

DEPARTMENT OF HEALTH

ANNUAL REPORT
2002

**NATIONAL CENTRE
FOR
OCCUPATIONAL HEALTH**

JOHANNESBURG



DEPARTMENT OF HEALTH
Republic of South Africa

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NATIONAL CENTRE FOR OCCUPATIONAL HEALTH

CHAPTER I

INTRODUCTION

DIRECTOR / PROFESSOR'S REPORT 2002

This is likely to be the last year that the NCOH will be governed directly by the Department of Health. In 2003, the NCOH will join the National Health Laboratory Service (NHLS), a statutory agency governed by the NHLS Board, which is appointed by the Minister of Health. The Department of Health is still to fund the NCOH but we will be able to supplement the NCOH budget with research grants and other mechanisms still to be identified.

The changes will be substantial, including a change of name to the National Institute for Occupational Health (NIOH). However, the goal of the NIOH will remain that of similar institutes around the world, namely to promote good occupational health and working life through being a centre of knowledge and development. More concretely the activities listed below will have to be maintained and developed if the NIOH is to continue to contribute to building the occupational health and safety system in our country and region.

- Advisory services which include giving advice on establishing occupational health services at provincial, district and enterprise levels; serving on technical committees; and consultations with enterprises on hazard control and the monitoring of workers.
- Information services, including the national reference library, the query handling service and SADC Clearing House.
- Support services e.g. specialized laboratories and health hazard evaluations.
- Applied laboratory and epidemiological research.
- Surveillance of occupational disease and indicators of occupational health performance.
- Development of occupational health professionals and specialists.
- The statutory autopsy services in terms of the Occupational Diseases in Mines & Works Act (ODMWAAct).

One of the challenges in this new environment will be to ensure that the NIOH responds to the changing world of occupational health and that we

continue to develop knowledge and services in ergonomics, bioaerosols, psychosocial aspects of work and molecular biology.

Some notable activities during 2002 include:

Advisory services

To contribute to the strengthening of services in the public sector at provincial level, reports were written for the North West, Gauteng, Limpopo, Mpumalanga, Free State, Western Cape, Eastern Cape and Northern Cape Provinces by NCOH Occupational Hygiene staff.

Information services.

A SADC Clearing House was established in 2002. It will collate and provide regional information on OH and S legislation and policy; professional training opportunities; research; international activities; and practical solutions to controlling exposure to silica and pesticides.

The NCOH continued to provide the national reference library for South Africa and improved book holdings in 2002 (particularly occupational hygiene) and journals in the newer disciplines of occupational psychology and ergonomics.

A guide for practitioners in the investigation and management of workers with occupational allergy "Tests of Sensitisation to Workplace Agents" was produced.

Specialised laboratory support services

The most important work at present is to obtain accreditation. This is a major undertaking and the NCOH labs are making good progress.

The capital equipment replacement programme is bearing fruit and a range of new tests has been introduced in Analytical Services and Toxicology and Biochemistry research.

Research

The NCOH was engaged in research in 20 topic areas.

A document on the research projects and programmes with their objectives and expected outcomes is available from the Chairperson: Research Committee, NCOH, P O Box 4788, Johannesburg, 2000.

The work on hand arm vibration syndrome was particularly rewarding because it raised awareness of the issue for the first time in South Africa and it developed capacity to diagnose and manage the condition.

In 2002, the NCOH published articles on HIV, training programmes, lead, silica and tuberculosis, lung cancer in the pulp and paper industry, occupational lung disease in miners, the elimination of silicosis, occupational allergy in the food industry, reading chest radiographs and mica pneumoconiosis.

Health hazard evaluations to detect cases and improve practice and clinical services

Six surveys were done in 2002 to document silicosis and pulmonary tuberculosis rates in silica industries.

Eighteen occupational hygiene reports were written following assessments in workplaces. Eleven of these reports were of work done in the public sector.

Immunology & Microbiology conducted 10 on-site assessments for allergens or microbial hazards.

Surveillance

The NCOH continued the surveillance of occupational respiratory disease (SORDSA), introduced a new programme on upper limb musculoskeletal disorders (SAMOSA) and contributed to a programme on tuberculosis in health care providers in the public sector.

Development of occupational health professionals

This is a growing area of work in the NCOH and a large number of courses, seminars and workshops were presented in 2002. Training thrusts were on biological monitoring, toxicology, musculoskeletal disorders and occupational microbiology.

A new masters level course "Introduction to Occupational and Environmental Toxicology" has been designed and will be presented next year in August.

The first group of Master in Public Health: occupational hygiene students completed their course work with training provided by local and overseas experts. This is the first public health

orientated masters programme in occupational hygiene in Africa. There are now 28 students enrolled from many parts of our region.

The NCOH is mentoring a large number of "interns" in four sections.

Four NCOH staff members gained higher degrees:

- **Deleen Bartie** (PhD) University of Pretoria
- **Tonya Esterhuizen** (MSc) London School of Hygiene and Tropical Medicine
- **Tanusha Singh** (MSc *cum laude*), University of the Witwatersrand
- **Mondi Govuzela** (BSc Med (Hons)) Medical University of South Africa.

Statutory autopsy services

The annual Pathology Division Report: Demographic Data and Disease Rates summarises data from the approximately 3000 autopsies done each year. This report is a key contribution to the surveillance of occupational lung disease in the mining industry and is an increasingly valuable addition to disease surveillance in our region.

International Programmes on Work and Health

The Joint Effort on Occupational Safety and Health in Africa.

The NCOH has become a partner in this Joint Effort. There are numerous activities. A document on the programme is available in Occupational Health Southern Africa January/February 2002 Vol 8 No1.

SADC/Sida Work and Health in southern Africa

The NCOH produced a 100-page document on key issues to address in southern Africa for a joint SADC/Sida programme on Work and Health

Collaborating institutions

In 2002, the NCOH strengthened partnerships with the Health and Safety Laboratory (UK), the Swedish National Institute for Working Life and NIOSH.

SORDSA PUBLICATIONS – 2002

D Rees and TM Esterhuizen produced for the **National Asthma Education Programme:**

- A South African Worker's Guide to Occupational Asthma
- A South African Employer's Guide to Occupational Asthma

NCOH REPORTS – 2002

1/2002 **S Chauhan, T Sebata, D Kielkowski, D**

Rees Research questions in occupational health in South Africa

2/2002 **K Renton, AC Cantrell** A walkthrough of Lonmin Base Metals Refinery – Smelter, Rustenburg

3/2002 **KM Thukhutha, KB Siziba, X Masoka, M Gulumian** Glue sniffing project

4/2002 **T Molefe, X Masoka, M Gulumian** Evaluation of DNA damage in human mononuclear cells exposed to DDT related compounds in vitro

5/2002 **D Kielkowski** Preliminary results on cancer mortality of paper pulp workers – Swaziland.

6/2002 **H Vergotine, A Baker** Development and strengthening of occupational health services in the North West province

7/2002 **H Vergotine, A Baker** Development and strengthening of occupational health services in the Northern Cape Province

8/2002 **H Vergotine** An occupational exposure assessment of workers' exposure to noise, illumination, thermal environment and coal dust at Krugersdorp Correctional Services

9/2002 **H Vergotine** An occupational exposure assessment of workers' exposure to noise, illumination and thermal environment and coal dust at Jubilee Hospital, Hammanskraal

10/2002 **A Baker, H Vergotine** The development & strengthening of occupational health services in the Gauteng Province

11/2002 **A Spies** The determination of environmental asbestos fibres in houses built with asbestos-containing material in Middleburg

12/2002 **K Renton** Manganese exposures in a manganese smelter Samancor: West Plant and Advalloy, Meyerton

13/2002 **J Murray** Demographic data and disease rates for January-December 2001

14/2002 **H Vergotine, B Nyantumbu** An ergonomic risk assessment of working

conditions of pregnant workers at Gold Reef City casino,

Johannesburg

15/2002 **H Vergotine** An environmental noise survey at the Gauteng Provincial Department of Correctional Services, Information Technology Section, Pretoria

NCOH PUBLICATIONS – 2002

Carel R, Kauppinen T, Teschke K, Andersen A, Jappinen P, Pearce N, Rix B, Bergeret A, Coggon D, Persson B, Szadkowska-Stanczyk I, Kielkowski D, Hennenberger P, Kishi R, Facchini A, Sala M, Colin D, Kogevinas M. 2002 Exposure to asbestos and lung and pleural cancer mortality among pulp and paper industry workers. *J Occup Environ Med* 44(6):579-584

