (Occupational Health and Safety Information System), which is being used in the NHLS, is now being migrated from being paper-based to an online health information system.

The intention is to streamline the capturing of sentinel health incidence data within the organisation by allowing this information to be captured immediately, on site, by the health and safety representatives or nominated staff.

Currently, the process requires that facilities complete forms and then forward them to the SHE officer for capturing by OHASIS. The process of training the health and safety representatives to use OHASIS is already under way and the roll-out process should be finalised during the 2013–2014 financial year.

In the OHASIS agreement with the University of British Columbia (UBC), Vancouver, Canada, the NHLS was given the right to roll out OHASIS to any other African country.

At present, interest has been shown by Ghana but nothing has transpired. In partnership with UBC, the NHLS continued to support the roll-out of OHASIS in the Free State provincial Department of Health, specifically at Pelonomi Hospital.

One of the highlights of the year was the development of a baseline survey targeting 15% of the employees of the NHLS, prior to the roll-out of OHASIS as an online reporting system.

This survey was conducted in collaboration with the epidemiology, IT and communication divisions. The survey was anonymous and participants were drawn from all sections and employment categories in the NHLS.

Questions were divided into five broad sections, namely: demographics, the workplace and experiences relating to health and safety, occupational health and safety training, workplace hazards, and occupational health and safety procedures and barriers. It is intended to rerun the survey in two years' time to see if the implementation of OHASIS and additional health and safety systems have made a significant difference in the lives of employees.

Information on the incidents that were recorded in OHASIS, for the period under review, is reflected in Figure 1.

Audits and risk assessments

During the period under review, the SHE officers continued the auditing of facilities across the NHLS. The audits were based on the type of information that would be consulted by the Department of Labour. In the reporting year, 244 safety audits were conducted.

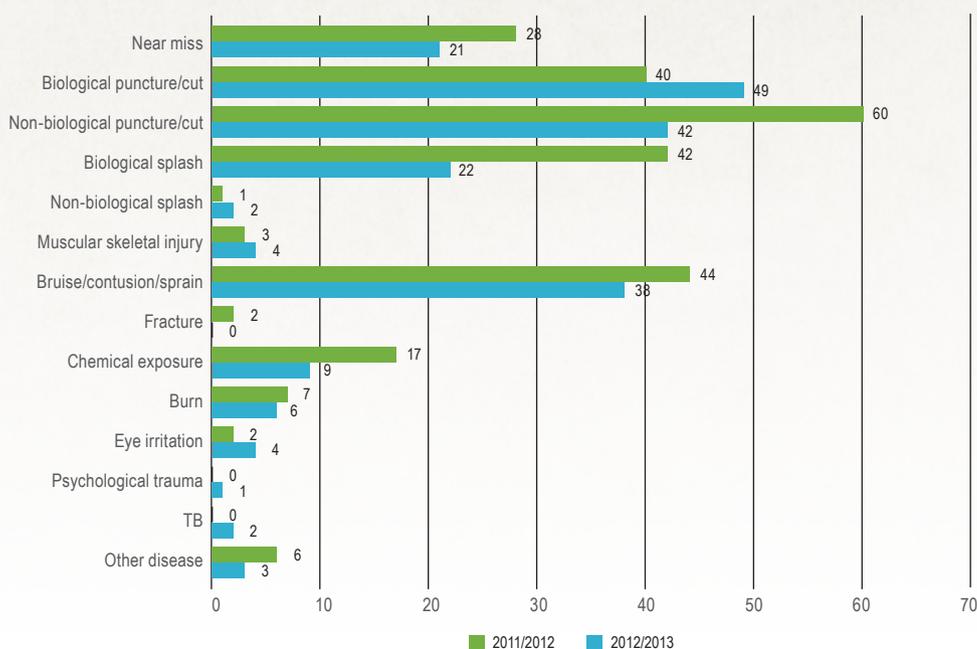
To assess the level of risk in the various facilities, 171 different risk assessments were evaluated; of these, 98 were found to be satisfactory. To assist the facilities, SHE officers conducted 93 risk assessments to ensure compliance. These risk assessments will eventually provide information to the occupational medicine practitioner, who can design a medical surveillance programme that will be risk based.

SHE policy and HIV/TB policy

The roll-out and communication continued of the SHE policy, which was signed by the CEO and reported on in the previous financial year. The SHE policy was published on Q-pulse and facilities were requested to display the signed policy, in line with legislation. This compliance was monitored during the safety audit process conducted by the SHE officers and will be an ongoing item on the audit checklist. This section also worked on an HIV/TB policy with the HIV/TB in the Workplace section of the NIOH.

AZT/3 TC starter packs continue to be ordered, with the assistance of South African Vaccine Producers (SAVP), and are then distributed by the section. These packs are for staff that may by accident have been occupationally exposed to biological material. The distribution of the starter packs is done after counselling and testing and includes visits to medical professionals.

Figure 1: Numbers of incidents recorded in OHASIS in 2011/2012 and 2012/2013.



Flu vaccines

Influenza vaccination was offered to all NHLS employees during the period under review. This is part of a collaborative programme with the corporate HR wellness initiative.

Training

Health and safety representative (HSR) training

The highlight of the year was the establishment of the online HSR training platform. This training course aims to educate and equip health and safety representatives. The training was covered in five modules, which were offered online and accessed via the NHLS intranet. Each module had an assessment, which was marked by the SHE officers at the end of each training period.

The advantages of conducting the training in-house and online are that the participants can work at a time when they are less busy and the NHLS can save on travel and accommodation costs. Another advantage is that the training material can be presented in a manner that is relevant to a laboratory environment and saves on the cost of sending staff to external service providers.

Training and presentations

The SHE officers gave a total of 47 training presentations within their respective departments. The topics included safety orientation/induction, healthcare risks, OHASIS, business manager meeting presentations, management review meetings and evacuation drills.

In consultation and collaboration with the NHLS Quality Assurance Division, Ms M Morgan and Ms A Potgieter participated in a training programme aimed at strengthening laboratory safety in Swaziland. The training was for the University Research Council of Swaziland and funded by the Centers for Disease Control and Prevention (CDC) in the United States.

Mr Jones presented a paper to the Infection Control Africa Network entitled: "The implementation and evaluation of OHASIS, a health information system in a health laboratory service, an overview of the OHASIS health information system".



Dr Muzimkhulu Zungu
Head

The unit has successfully managed to enter into a partnership with the International Labour Organisation in order to develop a comprehensive HIV/TB workplace programme for the NHLS.

The HIV/TB in the Workplace Unit is a nascent entity within the NIOH and is in its second year of operation.

The unit has filled three positions out of five approved posts; since July 2012 these are the section head (public health medicine specialist) and two scientist posts. The unit is one of a few of its kind within South Africa that provide services, research, and teaching and training for HIV and TB in the workplace.

Services

NHLS HIV/TB workplace programme

The unit has successfully managed to enter into a partnership with the International Labour Organisation in order to develop a comprehensive HIV/TB workplace programme for the NHLS.

The support of this partnership, together with assistance from sections within the NIOH, labour unions and NHLS management, allowed for the unit to produce a signed policy for HIV/TB in the workplace, an HIV/TB KABP (standing for knowledge, attitudes, behaviours and

perceptions) survey and an HIV prevalence survey. The unit also established an HIV/TB workplace programme committee and a draft HIV/TB workplace programme strategy for the NHLS during the period under review.

TB in the mines

The unit has been a technical representative of the national DoH in the Southern African Development Community (SADC). At the SADC Technical Working Group the unit, together with other technical experts, produced the SADC Declaration on TB in the Mines, which was signed in August 2012 by Heads of State.

The unit continues to work with SADC in finalising the SADC Code of Conduct on TB in the Mines, which will guide the implementation of the SADC declaration.

Within South Africa the unit is participating across multiple platforms that address TB, silicosis and HIV in the mines, including a mining-led initiative on the control of TB in mines.

The unit is a nascent entity within the NIOH and is in its second year of operation

Technical support to government departments

The HIV/TB in the Workplace Unit has played an active role in supporting the DoH, especially the Medical Bureau for Occupational Diseases (MBOD) and the Compensation Commissioner for Occupational Diseases (CCOD). Dr M Zungu, who heads the section, was appointed both acting director of the MBOD and an assistant Compensation Commissioner of the CCOD. With the office of the executive director, the unit coordinated the health response of South Africa during the period of the Marikana tragedy. The unit also provided technical support services to the departments of Mineral Resources, Labour, Energy, Environmental Affairs and several provincial departments of health, as well as to occupational health coordinators and their programmes.

