

# NATIONAL CENTRE FOR OCCUPATIONAL HEALTH

## CHAPTER I

### INTRODUCTION

#### DIRECTOR / PROFESSOR'S REPORT

The 1997 Director's Report described the new functions of the National Centre for Occupational Health. Prominent among these was training, which was described as the provision of specialized training where this is of limited availability elsewhere (e.g. occupational epidemiology, occupational toxicology, occupational hygiene and occupational medicine). In the 1999 Report, training was deemed to be a growth area and a focus for 2000. The same can be said for 2001 and onwards, so there is merit in considering the current role of the NCOH in training, and our contribution in 2000.

Training is a core function of occupational health centres and institutes around the world. The World Health Organisation's 1999 directory of WHO Collaborating Centres in Occupational Health lists 55 centres, of which 51 (93%) cite training as a major task. For most of these Centres, practitioners (broadly defined) and professionals are the predominant target groups, rather than workers and managers. The NCOH is no exception.

Given that the training of professionals and practitioners is a major task of most occupational health institutions, what is the justification for involving national centres? And why target professionals? Put simply, national centres are involved because a multi-disciplinary team of experienced practitioners is needed to train occupational health professionals. However, these teaching practitioners are in short supply, except in national centres, which are often the only multi-disciplinary collective of practitioners in a country. There are obvious efficiencies in using the national centres' skills and infrastructure in training. There is also a self-serving reason for training: the contact with academia and intellectually critical colleagues, and the rigour of preparation for teaching, are good stimuli to keep up-to-date.

Why focus on professionals and practitioners? Essentially because this is the group who will best benefit from specific training. Managers and workers, in general, need basic information so that

they may understand their obligations, rights and options, can identify deficiencies in enterprise level occupational health services and are enabled to understand what occupational health professionals can do to improve workplace conditions. Also, the specialist professional is often a poor teacher of non-professionals. Of course, the NCOH does contribute to programmes for workers and management, particularly when there are technical matters to be presented, but these programmes are not our primary focus.

Usually, and 2000 was typical in this respect, we provide training through:

- Formal university programmes. The NCOH is responsible for a postgraduate programme for doctors (the Diploma in Occupational Health) and in 2000 established a Diploma and Master's programme in Occupational Hygiene, a significant development for the region. The first students will be enrolled in 2001.
- Contributions to postgraduate university and technician programmes. NCOH staff taught on many programmes for doctors, nurses and public health practitioners throughout the country in 2000.
- Skills development seminars for practitioners. In 2000, these included radiology, spirometry, diagnosis of contact dermatitis, occupational asthma, occupational health information resources, the use of occupational hygiene equipment, hand arm vibration syndrome etc. A seminar was developed for health and safety representatives in hospitals.
- Short courses on specific topics. The preparation of courses in occupational toxicology was the focus in 2000. These will be presented from 2001.
- Daylong seminars on selected topics and industries. The annual Webster Seminar exemplifies this activity. Occupational health and solvents was the topic this year.
- In-service training of our own staff and

attachments to the NCOH. Ms Casimiro was awarded a Doctor of Philosophy and Mr Renton a Master of Science in Industrial Hygiene. The attachments are a significant development and interns from a number of technikons were trained in Toxicology & Biochemistry Research, Analytical Services and Occupational Hygiene.

- o The supervision of students doing research for higher degrees.

Of course training was only one activity; this Annual Report presents the work of a Centre doing a great deal in many areas.

Occupational respiratory disorders dominate the research publications, a historic strength of the NCOH and still a concern, particularly given the high tuberculosis, silicosis and asbestos-related disease rates in our country. Pathology had an excellent research year.

The publications are a product largely of past work and do not reflect our diverse research programme, well documented in a recent NCOH publication ***Research at the National Centre for Occupational Health. List of current research programmes 1999-2000***, in which research projects are presented in 12 programmes: mineral dusts and fibres; infectious diseases; toxic metal ions; pesticides; occupational allergy and contact dermatitis; evaluations in specific industries; surveillance and occupational health indicators; biological markers; compensation; occupational health research prioritization; stress; and ergonomics. As projects in these fields are completed we will see a more diverse set of publications.

The introduction of new laboratory equipment and methods in Analytical Services and Toxicology & Biochemistry Research, and the commissioning of a new mobile x-ray facility by Occupational Medicine were the most important service-related developments. Although not a feature of the Director's Report, the routine services of the NCOH are provided to thousands of patients and their families, practitioners, workers and employers and are the central business of many NCOH staff members.

We were fortunate to have Eric Esswein, National Institute for Occupational Safety and Health, USA, spend a year with us. His dedication and expertise added greatly to our work in 2000.

Ms Irmgard Henseleit died in service in August after twenty nine years in the Analytical Services laboratory.

## SORDSA PUBLICATIONS – 2000

**SORDSA News** Volume 4 (1). (Jan – June 2000)

**SORDSA News** Volume 4 (2). (July – Dec 2000)

**SORDSA Alert:** Diagnosis and management of asbestos-related diseases in SA

**SORDSA Poster:** Asbestos: Exposures and Compensation in South Africa

## NCOH REPORTS – 2000

**01/2000**      **Yousefi V.** A report back on a visit to the Northern Cape Province, Department of Health

**02/2000**      **Esswein E, Garton E, Phillips J.** Result from a pilot study to evaluate for the presence of asbestos fibres in SOWETO, South Africa

**03/2000**      **Esswein E.** A suburban shopping center - Indoor Environmental Quality (IEQ) Survey, Johannesburg

**04/2000**      **Whitford T.** Feelings of stigma in patients with contact dermatitis

**05/2000**      **Spies A.** Thermal environment assessment at the Commission for Conciliation, Mediation and Arbitration (CCMA) office, Johannesburg

**06/2000**      **Spies A.** Airborne particulate assessment at a transport company and sand quarry, Gauteng

**07/2000**      **Spies A, Cantrell A, Yousefi V.** Risk assessment at a PTFE sodium-ammonia etching process, Elandfontein

**08/2000**      **Esswein E, Myeni S, Renton K, Spies A, Theodorou P, Naik I.** Determination of occupational exposure to inhalable and respirable manganese-containing dust and fumes in a ferro-silicon smelter

**09/2000**      **Esswein E, Renton K, Spies A, Myeni S, Theodorou P, Naik I.**

Assessment of occupational exposures to manganese dust & fumes in a Si-manganese smelter

- 10/2000** **Esswein E.** Assessment of occupational exposure to manganese-containing dust in a materials handling operation at a manganese smelter
- 11/2000** **Spies A, Esswein E.** Assessment of occupational exposure to manganese dust and fumes
- 12/2000** **Lebudi K, Fourie A, Kielkowski D, Ramafi G.** Report on the prevalence of skin and respiratory problems among hairdressers in Gauteng

#### **NCOH PUBLICATIONS – 2000**

**Churchyard GJ, Kleinschmidt I, Corbett EL, Murray J, Smit J, de Cock KM.** (2000) Factors associated with an increased case-fatality rate in HIV-infected and non-infected South African gold miners with pulmonary tuberculosis. *Int J Tuberc Lung Dis.* 4(8):705-12.