Corbett EL, Churchyard GJ, Charalambous S, Samb B, Moloi V, Clayton TC, Grant AD, Murray J, Hayes RJ, de Cock KM. 2002 Morbidity and mortality in South African gold miners: impact of untreated disease due to human immunodeficiency virus. *Clin Infect Dis* 34:1251-1258

Esterhuizen TM, Rees D. 2002 Occupational asthma in food handlers: cases reported to SORDSA (1996-2002). *Curr Allergy Clin Immunol* 15(4):156-158

Ferrie R, Rees D. 2002 The Diploma and Masters in Public Health: Occupational Hygiene. *Occup Hlth SA* 8(1):24-25

Gulumian M, Fubini B, Makhubela S. 2002 Some mechanistic aspects of silica-induced increased predisposition to TB [Abstract]. *Med Lav* 93:S35

Lee W, Teschke A, Kauppinen T, Andersen A, Jappinen P, Szadkowska-Stanczyk I, Pearce N, Persson B, Bergeret A, Facchini A, Kishi R, Kielkowski D, Rix B, Hennenberger P, Sunyer J, Colin D, Kogevinas M, Boffetta P. 2002 Mortality from lung cancer in workers exposed to sulfur dioxide in the pulp and paper industry. *Environ Hlth Perspectives* 110(10):991-995

Mathee A, von Schirnding YER, Levin J, Huntley R, Cantrell A. 2002 A survey of blood lead levels among young Johannesburg school children. *Environ Res* 90(3):181-184

Murray J, Back P. 2002 Analysis of occupational lung disease identified at autopsy in the South African mining industry [Abstract]. *Med Lav* 93:S68

Murray J, Coetzee L, Back P, Banyini A, Ross M. 2002 Analysis of occupational lung disease identified at autopsy in the South African mining industry. *Occup Hlth SA* 8(4):3-5

Rees D. 2002 Why the poor response in South Africa to the ILO/WHO Global Programme to Eliminate Silicosis?. *Afr Newslett Occup Hlth Safety* 12(3):55-56

Shukla A, Gulumian M, Hei T, Kamp D, Rahman Q, Aust A, Mossman B. Multiple roles of oxidants in the pathogenesis of asbestos-induced diseases. *Free Radic Biol Med* 34: 1117-1129; 2002

Solomon A. 2002 Semantics and the application of the ILO Classification: the need for recording visceral pleural manifestations separately [Letter]. *Int J Occup Environ Health* 8(3):288-289

Solomon A. 2002 The role of radiology in occupational lung disease. *Occup Hlth SA* 8(4):24-25

Whitford T, Fourie A, Nieuwoudt J. 2001 Feelings of stigmatization in persons with contact dermatitis. *UNISA Psychologica* 27(1&2)18-25

Zinman MD, Richards GA, Murray J, Phillips JI, Rees DJ, Thomas RG. 2002 Mica dust as a cause

of severe pneumoconiosis. *Am J Ind Med* 41:139-144

STAFF QUALIFICATIONS OBTAINED – 2002

- **Deleen Bartie**

Evaluation of detection methods for *Legionella* in industrial cooling water systems, **Doctor of Philosophy**, Faculty of Nature & Agricultural Sciences, University of Pretoria

- **Tonya Esterhuizen**

By course work and dissertation, **Master of Science in Epidemiology**, London School of Hygiene & Tropical Medicine

- **Mondi Govuzela**

BSc Med (Hons) in Environmental Epidemiology, Medical University of South Africa

- **Tanusha Singh**

Detection of *Legionella* in dental unit waterlines using different techniques, **Master of Science (Med) cum laude**, Faculty of Health Sciences, University of the Witwatersrand.

CHAPTER II

OCCUPATIONAL HYGIENE

In order to maintain our position as a leading occupational hygiene centre in the country, we continued offering technical services, undertook applied research, provided a specialized hygiene service, collaborated with health professionals and applied occupational hygiene principles to promote the control and prevention of work related discomfort, injuries, illness and diseases. During 2002 we focused mainly on the following activities:

- * recognition of workplace hazards
- * co-ordination of teaching and training
- * applied research
- * standard setting and technical co-operation
- * providing specialized analytical services
- * dissemination of technical information
- * providing technical and advisory services to the provinces
- * mentoring new graduates planning to practice as occupational hygienists

RECOGNITION OF WORKPLACE HAZARDS

Workplace hazard identification was a major function of the section. Emphasis was placed on assistance to government institutions and provincial structures. Many of these institutions are not yet resourced to undertake occupational hygiene work. Assistance in setting up occupational health and safety programmes was given to most of the provinces. Private industries and enterprises were also visited. Technical support, monitoring and the quantification of hazardous agents were continued as in the past.

Exposure to high temperature, noise, asbestos fibers and quartz-containing dust; ergonomic factors and indoor air quality are still the major occupational and environmental issues. The sampling and evaluation of these hazardous agents requires specialized knowledge, skills and equipment, and the NCOH continues to be the national reference centre for such work. During 2002 there was an increased interest in the identification of hazards, and the section was able to provide this service effectively.

Research and routine survey findings were presented in the form of NCOH Internal Reports, a list of which follows:

2/2002 **K Renton, AC Cantrell** A walkthrough of a base metals refinery–smelter,

| | | |
|---------|---------------------------------|---|
| | Rustenburg | |
| 6/2002 | H Vergotine, A Baker | Development and strengthening of occupational health services in the North West province |
| 7/2002 | H Vergotine, A Baker | Development and strengthening of occupational health services in the Northern Cape Province |
| 8/2002 | H Vergotine | An occupational exposure assessment of workers' exposure to noise, illumination, thermal environment and coal dust at Krugersdorp Correctional Services |
| 9/2002 | H Vergotine | An occupational exposure assessment of workers' exposure to noise, illumination and thermal environment and coal dust at Jubilee Hospital, Hammanskraal |
| 10/2002 | A Baker, H Vergotine | Development & strengthening of occupational health services in the Gauteng Province |
| 11/2002 | A Spies | The determination of environmental asbestos fibres in houses built with asbestos-containing material in Middleburg |
| 12/2002 | K Renton | Manganese exposures in a manganese smelter Samancor, West Plant and Advalloy, Meyerton, SA |
| 14/2002 | H Vergotine, B Nyantumbu | An ergonomic risk assessment of working conditions of pregnant workers at Gold Reef City casino, Johannesburg |
| 15/2002 | H Vergotine | An environmental noise survey at the Gauteng Provincial Department of Correctional Services, Information Technology Section, Pretoria |
| 16/2002 | H Vergotine | Report on the South African Institute of Environmental Health National Conference, Durban 18-20 November |
| 17/2002 | H Vergotine | Development & strengthening of occupational health |

- 18/2002 services in Limpopo Province
A Baker Development & strengthening of Occupational Health Services in Mpumalanga Province
- 19/2002 **A Baker** Development & strengthening of occupational health services in Eastern Cape Province
- 20/2002 **A Baker** Presentation at the South African Institute of Environmental Health Conference, Durban 18-20 November
- 21/2002 **A Baker** Noise survey In PGW Construction & Engineering Works
- 22/2002 **H Vergotine, A Baker** Development & strengthening of occupational health services in the Western Cape Province
- 23/2002 **H Vergotine, A Baker** Development & strengthening of occupational health services in the Free State Province

groups. One senior hygienist continues to act as a local examiner for the Diploma and Competency examinations of the British Institute of Occupational Hygiene.

The section has purchased a fairly comprehensive set of Personal Protective Equipment (PPE) for the use of NCOH and MBOD staff when they visit sites.

Senior hygienists served on a number of technical committees, representing the NCOH and the National Department of Health. These included:

| | |
|---------------------------------|---|
| ASOSH | 6 |
| SABS | 9 |
| Department of Minerals & Energy | 1 |
| Group Environmental Monitoring | 1 |
| Gauteng Provincial Government | 5 |
| SAIOH | 4 |
| Philips XRD users | 3 |

TEACHING & TRAINING

Occupational hygiene staff were involved in both formal and informal teaching, lecturing and training.