Collaboration and partnerships

The unit, albeit small and new, has fostered promising relations and is working on several initiatives with:

- the World Health Organization, on a project to introduce occupational health services at primary health care (PHC) level, in line with both the National Health Insurance and the re-engineered PHC system;
- the World Bank and SADC on the control of TB in mines, both in South Africa and in the SADC region;
- the International Labour Organisation (ILO), in the development of HIV/TB workplace programmes; and
- the University of British Columbia, in strengthening occupational health services for healthcare workers in the Gauteng and Free State provinces.

Teaching and training

In the review period of 2012–2013, the unit successfully hosted registrars in public health medicine from the universities of Pretoria and Limpopo. Furthermore, the unit trained a PEPFAR Fellow for a 12-month period in establishing HIV/TB workplace programmes. Staff of the unit provided teaching to both undergraduate and postgraduate students at the School of Health Systems and Public Health (SHSPH) of the University of Pretoria, as well as at several public and private institutions.

Dr Zungu has been made a joint appointee at the SHSPH. The unit also conducted a workshop for the NHLS on the establishment and development of an HIV/TB workplace programme. Staff participated in meetings of the Colleges of Medicine of South Africa, at which the training of undergraduate medical students in public health was discussed.

Research

The unit conducted the NHLS HIV Prevalence Survey, together with researchers from the SHSPH; the completed survey results will be shared internally with the organisation.

In partnership with UBC, the unit finalised research on “strengthening competencies to prevent occupational tuberculosis: lessons from an international collaboration in the Free State, South Africa”. Staff participated in and presented posters and oral presentations at the following conferences: the International Commission on Occupational Health (ICOH) in Mexico, the Africa–Canada Forum in Uganda, and the Public Health Association of South Africa (PHASA) conference in Bloemfontein.



Dr Danuta Kielkowski

Head

The section conducts both simple and complex data analysis and interpretation of results.

Areas of expertise are study design, collaborative field surveys, teaching of occupational epidemiology and research on exposure and disease in the workplace.

The Epidemiology and Surveillance Section (ESS) provides key support for many of the projects conducted at the NIOH but it also conducts its own research into occupational health topics of national importance. The section uses the skills acquired in epidemiology and surveillance to design studies, surveys and questionnaires, to train fieldworkers in the administration of the questionnaires, and in data collection. The ESS also provides training to health professionals in basic epidemiology, and its staff mentor junior researchers.

The section conducts both simple and complex data analysis and interpretation of results. Areas of expertise are study design, collaborative field surveys, teaching of occupational epidemiology and research on exposure and disease in the workplace.

The focus of the section in 2012 was more on collaborative support for NIOH projects and government departments than on independent research. This allowed the section to work towards the mandate of supporting strategic development and research on nationally important needs.

Private pathology services

During the financial year, strategies were implemented at the NHLS laboratory at the Charlotte Maxeke Academic Hospital, Johannesburg, to provide pathology services to private sector clients. Systems and work flow were re-organised, staff were recruited and test runs were practised to meet the agreed-upon turnaround times. These improvements will greatly advantage both the public and private sector services of the NHLS.

Support for national and provincial government departments

The epidemiology section played a role in many of the projects conducted at the NIOH on behalf of government departments.

These projects ranged from data support for the Compensation Commissioner for Occupational Disease (CCOD) to epidemiological support for the noise-induced hearing loss project awarded to the NIOH by the Department of Labour (DoL), as well as Mine Health and Safety Council tenders.

The section also worked closely with the Occupational Health Unit of the Gauteng provincial Department of Health by conducting data analysis and compiling a report on a survey of employee wellness centres in Gauteng healthcare facilities.

A manuscript on a pilot TB surveillance study conducted in Gauteng healthcare facilities was prepared for publication. Analysis of data from a follow-up investigation on the management of occupational health and safety of hospitals in the province was also conducted. A final report on the results was produced for the Occupational Health Unit within the Gauteng health department.

The epidemiology section prepared, in addition, a manuscript on danger pay in answer to a parliamentary question and conducted data analysis on paid compensation claims for the 2010 annual report of the Compensation Commissioner for Occupational Diseases in Mines and Works.

The section also prepared a short report on cases of occupational disease among miners from Botswana. Ongoing support was also given for the upgrade of the data management system of the CCOD.

During the period under review, two members of the section sat on the sectoral working group committee for the preparation of the 2012 Millennium Development Goals report.

The epidemiology section also provided statistical support for projects conducted by the Department of Public Service and Administration.

Support to the national Department of Health

Dr E Singh provided management and governance support to the Medical Bureau of Occupational Diseases (MBOD) and the CCOD. Dr Singh also managed the additional personnel seconded by the Department of Health to assist with the business re-engineering of the MBOD/CCOD, and with the compilation of the CCOD annual report.

The concept of the National Public Health Institutes of South Africa (NAPHISA) aims to amalgamate various South African organisations involved in public health activities under one umbrella body. Dr Singh has been closely involved with the establishment of NAPHISA from concept development to current pre-implementation processes.

Support for NIOH projects

Work continues with implementing an occupational health and safety information system (OHASIS) for the NHLS. A baseline survey was designed and conducted via the internet.

The epidemiology section provided a study and questionnaire design for this project along with data analysis and the issuing of a report.

The survey was conducted with the aim of generating a baseline for the NHLS on training, behaviour and experience of the occupational health system within the organisation. This survey will be repeated in 24 months to measure the changes following the implementation of online access to OHASIS.

Support was provided for the Tsumeb project, in collaboration with the Occupational Medicine Section, through occupational medicine baselines, which will be conducted there for all occupational hazards at its smelter operations. Questionnaires were designed and training was provided to the study nurses on data collection. The Epidemiology Unit continued to provide management for the Ekurhuleni project along with many visits to participating hospitals to encourage and provide information on cancer registration data within the Ekurhuleni municipal district.

A newsletter was produced with up-to-date figures for reporting by each hospital in the municipality, and statistics of the 2,004 reported cancers were prepared for contribution to the National Cancer Registry report.

Teaching and training

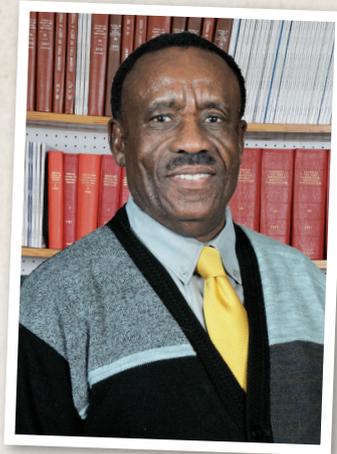
The epidemiology section engaged with Diploma in Occupational Health students by providing an introductory lecture on epidemiology, a one-week course with practical exercises on freeware software for database development and on the basic analysis of data. Training was provided to interns stationed at the MBOD and the CCOD on data, PI Info software, and data capturing and management.

Dr E Singh supervised two public health medicine registrars rotating at the NIOH and NCR. Dr Singh has also provided teaching support to both Schools of Public Health at the universities of the Witwatersrand and Pretoria.

Dr Singh currently serves as the on-site supervisor for a South African Field Epidemiology and Laboratory Training Programme (SA-FELTP) student during her placement at the National Cancer Registry.

Honours

Dr P de Jager won the University of the Witwatersrand Health Sciences Faculty research prize for best student oral presenter on the subject: "Cost and cost-effectiveness of conventional and liquid-based cytology: A laboratory service provider perspective".



Mr Gopolang Sekobe

Head

The section has made a considerable investment in facilities, equipment and skills over the last few years and is now in a strong position to provide valuable input to the occupational hygiene needs of the SADC region.

The Occupational Hygiene section provides professional occupational hygiene services to national and provincial government departments, industry, and private clients as well as support for occupational health and safety initiatives within the NIOH and NHLS.