**Corbett EL, Murray J, Churchyard GJ, Herselman PC, Clayton TC, De Cock KM, Hayes RJ.** (1999) Use of mini-radiographs to detect silicosis: comparison of radiological with autopsy findings. *Am J Resp Crit Care Med.* 160:2012-2017.

**Dias B, Rees D.** (2000) Establishing exposure to a recognized cause in suspect cases of occupational asthma. *SORDSA News* 4(1) Jan-June 2000.

**Esterhuizen T.** (2000) A review of the occupational health hazards associated with bitumen and coal tar derivatives. *Occup Hlth SA.* 6(2):10-13.

**Godfrey-Fausset P, Sonnenberg P, Shearer S, Bruce M, Mee C, Morris L, Murray J.** (2000) Tuberculosis control and molecular epidemiology in a Southern African gold mining community. Patterns of transmission of pulmonary tuberculosis in the gold mining industry: conventional and molecular epidemiology. *Lancet.* 356:1066-1071.

**Gulumian M.** (2000) The ability of mineral dusts and fibres to initiate lipid peroxidation. Part II: relationship to different particle-induced pathological effects. *Redox Rep.* 5(6):325-51.

**Gulumian M, Nogueira C.** (2000) Detoxification of

Asbestos Fibres: Rationale, Feasibility and the Future of the Process. In *Asbestos Disease Control.* (Eds. GA Peters, BJ Peters). Lexis Publishing, USA. **Hnizdo E, Churchyard G, Dowdeswel R.** (2000) Lung function prediction equations derived from healthy South African gold miners *Occup Environ Med.* 57(10):698-705.

**Hnizdo E, Murray J, Davison A.** (2000) Correlation between autopsy findings for chronic obstructive airways disease and in-life disability in South African gold miners. *Int Arch Occup Environ Health.* 73(4):235-244.

**Hnizdo E, Singh T, Churchyard G.** (2000) Chronic pulmonary function impairment caused by initial and recurrent pulmonary tuberculosis following treatment. *Thorax.* 55(1):32-8.

**Jeebhay M, Stark JH, Fourie A, Robins T, Ehrlich R.** (2000) Grain dust allergy and asthma among grain mill workers in Cape Town. *Current Allergy & Clinical Immunology.* 13(3): 23-15.

**Jupp PG, Phillips JI, Garton E.** (2000) The pulvillus and empodium in *Culex quinquefasciatus*: visualization with the light microscope and a study of fine structure with the scanning electron microscope. *J Amer Mosquito Control Assoc.* (2):166-170.

**Kielkowski D, Nelson G, Rees D.** (2000) Risk of mesothelioma from exposure to crocidolite asbestos: a 1995 update of a South African mortality study. *Occup Environ Med.* 57:563-567.

**Mansoor N, Ramafi G.** (2000) Onion allergy – a case report. *Current Allergy & Clinical Immunology.* 13(3): 14-15.

**Murray J.** (2000) Services offered by the NCOH. *Mine Medical Officers' Assoc SA.* Aug p 9.

**Murray J, Sonnenberg P, Shearer S, Godfrey-Faussett P.** (2000) Drug-resistant pulmonary tuberculosis in a cohort of southern African goldminers with a high prevalence of HIV infection. *S Afr Med J.* 90(4):381-386.

**Nel LH, Venter SN, Bartie D, Goosen C** (2000): Detection methods for *Legionella* in cooling water systems. A Water Research Commission Report (K5/829).

**Nyantumbu B, Phillips JI, Murray J, Dias B, Lowe PJ, Allan LJ, Barber CM, Curran AD.** (2000) Proposed study on hand arm vibration syndrome in SA gold miners. *Mine Med Officers' Assoc SA.* Aug

pp 7-8.

**Phillips JI, Shor A, Murray J, Ong G, Taylor-Robinson D.** (2000) Myocardial infarction associated with *Chlamydia pneumoniae*. Cardiovascular J SA. 11(1):25-28.

**Rees D.** (2000) The burden of occupational lung disease. Occup Hlth SA. 6:10-14.

**Rees D.** (2000) The burden of occupational lung disease. SA Resp J. 6:18-25.

**Rees D, Issah W.** (2000) Don't forget the ferruginous bodies. S Afr Med J. 90(2):128.

**Renton K.** (2000) Constructing healthy buildings. Refrigeration and Airconditioning 2000, Jan: 39-43.

**Rees D, Mansoor N.** (2000) Case report of occupational asthma due to onion. Occup Hlth SA. 6(5):29-30.

**Shor A.** (2000) The pathology of *Chlamydia pneumoniae* lesions in humans and animal models. Trends Microbiol. 8(12):541-542.

**Shor A, Phillips JI.** (2000) Histological and ultrastructural findings suggesting an initiating role for *Chlamydia pneumoniae* in the pathogenesis of atherosclerosis. Cardiovascular J SA. 11(1):16-23.

**Singh T.** (2000) Legionaries' disease : The need for notification. LAG (*Legionella Action Group*), November.

**Solomon A, Rees D, Felix M, Venter E.** (2000) A proposed radiographic classification of tuberculosis to accompany the ILO International classification of radiographs of pneumoconiosis. Int J Occup Environ Health. 6(3) 215 - 219.

**Sonnenberg P, Godfrey-Fausset P, Glynn JR, Shearer S, Murray J.** (2000) Classification of drug-resistant tuberculosis in an epidemic area (letter). Lancet. 356:1930-1931.

**Sonnenberg P, Murray J, Glynn JR, Glyn Thomas R, Godfrey-Faussett P, Shearer S.** (2000) Risk factors for pulmonary disease due to culture-positive *M. tuberculosis* or non-tuberculous mycobacteria in South African gold miners. European Resp J. 15:291-296.

**Sonnenberg P, Murray J, Shearer S, Glynn JR, Kambashi B, Godfrey-Fausset P.** (2000) Tuberculosis treatment failure and drug resistance – same strain or new infection? Trans Royal Soc Trop Med Hyg. 94:603-607.

**Walker ARP, Ballard R, Raal FJ, Vermaak WJH, Delpont R, Shor A, Brink A.** (2000) Changing concepts of coronary artery disease – Part 1. Cardiovascular J SA. 11(1):32-40.

**Walker ARP, Shor A.** (2000) Coronary heart disease – any likelihood of benefit from the control of *Chlamydia pneumoniae*? Cardiovascular J SA. 11(1):7-9.