Risk assessment, health hazard evaluation, exposure assessment and the principles of occupational hygiene, control and prevention of exposure to hazardous agents, risk management, the monitoring of workplace environments, radiation and electromagnetic stressors were taught to different audiences. The selection, calibration, use, care and operation of direct and indirect reading instruments and field sampling equipment was demonstrated to a variety of visitors and students. Diploma of Occupational Health students, Occupational Health Nursing students, and Environmental Health students from the Witwatersrand Technikon, Free State University, MEDUNSA and the University of Pretoria participated in training activities.

The section was heavily engaged in the running of postgraduate courses, in particular, the MPH: Occupational Hygiene with the School of Public Health, University of Witwatersrand. The section also presented various industrial hazard awareness and occupational health and safety courses at Peninsula Technikon, Free State University and the University of Pretoria.

STANDARD SETTING & TECHNICAL CO-OPERATION

Staff from the section were also involved in various technical committees and standard generating

RESEARCH

The Occupational Hygiene section contributed to research by participating in, and supporting, a number of research projects, both within the NCOH and externally. The activities included:

- ethylene oxide
- solvents
- environmental dust due to wind erosion of mine waste dumps
- environmental asbestos concentrations in Soweto dwellings with asbestos cement roofs
- occupational allergy in workers exposed to soybean
- isocyanate exposure in automotive spray shops

SPECIALIZED ANALYTICAL SERVICES

Specialized testing was carried out in the form of asbestos fiber and crystalline silica evaluation using x-ray diffraction (XRD). This service was severely hampered by out-of-date XRD equipment which is to be replaced as a matter of urgency.

The section continues to maintain legal compliance with respect to the regulations governing hazardous chemical and biological agents.

RECRUITMENT AND STAFF DEVELOPMENT

During the year:

- all practicing hygienists were encouraged to become members of a professional society

- five staff members undertook further study
 - one person completed the final year of study for a Higher Diploma in Safety Management
 - three senior members attended courses organized by Pretoria Technikon on the occupational hygiene legislation. All were successful, which allowed the section to qualify as an Approved Inspection Authority (AIA)
- the section continued taking newly-graduated environmental health graduates for mentoring, professional supervision and in-house training. This programme adds to their experience and confidence and assists them in obtaining appropriate employment. Subsequently, two graduates got appointments in the provincial public services.

CONFERENCES ATTENDED

A Baker and **H Vergotine** attended the South African Institute of Environmental Health Conference, Durban 18-20 November and presented the following:

- The role of environmental health practitioners in the development and strengthening of occupational health services in the provinces
- The management of occupational health services at the provincial, regional and district level in South Africa, respectively

H Vergotine presented at the following events:

- **Low back pain disability as a work related accident** at the Institute for Health Professional Development Conference,

entitled: *Back pain and Disability - A multi disciplinary approach* in Johannesburg on 22-23 March 2002

- **Demystifying the Regulations for Hazardous Biological Agents**, at a workshop entitled *Update on Occupational Infectious Diseases and Dermatoses*, held at the National Centre for Occupational Health, Johannesburg on 6 November 2002

SAFETY, HEALTH AND ENVIRONMENT

Staff of the section were involved with the health and safety issues at the NCOH. These included:

- Advice to the NCOH SHE Committee
- Advising the newly appointed Acting SHE officer
- Drafting a SHE action plan for the NCOH
- Developing SHE standard operating procedures for use in all laboratories at NCOH

SCIENTIFIC & TECHNICAL STAFF

| | | |
|--------------|--------------|-------------------------|
| V Yousefi | Head: | MSc, MSPH, MPhil, DOHy |
| A Baker | | BTech |
| R Khakhu | | Technician |
| E Makhudu | | Chief Technical Officer |
| JT Mohasoane | | Technician |
| JF Moseboa | | Technician |
| HS Ntuba | | BSc |
| KA Renton | | MSc, MSc (Ind Hyg) |
| A Spies | | BSc Hons, MSc |
| H Vergotine | | BTech BSc(Hons) (Erg) |

CHAPTER III

TECHNICAL ADVISORY SERVICES

A core function of the NCOH is to provide specialist information services in occupational health and safety. An expanding community of users was provided with technical and scientific information covering a wide range of topics. Queries were received from all nine of the South African provinces, from the SADC, and from countries further afield. Staff of the section handled queries directly whenever possible, but also called on an extensive network of experts, both from within the NCOH and elsewhere, to ensure that accurate and appropriate information was supplied.

The role played by the AJ Orenstein Library for Industrial Medicine continues to be an essential element in the support of occupational health and safety practice in South Africa and the region. As the only specialist reference library dealing exclusively with the subject, it plays a strategic role in teaching, research and the provision of specialist services.

Members of the section were active in promoting the further development of the SADC Clearing House for OH&S information. This effort is being harmonized with our commitment to the WHO/ILO Joint Effort in Occupational Health and Safety in Africa. Material is accumulating from the various SADC countries, and particular assistance has been received from the WHO in the form of donations of printed and electronic material on OH&S. At the same time, contact information for networking African OH&S practitioners and organizations is being gathered. Particular emphasis is being given to the areas of

practical OH&S Solutions, training, national policies, programmes & legislation, and the promotion of OHS involving workers in the informal sector.

TEACHING & TRAINING

In collaboration with Dr Spo Kgalamono of Occupational Medicine, staff of the section have contributed to the teaching of the postgraduate Diploma in Occupational Health (DOH) for the University of the Witwatersrand during 2002. The class intake comprised 33 medical doctors and one occupational health sister. These candidates were drawn from six of the nine national provinces, with one each from Namibia and Zimbabwe respectively.

Staff of the section contributed to training workshops on biological monitoring and hazardous chemicals held at various occasions in Gauteng and also in Durban.

Prof Cantrell was involved also as visiting lecturer on DOH programmes at the Universities of Pretoria and the Free State. He also tutored undergraduate medical students on factory visits and acted as examiner for the Medical IV exams.

PRESENTATIONS

The Section continues to co-ordinated educational and fact-finding visits to the NCOH. Postgraduate student groups from three universities, technikon students from three of the northern provinces, and occupational health nurses in training were introduced to the scope of services offered by the

NCOH and the range of activities carried out by the scientific and technical sections. The Resource Centre staff co-ordinated an exhibition stand at the annual NOSHCON conference at Sun City. This is a prestige event attended by leading OH&S practitioners, and the services of the NCOH are promoted on this occasion.

STAFF TRAINING

Members of the section attended **Pesticide Risk Management – from use and exposure to control measures**, NCOH, Johannesburg, 5-8 February 2002. The workshop was jointly run by the NCOH, the Finnish Institute of Occupational Health (FIOH), and the Scientific Committee on Pesticides of the International Commission on Occupational Health (ICOH).

CONFERENCE ATTENDANCE

AC Cantrell, *First National Conference of the Toxicology Society of South Africa*, TOXSA 2002, University of Pretoria, 6-8 May 2002. Organizing Committee/Delegate. Chaired session on Environmental & Occupational Health.

INTERNAL REPORT

2/2002 K Renton, AC Cantrell A walkthrough of a base metals refinery–smelter, Rustenburg

PUBLICATION

Mathee A, von Schirnding YER, Levin J, Huntley R, Cantrell A. 2002 A survey of blood lead levels among young Johannesburg school children. *Environ Res* 90(3):181-184

PRESENTATIONS

AC Cantrell, NCOH Toxicology Training Seminar
Toxicology of different groups of chemical & physical agents. *How the body deals with solvents*. Johannesburg, 16th January 2002

AC Cantrell, Department of Minerals & Energy: Annual Occupational Medicine Conference.
Invited lecture: *Vanadium processing*. Hennops Pride Conference Centre, 19 April 2002

AC Cantrell, NCOH Seminar on biological monitoring in occupational health. *How hazardous chemicals are regulated*. Johannesburg, 23rd April 2002

AC Cantrell, Afrox Occupational Medical Standards Committee Invited lecture: *The toxicology of coal tar pitch volatiles*. Randburg, 2nd August 2002

AC Cantrell, Coal & the Environment: Pre-conference to the World Summit on Sustainable Development. Invited lecture: *Polyaromatic Hydrocarbons* Dept Minerals & Energy and the Fossil Fuel Foundation. Randburg, 8th August 2002

AC Cantrell, Seminar on biological monitoring in occupational health. Centre for Occupational Health, University of Natal, Department of Community Nursing, Durban Institute of Technology & NCOH *How hazardous chemicals are regulated*. Durban. 16th October 2002

SCIENTIFIC & TECHNICAL STAFF

| | |
|-------------|--------------------------------------|
| AC Cantrell | Head: MSc (Agric), PhD, COCOH |
| L Darwin | BSc (Hons) |
| S Mabona | Library Messenger |
| M Marshoff | Network Controller |
| KM Hlazana | Senior Network Controller |
| E Mokotedi | BBibl |
| EK Semenya | Operator |
| NE Sesoko | BA (Hons) |

CHAPTER IV

TOXICOLOGY & BIOCHEMISTRY RESEARCH

The Section's 2002 activities are presented under the headings Teaching & Training, Service Provision, Research, Publications and Conference Presentations.