During the period under review, the section was involved in training, service and research projects. Teaching activities included academic support for undergraduate and postgraduate students at the University of Johannesburg and University of the Witwatersrand. Effort has continued to be put into the development of section staff and the expansion of the capabilities of the Occupational Hygiene section. The section's two interns, supported financially by the Department of Science and Technology, continue to participate in the section's activities.

The section has collaborated with other NIOH entities in: (a) nanoparticles research projects with the toxicology section, and (b) noise control and hearing conservation practices of eight steel manufacturers, carried out together with the occupational medicine section for the Department of Labour.

The section staff authored a journal publication, "The history of air sampling practices in gold mines and the way forward", for the Mine Ventilation Society of South Africa's 2013 conference proceedings. Two staff members attended and presented at international conferences and one presented at a national conference.

The section has made a considerable investment in facilities, equipment and skills over the last few years and is now in a strong position to provide valuable input to the occupational hygiene needs of the SADC region.

Accreditation with SANAS, as required by the DoL, is currently in progress. The section will continue its efforts to provide occupational hygiene support in the form of training, advice, risk assessments and exposure monitoring to the national and provincial departments of Health, Labour, Minerals and Energy, National Defence, and Environmental Affairs.

Occupational hygiene services

Occupational hygiene risk assessments, audits, surveys and advisory services were provided for 66 organisations, both public and private; this represents a 50% increase over the previous year.

The section's services aim to provide recommendations that will contribute to improved occupational health in all workplaces. Improved health at work increases productivity and reduces expenditure on national "ill health".

The Occupational Hygiene section produced 39 reports on conditions in a wide range of workplaces including: port facilities in Lüderitz, Namibia; foundries; laboratories; offices; and informal businesses in Bree Street, Johannesburg and in Orlando, Soweto, in Gauteng. The reports all include and focus on practical recommendations to reduce occupational health hazards in the workplace.

The section participates in two international quality control schemes: the Respirable Crystalline Silica International Quality Assurance of the Health and Safety Laboratory (HSL) in the UK; and the Institute for Occupational Medicine's AFRICA asbestos proficiency testing scheme. The latter has awarded the section a "level 1" grading (corresponding to "Good").

The X-ray Diffraction/FTIR Laboratory functions within the Occupational Hygiene section and is headed by Ms T Madzivhandila under the supervision of the section head. Dust and solutions are analysed to determine workplace risk.

Three posters were made to further the research and service aims of the laboratory. Sixty bulk dust samples collected from gold, platinum, coal, and diamond mines were analysed for quartz using X-ray diffraction/FTIR.

Research

Evaluating the effectiveness of the respiratory protection programme at NHLS Laboratories

Title: A survey of South African facial characteristics and respirator fit test.

J Manganyi leads the NIOH study team.

To date, 230 NHLS laboratory employees have been fit-tested for their respirators. Reports were sent to laboratory managers to ensure good laboratory practice for their respirator protection programmes. The preliminary results were presented in 2012 at the National TB conference and the International Occupational Hygiene Association (IOHA) conference.

Reproductive health risk

Title: Reproductive health risk evaluation in NHLS histopathology laboratories.

Led by G Mizan.

The aim of this study is to assess the potential reproductive health risks related to various tasks currently performed in NHLS histopathology laboratories.

The procedure being developed uses information from the literature, field observations, interviews and measurements to determine risk to the health of employees.

Nanoparticles

Title: Occupational exposure assessment for nanoparticles.

Led by G Sekobe.

The programme was initiated to determine a standard for risk assessment of gold nanoparticles at acute, subchronic and chronic exposures in in vitro and in vivo studies as specified by the Organisation for Economic Cooperation and Development (OECD). The section works in collaboration with the Particle Toxicology/Nanotoxicology Unit.

Title: An approach to occupational exposure assessment of metal oxide nanomaterials during their synthesis in research laboratories.

This study has been approved for funding by the National Research Foundation (NRF). The aim is to assess potential exposure to nanomaterials during the synthesis process.

Noise

Title: Study of noise-induced hearing loss in the primary iron and steel industry.

The noise control and hearing conservation practices of eight steel manufacturers were audited, in association with the NIOH Occupational Medicine Section, for the Department of Labour. The project has been completed and the final confidential report on noise-induced hearing loss in the iron and steel industry study was submitted to the department on 13 December 2012.

Teaching and training

Forty undergraduate environmental health and BTech students from the University of Johannesburg (UJ) visited the NIOH for a short practical training course entitled "Introduction to Occupational Hygiene and Practical Measurement". Three BTech students from UJ spent a week at the NIOH for their experiential training, during which they learnt to carry out risk assessments.

Postgraduate teaching and training activities included course management, student supervision and teaching, and practical support for the Master's in Public Health (Occupational Hygiene) degree at the University of the Witwatersrand. Support is also given to the University of Pretoria's School of Public Health where staff members act as external examiners for the mini-dissertations of the MPH students.

A risk assessment training workshop was also held during the year for 29 Mpumalanga provincial health department personnel.

Professional development

Master's in Public Health (Occupational Hygiene) students: two registered.



Dr Boitumelo Kgarebe

Head

The advisory services component encompasses advice to occupational health practitioners and employers on matters relating to environmental and biological monitoring of chemical exposures in the workplace.

The Analytical Services section provides specialised laboratory tests, research, advisory services and training to support private industries, government departments, and academic institutions in occupational and environmental health. The main responsibility of the section is to build capacity in the analysis of hazardous substances present in environmental and biological media as a way of assessing workplace exposure to meet the requirements of the Department of Labour's regulations on hazardous chemical substances.

The section supports research projects of national importance, provides advice to the private and public sectors and trains undergraduate and postgraduate students on biological monitoring for chemical exposures. The section further targets occupational health professionals through the provision of seminars, workshops and lectures. In-service training programmes for students completing a diploma in biotechnology or analytical chemistry, as well as internship training for students with BSc (Hons) degrees in chemistry, focus on preparing students for employment in a laboratory setting. The advisory services component encompasses advice to occupational health practitioners and employers on matters relating

to environmental and biological monitoring of chemical exposures in the workplace.

Diagnostic services

A total of 12,294 tests (for diagnostic and research purposes) were analysed during the reporting period. The tests included analyses on serum, blood, urine, soil, paint, medicines, turpentine, thinners and water samples. Most of the organic assays conducted on biological samples were for hexanedione, hydroxypyrene, mandelic acid, methylhippuric acid, methyl ethyl ketone, o-cresol, phenol, toluene diaminei socyanates, organophosphate metabolites, toluene, benzene, trichloroacetic acid, t,t-muconic acid and methylene diphenylisocyanate. Assays conducted on toxic metals were mainly for aluminium, arsenic, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, uranium, vanadium, and zinc in serum, blood, and water samples.

New developments

In line with increasing its scope of activities and analyses, the section developed new methods to measure aluminium in urine, metals in medicines,

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and benzene and methanol in blood, respectively. The method for chromium in blood was modified. Furthermore, a new ICP-MS instrument has been purchased and is currently being installed.

Accreditation

The Metals and Organic units maintained their ISO15189 accreditation status. A total of 11 tests were accredited to the Metals Unit and six tests to the Organic Unit. The Metals Unit tests include: aluminium in serum; cadmium, lead, mercury, chromium, creatinine, and arsenic in urine; and cadmium, lead, manganese, and mercury in whole blood. The Organic Unit's accredited tests include: mandelic acid, phenol, o-cresol, hexanedione, 1-hydroxypyrene and methyl hippuric acid in urine.

The validations for the following environmental methodologies were completed: aluminium, arsenic, and mercury in water. Regular internal audits were conducted throughout the year to maintain quality in the laboratories.

Participation in the External Quality Assurance (EQA) programme included:

1. New York State Department of Health for arsenic, cadmium, chromium, lead, manganese and mercury in blood and urine;
2. The German EQA programme for mandelic acid, nickel, phenol, o-cresol, hexanedione, 1-hydroxypyrene and methyl hippuric acid in urine and aluminium in serum;
3. The Thistle EQA programme for creatinine in urine; and
4. The LAMP Programme of the US CDC for cadmium, lead and mercury in blood.

Research projects

Paint samples (56) from the Department of Health were analysed for lead. A large percentage (39%) of the samples had levels above the prescribed

level of 1 mg/g Pb. A follow-up of spray paints received from a private retailer showed that two makes of paint manufactured locally contained lead and two spray paints manufactured abroad did not contain lead.