#### STAFF QUALIFICATIONS OBTAINED - 2000

**EMVM Casimiro** *Doctor of Philosophy*, Faculty of Science, University of the Witwatersrand, *Newly synthesized chelating agents as possible antidotes for heavy metal ion poisoning, with special reference to cadmium*

**K Renton** *Master of Science, Industrial Hygiene* University of Michigan

## CHAPTER II

### OCCUPATIONAL HYGIENE

This year the Occupational Hygiene section continued with its functions of:

- Surveys of workplace hazards
- Co-ordination of teaching and training
- Research, particularly co-operative projects
- Technical co-operation
- Providing specialized analytical services
- Dissemination of technical information
- Providing technical and advisory services to the provinces and
- Mentoring and practical training of Environmental Health graduates

#### **Surveys of workplace hazards**

In 2000, the emphasis was on assistance given to the provincial health departments, with an inevitable reduction of assistance to formal industries. As part of the bilateral NIOSH-NCOH cooperation agreement, a certified industrial hygienist, Mr. E J Esswein CIH, joined NCOH and participated in activities of the section. Research and routine survey finding were presented in the form of NCOH Reports as listed below.

- 01/2000 Yousefi V.** A report back on a visit to the Northern Cape Province, Department of Health
- 02/2000 Esswein E. Garton E, Phillips J.** Result from a pilot study to evaluate for the presence of asbestos fibres in SOWETO, South Africa
- 03/2000 Esswein E.** A suburban shopping center - Indoor Environmental Quality (IEQ) Survey, Johannesburg
- 05/2000 Spies A.** Thermal environment assessment at the Commission for Conciliation, Mediation & Arbitration (CCMA) office, Johannesburg
- 06/2000 Spies A.** Airborne particulate assessment at a transport company & sand quarry, Gauteng
- 07/2000 Spies A, Cantrell A, Yousefi V.** Risk assessment at a PTFE sodium-ammonia etching process, Elandfontein
- 08/2000 Esswein E, Myeni S, Renton K, Spies**

**A, Theodorou P, Naik I.** Determination of occupational exposure to inhalable and respirable manganese-containing dust and fumes in a ferro-silicon smelter

**09/2000 Esswein E, Renton K, Spies A, Myeni S, Theodorou P, Naik I.** Assessment of occupational exposures to manganese dust and fumes in a silicon manganese smelter

**10/2000 Esswein E.** Assessment of occupational exposure to manganese-containing dust in a materials handling operation at a manganese smelter

**11/2000 Spies A, Esswein E.** Assessment of occupational exposure to manganese dust & fumes

#### **Teaching and Training**

Occupational hygienists lectured on occupational hygiene, demonstrated the calibration, use and operation of direct and indirect reading instruments and field sampling equipment to a variety of practitioners including Diploma of Occupational Health (DOH) students, and Occupational Health Nursing Students, as well as Environmental Health students.

Staff of the section were engaged in the establishment of a postgraduate programme in occupational hygiene at the School of Public Health, University of Witwatersrand, viz. the Diploma in Public Health: Occupational Hygiene and the degree of Master of Public Health (MPH): Occupational Hygiene. Staff members were heavily involved in coordinating the course and finalizing the syllabus covering different aspects of occupational hygiene.

#### **Research**

This section contributed by participating in and supporting a number of research projects, both internally (NCOH) and externally (Government Mining Engineer, communities, etc). Hygienists' internal involvement was:

- Environmental asbestos concentrations in SOWETO dwellings with asbestos cement roofs;
- Occupational allergy in workers exposed to soybean.

External projects included:

- o a manganese project with Prof Myers, UCT and Dr Dees, Afrox Health Care
- o a SIMRAC project, SIMHEALTH 605, *Assessing hazards created by fumes, gases and UV radiation during welding and cutting in the South African mining industry.*

### **Technical committees**

A senior staff member served on a number of technical committees, representing the NCOH and the Department of Health.

Staff also met with various professional and technical institutions/organizations:

ASOSH	9
SABS	8
Department of Minerals & Energy	4
Group Environmental Monitoring	4
Gauteng Provincial Government	5
SAIOH	3
Philips XRD users	3

### **Occupational hygiene field equipment**

The section acquired a number of new scientific instruments during 2000. It also obtained calibration certificates for certain pieces of existing apparatus in anticipation of laboratory accreditation. The section is now in a better position to do health hazard evaluations on a variety of agents in different industries. The section also assisted a number of researchers and teaching institutes by lending them instruments for field survey and monitoring of hazardous workplace agents.

### **Acquiring new reference books**

An extensive list of reference books was prepared, acquired and placed in our section for easy and immediate access by hygienists and postgraduate DOH and MPH students.

### **Specialized analytical services**

Asbestos fibre and crystalline silica evaluation using x-ray diffraction was carried out on 20 bulk and 10 air samples were evaluated.

### **Recruitment and staff development**

With the streamlining and staff development of the occupational hygiene section, we have been able to plan for the recruitment of staff.

- o Two vacant posts for Assistant Director were advertised, of which one was filled
- o One staff member successfully completed his specialized course from Michigan University, USA, obtained his MSc. degree, and returned to his post, being promoted to specialist scientist.
- o A hygienist was granted sponsorship to undertake a modular BIOH course offered by Pretoria Technikon.
- o One technical staff member was supported and sponsored to study through Technikon SA for a Safety Management Diploma, while another studied for his matric.

### **Human resource development**

The Occupational Hygiene section initiated a scheme for taking in newly graduated Environmental Health technikon students for mentoring, professional supervision and in-house training. This training added to their experience and confidence and within six months all had managed to get a job and left the NCOH.

### **PRESENTATIONS**

- o Oral presentation, by **V Yousefi**, of a paper with **D Mthethwa** and **SR Strydom**. *Burdened by dust from the mine waste dumps*, NOSHCON, 2000, International Safety, Health and Environment Conference, Sun City
- o Panel presentation by **Vali Yousefi**. *Ventilation and the Working Environment* at the FRIGAIR 2000, 10<sup>th</sup> International Air Conditioning, Refrigeration & Ventilation Congress, 8-10 March 2000, Midrand
- o **V Yousefi** - interview published in NOSA's Safety Management, Jan 2000, *Dust: the biggest killer in industry?* pp 3-5

### **SCIENTIFIC & TECHNICAL STAFF**

V Yousefi <b>Head:</b>	MSc, MSPH, MPhil, DOHy
R Khakhu	Technician
L Khumalo	Secretary
E Makhudu	Chief Technical Officer
JT Mohasoane	Technician
JF Moseboa	Technician
KA Renton	MSc, MS (Ind Hyg)
A Spies	BSc Hons, MSc

## CHAPTER III

### TECHNICAL ADVISORY SERVICES

The section continues in its primary task of accessing and disseminating technical information to occupational health and safety professionals both nationally, regionally and within the NCOH.

Day to day communication and transfer of information depends largely on the Centre's local area computer network (LAN). The need to keep this facility effective has been recognised, and substantial resources were spent during the year to keep the system compatible with rapidly changing technology.

Similarly, the AJ Orenstein Library for Industrial Medicine is a valuable national resource, being the only formal occupational health library in the region. With the cost of imported books and periodicals spiralling, rationalization of holdings has had to take place. However, it has been decided that the core of specialized occupational health material must be maintained, as there is no other reference point. At this stage, the option of changing to on-line versions of the scientific journals is neither feasible nor cost effective.