TEACHING & TRAINING

- **Training of Technikon students**

Toxicology & Biochemistry Research trained 18 interim students from Technikons during the financial year 2002/03.

- **Toxicology Training Courses**

Occupational Toxicology training programmes were organized in the form of one-day seminars and a workshop on pesticides and presented by the members of the Toxicology and Biochemistry Research Section and by experts from other organizations. The 1st seminar entitled "*Toxicology of Different Groups of Chemicals and Physical Agents*", was presented on the 16th January 2002. The second seminar was entitled "*Toxicity Manifestations in Different Target Organs/Tissues*", and was presented on the 30th January 2002. Finally, the workshop on Pesticides was entitled "*Pesticide risk management – from use and exposure to control measures*" and was presented on 5-8 February 2002. Funding for these three activities was received from the World Health Organization (WHO).

- *Training students on specific projects*

With funds obtained from WHO, four students were trained on specific projects relating to pesticides, solvents and glue sniffing, and silica. For this

training, Mr Chris Sifile and Miss Mapule Malema worked on a project entitled *Are there sufficient effective programmes in place for the prevention and eradication of silicosis in the pottery industry in South Africa?*, Miss Khathutshelo Thukhutha on a project entitled *Glue sniffing in street children* and Mr Thato Molefe on a project entitled *Health effects of occupational exposure to pesticides*.

Ad hoc training

Lectures on Occupational Toxicology were delivered to 60 students from RAU on the 16th October 2002.

Dr Gulumian gave tutorials to 15 Honours students from the department of Haematology & Molecular Medicine, University of the Witwatersrand.

SERVICE PROVISION

Established methodologies were used to provide laboratory services in the assessment of the toxicology and genotoxicity of medicinal plants investigated at the University of Pretoria.

RESEARCH

Research in biomarkers has continued in the Toxicology and Biochemistry Research Section with the addition of a new project to investigate the possible biomarkers of silicosis. In addition, a second new project was added to investigate the surface properties of silica dust collected from South African Gold Mines.

Mineral dusts and fibres: The investigations by

Mrs Sharon Makhubela on the increased predisposition to *Mycobacterium tuberculosis* infection following exposure to silica has been finalised. This work forms part of a postgraduate study and therefore Mrs Makhubela is presently completing her thesis. Miss Mpho Semano has registered for her PhD on a project involving investigation on the surface activity of particles collected from a number of gold mines in South Africa. In addition, a new WHO-funded project investigating the programmes in place to eradicate silicosis in the pottery industry has been initiated.

Pesticides: Mr X Masoka continued the laboratory testing of the genotoxicity of DDT and its metabolites. A WHO sponsored programme to assess health effects of pesticides has also been initiated during this financial year.

Toxic metal ions: Work on the speciation of manganese in biological fluids continued in collaboration with the Department of Chemistry, University of the Witwatersrand.

Solvents and glue sniffing: The next phase of the project 'Glue sniffing' has been initiated which involved various relevant organizations such as street children organizations and support groups, with the aim of collecting data on the problem. Ms Khathutshelo Thukhutha is sponsored by the WHO to work on this study as the primary investigator.

PUBLICATIONS

Gulumian M, Fubini B, Makhubela S. Some mechanistic aspects of silica-induced increased predisposition to TB. *La Medicina del Lavoro* 93: S35; 2002

Shukla A, Gulumian M, Hei T, Kamp D, Rahman Q, Aust A, Mossman B. Multiple roles of oxidants

in the pathogenesis of asbestos-induced diseases. *Free Radic Biol Med* 34: 1117-1129; 2002.

REPORTS

Thukhutha KM, Siziba KB, Masoka X, Gulumian M. *Glue sniffing:* Technical WHO Report 2002

EOC Programme and Technikon students produced a total of 18 technical reports under supervision, as part of their training.

CONFERENCE PRESENTATIONS

M Gulumian *Suitability of chelating agents possessing nitrogen donor groups as therapeutic antidotes for cadmium* 1st National Conference on Toxicology 6-8 May, 2002, University of Pretoria, Pretoria

S Makhubela, P Bianchi, M Gulumian *The effect of silica dust on the activation and function of mononuclear cells infected with Mycobacterium tuberculosis*, 1st National Conference on Toxicology 6-8 May, 2002, University of Pretoria, Pretoria

Molefe T, X Masoka, K Siziba, S Makhubela, M Gulumian *Evaluation of DNA Damage in Human Mononuclear cells exposed to DDE in vitro Using the Comet Assay* 1st National Conference on Toxicology 6-8 May, 2002, University of Pretoria, Pretoria

M Semano, B Mbatha, S Ntenti, G Hearne, M Gulumian *Surface chemical properties of crocidolite fibres responsible for lipid peroxidation reactions* 1st National Conference on Toxicology 6-8 May, 2002, University of Pretoria, Pretoria

Thukhutha K M, Siziba, K B, Masoka, X and Gulumian, *Glue sniffing problem in South African street children* 1st National Conference on Toxicology 6-8 May, 2002, University of Pretoria, Pretoria

Sifile C, M Maraba, S Makhubela and M Gulumian *An in vitro investigation on the mechanisms by which silica dust leads to increased susceptibility to Mycobacterium tuberculosis: possible role of oxidative stress* 1st National Conference on Toxicology 6-8 May, 2002, University of Pretoria, Pretoria

M Tikly, S Makhubela, M Gulumian *Free radical-mediated DNA damage measured by the single gel electrophoresis (Comet) assay in systemic sclerosis* The 3rd International Conference on oxygen/nitrogen

radicals: Cell injury and disease 1-5 June 2002, Morgantown, USA

M Gulumian, B Fubini, S Makhubela *Some mechanistic aspects of silica-induced increased predisposition to TB* 3rd International Symposium on Silica, Silicosis, cancer and other diseases S Margherita Ligure, Italy, 21-25 October 2002

M Gulumian *Mineral particles as environmental mutagens and carcinogens* PAEMS Fourth International Meeting, PAEMS 2003, 2-7 March 2003, Ain Shams University, Cairo, Egypt

S Makhubela, M Maraba, C Sifile, M Radebe, M Mamburu, M Gulumian *The effect of in vitro co-exposures to crystalline silica and BCG on human MNC* PAEMS Fourth International Meeting, PAEMS 2003, 2-7 March 2003, Ain Shams University, Cairo, Egypt

Steenkamp, V, Stewart, M J, Makhubela, S and Gulumian, M, *The effect of traditional remedies on oxidative DNA damage*, 1st National Conference on Toxicology, 6-8 May 2002, University of Pretoria

SEMINAR AND WORKSHOP PRESENTATIONS

M Gulumian *Mineral dusts and mechanisms of toxicity*. Seminar on toxicology of different groups of chemicals and physical agents sponsored Toxicity manifestations in different target organs/tissues, sponsored by WHO, National Centre for Occupational Health, Johannesburg, 16^h January 2002.

M Semano *Metal speciation with respect to manganese toxicity*, Seminar on toxicology of different groups of chemicals and physical agents sponsored Toxicity manifestations in different target organs/tissues, sponsored by WHO, National Centre for Occupational Health, Johannesburg, 16^h January 2002.

K Siziba *Neurotoxicity – Mechanisms of neuronal damage*. Seminar on Toxicity manifestations in

different target organs/tissues, sponsored by WHO,

National Centre for Occupational Health, Johannesburg, 30th January 2002.