Medicine samples comprising 44 tablets and nine powders were analysed for metals (Hg, Pb, Al, Cr, Cu, Mn, As, Cd, Fe, Ni, Zn, Se, Co, Mo and V) for the Department of Health.

Teaching and training

Ms K Channa was invited to present her research findings at the 1st International Conference on Occupational and Environmental Health, on "Pesticide exposure in South Africa," from 1–2 March 2013, in New Delhi, India. Ms Channa, together with the training department, conducted a workshop on "Management of chemical exposures, simple and cost-effective solutions using Stoffenmanager as a risk assessment tool" on 28 February 2013, in New Delhi.

Honours/recognition

The division continues to serve as a reference laboratory for the German External Quality Assessment Scheme (G-EQUAS) as a result of its continued good performance in the determination of 2,5-hexandione in urine.

Professional development

The section continued its collaboration with the Vaal University of Technology by providing experiential training for students studying for the Diploma in Analytical Chemistry or Biotechnology. Four students – two in the organic and two in the metals laboratories – have since completed their training. Two scientists are currently undergoing their internship training in clinical chemistry (analytical chemistry).



Professor Mary Gulumian

Head

The NIOH Nanotoxicology Strategic Plan, established in 2009, has created the opportunity to conduct work pertaining to the toxicity of incidental and manufactured nanoparticles.

Nanotoxicology

The NIOH Nanotoxicology Strategic Plan, established in 2009, has created the opportunity to conduct work pertaining to the toxicity of incidental and manufactured nanoparticles. Within this programme, the toxicology section has completed phase I of the project on nanotoxicology and the risk assessment of gold nanoparticles. In addition, it has completed a project on incidental nanoparticles and continued with the remaining two projects. Results obtained from these projects were published in two book chapters, three scientific papers, and three research reports during the year under review.

Research projects

Research projects begun in 2009 within the Nanotechnology Strategic Plan were continued. These projects focused on investigations of the toxicity of incidental as well as engineered nanoparticles. Investigations on incidental particles included those collected from different gold, platinum, coal and diamond mines and from a manganese smelter, as well as from gold mine tailings in and around Johannesburg. In addition, the Mine Health and Safety Council has funded four research projects, which the NIOH will be leading.

Research on engineered nanoparticles

Investigations continued on engineered nanoparticles (mainly gold nanoparticles); this project was initiated within the sponsorship programme of the Organisation for Economic Cooperation and Development (OECD). Projects begun within this programme have involved several research centres: NIOH (Professor M Gulumian), Mintek (Dr R Tshikhudo), and the universities of Johannesburg (Professor Victor Wepener) and North West (Professor A Grobler). The programme was funded by the Department of Science and Technology (DST). The following projects were initiated by the NIOH Toxicology Section within this programme.

Assessing the potential toxicity of charged peptides used as a coating material on gold nanoparticles

This study assesses the in vitro toxicity of manufactured gold nanoparticles. Results from these investigations will guide further studies into the mechanisms of toxicity of gold nanoparticles. The project is conducted by Mr K Boodhia under the supervision of Professor Gulumian.

An in vitro study of the effects of functional groups on the toxicity of gold nanoparticles

This study will investigate the in vitro toxicity effect of gold nanoparticles, modified with different functional groups, on cells to alter biological functions and to ascertain the role of the functional groups and surface moieties as key factors in the different cytotoxic mechanisms. The project is being conducted by Ms N Tlotleng under the supervision of Professor Gulumian.

In vitro assessment of the toxicity of gold nanoparticles

The aim of this study is to assess the in vitro toxicity of different-sized and functionalised gold nanoparticles through measurement of various endpoints and via elucidation of mechanisms of toxicity. Initial results suggest that gold nanoparticles may be genotoxic to animal cells but not to bacterial cells. The project is being conducted by Ms M Vetten under the supervision of Professor Gulumian.

Inter-laboratory comparison of the colony-forming efficiency assay for assessing cytotoxicity of nanomaterials

The colony-forming efficiency (CFE) assay is a non-colorimetric method to determine cytotoxicity. It is based on the ability of viable cells to form colonies. The purpose of the study is to determine the in vitro cytotoxicity induced by selected nanomaterials. The project is being conducted by Ms Vetten under the supervision of Professor Gulumian.

The biodegradation half-lives of gold nanoparticles

The aim of this study is to investigate the degradation half-lives of core AuNPs as well as their surface ligands in simulant biological

fluids in vitro over a period of 90 days. The test materials mimic phagolysosomal, lung epithelial lining, artificial lung lining, gastrointestinal, synovial, saliva, sweat and human blood plasma simulant fluids in vitro. The project is being conducted by Mr S Xaba under the supervision of Professor Gulumian.

Assessment of exposure to nanoparticles in research laboratories

The assessment of exposure was conducted in a laboratory dedicated to research and development on gold nanoparticles (AuNPs). For the purpose, a volume of one litre of AuNPs was synthesised by reducing heated chloroauric acid solution with citrate. Using specialised instruments to characterise particle numbers, it was possible to show that this procedure resulted in the generation of nanomaterials peaking at 47,000 particles per cubic centimetre of air, more than double the local particle reference value. The project is being conducted by Mr X Masoka under the supervision of Professor Gulumian.

Research on incidental nanoparticles

Exposure to incidental nanoparticles in the workplace, especially in the mining industry, is a common occurrence. The following projects, funded by the Mine Health and Safety Council, were initiated to study the toxicity of the nanoparticles generated in this work environment.

In vitro toxicity assessment of dust emissions from six South African gold mine tailings site

Johannesburg is currently faced with the challenge of disposing of mine waste (known as tailings), which contributes to environmental pollution in the form of particulate matter. The aim of this study is to assess the hazard of tailings particulate matter using in vitro systems. Physicochemical analysis of tailings dust collected

from mine dumps around Johannesburg revealed the presence of nanoparticles, known to lodge deep in the human respiratory system. This study may aid in the improvement of risk assessment of incidental particulate matter. The project is being conducted by Ms C Andraos under the supervision of Professor Gulumian.

Physicochemical properties of bulk and respirable dusts collected from selected gold, platinum and coal mines

This project sets out to test the hypothesis that differences in the physicochemical properties of mine dusts from different regions are responsible for the marked differences in the prevalence of occupational diseases despite people being subject to comparable dust exposure. Various physicochemical properties in settled dust particles collected from gold, platinum, diamond and coal mines in South Africa were studied. Results indicate the presence of crystalline silica in all the mining products, except platinum. The project is being conducted by Mr X Masoka under the supervision of Professor Gulumian.

Evaluation of the comet assay to assess oxidative DNA damage and repair capacity in cells from patients with fibrotic disease

The single-cell gel (SCG) electrophoresis, or "comet," assay is a rapid and sensitive method to examine oxidative DNA damage and repair and is widely used in toxicology, ranging from genetic toxicology to research in DNA repair kinetics. Evidence is emerging that oxidative stress is implicated in the causation and perpetuation of systemic sclerosis (SSc) and to a lesser extent in systemic lupus erythematosus (SLE). In this study we evaluated the use of the comet assay to detect DNA damage induced by free radicals and DNA repair kinetics in SSc and SLE patients. In addition we measured the levels of urinary 8-hydroxy-2'-deoxyguanosine (8-OHdG) as a further biomarker

of oxidative DNA damage. Results indicate that urinary 8-OHdG may be a more sensitive biomarker of DNA damage in the patient groups studied than the comet assay. The project is being conducted by Mr X Masoka under the supervision of Professor Gulumian.

Investigation of the genotoxicity and cytotoxicity of South African gold, platinum, coal and diamond mine dust

Mechanisms such as the direct interactions between crystalline silica particles with cell membranes, which lead to cellular toxicity, have been associated with the development of silicosis and lung tumours, yet other mechanisms remain to be explored. To elucidate the mechanisms involved in mine dust toxicity, this study has determined the effects of respirable silica (Min-U-Sil 5) on the mitochondrion, on membrane lipids as well as on DNA in vitro. We have also examined the effects of dust samples obtained from different South African mines using U937 alveolar macrophages after incubation for an hour in a non-cytotoxic concentration. This study has confirmed previous investigations that showed different mine dust particles produced different levels of toxicity. The project is being conducted by Ms N Matiwane under the supervision of Professor Gulumian.