The section handles a growing number of queries for technical information on occupational health and safety issues. It is interesting to note that a third of the queries dealt with during 2000 came from outside Gauteng, originating from all nine of the other provinces and from foreign countries. This highlights the national role of the information service.

The staff of the Resource Centre introduced a variety of visiting groups to the services and activities of the National Centre. Visitors were drawn from universities and technikons, trade unions, occupational health nurses, industries, foreign practitioners and members of the general public.

Similarly, the activities of the NCOH were promoted by manned exhibitions mounted at the NOSHCON Conference in Durban in May, and the SASOM Exhibition in November.

#### **TEACHING & TRAINING**

Dr Cantrell, together with Dr Felix of Occupational Medicine, co-ordinated and presented the

postgraduate Diploma in Occupational Health for the University of the Witwatersrand during 2000. He was involved also as visiting lecturer on Diploma in Occupational Health programmes at the Universities of Pretoria and the Free State, and the Nursing Diploma in Occupational Health. Both he and Ms Whitford tutored undergraduate medical students on factory visits.

#### **SORDSA ALERT**

Members of the section contributed to the writing, editing and production of an Alert document during 2000: ***Diagnosis and management of asbestos-related diseases in SA***

#### **NCOH REPORT**

**04/2000 Whitford T.** Feelings of stigma in patients with contact dermatitis

**07/2000 Spies A, Cantrell A, Yousefi V.** Risk assessment at a PTFE sodium-ammonia etching process, Elandfontein

#### **CONFERENCES & MEETINGS ATTENDED**

**AC Cantrell** attended the **38th Annual General Meeting of the ILO/CIS National Centres**, held at the Health and Safety Authority, Dublin, Ireland from 20-21 June 2000. He attended in his capacity as Manager of the South African CIS National Centre and was elected to serve as chairperson for the duration of the meetings.

**AC Cantrell** attended the *e-OSHE World: Seeing the Future - 4<sup>th</sup> International Occupational Safety, Health and Environment Information Conference*, Conference Centre of the European Foundation for the Improvement of Living & Working Conditions, Dublin, Ireland 22-23 June 2000.

**Collaboration with the Health & Safety Laboratory**, The NCOH has a standing collaboration agreement with the HSL, UK. **Dr Cantrell** visited the HSL at Broad Lane, Sheffield from 3-5 July 2000, for meetings with Divisional and

Section Heads at the HSL. At the same time, he undertook a study of the HSL's technical query answering service to identify possible improvements to the local NCOH service.

**AC Cantrell** was one of the contributors to the 3rd Webster Memorial Seminar, *Solvents*, held at the NCOH on 16 Nov 2000.

### **SCIENTIFIC & TECHNICAL STAFF**

AC Cantrell	<b>Head:</b> MSc Agric, PhD, COCOH
RL Landless	BSc Hons, Dip Data
S Mabona	Library Messenger
KM Mkhise	Senior Network Controller
E Mokotedi	BBibl
EK Semanya	Operator
NE Sesoko	BA
D Traub	BA Hons Dip Lib Sci
DL Thompson	MSc, Dip Data
T Whitford	BA, TTHD



## CHAPTER IV

### TOXICOLOGY & BIOCHEMISTRY RESEARCH

In 2000, the Section focused on the development of biomarkers of exposure and susceptibility as well as biomarkers of genotoxicity of toxic compounds encountered in the working environment. In addition, work has been started to establish Toxicogenomics in the section. To this end, a collaborative protocol with the University of Sydney, Australia, has been finalized to send Ms Claudina Nogueira for training and also for registering for a higher degree at this University.

The section was also instrumental in organizing the 1<sup>st</sup> International Conference on ***Biomedical Relevance of Free Radicals: From Molecular Mechanisms to Therapeutic Interventions*** which was held in the Kruger National Park, Mpumalanga from 16-20 July 2000. In addition, preceding this conference, a oneday workshop on ***Occupational Lung Disease: Mechanisms and Future Prophylactic and Therapeutic Interventions*** at the NCOH, as well as a three day workshop on Comet assay at the Technikon Witwatersrand were organized.

#### TEACHING

The Section also participated in a training programme initiated by the Educational Opportunities Council (EOC) to train University graduates in Occupational Toxicology. Similarly, a training programme was also provided by the section to technikon graduates on methodologies available in the section where, within the year 2000, eight students and tTechnikon graduates have already been trained. In addition, Dr Gulumian has given tutorials to BSc Honours students from the Haematology and Molecular Medicine Department, University of the Witwatersrand. Finally, she also lectured to students completing their DOH course at the NCOH/University of the Witwatersrand.

#### RESEARCH

Work on three main programmes continued and results obtained were presented at the aforementioned as well as other national and international conferences.

***Mineral dusts and fibres:*** Mrs Sharon Makhubela has continued her investigations on the mechanisms involved in the increased predisposition of infection with *Mycobacterium tuberculosis* after exposure to silica using the flow cytometer housed in the

Department of Surgery, University of the Witwatersrand. Miss Mpho Semano has continued her work on surface characterization of mineral particles using the Transmission Mössbauer Spectrometer housed in the Department of Physics, University of the Witwatersrand as well as X-ray Photoelectron Spectroscopy at the CSIR, Pretoria. Mr Caiphus Ramoroka has established new methodologies at the measurement of lipid peroxidation products including isoprostanes in biological fluids. Finally, Dr Mohammed Tikley, in collaboration with the NCOH, has completed the practical work for his PhD work on the ***Aetiopathogenesis of systemic sclerosis.***

***Pesticides:*** Mr Xolani Masoka has developed a new multidisciplinary programme on pesticides entitled ***NCOH multidisciplinary programme on the health effects of occupational exposure to pesticides.***

***Toxic Metal Ions:*** The need for speciation of toxic metal ions in biological fluids has long been discussed in the scientific literature. The Toxicology and Biochemistry Research Section has therefore initiated a new programme to investigate the speciation of manganese and chromium in biological fluids. Part of this work is to be conducted in collaboration with the Department of Chemistry, University of the Witwatersrand.

#### PUBLICATIONS

**Gulumian M.** (2000) The ability of mineral dusts and fibres to initiate lipid peroxidation. Part II: relationship to different particle-induced pathological effects. Redox Rep. 5(6):325-51.

**Gulumian M, Nogueira C.** (2000) Detoxification of Asbestos Fibres: Rationale, Feasibility and the Future of the Process. In *Asbestos Disease Control*. (Eds. GA Peters, BJ Peters). Lexis Publishing, USA.

#### CONFERENCE PRESENTATIONS

**M Tikly, M Gulumian, N Haldar, S Marshal, P Wordsworth, K Welsh.** Free radical scavenger polymorphisms in systemic sclerosis. The First International Conference of the SFRR-Africa. 16-20 July 2000. Malelane Gate Resort, Mpumalanga, South Africa.