M Gulumian *Mutagenicity and carcinogenicity – fundamental principles and mechanisms*. Seminar on Toxicity manifestations in different target organs/tissues, sponsored by WHO, National Centre for Occupational Health, Johannesburg, 30th January 2002.

X Masoka *Pesticide Research in SA*. Workshop on pesticide risk management – from use and exposure to control measures. 5-8 February 2002

M Gulumian *Genotoxicity of pesticides*. Workshop on Pesticide risk management – from use and exposure to control measures 5-8 February 2002

PARTICIPATION IN SCIENTIFIC SESSIONS AND A WHO FINAL REVIEW BOARD

M Gulumian chaired a session entitled *ROS/RNS in cell injury and apoptosis* at the 3rd International Conference on oxygen/nitrogen radicals: Cell injury and disease. 1-5 June 2002, Morgantown, USA.

SCIENTIFIC STAFF

| | |
|---------------|-----------------------|
| M Gulumian | Head: MSc, PhD |
| L Darwin | BSc Hons |
| S Makhubela | MSc |
| X Masoka | BSc Hons |
| CMCA Nogueira | MSc |
| M Semano | BSc Hons |
| K Siziba | PhD |

CHAPTER V

ANALYTICAL SERVICES

Analytical Services continued rendering specialized analytical services in environmental and biological monitoring during 2002, to support the practice of occupational and environmental health in the public sector and at enterprise level. The section supported research projects of national importance, by providing analytical capacity and continued the quality assurance scheme for blood lead and cadmium for laboratories countrywide.

ANALYSES CONDUCTED

Samples submitted during the year for analysis were mainly on blood, urine, tissues, bulk, filters, water, soil and on charcoal absorption tubes. Analysis included assays on toxic metals mainly for lead, cadmium, mercury, manganese, copper, zinc, nickel, chromium, aluminium, vanadium, uranium and lead in teeth. Organic assays included RBC and plasma cholinesterase, acetic acid, trichloroethylene, trichloroacetic acid, mandelic acid, toluene, styrene, phenol, o-cresol, isoprostane, methyl ethyl ketone, N-methylformamide, methanol and xylene in biological and air samples.

NEW DEVELOPMENTS

One of the key functions of Analytical Services is to develop methodologies to measure substances listed in the Department of Labour's Regulations for Hazardous Chemical Substances.

New methods developed to measure organic

contaminants include isocyanates and ethylene oxide in air. Methods under development are the organic substances that could be measured by GC-MS.

In the Inorganic Division all the methods that were on the old Varian Atomic Absorption Spectrophotometer (AAS) had to be transferred to the new Perkin Elmer AAS. Each method had to be revalidated. New methods under development are cobalt and arsenic in blood and urine samples.

The new Laboratory Information System (LIMS) was installed during the year. The training took approximately nine months and staff are now fully trained for the system to go live.

The laboratory is preparing for the ISO 17025 accreditation and the first audit was conducted in February 2002.

RESEARCH

A collaborative project involving the Technikon Witwatersrand, the Medical Research Council and the NCOH entitled **Hillbrow community partnership in health personnel education** was initiated in September 2001 and was completed in 2002. All the environmental and biological samples were analysed by the Analytical Services.

A collaborative project between the NCOH, Medical Research Council and the Transnet Phelophepa Health Train was launched in June, entitled Towards a National Surveillance programme of long-term

exposure to lead amongst young South African children. The collection of teeth continued during 2002 from eight provinces

OTHER ACTIVITIES

Analytical Services organized two seminars, one in Gauteng and the other in Kwa Zulu Natal, both entitled **Biological Monitoring in Occupational Health**.

STAFF DEVELOPMENT

Mrs Naik and Mrs Theodorou visited the Occupational Safety and Health Association (OSHA) Technical Centre in Salt Lake City USA, in August and November respectively.

Mrs. Daya attended an international symposium titled **ANALITIKA 2002** held in Stellenbosch in December 2002.

Mr Mokoena and Ms Graf attended a one week training course on **Packed column Gas Chromatography** offered by Technikon Natal in November 2002.

Mrs Theodorou and Mrs Daya attended a one-week course on ICP-OES at the Pretoria Technikon in June 2002.

Mrs Naik and Mrs Theodorou attended the **LIMS Validation Seminar** at the CSIR Conference Centre in March 2002.

Mrs Naik passed the **Occupational Hygiene Legislation Course** offered by the Pretoria Technikon in May 2002.

All the staff members attended computer courses offered by SITA.

Three students from the Analytical Chemistry Department from the Technikon Witwatersrand completed their one year in-service training in the section.

CONFERENCE ATTENDANCE

Mrs Naik was invited by the Department of Labour as a panel member to discuss the **Draft Guide to the Lead Regulations 2001** in Nylstroom on 20th November 2002.

SCIENTIFIC & TECHNICAL STAFF

| | |
|-------------|--|
| I Naik | Head: MSc, Dip Med Tech (Chem Path, Micro & Haem) |
| K Channa | Head Organic Tox; MSc |
| A. Daya | Lab Head: BTech, H Dip Med Tech |
| C. Graf | Dip Med Tech |
| LK Mokoena | Dip Biotech |
| H Tassell | Dip Pharm Tech |
| P Theodorou | Head QA: BSc (Hons) |

CHAPTER VI

OCCUPATIONAL MEDICINE

The Occupational Medicine Section continued with its core functions of service provision, conducting research and doing field surveys as well as providing education and training to occupational health practitioners. Clinical and radiological services were offered and assistance was given in the processing of compensation claims.

RESEARCH

924603: *Dust control and silicosis in South African foundries: a qualitative study.*

The data collection phase of the study was completed. The study is investigating current perceptions about dust control and silicosis in South African foundries.

924702: *The occurrence of hand arm vibration syndrome (HAVS) in South African gold mines.*

The project was supported by the Safety in Mines Research Advisory Committee (SIMRAC). It was conducted to determine the prevalence of HAVS in the South African gold mines. The report of the findings was submitted to SIMRAC and is available on their website.

925401: *South African Musculoskeletal Occupational Surveillance Action (SAMOSA) Group: A pilot study of upper limb work-related musculoskeletal disorders in Gauteng Province.* SAMOSA involves the monthly reporting of new cases of work-related upper limb musculoskeletal

disorders by occupational health practitioners. The information collected is used to identify jobs and industries with high risk for the development of work-related upper limb musculoskeletal disorders. The industries with high risk are helped to control ergonomic hazards that contribute to the development of work-related upper limb musculoskeletal disorders. A referral clinic for workers who are suspected of having these disorders was initiated in 2002.

926601: *Health effects associated with exposure to hexamethylene diisocyanate (HDI) in automotive spray-painting processes in small, medium and micro enterprises.*

The pilot of the questionnaire and the hygiene methodology for the measurement of HDI were done at spray painting and panel beating workshops. The study will be carried out in small, medium and micro enterprises (automotive repair workshops) to quantify exposure to HDI and identify sentinel cases of occupational asthma.

SURVEYS

Five factory surveys were conducted utilizing the mobile X-ray machine. The workplaces visited included two brick works, a power station and two foundries. In these surveys workers exposed to silica and asbestos dusts were investigated for radiographic changes in the lungs.

TEACHING AND TRAINING OF MEDICAL PRACTITIONERS

The following **teaching and training** was performed:

Diploma in Occupational Health: University of Witwatersrand, University of Pretoria, Witwatersrand Technikon

Masters in Public Health: University of Witwatersrand.

X-Ray Teaching: Department of Radiology, Johannesburg Hospital, Open weekly sessions at the NCOH, for the discussion of occupational disease cases - NCOH and MBOD.

Workshops and Seminars

Latex Allergy: These were offered to nurses at Johannesburg Hospital to raise awareness about latex allergy.

Occupational Causes of Lung Diseases Seminar: The Occupational Medicine Section participated in this seminar sub-titled Toxicity Manifestations in Different Target Organs/Tissues. The seminar was organised by the Toxicology and Biochemistry Section for occupational health practitioners.

Biological Monitoring Workshop: This workshop was organized by the Analytical Services Section. The occupational medicine section participated in this workshop organised for occupational health practitioners.

SAMOSA Workshops: These workshops provided special training to occupational health nurses and doctors to promote understanding, recognition and diagnosis of work-related upper limb musculoskeletal disorders at their workplaces.