Characterisation of manganese dioxide (MnO₂) dust particles collected from a ferromanganese smelter and in vitro cytotoxicity and genotoxicity studies

This study involves the effects of MnO₂ dust, collected from a South African ferromanganese smelter, on primary rat astrocytes and BEAS-2B cells. The results indicate the sample is made up of both micro and ultra-fine particles; from the cell-based experiments a dose-dependent decrease in viability was recorded as well as increased sensitivity of astrocytes to the toxic effects of the MnO₂ dust compared to the BEAS-2B cells. The

project is being conducted by Ms LA Koekemoer under the supervision of Professor Gulumian.

Research on mechanisms of disease

The following project, which is funded by the Medical Research Council, was initiated to study the mechanism of disease in silicosis, lupus and scleroderma.

Assessment of DNA methylation in a group of silicosis, lupus and scleroderma patients

We aimed to determine global and gene-specific DNA methylation in lupus and scleroderma with the purpose of identifying “overlap” genes. A panel of 12 genes, selected on the basis of their involvement in inflammation, autoimmunity and/or fibrosis, was analysed using PCR arrays. The project is being conducted by Dr P Matatiele under the supervision of Professor Gulumian.

Research on health risk assessment of toxic metals

The following project, partially funded by the Consortium for Advanced Research Training in Africa, was newly initiated to assess the exposure of children to lead from different sources and the subsequent assessment of risk using different models.

Health risk assessment of exposure of children to lead in Blantyre, Malawi

The aim of this project is to determine the exposure to lead and risks of children through paint, dust, soil, toys and food in Blantyre and to assess the applicability to Malawi of the US Environmental Protection Agency’s Integrated Exposure Uptake Biokinetic (IEUBK) model. Lead will be measured in household paints, children’s toys, drinking water, foods, house dust, blood and

urine. The children’s exposure to lead and risks, and any correspondence between predicted and observed blood lead levels, will be reported. The project is being conducted by Mr W Utembe under the supervision of Professor Gulumian.

Teaching and training

The section was involved in organising a two-week course in April 2012, funded by the International Council for Science (ICSU) and the National Research Foundation (NRF), entitled “Health Risk Assessment Certificate Course”. It was held at the University of the Witwatersrand and covered pesticides, water quality and nanotechnology. Training was given to 20 students from South Africa, Kenya, Tanzania and Nigeria. The course provided an understanding of the basics of human health and environmental risk assessment, assisted with developing a common base knowledge and terminology on human health and environmental risk assessment. It also provided a framework for developing risk-based management decisions. The section also continues to train and supervise postgraduate students for master’s and PhD degrees at the universities of the Witwatersrand and Johannesburg.

Honours

Professor M Gulumian has been invited by the World Health Organization to join the committee on the development of WHO/NANO H guidelines for nanomaterials in the workplace.

Professional development

Postdoctoral: one.
PhD: five
(registered at the University of the Witwatersrand).
MSc: three
(registered at the University of the Witwatersrand).
MTech: one
(registered at the University of Johannesburg).



Ms A Mzoneli

Head

Through the libraries, the section provided a range of information resources in support of training, teaching and research.

Information Services

The Information Services section comprises South Africa's national reference library for occupational health (the NIOH library); a query handling service providing technical and scientific information on occupational health to practitioners throughout South Africa and internationally; a resource centre with publications from international agencies; the National Institute for Communicable Diseases (NICD) library located in Sandringham and largely serving the information needs of the NICD community; and the National Health Laboratory Service (NHLS) library, formerly known as the SAIMR library, situated in Braamfontein, Johannesburg, and serving the needs of all the NHLS laboratories throughout South Africa.

Through the libraries, the section provided a range of information resources in support of training, teaching and research. These extend from print materials to electronic resources. The section, through the NIOH library – the only specialist reference library in the country dealing exclusively with occupational health and safety – continually executed its primary

responsibility of searching, retrieving and disseminating information in support of occupational health services throughout South Africa and the SADC region.

The occupational health professionals, university students, workers, management, health and safety representatives and trade union officials were offered the skills to source information on occupational health and safety through various training interventions at the library.

The section also dealt with questions about technical and scientific information in occupational health issues through the query handling service.

A system created in-house linked to the organisation's website facilitated the process of responding to requests for services as well as queries posted by outside parties. These queries came from a wider audience – university students, government departments, private industry, mining companies, neighbouring states and a few countries further afield. These interactions reaffirm the national and international role played by the information service section.

Although journal subscriptions were cancelled owing to financial constraints during the reporting year, the libraries continued to support the research function of the organisation by providing researchers with literature necessary for their projects. Other means of obtaining up-to-date and relevant information were used; for example, sourcing information through open source databases and partnering with other institutions and library networks greatly expanded the resources available to the library clientele.

During the year under review, staff in the section conducted several workshops on information tools such as TDNet, an electronic platform for accessing the journals collection; Zotero, a citation builder tool; and Open Access. The section also investigated and introduced a document management system, Kordil, to store and manage the intellectual output of the organisation. The libraries embarked on a digitisation project where reports and researchers' published articles were scanned and deposited into the Kordil system. In commemorating world health events, the section held library exhibitions and displays to create awareness on various themes and the library resources available.

Teaching and training

The section hosted five students from the Durban University of Technology for an internship programme providing experiential learning. The libraries provided training to new employees and interns on information search tools such as TDNet, an electronic journals portal, as well as on the Endnote reference management software to enhance their research skills in sourcing information.

Similarly, the section participated in offering the MPH programme at the University of the Witwatersrand Medical School with a focus on sources of information in occupational health.

It also provided library orientation sessions to international visitors such as WHO, Fogarty International Center (US) and ILO officials, as well as local stakeholders, including occupational health nurses, registrars, officials from provincial government departments of labour and health, trade union representatives, health practitioners and university students.

Professional development

As part of staff development in the section, a paper was presented at the Library and Information Association of South Africa's conference entitled "A transition! From cataloguing librarian to metadata librarian".

Members of the section also attended and participated in an ILO-CIS International Occupational Safety and Health Information Centre meeting in Geneva, Switzerland, in order to engage in dialogue and collaborate with other international organisations actively involved in generating, disseminating and using knowledge and information on occupational health and safety.

The meeting provided an invaluable platform for sharing experiences and knowledge with other information specialists in occupational health and safety information services and also enabled the formation of international links with other organisations worldwide.



Ms S Hampson
Manager

The NHLS website was revamped, both in terms of aesthetics and hierarchy of content, and re-launched to staff.

The section provides a support function to the NIOH and NCR as well as to the NHLS. Its main objectives are the promotion of occupational health and safety and the development of human resources in the SADC region, through multinational training and outreach programmes. The section coordinates training programmes run by the NIOH, organises programmes for visitors and provides event management, marketing, communications, public relations and graphic design services for the institute – internally and externally, locally and internationally. In addition, the section manages and coordinates the NIOH programme for continuing professional development through the Health Professions Council of South Africa (HPCSA), also providing extensive support to the NIOH Training Unit.

Services

During the reporting period, section staff contributed to the management, content and design of the websites of the National Institute for Occupational Health, the National Institute for Communicable Diseases, South African Vaccine Producers (SAVP) and the National Health Laboratory Service as well as the NHLS

intranet. The NHLS website was revamped, both in terms of aesthetics and hierarchy of content, and re-launched to staff. During the period under review, the SAVP website was in the beginning stages of redesign and development in order to align with the corporate identity of the NHLS; S Hampson developed and managed the front-end design elements as well as all the technical specifications for the site.

The section staff are members of the NHLS Communications Forum and attended the monthly meetings which brought together communications representatives from the NHLS, NIOH and NICD to develop and implement a common communications and marketing strategy across the NHLS as a single organisation. The aims and benefits of these meetings are to share experiences and knowledge and to ensure that the communications and marketing methods and strategies are aligned to the corporate strategies of the NHLS.

During the period under review, staff of the section also attended the NHLS communications strategy planning meetings in an attempt

to consolidate the roles and responsibilities of the communications team. Staff also attended editorial committee meetings that were convened by the Communications Unit in Sandringham, for the purpose of unifying and aligning all support units with the revised corporate identity of the NHLS as well as to enhance relations among units from a communications perspective. Moreover, section staff hold membership of the Public Relations Institute of South Africa (PRISA).