Caiphus Ramoroka

**M Tikly, K Channa, P Theodorou, M Gulumian.** Oxidative stress and trace elements in systemic sclerosis. The First International Conference of the SFRR-Africa. 16-20 July 2000. Malelane Gate Resort, Mpumalanga, South Africa.

**C Ramoroka, S Makhubela, M Semano, M Gulumian.** Biomarkers of exposure in occupational toxicology. The First International Conference of the SFRR-Africa. 16-20 July 2000. Malelane Gate Resort, Mpumalanga, South Africa.

**S Makhubela, P Bianchi, M Gulumian.** CD69 expression by human peripheral mononuclear cells treated with silica and BCG measured by flow cytometer. The First International Conference of the SFRR-Africa. 16-20 July 2000. Malelane Gate Resort, Mpumalanga, South Africa.

**M Semano, G Hearne, M Gulumian.** Surface characterization of mineral particles in relation to their ability to peroxidise lipids. The First International Conference of the SFRR-Africa. 16-20 July 2000. Malelane Gate Resort, Mpumalanga, South Africa.

**M Gulumian, P Bianci, S Makhubela.** Some mechanistic aspects of mineral particle-induced predisposition to *M Tuberculosis*. 10<sup>th</sup> Biennial Meeting of the SFRR, 16-20<sup>th</sup> October, 2000. Kyoto, Japan.

#### **INVITED LECTURES AND CHAIRING SCIENTIFIC SESSIONS**

**Dr Gulumian**, invited lecture, *Oxidative stress and occupational diseases*, at the First International Conference of SFRR-Africa. 16-20 July 2000. Malelane Gate Resort, Mpumalanga, South Africa. She also chaired a session on *Occupational and Environmental Health*.

#### **TRAINING OF STAFF MEMBERS**

During 2000, training continued to be provided, and the staff members of the section attended the following workshops and courses:

**Laboratory Management:** Short course offered by the Department of Chemistry and Physics, Pretoria Technikon, 29 May - 2 June 2000. Course content: personnel management, safety management, financial management, and method validation. *Attended by: Mpho Semano, Sharon Makhubela,*

**HPLC (High Pressure Liquid Chromatography):** Short course offered by the Department of Chemistry and Physics, Pretoria Technikon, 10 – 14 of April 2000. Course content: basic chromatography, instrumentation, column packing material, quantitative and qualitative analysis. *Attended by: Sharon Makhubela, Caiphus Ramoroka*

**Comet Assay Workshop:** Short “hands-on” course on various theoretical and practical aspects of the comet assay (single cell gel electrophoresis) used to assess DNA damage, offered by the Department of Biotechnology of the Witwatersand Technikon, 12 – 14 July 2000, presented by Prof. Andrew Collins (Scotland) and Dr. Mária Dušinská (Slovakia). *Attended by: Sharon Makhubela, Claudina Nogueira, Xolane Masoka, Caiphus Ramoroka*

**Laboratory Accreditation Course:** Short course providing tools and techniques on developing a system to enable laboratories to become accredited to ISO Guide 25, offered by LabHouse – Contract Laboratory and Laboratory Training, 4 - 5 July 2000, presented by Joe Johnston of Johnston-Cox International. *Attended by: Claudina Nogueira*

**Advanced HPLC Method Development Workshop:** Short course providing tools and techniques in advanced HPLC method development and applications. LabHouse – Contract Laboratory and Laboratory Training, 25 - 26 July 2000. *Attended by: Claudina Nogueira*

**General Microbiology Practical Course:** Comprehensive course on the theoretical and practical aspects of microbiology, LabHouse – Contract Laboratory and Laboratory Training, 14 – 18 August 2000. *Attended by: Sharon Makhubela*

**Training in GC-MS Methodology for Pesticide Analysis:** A 3-month course offered by Michigan University, USA. *Attended by Xolane Masoka*

**Creative Research and Development Management Programme:** 8-10 February, 2000, Farm Inn, Pretoria was successfully completed by *Dr M Gulumian.*

#### **SCIENTIFIC & TECHNICAL STAFF**

M Gulumian	<b>Head:</b> MSc, PhD
S Makhubela	MSc
X Masoka	BSc Hons
CMCA Nogueira	MSc
C Ramoroka	MSc
M Semano	BSc Hons

# CHAPTER V

## ANALYTICAL SERVICES

### **Services provided**

A responsibility of the Analytical Services section of National Centre for Occupational Health is to supply specialized analytical capacity in environmental and biological monitoring to support the practice of occupational and environmental health. The services include consultations on the appropriate collection of samples; measurement of the selected contaminant on biological and environmental samples collected from workplaces and from workers; and the organization of quality assurance schemes for selected hazardous agents for laboratories countrywide. Additional functions of the section are to contribute to research and health hazard evaluations in occupational health and provide training to students in analysis of toxic substances. Inspectors implementing the Occupational Health and Safety Act and its Regulations, provinces and SADC regions may utilize the services offered by the section.

### **New developments**

New organic toxicology, multi-element assay and sample preparation laboratories were established during the year.

### **Analyses conducted during 2000**

Samples submitted for analysis were mainly blood, urine and filter samples. New method developments included assays for red cell and plasma cholinesterase, acetic acid in air samples, trichloroethylene, toluene, styrene, phenol, *o*-cresol, *iso*-prostane and methylethyl ketone in biological samples. The total number of samples increased by 53% and work units by 76% compared to 1999.

During the year 2000, a large collaborative study on ***The neurological effects of occupational & environmental exposure on workers in a South African manganese smelter*** was conducted by the University of Cape Town, the US National Institute for Occupational Safety & Health and NCOH. This section carried out all the manganese analyses on blood, urine, filters and bulk samples.

### **Staff development**

Mrs Naik and Mrs Theodorou attended a training course on Varian<sup>R</sup> Vista Inductively Coupled Plasma Atomic Emission Spectrophotometry in Melbourne, Australia, 3 – 9 July

Ms Daya and Mr Ntsuba attended an Atomic Absorption Spectrometry Workshop at Technikon Natal, 22-24 March

Mrs Naik attended the Applied Management Techniques course in Pretoria, 24-28 January

Mesdames Naik, Theodorou and Channa attended a seminar on Microwave Sample Preparation offered by Wirsam Scientific in Johannesburg, 4 April

Mrs Theodorou and Mrs Channa attended Integrated Procedures for Trace-level Analysis of Organic Micro Contaminant Workshop, Chrom SA and SAAMS, Warmbaths, 19 – 20 October

Mrs Theodorou attended a one-day course on Biological Monitoring in Occupational Health by the School for Health Systems and Public Health, University of Pretoria, 22 January

Staff members attended various laboratory-related courses such as ICP-MS, the Customer Services workshop, Spectrometry, GC, HPLC and accreditation seminars.