Radiological Occupational Lung Disease Surveillance Workshop: Prof Solomon gave presentations on a) The role of the radiologist in occupational chest disease. b) Radiology related to asbestos exposure. c) Radiological features of silico-tuberculosis. The workshop was held at Indaba Hotel on the 15th and 16th of February 2002.

X-Ray Reading: Prof Solomon was involved in reading of chest X-rays and consultations for the NCOH Clinic, Amcoal, Afrox, Anglo Gold, City Council of Pretoria, Corobrick, Cape Asbestos. He also participated in epidemiological survey x-rays under the promotion of Prof Davies to identify radiographic changes in the lungs of ex-miners from Limpopo Province.

OCCUPATIONAL MEDICINE CLINIC

One hundred and forty new cases were seen at the Occupational Medicine Clinic in 2002. Half of them were found to have non-occupational diseases. In 17% of the cases, the diagnosis had not been finalized. Conditions diagnosed were silicosis, asbestosis, asthma, tuberculosis, pleural plaques, mesothelioma and respiratory conditions due to inhalation of chemical, gases, fumes and vapours. Table 1 shows conditions diagnosed at the Occupational Medicine Clinic.

Table 1: Conditions diagnosed at the clinic (140 cases)

| Condition | Frequencies (%) |
|---------------------------|-----------------|
| Asbestosis | 3 |
| Asthma | 5 |
| Non-occupational diseases | 51 |
| Silicosis | 14 |
| Tuberculosis | 3 |
| Other | 7 |
| Diagnosis not finalized | 17 |

The various hazardous agents that these workers were exposed to are shown in Table 2. Silica dust, chemicals and asbestos were the commonest hazardous agents to which the workers were exposed.

Table 2: Hazardous Agents

| Hazardous Agent | Workers exposed (%) |
|-----------------|---------------------|
| Silica dust | 17 |
| Chemicals | 13 |
| Asbestos | 14 |
| Fumes | 8 |
| Grain | 9 |
| Manganese | 12 |
| Other | 27 |

The workers were referred from various industries shown in Table 3. They included engineering, foundries, food processing, chemical, manufacturing, smelting, power, construction and health.

Table 3: Referring Industries

| Industries | % of workers |
|-----------------|--------------|
| Engineering | 16 |
| Foundries | 16 |
| Manufacturing | 9 |
| Chemical | 9 |
| Power | 5 |
| Smelting | 7 |
| Health | 4 |
| Food processing | 10 |
| Construction | 4 |
| Other | 20 |

Twenty five cases were submitted to the Compensation Commissioner. These are shown in Table 4.

Table 4: Cases submitted for compensation

| Occupational Disease | Number of cases |
|----------------------|-----------------|
| Asthma | 7 |
| Asbestosis | 3 |
| Silicosis | 9 |
| Silicosis + TB | 3 |
| Latex allergy | 1 |
| Mesothelioma | 1 |
| TB | 1 |

PUBLICATIONS

Solomon A. 2002 *Role of radiology in occupational lung disease.* Occupational Health SA July/August .

Solomon A. 2002 *Semantics and the application of the ILO Classification: the need for recording visceral pleural manifestations separately.* Int J Occ Environmental Health 8(3) 288-289

Nyantumbu B, Phillips JI, Dias B, Kgalamono S, Curran A, Barber C, Fishwick D, Allan L. 2002 The occurrence of hand arm vibration syndrome in South African gold mines and the identification of the potential effects of whole body vibration. Part 1: SIMRAC, Health 703 2002.

Nyantumbu B. 2002 The occurrence of hand arm vibration syndrome in South African gold mines. Masters Dissertation, University of Witwatersrand,

CONFERENCE ATTENDANCE & PRESENTATIONS

Solomon A . Quiz Master for Radiological Exercise. Combined Pulmonology & Intensive Care Congress, Sun City 21-25 July 2002.

Nyantumbu B. Undiagnosed occupational disease in a high exposure environment. WITS School of Public Health Academic Meeting, National Health Laboratory Service July 2002.

CONTINUING EDUCATION

Kgalamono S

- received training at the Occupational Medicine Unit in Gothenburg, Sweden

- attended Microsoft Excel and Powerpoint courses
- attended Occupational Health Legislation course offered by the Department of Labour

Kgalamono S, Nyantumbu B

- attended a short course on Evidence Based Medicine at the School of Public Health (WITS)

du Preez D attended a Microsoft Excel 2000 Beginners course

Mota B attended an MS-Word 2000 Intermediate course

SCIENTIFIC & TECHNICAL STAFF

| | |
|--------------|---|
| JCA Davies | MBBS, DPH, FFPHM, FFOM (supernumary) |
| Sr T Dlamini | RN |
| B Dias | MBBCh DOH |
| DR du Preez | Admin Clerk |
| MA Felix | MBBCh, DOH, PhD |
| S Kgalomono | MBBCh, DOH |
| B Mota | Admin Clerk |
| B Nyantumbu | BSc, DOH, Adv Dip Occ Safety Hlth, Cert Ind Erg |
| A Solomon | MBBCh, MMed (Rad), FC (Rad) |
| E Venter | MSc |

CHAPTER VII

EPIDEMIOLOGY & SURVEILLANCE

In 2002, surveillance was expanded to include a programme for reporting certain occupational musculoskeletal disorders, and another for the notification of cases of tuberculosis among health workers, in collaboration with the National Tuberculosis Control Programme [NTCP] of the Department of Health. One new research project involving collaborative work on ethylene oxide exposed health workers is underway. The exploratory analysis of available national data, such as census and corresponding mortality data, for mapping occupational health information, is nearing completion. A national survey to investigate the provision of occupational health services in South African industries was designed, and preparations are in hand to implement this survey next year.

SORDSA

Two new information brochures, *A South African Employer's Guide to Occupational Asthma* and *A South African Worker's Guide to Occupational Asthma* were published and circulated. Other educational materials which were reprinted, due to a strong demand from occupational health practitioners and students, were two *Alert* publications on Silicosis, and on Latex Allergy, and a poster: *Agents of Occupational Asthma*.

SAMOS

In June this new programme, for surveillance of occupational musculoskeletal disorders of the upper limb, distributed its first issue of information and reporting materials to more than 500 potential

participants. A newsletter was published to advertise the surveillance programme, and two training workshops were held for SASOM and SASHON members. To date 31 suspected cases of work related musculoskeletal disorders have been reported to the programme. This work will continue for another year to test methods and feasibility of the programme.

TUBERCULOSIS IN HEALTH CARE WORKERS

In preparation for the surveillance of health workers contracting TB, meetings were held with NTCP to discuss the project and data collection form. Researchers are awaiting return of health workers notification forms for year 2002 to compile a report. A research project will subsequently be developed to study determinants and social consequence of tuberculosis in health workers.

TEACHING

Dr Kielkowski continued to teach students for the postgraduate Diploma in Occupational Health, and supervise their research projects.

A Calverley coordinated the undergraduate factory visits tutorials for the 4th year medical students of the University of the Witwatersrand.

T Esterhuizen tutored practical modules on epidemiology and biostatistics for 1st year MPH (Occ Hyg), advanced statistical modules for MPH Students, and coordinated the surveillance module for MSc Epidemiology, for the University of the Witwatersrand.

RESEARCH

Follow up on long term cohort studies was not possible this year, as data were not available from the Department of Home Affairs.

An atlas of maps showing the distribution of industry, occupation, burden of disease and relevant factors in South Africa was prepared for publication. Data had been obtained from 1996 census and the death registry for 1996.

The research project on ethylene oxide and the reproductive health of women working in hospital sterilizing units was approved by the Research Committee and Ethics Committee and data collection was initiated. The first visits to all Gauteng Hospitals that use ethylene oxide was completed by July. Preliminary measurements were taken to evaluate methods of collecting environmental samples and the detection of ethylene oxide. Questionnaires were administered to 30 women who reported pregnancy in the study period.

PRESENTATIONS

Carman H, Calverley AE, Fourie A. Dermatitis in mineworkers: when is it occupational? Dermatology Indaba 2002. Dermatology Society of Southern Africa Annual Congress, International Conference Centre, Durban 17-20 April 2002.

Calverley AE, Rees D. Women workers in electronics assembly: work, stress and health. Women Work and Health, 3rd International Congress, Stockholm, Sweden 2-5th June 2002.