The section was closely involved in the preparation of tender bid documents throughout the reporting period in an attempt to generate income for operational and strategic initiatives within the institute. S Hampson provided extensive support to the executive director in this regard through the generation of tender templates and layouts as well as by coordinating and collating all information for the bid documents.

In total, seven tenders were submitted, as follows:

- MHSC: "Awareness campaign on the Mining Charter and HIV/AIDS, TB and silicosis";
- BMW SA: "Physical and chemical stress surveys for the Rosslyn, VDP and Midrand sites";
- City of Windhoek, Namibia: "Expression of interest for the provision of occupational health & safety training in partnership with OccuCare (Namibia) and the Action Training Academy (SA)";
- Gauteng Medical Waste Treatment Facility: "Biomedical waste removal – the appointment of a transaction advisor to develop a commercial case for the establishment of a medical waste treatment facility";
- MHSC: "Conducting a baseline survey focusing on women who joined the mining sector from January 2008 in line with OHS milestones, in particular exposure to silica dust and noise";

- South African National Biodiversity Institute (SANBI): "Appointment of a service provider to conduct a comprehensive occupational health and safety and environmental audit in six SANBI centres across South Africa";
- Department of Environmental Affairs: "To determine the status and role of waste pickers in the country and train them".

Marketing and stakeholder relations

Stakeholder engagement provides opportunities to align business practices further with societal needs and expectations, helping to drive long-term sustainability and value. This engagement is intended to help public and occupational health practitioners and specialists realise the benefits of stakeholder engagement in their organisation, to compete in an increasingly complex and ever-changing business environment, while at the same time bringing about systemic change towards sustainable development.

The section was invited to exhibit at the two-day annual conference of the South African Society for Occupational Medicine (SASOM) in July 2012. The exhibition provided an ideal platform for re-establishing links with medical and occupational health practitioners as well as forging new links with institutions and individuals. The conference was well supported with over 120 colleagues in attendance.

The NIOH was also allocated an exhibition stand for marketing and networking purposes at the Vaal University of Technology Career Fair in March 2013. This one-day event allowed the NIOH to engage in detail with students and young medical technologists and technicians interested in the field of occupational health.

This was an ideal platform to market our services and core functions to young students.

During the third quarter, the organising committee for the academic conference of the Consortium for Advanced Research Training in Africa (CARTA), in collaboration with the School of Public Health at the University of the Witwatersrand, invited the NIOH to participate in their poster exhibition sessions.

These posters cover a variety of scientific studies currently under way within the institute; 11 posters were loaned to the university for the duration of the conference. The event formed part of a pan-African PhD programme which has, as its flagship initiative, a structured doctoral training programme that recruits fellows from the staff of nine institutions across Africa.

The fellows come together once a year for an intensive four-week seminar (the Joint Advanced Seminar (JAS)) and there are four such seminars during the four-year programme. The University of the Witwatersrand hosted the second of these seminars in November/December. For some of the students this is the first time they have gone abroad and some have never previously attended an academic conference. The purpose of using NIOH posters for display was to expose students to good quality research with the intention of introducing them to excellent, cutting-edge ideas in the fields of public and population health.

Staff in the section were responsible for coordinating and providing the logistic arrangements for visits by key stakeholders, which aimed to re-establish links and initiate new collaborative endeavours.

During the reporting year, meetings were held with representatives from: the Medical Bureau for Occupational Diseases (MBOD); the Department of Labour and the Compensation Commissioner; provincial occupational health coordinators; the Chamber of Mines; the International Cooperation Branch of the Organisation for the Prohibition of Chemical Weapons (OPCW, The Hague, The Netherlands); NIOSH-CDC (USA); the International Atomic Energy Agency (IAEA); the World Health Organization (WHO); the Safework programme of the International Labour Organisation (ILO); and the Mine Health and Safety Council.

The section also coordinated visitor programmes for occupational health nursing students from the universities of the Witwatersrand and Johannesburg; 22 oncology nursing sisters from Charlotte Maxeke and Rahima Moosa hospitals; three representatives from the Botswana University School of Public Health; eight representatives from the South African Military Health Services; Rita Lawlor from the Italian Centre for Applied Research on Cancer and President of the European, Middle East and African Society for Biopreservation and Biobanks (ESBB); 11 public health medicine registrars from the universities of Cape Town and Stellenbosch; Professors Iwuoha and Baker from SensorLab in Cape Town; officials from the Ministry of Health in Namibia; and three public health medicine doctors from Botswana.

Information dissemination

The section also dealt with queries from the media and occupational health professionals from various industries, both public and private, for marketing materials (both printed and audio-visual) as well as technical and

scientific information on a variety of issues related to occupational health. These queries are accessed from the website or are sent directly to the section.

The staff also fostered online links with many occupational health-related organisations' and societies' web platforms; the generation of these links allows the NHLS and NIOH to act as a single entry point for these information resources.

During the reporting period, the section established contact with Dr A Swelam, from the University of Cairo, about collaboration and information exchange regarding their e-learning platforms. The section plans to become more involved in the arena of e-learning in the year ahead.

Local and international collaborations in occupational health

The section has contributed to collaborating, networking, fostering and maintaining links with international organisations [the World Health Organization, the International Labour Organisation, the International Commission on Occupational Health (ICOH), NIOSH-CDC (USA), the Finnish Institute for Occupational Health (FIOH), the Health and Safety Laboratory (UK), the International Association of Cancer Registries (IACR)] as well as local societies and stakeholders; the national and provincial departments of health, the departments of Labour and Mineral Resources, the South African Society of Occupational Medicine (SASOM), the African Regional Association for Occupational Health (ARAOH), the South African Society of Occupational Health Nurses (SASOHN), the Mine Medical

Professionals Association (MMPA), academia, union representatives, employers, employees, and public and private sector interests.

During the last quarter of the reporting period, the section provided logistic and events management support to a pre-conference workshop in Delhi, India, entitled "Management of Chemical Exposures, Simple and Cost Effective Solutions using Stoffenmanager as a Risk Assessment Tool". The workshop was held in collaboration with Occupational Health and Safety Management Consultancy Services (OHS-MCS).

Around the time of the workshop the NIOH worked extensively with representatives from the WHO on the roll-out plans for training nurses and doctors in primary healthcare settings.

While in India, the NIOH hosted a one-day seminar on the WHO Global Plan of Action for Workers' Health; non-communicable diseases and universal coverage; costing of essential health interventions for workers' health using the UN OneHealth costing tool software; capacity building; and what are essential interventions, where South Africa is and what is needed to increase capacity in primary health care.

The seminar was followed by a practical demonstration of the OneHealth costing tool. The section provided logistic, audio-visual and event management support for the occasion.

The generation of these links allows the NHLS and NIOH to act as a single entry point for these information resources



Dr Tanusha Singh

Manager

Collaborations and networks have been fostered and maintained with several international organisations through links with various NIOH sections.

Outreach to the SADC region

The NIOH continued to contribute to the enhancement of efforts in research, training and capacity building and sustainability in the SADC region. The joint annual meeting of the Fogarty/Millennium Promise Programme Review Committee (PRC) was held at the NIOH in February 2013.

The Millennium Promise Grant in non-communicable chronic diseases, entitled "Research training on chronic lung diseases in South Africa", has awarded scholarships to two staff members from the Pathology Section to register for a PhD. Mrs Z Ndlovu and Mr S Milne left for the USA to attend mandatory research training on chronic lung diseases in southern Africa, on a part-time PhD scholarship through the Millennium Promise Programme, from 28 August–15 December 2012, at the Center for Occupational Health & Safety Engineering, Department of Environmental Health Sciences, University of Michigan.

Another initiative in the SADC region includes representation of the National Department of Health at SADC level as a Technical Working

Group Member for TB in mines. Dr M Zungu reviewed the SADC TB Declaration on behalf of the National Union of Mineworkers. The HIV/TB unit, headed by Dr Zungu, represents the NIOH in coordinating the delivery of occupational health services for ex-mine workers in labour-sending areas by various stakeholders including the World Bank, Yale University, TB Care, the KNCV Tuberculosis Foundation (The Netherlands) and various governments.