### **NCOH Reports**

**08/2000 Esswein E, Myeni S, Renton K, Spies A, Theodorou P, Naik I.** Determination of occupational exposure to inhalable and respirable manganese-containing dust and fumes in a ferro-silicon smelter

**09/2000 Esswein E, Renton K, Spies A, Myeni S, Theodorou P, Naik I.** Assessment of occupational exposures to manganese dust and fumes in a silicon manganese smelter

### **SCIENTIFIC AND TECHNICAL STAFF**

I Naik	<b>Head:</b> MSc, Dip Med Tech (ChemPath, Micro, Haem)
P Theodorou H Tassell	<b>Head QA:</b> BSc (Hons) <b>Acting Lab Head:</b> Dip Pharm Tech
K Channa	<b>Head Organic Tox;</b> MSc
A Daya	H Dip Med Tech
H Ntsuba	BSc

***We regret to report the death of Ms. Irmgard Henseleit on 16 August 2000. She was the Technologist-in-Charge in the Analytical Laboratory and worked at the NCOH from 1971 - 2000.***

# CHAPTER VI

## OCCUPATIONAL MEDICINE

The Occupational Medicine Section is involved in clinical and radiological investigation of sentinel cases of occupational diseases, processing of compensation claims, research surveys and teaching and training.

### RESEARCH

#### **924702: The Occurrence of Hand Arm Vibration Syndrome (HAVS) in South African Gold Mines**

The project is supported by the Safety in Mines Research Advisory Committee. It is conducted in one of SA's gold mines to determine the prevalence of HAVS in the goldminers. The benefit of doing the study is capacity building in HAVS diagnosis in SA.

#### **924901: To determine the prevalence of abnormal clinical tests of manual dexterity, hand grip, vascular and peripheral nerve function in a group of goldminers**

This is a sub project of the HAVS project mentioned above. Its main objective is to determine the prevalence of abnormal clinical tests.

#### **924401: Asbestosis in the non-mining industry in the Gauteng Province**

This is a review of asbestosis cases diagnosed at the NCOH clinic from 1980 to 2000. The objectives of the study are to identify jobs and industries that are associated with asbestosis. Furthermore, the study will characterize the nature of asbestos exposure.

### SURVEYS

Through the efforts of Prof Solomon, the section acquired a state-of-the-art mobile x-ray van. This vehicle is central to the surveys that are carried out by the section.

**Polyurethane foam factory** : A chest X-ray survey was undertaken to detect radiographic changes in the lungs of workers exposed to solvents.

### TEACHING & TRAINING OF MEDICAL PRACTITIONERS

Staff members were involved in formal and informal lectures in occupational health and radiology:

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

**X-Ray Teaching:** Department of Radiology Johannesburg Hospital, Anglo Gold Highveld Hospital, Witbank, NCOH and MBOD - Continuing Education Programme: Regular Friday meetings for discussion of occupational health cases.

### Lung Function Courses

These were offered to doctors and nurses.

### 3<sup>rd</sup> Webster Memorial Seminar

This is an annual event organized by the section. For the year 2000 the topic was **Exposure to solvents in the workplace.**

### HIV/AIDS Workshop

This workshop was organized for medical practitioners, and was on HIV/AIDS in the workplace.

### Hand Arm Vibration Syndrome Workshop

This workshop was organized to raise awareness about HAVS in health care professionals in the mining industry and also to inform them about the HAVS study.

### Training of workers

The section also did training of workers in the following companies: Eskom Technology Services International, Iscor, TMI, Samancor.

### HIV/AIDS Workshops

Four workshops were organized for the staff of NCOH, MBOD and CCOD.

### X-RAY READING

The services of Prof Solomon were utilized in consultation and reading of chest X-rays for the NCOH clinic, Amcoal, Afrox, Anglogold Health Services, City Council of Pretoria, Corrobrick, coal workers' pneumoconiosis survey, claimants in the case against Cape Asbestos plc and referral and arbitration of radiographs from MBOD for finalizing compensation decisions.

### OCCUPATIONAL MEDICINE CLINIC

In the year 2000, 277 new workers were seen at the Occupational Medicine Clinic. An increasing number of workers with occupational asthma and dermatitis attended the Clinic. Table 1 shows the commonest occupational diseases seen during the year.

**Table 1: The commonest occupational diseases seen at the Clinic**

Occupational Disease	Workers Seen
Asthma	45
Dermatitis	31
Silicosis	16
TB	14
Asbestosis	13

Other conditions seen were bronchitis, chronic obstructive pulmonary disease and other respiratory disorders. The main industries that employed workers are shown in Table 2 below:

**Table 2: The main employing industries**

Industries	Number of Workers
Engineering	69
Chemical	31
Foundry	31
Manufacturing	15
Hospital	13
Food Processing	11

The greatest number of workers referred to the clinic was exposed to different chemicals, chemical fumes, asbestos, silica and latex dust.

### Compensation

Table 3 shows the 32 cases that were submitted to the Compensation Commissioner after presentation to the NCOH and MBOD panel.

**Table 3: Cases submitted for compensation**

Occupational Disease	Number of Cases
Asthma	9
Asbestosis	9
Silicosis	9
TB	2
COPD	2
PMF	1

### PUBLICATIONS

**Dias B, Rees D.** (2000) Establishing exposure to a recognized cause in suspect cases of occupational asthma. SORDSA News. 4(1) Jan-June 2000

**Nyantumbu B, Phillips JI, Murray J, Dias B, Lowe PJ, Allan LJ, Barber CM, Curran AD.** (2000) Proposed study on hand arm vibration syndrome in SA gold miners. Mine Med Officers' Assoc SA. Aug pp 7-8

**Solomon A, Rees D, Felix M, Venter E.** (2000) A proposed radiographic classification of tuberculosis to accompany the ILO International classification of radiographs of pneumoconiosis. Int J Occup Environ Health. 6(3) 215 - 219

### CONFERENCE ATTENDANCE & RESENTATIONS

**Nyantumbu B, Vingard E.** Prevention of work-related musculoskeletal disorders at the Department of Health in SA. 26<sup>th</sup> International Congress on Occupational Health: Healthy worker, healthy workplace: A new millennium. 27<sup>th</sup> August-1st September 2000, Singapore

**Nyantumbu B, Lebudi K, Kielkowski D, Govuzela M.** Suitability of workstations and musculoskeletal symptoms in garment workers. Epidemiological Society of Southern Africa: Poverty and inequity: The Challenges for public health in Southern Africa. 24-25 February 2000, East London

### CONTINUING EDUCATION

**B Dias, S Kgalamono & B Nyantumbu** received training for hand arm vibration syndrome from scientists at the Health & Safety Laboratory, Sheffield, UK

**B Dias & S Kgalamono** attended:

- o the Combined Congress Critical Care Society & Pulmonology Society, International Convention Centre, Durban, 23-27 July 2000
- o 3<sup>rd</sup> CME Congress in Pulmonology, Holiday Inn, Durban, 15-17 September 2000
- o The first year of the Diploma in Occupational Health at the University of the Witwatersrand

### SCIENTIFIC & TECHNICAL STAFF

E Venter	<b>Acting Head:</b> MSc
JCA Davies	MBBS, DPH, FFPHM, FFOM (supernumary)
T Dlamini	RN
B Dias	MBBCh
DR du Preez	Secretary to Section
MA Felix	MBBCh, DOH, PhD
S Kgalomono	MBBCh
B Mota	Clinic Clerk
B Nyantumbu	BSc, DOH, Adv Dip Occ Safety Hlth, Cert Ind Erg
NPZ Sekhame	RN, DOH

## CHAPTER VII

# EPIDEMIOLOGY & SURVEILLANCE

Activities of the section continued with important programmes viz. research, teaching and consultations. New and exciting developments occurred such as the proposals for the surveillance of occupational musculoskeletal disorders, and the study of the consequences of occupational asthma.