Esterhuizen T, Sitas F, Kielkowski D, Carrara H,

Pacella-Norman, Urban M, Sur R, Ruff P, Hale M, Patel M Beral V. Occupational exposure and lung cancer in the African population of Johannesburg and Soweto, South Africa. 16th International Conference, Epidemiology in Occupational Health. 11-14th September 2002, Barcelona, Spain.

Jones K, Graffit SJ, Calverley A, Channa K, Cocker J, Curran AD. Identification of a possible biomarker for colophony exposure. 16th International Conference, Epidemiology in Occupational Health. 11-14th September 2002, Barcelona, Spain.

Kielkowski D, Rees D, Bradshaw D. Burden of Occupational Morbidity in South Africa -comparison of two households' surveys. 16th International Conference, Epidemiology in Occupational Health. 11-14th September 2002, Barcelona Spain.

Work related Musculoskeletal Disorders **workshop** organized by SAMOSA Surveillance Programme: 2nd February 2002, Johannesburg NCOH.

Work related Musculoskeletal Disorders **workshop** organized by SAMOSA Surveillance Programme: 10th October 2002 Johannesburg NCOH.

D Kielkowski attended the 14th IUATLD Africa Region Conference, Durban, 11-14 June 2002.

NCOH INTERNAL REPORTS

S Chauhan, T Sebata, D Kielkowski, D Rees. Research questions in occupational health South Africa. NCOH Report no.1/2002.

D Kielkowski. Preliminary results on cancer mortality of the paper pulp workers- Swaziland

cohort. NCOH Report 2/2002.

2002, Thusano School of Public Health,
Johannesburg

OTHER REPORTS:

Rees D, Kielkowski D, Occupational Health: Disease and Injury in working adults. Chapter 10, Mortality and morbidity of adults. Pages 181-188. South African Demographic and Health Survey 1998. Full Report. Department of Health; May 2002, SA.

- Three staff members attended STATA Training Workshop, Witwatersrand University, Thusano School of public Health, Johannesburg
- Members of the section attended a total of 9 courses on software applications - SITA, Centurion

TRAINING:

- **Tonya Esterhuizen** completed the MSc degree in Epidemiology: Principles and Practice, University of London, UK November 2002
- **Mondi Govuzela** completed a BSc Hons degree in Environmental Epidemiology at MEDUNSA University December 2002
- Two staff members attended Geographical Information Systems (GIS) 8 –10th October

SCIENTIFIC & TECHNICAL STAFF

| | |
|---------------|-------------------------------|
| D Kielkowski | Head: PhD |
| A Calverley | MSc, AIMLT |
| S Chauhan | BSc(Hons) |
| T Esterhuizen | BSc(Hons) |
| MH Govuzela | BSc |
| K Zantsi | BSc(Hons) |
| S Pitso | Data Capturer |
| F Penxa | Data Capturer |
| T Duma | Nat Dip Admin (SORDSA Office) |

CHAPTER VIII

IMMUNOLOGY & MICROBIOLOGY

The Immunology & Microbiology Section has continued to provide service, training and research in the field of occupational health for sectors of the South African workforce in 2002.

SERVICE PROVIDED

Service took the form of skin prick tests (24), patch tests (73), radioallergosorbent assays (RAST) (142) and on-site visits (10). A good number of these tests were positive especially with latex sensitivity, necessitating interaction with workplace services and management. On the basis of these results, recommendations were made to employers to modify the workplace activities for those affected so as to avoid or reduce the levels of exposure that could lead to occupational disease. On a large scale, service in the form of skin prick tests was provided to Johannesburg Hospital staff and to nurses around Johannesburg for latex allergy testing.

TRAINING AND DEVELOPMENT

Grace Ramafi promoted services offered by the Immunology & Microbiology section to occupational health nurses and students from Technikons and Universities who from time to time visit the NCOH, and also at the NOSHCON conference held at Sun City in May 2002.

Delene Bartie and **Tanusha Soogreem** also attended a teaching course offered by Wits

University highlighting weaknesses in presentations and ways

of overcoming them. This was important for the section as we promote good occupational health through the training of occupational health practitioners.

Delene Bartie presented a lecture on Risk Assessments for biological hazards for Masters in Public Health students at NCOH and another one on Biological hazards in the workplace at a mini symposium held at Pretoria Technikon

Tanusha Soogreem gave a lecture to the Diploma in Tropical Medicine and Hygiene (DTMH) students at the University of Pretoria on Legionnaires disease.

Anna Fourie gave a lecture on contact dermatitis: a practical approach to the Diploma in Occupational Health (DOH) students of both the Universities of Pretoria and Wits. She has also been involved in the training of Wits University 4th year medical students taking them to workplaces for identification of workplace exposures.

Members of staff including the head of section, Grace Ramafi attended various courses and workshops in order to inject the needed expertise and skills in the section. These included training in the use of computer programmes on presentation and research data analysis.

LEGIONELLA ACTION GROUP [LAG]

The Legionella Action Group (LAG) is a non-profit organisation which aims to provide the best possible awareness programmes and services related to *Legionella* problems to South Africans through innovative, holistic and cost effective programme implemented by an intergrated team composed of professionals, who are motivated by their desire to protect and enhance the health of the South African nation. The NCOH Immunology & Microbiology section is collaborating with this group to achieve the above-mentioned aims.

Ms Soogreem is the Chairperson of this group and Dr Delene Bartie is an active member. A website has been developed by Ms Soogreem for LAG as a means of disseminating information on *Legionella*.

RESEARCH PROJECTS

923105 The pro-inflammatory effects of platinum in human neutrophils in vitro: *G Ramafi, R Anderson and A Theron and Z Kistern.*

This is a collaborative project by the NCOH and the Immunology Department at the University of Pretoria.

Platinum allergy in refineries is well documented. Inhalation of platinum salts during industrial processing of this metal may result in the development of respiratory symptoms, including sneezing, lacrimation, rhinorrhea, cough and asthma. Asthma is believed to result from both IgE and cell mediated immune responses to platinum, although specific sensitisation to this metal has been difficult to establish. It is therefore the aim of this study to investigate the

effects of platinum on various pro-inflammatory

activities of neutrophils in order to understand the mechanism by which platinum sensitizes the airways. Is it IgE-mediated or due to a non-specific irritant mechanism or to both of these? The project is on-going.

923503 Sensitization to maize in workers in the maize milling industry: *D Bartie and G. Ramafi*

Grain dust is complex in nature and specific allergens in the grain milling industry are difficult to identify. It is well known that exposure to grain dust in general increases the risk of respiratory disease but very little has been published on the specific respiratory health effects of maize (corn). The aim of the study is to investigate the role of tests of sensitisation to maize and common allergens in predicting maize-related respiratory disease, and the role of these tests in monitoring exposed workers. The project is on-going.

923402 Occupational allergy in workers exposed to soybeans: *N Mansoor, A Fourie, D Rees, D Kielkowski*

The subjects of this study were workers exposed to soybean material at a processing plant in the North West Province. Analysis of results is proceeding.

CONFERENCES ATTENDED

Anna Fourie gave an oral presentation at the Allergy Society of South Africa (ALLSA) conference held at the Gallagher Estates (Midrand) on the 18th-19th of October 2002. She spoke on *Patch testing for occupational contact dermatitis at the National Centre for Occupational Health (1999-2001)*.

WORKSHOPS AND COURSES

A successful workshop entitled **Contact Dermatoses & Infectious Diseases** was organized. It took place at the NCOH on 6th

November 2002. Occupational health practitioners from the various workplaces in the country attended.

allergens

PUBLICATIONS

Bartie C, Venter F, Nel L. 2002 *Legionella detection from South African water systems*, Chapter 56 in: *Legionella* , ASM Press

HANDBOOKS

Ramafi G. 2002 Tests of sensitization to workplace

SCIENTIFIC & TECHNICAL STAFF

| | |
|------------|-----------------------|
| G Ramafi | Head: BSc, PhD |
| C Bartie | NHD Med Tech, PhD |
| A Fourie | BSc (Lab Med), MSc |
| Z Kirsten | NHD Med Tech (Immuno) |
| T Soogreem | MSc |

CHAPTER IX

PATHOLOGY

Pathology continues to carry out the statutory requirement of examining the cardio-respiratory organs of deceased miners (in terms of Occupational Diseases in Mines & Works Act: Act 78 of 1973). The post mortem service is utilized by 80% of families of men who die while in mining service. To increase the efficiency of the compensation process, the NCOH, MBOD and CCOD will be linked by a web based computer network. Work on this new system is well under way. The infrastructure is now in place at the three sites. The new system will be deployed in the first quarter of 2003. The computerized Pathology database (Pathaut) has made the information derived from the service more accessible. The data reflect disease trends in the mining industry and the database is a national resource. The data has also been utilized in international collaborative studies. A detailed report of the database giving demographic data and disease rates is produced annually. During 2002, 2799 cases came to autopsy compared with 2531 cases during 2001 and 2608 in 2000.