Several NIOH sections contributed to work in Namibia. For example, Occupational Hygiene gave a presentation about the service in the XRD Laboratory to the Ministry of Health officials in Windhoek in December 2012. Ms B Nyantumbu-Mkhize, Sr G Buffel and Dr M Ndaba attended a meeting between the NIOH and representatives from the Namibian Ministry of Health to discuss the Tsumeb project.

This project involves the NIOH performing a comprehensive health risk assessment of 2,800 employees of the National Custom Smelter (NCS) in Tsumeb, Namibia. Dr S Kgalamono and Professor D Rees submitted a draft proposal for this medical surveillance project to Dr B Kistnasamy for review and

comments after an extensive meeting with Dr G Kew (Namibia). It is hoped that the project will start in March 2013.

Dr A El Sherif and Mr T Kaakunga, from the Ministry of Health of Namibia, visited the NIOH in December 2012 on a tour of the facilities as well as to attend a planning meeting on the Tsumeb project. The NIOH was also represented at a SADC ministerial meeting in Angola. Dr S Kgalamono, Dr O Abrahams, Dr M Ndaba and Professor D Rees attended a workshop on arsenic poisoning organised by Professor Rees.

Professor Rees has been contacted by mining company AngloGold Ashanti to advise on a method for conducting a study to evaluate the health effects of arsenic exposure in their decommissioned mine in Ghana as a response to the mining community's outcry that the plant is responsible for a range of health problems suffered by residents. The NIOH also hosted representatives from the University of Botswana's School of Public Health for an orientation and discussion with the Occupational Medicine Division. The purpose of the visit was to learn more about how a successful registrar programme works.

International collaborations in occupational health

Collaborations and networks have been fostered and maintained with several international organisations through links with various NIOH sections. These include the World Health Organization, the International Labour Organisation, the International Commission on Occupational Health (ICOH), the National Institute for Occupational Safety and Health—Centers for Communicable Diseases (NIOSH-CDC), the Finnish Institute

for Occupational Health (FIOH), the Health and Safety Laboratory (HSL) in the UK and the International Association of Cancer Registries (IACR). The HIV/TB unit is working with the University of British Columbia on TB control in healthcare workers.

Much progress has been made and the project is likely to begin in July 2013. Dr D Kielkowski, who heads the National Cancer Registry, attended a meeting in Italy organised by the IARC-WHO in May entitled "Emerging oncogenic viruses". Professor M Gulumian, as an expert appointed by the South African Bureau of Standards (SABS), attended the ISO/TC 229 Working Group 3 on Health, Safety and Environment meeting on nanotechnologies in Stresa, Italy, 11–15 June 2012.

She gave an oral presentation for a new project proposal by South Africa entitled "In vitro methodologies to assess nanomaterial biodurability" and has also contributed to the preparation of two documents entitled "Determination of antibacterial potency of silver nanoparticles by release of muramic acid from *Staphylococcus aureus*" and "Detection of surface-bound molecules to gold nanoparticles using Fourier transform infrared (FT-IR) spectroscopy".

Professor Gulumian visited the European Union Joint Research Centre (JRC) in Ispra, Italy, in June 2012, and discussed the possibility of signing a memorandum of understanding (MoU) with NIOH for an exchange of students and scientists on nanotechnology.

She also visited the Korean Occupational Safety and Health Research Institute (OSHRI), the equivalent institute to NIOH in Seoul, in May 2012.

She has discussed matters of mutual interest including silicosis and nanotechnology and has investigated the possibility of signing an MoU for collaboration between these two institutes. She also visited NANOTEC, Bangkok, Thailand, in September 2012, where she met Professor S Songsivilai, the Director, and Professor S Tepakum, the Deputy Director of NANOTEC, where the possibility of signing an MoU between NANOTEC and NIOH was discussed.

Professor M Gulumian, in her capacity as a director at the IUTOX Exco, attended its meetings in September in Bangkok, and proposed a session on "Drug delivery using nanotechnologies" at the IUPHAR meeting to be held in South Africa in 2014. Dr R Lawlor from the Italian Centre for Applied Research on Cancer, and President of the ESBB, visited the NIOH for a tour of the premises and a meeting with Biobank manager Mr B Duma.

World Health Organization

As a WHO collaborating centre (CC) in occupational health from 2005, the NIOH continues to be an integral part of the WHO CCs in the Global Plan of Action on Workers' Health (2012–2017). The NIOH is in the second year of its second designation award as a WHO CC in occupational health and has contributed to several activities within the plan.

During the reporting year, Dr T Singh completed the WHO survey that was intended to capture the contribution of the respective institutes to the implementation of the Global Plan that was agreed upon at the 9th Meeting of the Global Network of WHO CCs for Occupational Health in Cancun in March 2012, and to establish the topical international working groups.

The HIV/TB unit worked with the WHO CC on climate change and the green economy in preparing documents for the Rio+20 conference in June 2012. Professor M Gulumian was invited to represent South Africa in the WHO NANO Group for the development of Guidelines on Protecting Workers from Potential Risks of Manufactured Nanomaterials.

In her capacity as a member of the core committee, she participated in a discussion on the WHO Chemical Risk Assessment Network Operational Framework. The network is an initiative with the overall objective of improving chemical risk assessment globally through fostering and facilitating interaction between institutions on chemical risk assessment issues and activities.

Professor Gulumian also participated in discussions on investigating the possibility for establishing Health Risk Assessment collaborating centres of the WHO, where she made a presentation on risk assessment activities by the OECD.

As a member of the WHO core group on risk assessment, she received relevant documents for a business aspects core group conference call on 19 November 2012, discussing communications strategy, business plan, resource mobilisation strategy and overview of the EU HEROIC project.

In addition, as a member of the WHO NANO guidelines development group, she has contributed to the methodology for the development of systematic reviews and quality assessment of the evidence for WHO NANO guidelines.

Dr T Singh attended a meeting of the WHO collaborating centres (CCs) in South Africa (on 22–23 August 2012 in Pretoria), which was convened by the WHO country office in South Africa in collaboration with the WHO African Region and the DoH.

The meeting aimed to review the recommendations made at the previous meeting in 2009 as well as to see how the WHO CCs can assist the DoH and WHO in implementing their respective activities towards the improvement of health in the country and region. Occupational health was seen as a priority area and was kept on the current list of recommendations.

Ms I Naik and Ms S Hampson participated in an international teleconference with Dr E Kortum (WHO headquarters) and five other collaborating centre representatives to discuss the global output. They discussed an inventory of training modules for implementing healthy workplace programmes; implementation approaches for introducing training programmes into

the businesses; strategies for increasing collaborative employer and employee action; and the publication of inventory, approaches, and strategies according to the requirements for WHO information products. This was the first meeting of the working group; roles and responsibilities were discussed mainly with the NIOH taking a lead in the implementation approaches for introducing training programmes into the business community.

NIOH staff B Kistnasamy, E Singh and T Singh attended another WHO Advisory Committee Teleconference at which discussions included an update from WHO on the implementation of the Global Plan and the establishment of working groups.

International Labour Organisation

The Occupational Medicine Section facilitated collaboration with Professor Stavroula Leka of the ILO regarding psychosocial tools for a pilot study.



Dr Danuta Kielkowski

Deputy Director

Regulations were published in 2011, making cancer a reportable condition, with the NCR responsible for the collection of notifications through the establishment of a population-based cancer registry.

The National Cancer Registry (NCR) is predominantly a pathology-based operation with its research arm funded, in part, by the Medical Research Council. Its activities in the 2012/2013 reporting period concentrated on the following areas: implementation of the new cancer regulations; production of cancer incidence rates from pathology data; international collaborations; and teaching and cancer research.

Implementation of new cancer regulations

Regulations were published in 2011, making cancer a reportable condition, with the NCR responsible for the collection of notifications through the establishment of a population-based cancer registry. Given the resources available, the NCR opted to establish a countrywide, hospital-based cancer registry with sentinel sites for the population-based registry.

Hospital-based cancer registry

Initial meetings were held with three provincial departments of health, in collaboration with the Chronic Diseases Directorate of the national Department of Health. KwaZulu-Natal and the

Western Cape have opted to transfer data electronically from the patient information systems of their tertiary hospitals to the NCR. The necessary IT interfaces are currently being developed. The North West province is unable to report electronically and an alternate system of reporting is being investigated.