### **RESEARCH & SURVEILLANCE**

Long-term projects have continued and new research has been developed such as the study of cancer and reproductive risks in the chemical industry. These will continue for the next four to five years.

#### ***Prieska birth cohort***

A survey was carried out among surviving cohort members to determine their residency time in Prieska, occupational and domestic exposure to asbestos, and smoking status. The response was rather poor, as only 250 questionnaires were completed. Difficulties were encountered in obtaining correct current residential addresses of cohort members.

#### ***Occupational health status***

The Occupational health indicators project conducted two field surveys. One measured the prevalence of Occupational Health and Safety Committees in the manufacturing industry, and the second surveyed public hospitals to determine the presence of Hepatitis B immunization programmes. Data were gathered from government departments to update Part III of the Occupational Health Indicators report.

#### ***Health hazard evaluation***

There was no new project in this category. Analysis of psychosocial data collected for the study of women assembly workers in a microelectronic factory showed that dissatisfaction with work content and with physical conditions caused increased stress levels more often than other factors. Dissatisfaction with work content was the only stressor that had a significant impact on the prevalence of work related musculoskeletal pain, more significant in fact than the job category. This supported the findings of psychological risk factors for musculoskeletal pain in other studies. Collaborative work on identification of biomarkers for colophony exposure was started with the Health and Safety Laboratory (UK). A dissertation on the project

was submitted for the degree, MSc (Med).

#### ***SORDSA - respiratory disease surveillance***

During 2000, 230 medical doctors and 163 occupational health nurses reported new cases of occupational respiratory diseases to SORDSA. From October 1996 until December 2000, 5297 newly diagnosed cases were reported. Of these cases, 1082 were reported during 2000. The conditions most frequently reported to SORDSA since 1996 included pneumoconiosis (3028 cases), inhalation accidents (429 cases), TB and chronic obstructive pulmonary disease (COPD) (360 cases), COPD and pneumoconiosis (297) and occupational asthma (291 cases).

#### ***New projects***

Study methods were reviewed for the research on the consequences of occupational asthma. Data were collected on 114 occupational asthma cases reported to SORDSA. Subjects were telephoned two to three years after initial diagnosis. They were asked to report on their personal, social and health status. Preliminary data analysis indicates that very few cases recovered completely. Many are still exposed to the causal agent and those workers are better off financially than cases who are now unemployed and also experiencing physical hardship.

Surveillance of work-related musculoskeletal disorders of upper limbs was planned and basic methods and materials developed to pilot the methods in Gauteng Province in 2001. Members of professional societies such as hand surgeons, orthopaedic surgeons, rheumatologists, occupational health doctors and physiotherapists were approached to participate.

### **TEACHING AND CONSULTATION**

Epidemiology training for the Diploma in Occupational Health continued. The Head of Section consulted on research projects, and staff members assisted with research projects of other sections. Ms A Calverley co-ordinated factory visit tutorials for Fourth Year medical students at the University of the Witwatersrand. This programme is part of their formal training in Occupational Health.

#### ***Training and development***

Two members are continuing their studies in a

distance-based post-graduate course, MSc in Epidemiology, at the London School of Hygiene and Tropical Medicine, University of London. The

students successfully completed the first year of the course. Another staff member enrolled in a part time, postgraduate honours degree in Environmental Epidemiology at the MEDUNSA University. A member of staff, registered for an MSc degree in the Faculty of Health Sciences of the University of the Witwatersrand, submitted her dissertation.

#### **Other activities**

M. Govuzela served as the elected representative for the NCOH branch of the NEHAWU trade union. S. Mathinya was a member of the Non-personal Health Services HIV/Aids Committee.

#### **PRESENTATIONS**

- Risk of mesothelioma from exposure to crocidolite asbestos. A 1995 update on the SA mortality study. D Kielkowski, G Nelson, D Rees. ESSA Conference, East London 23-24 February 2000
- Industry and occupation as risk factors for lung cancer in black cancer patients from Johannesburg and Soweto. Tonya Esterhuizen, D Kielkowski, F Sitas. Epidemiological Society of Southern Africa Congress. East London. 23-24 February 2000
- SORDSA results 1996-1999. T Esterhuizen. Epidemiological Society of Southern Africa Congress, East London. 23-24 February 2000
- Prevalence of skin and respiratory problems among hairdressers. K Lebudi, A Fourie, D Kielkowski. ESSA Conference, East London 23-24 February 2000
- Incidence of dermatitis and respiratory disease among hairdressing students. A Fourie, K Lebudi, D Kielkowski. Epidemiological Society of Southern Africa Congress. East London 23-24 Feb 2000
- Risk of mesothelioma from exposure to crocidolite asbestos. A 1995 update on the South African mortality study. D Kielkowski, G Nelson, D Rees. Department of Health, Pretoria. 23 March 2000
- Occupational asthma cases identified by SORDSA. T Esterhuizen. South African Society for Occupational Health Nursing Practitioners. Occupational Asthma Workshop for Gauteng branch of SASOHN, Johannesburg. April 2000
- Risk of mesothelioma from exposure to

crocidolite asbestos. A 1995 update on the

SA mortality study. D Kielkowski, G Nelson, D Rees. Academic Seminar Programme, Dept Community Health, University of the Witwatersrand. 14 Jul 2000

- Causes and occurrence of occupational asthma as identified by SORDSA. Tonya Esterhuizen. South African Thoracic Society Congress, Durban. July 2000
- Exposures and health problems in a microelectronic assembly line. A Calverley. Academic Seminar Programme, Department of Community Health, University of the Witwatersrand. 11 August 2000
- Musculoskeletal problems in women working in garment industry. D Kielkowski, B Nyantumbu, A Calverley, M Govuzela, K Lebudi. Academic Seminar Programme, Department of Community Health, University of the Witwatersrand. 20 October 2000

#### **NCOH REPORTS**

**12/2000K Lebudi, A Fourie, D Kielkowski, G Ramafi.** Report on the prevalence of skin and respiratory problems among hairdressers in Gauteng

#### **PUBLICATIONS**

**Esterhuizen T.** (2000) A review of the occupational health hazards associated with bitumen and coal tar derivatives. *Occup Health Southern Africa*. 6(2): 10-13.

**Kielkowski D, Nelson G, Rees D.** (2000) Risk of mesothelioma from exposure to crocidolite asbestos: 1995 update of a South African mortality study. *Occup Environ Med*. 57:563-567.