The pathology section is also a national reference centre for lung pathology. Some 621 surgical and cytological consultations were received this year compared with 519 in 2001.

Pathology provides an electron microscopy service for occupational disease and environmental monitoring. Tissues, dusts, fumes and fibres are analyzed to determine possible adverse health effects. Analyses are carried out for other sections of the NCOH, other Government departments, as well as private industries and laboratories. This year 900

specimens were analysed.

RESEARCH

Research and surveillance are seen as important functions of the Pathology section. The data from Pathaut are used extensively for these purposes. Data from Pathaut are widely utilized for disease surveillance and research purposes in collaboration with mines, the Epidemiology and Occupational Medicine section of the NCOH, and academic institutions in South Africa, and internationally.

Professor Charles Feldman is the research advisor to the Pathology section. The research projects have addressed both fundamental research into disease processes and operational research into improving patient care. The leading edge research projects have been conducted with international collaboration such as the London School of Tropical Medicine and Hygiene, UK, Health and Safety Laboratory, Sheffield, UK, International Environmental Research Foundation, USA and the National Institute of Occupational Safety and Health, USA. All research has local collaborators and end-user involvement.

The shortage of scientists and pathologists imposes constraints on the routine service work and the research interests of Pathology.

The research programmes within Pathology are listed below. Some involve international collaboration.

- An analysis of occupational lung disease identified and compensated in different

mining sectors by comparison of available databases with autopsies conducted under the ODMW Act.

- A clinico-pathological study of tuberculosis to reduce misdiagnosis and mortality in the mining industry.
- Mesothelioma and its association with Simian Virus 40. Collaboration with the City University of New York.
- The occurrence of hand arm vibration syndrome in South African gold mines and identification of the potential effects of whole body vibration. Collaboration with the Health & Safety Laboratory, Sheffield.
- A light and electron microscopic examination of sputa for asbestos and ferruginous bodies from residents of an asbestos mining area and a comparison with clinical and radiographic findings
- Environmental asbestos concentration in Soweto dwellings with asbestos cement roofs. Collaboration with the Health and Safety Laboratory, Sheffield.
- Human Immunodeficiency Virus and tuberculosis. Collaboration with the London School of Tropical Medicine & Hygiene.

TEACHING

Service functions are utilized to teach and train a variety of health professionals in lung disease, pathology disease surveillance and legislation. These include health professionals from the Department of Minerals & Energy, provincial

departments of health, occupational health nurses, medical technologists and doctors. We have had groups of health care workers and groups from trades unions visit the Pathology section. They are taught about occupational lung diseases and shown the range of services we offer. Kits that have been developed in house to render practical assistance are distributed to them and they are taken through the steps of the compensation process.

The diagnosis of occupational lung disease has become more difficult due to the synergistic effect of silica, tuberculosis and HIV. To assist with the diagnosis the NCOH in collaboration with SIMRAC is participating in two projects. The first deals with the radiological diagnosis of occupational lung disease. Mine medical officers are being assisted in the interpretation of chest X-rays. The other project deals with the diagnosis of pulmonary tuberculosis. A clinico-pathological study has shown that the diagnosis of pulmonary tuberculosis in life is only confirmed pathologically in 24% of cases. A road show has been assembled to explain the difficulties in diagnosing pulmonary tuberculosis with a background of silicosis, HIV and opportunistic infections.

The Pathology section hosts monthly meetings for chest physicians from the teaching hospitals. Problematic and interesting cases are discussed in depth from a clinical and pathological point of view. The section is a reference centre for lung pathology and cases are referred for diagnostic advice from all parts of South Africa.

The section has assisted with a technology transfer in the field of vibration induced disease. Hand Arm Vibration Syndrome (HAVS) is the most commonly compensated disease in the United Kingdom. In collaboration with the Health and Safety Laboratory,

UK (with whom the NCOH has a formal collaboration agreement) and SIMRAC. The presence of HAVS has been established in the South African gold mining industry. The diagnosis is complicated relying on clinical examination and objective testing. Doctors and medical technologists have been trained in the diagnosis of HAVS. To disseminate the acquired expertise, further workshops for health care professionals have been planned for 2003.

The Pathology section laboratories are teaching laboratories for medical laboratory technologists. We have an ongoing programme to train medical technologists. We have also held one week courses in mortuary techniques.

PUBLICATIONS

Corbett EL, Churchyard GJ, Charalambous S, Samb B, Moloi V, Clayton TC, Grant AD, Murray J, Hayes RJ, de Cock KM. 2002 Morbidity and mortality in South African gold miners: impact of untreated disease due to human immunodeficiency virus. *Clin Infect Dis* 34:1251-1258

Murray J, Back P. 2002 Analysis of occupational lung disease identified at autopsy in the South African mining industry [Abstract]. *Med Lav* 93:S68

Murray J, Coetzee L, Back P, Banyini A, Ross M. 2002 Analysis of occupational lung disease identified at autopsy in the South African mining industry. *Occup Hlth SA* 8(4):3-5

Zinman MD, Richards GA, Murray J, Phillips JI, Rees DJ, Thomas RG. 2002 Mica dust as a cause of severe pneumoconiosis. *Am J Ind Med* 41:139-144

INTERNAL REPORT

13/2002 **J Murray** Demographic data and disease rates for January-December 2001

CONFERENCE PRESENTATIONS

P Back, J Murray, Cryptococcal pneumonia diagnosed at autopsy in black South African miners. 2nd Combined Congress of the SA Thoracic Society and the Critical Care Society of SA. 21-25 July, 2002. North West Province

J Murray Invited speaker: at 5th MMOA Conference. Topic: Cryptococcus, PCP and TB trends in the mining industry. 3-5 May 2002. Watervalboven

J Murray, P Back Dual pulmonary pathology in HIV infected black South African miners with pneumocystis carinii pneumonia (PCP) at autopsy. 2nd Combined Congress of the SA Thoracic Society and the Critical Care Society of SA. 21-25 July 2002. North West Province

J Murray, P Back. Analysis of occupational lung disease identified at autopsy in the South African mining industry. 3rd International Symposium on Silica, Silicosis, Cancer and other Diseases. October 21-25, 2002. Santa Margherita Ligure, Italy

N Ngutshane, M Rikhotso, N Khoosal, J Cantrell, R Soko, M Humby, a. The accurate diagnosis of emphysema in deceased SA miners using Gough-Wentworth whole lung sections. **b.** Nocardia demonstrated in the lungs of deceased miners. 16th National Congress of the Society of Medical

Laboratory Technologists of SA. 1-14 May 2001

J Phillips Invited Participant: *Mesothelioma and SV-40*. International Environmental Research Foundation workshop. 10-14 June 2002 New York.

J Phillips Invited speaker: 5th MMOA Conference. Topic integrated technology transfer of noise and vibration research to the mining Industry. 3-5 May 2002. Watervalboven.

SCIENTIFIC & TECHNICAL STAFF

J Murray **Head:** BA, MBCh, FFPATH, DOH

P Back MBCh DTMH DPH DOH

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|-------------|-------------------|
| JD Cantrell | Dip Med Tech |
| J Dibedi | Lab Assistant |
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| M Humby | Dip Med Tech |
| N Khoosal | Dip Med Tech |
| W Mashele | Mortuary Services |
| J Mkhize | Med Technician |
| P Mbontsi | Mortuary Services |
| N Ngutshane | Med Technician |
| JI Phillips | BSc (Hons), PhD |
| G Rani | Mortuary Services |
| R Rikhotso | Dip Med Tech |
| A Sithole | Mortuary Services |
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| J Vallabh | H Dip Med Tech |

We regret to report the death of Mr Sithole in 2002

Compiled and edited by Prof AC Cantrell, NCOH, Johannesburg