One of the successes of the hospital-based cancer registry has involved the Charlotte Maxeke Academic Hospital in Johannesburg, whose Medical Oncology Unit provides the NCR with hand-written notification forms for newly diagnosed cancer patients. The NCR has received notifications for the majority of patients seen in the medical oncology ward, with additional notifications received from gynaecology, radiation oncology and some surgical wards.

The South African Children's Cancer Study Group has also volunteered to report newly diagnosed cancers from January 2012. In total, 812 cases were reported for 2012 from childhood oncologists across the country. The database is currently being assessed for completeness of reporting and an account of childhood cancers in South Africa will be published in 2013.

Population-based cancer registry

The Ekurhuleni Municipality was selected as a sentinel site for the urban population-based cancer registry. It was initially established as a hospital-based registry but with a plan to extend it to a population-based registry once funding is available to employ field workers.

Despite repeated visits from NCR staff, in which the importance and the legal imperative of reporting cancers were emphasised, few notifications have been received from this pilot project. However, important lessons have been learned regarding the selection of sites, the logistics of reporting, obstacles to reporting and the costs involved. These lessons will guide the future strategies of the NCR.

Cancer incidence data

Cancer incidence data derived from the pathology-based registry are currently available for 2005 on the NCR website. In addition, preliminary analysis has been performed on the 2009–2011 NCR data, at the request of the Chronic Diseases Directorate of the national Department of Health.

This involved analysis of pathology-based cancer notifications from NHLS laboratories, excluding KwaZulu-Natal. No private sector data were included. This report demonstrates the value of cancer surveillance by highlighting the increased incidence of HIV-related cancers in the country compared to previous years.

Despite its limitations, the report is sufficient to provide overall direction to public health planners at the Department of Health on broad areas of cancer intervention.

Research

The NHLS/MRC Cancer Epidemiology Research Group consists of two scientists, one project manager, two research nurses and a specialist clerk. Ms MI Urban is the principal investigator of the Johannesburg Cancer Case Control Study (JCCCS), a major project within the NCR research arm.

Tobacco and cancer – snuff use

Snuff users recruited into the JCCCS over a 14-month period, numbering more than 150, have responded to a detailed questionnaire on their use of the product. The data have been captured and a preliminary analysis conducted by Dr C Babb. A complete cancer risk factor analysis will be completed in the next year.

Genetic epidemiology of cancers in black South Africans

The genetics of cancer is one of the newer research areas within the NCR. A successful application for funding has allowed this unit to begin work on the genetics of prostate cancer in black South African men.

International collaborations

The NCR has been approached by the International Agency for Research in Cancer (IARC) to provide data for two collaborative projects.

The first involves breast cancer and hormonal receptors and the second investigates trends for haematopoietic cancers in the period 2000–2005.

Snuff users
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JCCCS numbered
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150

Teaching

Dr Kielkowski, Dr Sengayi and Mr C Nattey lectured during the Chronic Disease Module in September 2012 at the School of Public Health, University of the Witwatersrand. In addition, Dr Kielkowski is co-supervising one MSc and three PhD students.

Professional development

Scientific staff at the NCR have been trained by Ms MI Urban in cancer coding in terms of ICD-O.

Dr E Singh attended a course hosted by the African Cancer Registry Network, "Advanced Training Course: Cancer Registration Methods", held in Malawi, 9–13 July 2012.

Dr Kielkowski attended a workshop on 13–14 March 2013 on "Radiation and environmental uranium exposure and possible cancer risk" organised by the IARC in Johannesburg. The group will meet again in November 2013 to decide on the study and control populations to establish levels of uranium in body tissues

such as hair, nails, urine and blood samples in relation to environmental measurements. The NCR supports this project as a high national priority.

The NCR was successful in its application to host two DST/NRF interns for 2013/2014. These interns will be involved in scientific research and in the publication of CERG and NCR data.

Honours

Dr M Sengayi was awarded the Young Investigator award at the 20th Congress on Retroviruses and Opportunistic Infections, Atlanta, Georgia, USA, 3–6 March 2013, for her role in the study: "Prior HIV testing in newly diagnosed black cancer patients in Johannesburg, South Africa" by M Sengayi, C Babb, MI Urban and M Egger.

Dr D Kielkowski has been appointed Honorary Professor at the School of Health Systems and Public Health at the University of Pretoria from March 2013 to December 2016.

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ACTG	AIDS clinical trials group
ARMS-PCR	amplification refractory mutation system PCR
ART	antiretroviral therapy
ARV	antiretroviral
CANSA	Cancer Association of South Africa
CAPRISA	Centre for the AIDS Programme of Research in South Africa
CCHF	Crimean-Congo haemorrhagic fever
CCMT	Comprehensive Care Management and Treatment
CDW	Corporate Data Warehouse
CMJAH	Charlotte Maxeke Johannesburg Academic Hospital
CMV	cytomegalovirus
CNS	central nervous system
CPD	continuing professional development
CPUT	Cape Peninsula University of Technology
CRC	colorectal cancer
CSF	cerebrospinal fluid
CSIR	Council for Scientific and Industrial Research
CVD	cardiovascular disease
DST	drug susceptibility testing
EQA	external quality assurance/assessment
EU	European Union
DGGE	denaturing gradient gel electrophoresis
DGM	Dr George Mukhari Hospital
DST	Department of Science and Technology
EID	early infant diagnosis
ESBL	extended-spectrum beta-lactamase
FA	Fanconi anaemia
FBC	full blood count
FISH	fluorescence in situ hybridisation
FNA	fine needle aspiration
GC-MS	gas chromatography-mass spectrometry
GEMP	graduate entry medical programme
GERMS-SA	Group for Enteric, Respiratory Meningeal Disease Surveillance in South Africa
GSH	Groote Schuur Hospital
HA	haemophilia A
HAART	highly active antiretroviral therapy
HBV	hepatitis B virus
HBC	hepatitis C virus
HEU	HIV-exposed uninfected
HHV	human herpesvirus
HLA	human leucocyte antigen
hMPV	human metapneumovirus
HPV	human papillomavirus
HVTN	HIV Vaccine Trials Network
IALCH	Inkosi Albert Luthuli Central Hospital
ICU	intensive care unit
IMD	inherited metabolic disease
IPC	infection prevention and control

IRMA	immunoradiometric assay
KEH	King Edward VIII Hospital
KIDCRU	Children's Infectious Diseases Clinical Research Unit
LTI	Laboratory for Tissue Immunology
MDR-TB	multidrug-resistant tuberculosis
MIC	minimum inhibitory concentration
MGIT	mycobacterium growth indicator tube
MLPA	multiplex ligation-dependent probe amplification
MRC	Medical Research Council
MRSA	methicillin-resistant <i>Staphylococcus aureus</i>
MSSA	methicillin-susceptible <i>Staphylococcus aureus</i>
NAAT	nucleic acid amplification test
NIAID	National Institute of Allergy and Infectious Disease
NICD	National Institute for Communicable Diseases
NIH	National Institutes of Health
NRF	National Research Foundation
PBMC	peripheral blood mononuclear cell
PCR	polymerase chain reaction
PFGE	pulsed-field gel electrophoresis
PRF	Poliomyelitis Research Foundation
QF-PCR	quantitative fluorescent polymerase chain reaction
RA	rheumatoid arthritis
RCCH	Red Cross Children's (Memorial) Hospital
RFLP	restriction fragment length polymorphism
RIA	radioimmunoassay
RSV	respiratory syncytial virus
RT-PCR	real-time polymerase chain reaction
SAAVI	South African AIDS Vaccine Initiative
SABMR	South African Bone Marrow Registry
SADC	Southern African Development Community
SANAS	South African National Accreditation System
SARI	severe acute respiratory infection
SCC	staphylococcal cassette chromosome
SLE	systemic lupus erythematosus
SME	sub-acute measles encephalitis
SNP	single nucleotide polymorphism
STI	sexually transmitted infection
TB	tuberculosis
TMS	tissue microarray analysis
T-RFLP	terminal restriction fragment length polymorphism
UCT	University of Cape Town
UFS	University of the Free State
UKZN	University of KwaZulu-Natal
US	Stellenbosch University
WHO	World Health Organization
Wits	University of the Witwatersrand



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