#### **SCIENTIFIC & TECHNICAL STAFF**

D Kielkowski	<b>Head:</b> PhD
A Calverley	AIMLT
T Esterhuizen	BSc(Hons)
MH Govuzela	BSc
K Lebudi	BSc(Hons)
S Mathinya	Data capturer
F Penxa	Data capturer
T Sebata	MSc
T Duma [SORDSA]	NDAdmin

## CHAPTER VIII

# IMMUNOLOGY & MICROBIOLOGY

The Immunology & Microbiology section is committed to providing service, training and research in the field of occupational health for all sectors of the South African workforce.

### **SERVICES PROVIDED**

During 2000, services took the form of skin prick tests (60), patch tests (86), Phadiotop tests (8), specific IgEs (37) and 21 on-site visits. A fairly good number of these tests were positive, necessitating interaction with workplace services and management. On the basis of these results, recommendations were made to the employers to modify work place activities so as to avoid or reduce the levels of exposures that could eventually lead to occupational disease. On a large scale, service in the form of skin prick tests and patch tests was provided to Ga-Rankuwa/Medunsa hospital staff for latex allergy testing.

### **TRAINING & DEVELOPMENT**

Dr Ramafi attended a project management course to acquire competency required for effective management as the head of the Immunology & Microbiology section.

Mrs Bartie attended a microbiology workshop at Merck. This was very relevant to our Microbiology section as Mrs Bartie's work is concentrated on microbial contamination with special reference to water distribution systems.

Other members of this section attended other courses including: A workshop on accreditation as it is important for our laboratories to be accredited, Legionella Action Group seminars and Health and Safety workshops.

Staff in the section were responsible for formal teaching on the Diploma in Occupational Health programmes at the Universities of Natal, Pretoria and the Witwatersrand. Occupational Health nurses were lectured on contact dermatitis.

### **RESEARCH PROJECTS**

- **923502 Detection methods for Legionella in industrial cooling water systems - D Bartie**

Water quality and safety are important issues in SA and elsewhere today. Legionella species within cooling water systems may contribute to respiratory illness. The presence of organisms in cooling water systems also raises a number of questions concerning their growth and survival, with special reference to their interaction with protozoa.

If Legionella can be prevented from multiplying in cooling water systems, the probability of having an infective dose and subsequent occupational infections can be greatly reduced. This project has been completed and the outcome or impact is towards the standardization of identification methods for Legionella in South Africa.

This project has now been extended to investigate the interactions between legionella-like amoebal pathogens (LLAPs) and Legionella amoeba (protocol in preparation). These pathogens have not been studied in SA to date. Results from the above project indicate that these pathogens may be present in industrial cooling waters.

A PhD thesis is in the final stages of completion on this project. Three papers have been submitted, a report (WRC Report No 827/1/01) has been written.

- **923801 Detection of Legionella in dental unit water lines using different techniques: a prospective study - T Soogreem**

The aim of this study is to determine the prevalence of Legionella in dental unit water lines. The quality and safety of water is declining in many parts of the world. This is of great concern in hospitals, nursing homes, dental practices etc, where a number of immuno-compromised patients are cared for. Legionella species within dental lines may contribute to respiratory diseases as a result of aerosols generated in dental procedures. The project is completed and an MSc thesis is currently being written.

- **92340299 Occupational allergy in workers exposed to soybeans - N Mansoor: A prospective study**

Soybeans are one of the richest and cheapest sources of proteins and vegetable oil. They are used for both human and animal consumption. Soybeans are known sensitizers i.e. they can cause asthma or rhinitis. This project is still ongoing and the outcome is aimed at determining the appropriate test systems



for sensitization.

- **92330298 Contact dermatitis amongst hairdressers in greater Johannesburg - A Fourie & K Lebudi: A cross-sectional study.**

Chemicals in the products used by hairdressers can cause irritation or sensitization or both of the airways and may affect mucociliary transport in the nose and trachea. The aims of this study are to measure the self-reported prevalence of respiratory and skin symptoms amongst hairdressers, to describe and quantify daily exposures to various hair products and to relate self-reported symptoms to duration and type of hair product exposures. The project is still ongoing and it is hoped it will provide us with a better understanding of the pattern of health problems among hairdressers.

- **923503 Sensitization to maize in workers in the maize milling industry: A prospective study - D Bartie & 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 ongoing.

- **923105 Platinum allergy study at Lonrho Smelter (Marikana, Rustenburg) - K Duah, N Mansoor, A Fourie, G Ramafi and DJ Kocks (A collaboration study by Immunology section, NCOH and Community Health Dept, Medunsa): a cross-sectional study.**

Platinum allergy in refineries is well documented but records of similar conditions in platinum smelters are not available. Environmental and clinical studies have been carried out in refineries and it has been found that there is an association between exposure to platinum salts and the development of allergic illnesses affecting the respiratory system, eyes, skin and some systemic organs. The purpose of this study is to determine whether platinum allergy exists among workers of a smelter and the value of tests of sensitization. The project has been completed.

#### **PRESENTATIONS**

Presentations on services offered by the unit include the following:

- Legionella Action Group (LAG) seminar on

the detection methods for legionella in industrial cooling waters,

- Occupational Infections, Pretoria University DOH students,
- a lecture on principles of immunology and tests of sensitization was offered to the DOH students at Natal University Medical School,
- a presentation on contact dermatitis to hairdressing students at local technikons.

#### **CONFERENCES ATTENDED**

**D Bartie** presented *Detection methods for Legionella in cooling water samples* at the 5<sup>th</sup> International Conference on Legionella held in Ulm, Germany from 25-29 Sept 2000

**N Mansoor** presented *Soybean allergy in a South African processing plant* at the 17<sup>th</sup> International Congress on Allergology & Clinical Immunology held in Sydney, Australia from 15-20 Oct 2000

**A Fourie** presented *The incidence of dermatitis and respiratory disease in hairdressers* at the ESSA Conference - Poverty & Inequity: the Challenge of Respiratory Health in Southern Africa, held in East London from 23-25 Feb 2000

#### **NCOH REPORT**

**12/2000 Lebudi K, Fourie A, Kielkowski D, Ramafi G:** An NCOH report on the prevalence of skin and respiratory problems among hairdressers in Gauteng

#### **PUBLICATIONS**

**Nel LH, Venter SN, Bartie D, Goosen C.** (2000): Detection methods for *Legionella* in cooling water systems. Water Research Commission Report (K5/829)

**Mansoor N, Ramafi G.** (2000) Onion allergy: a case report. *J Allergy Soc SA.* 13(3):14-15

**Singh T.** (2000) Legionaries' disease: The need for notification. *LAG (Legionella Action Group)*, November.

#### **SCIENTIFIC & TECHNICAL STAFF**

G Ramafi	<b>Head:</b> BSc, PhD
C Bartie	NHD Med Tech, MSc
A Fourie	BSc (Lab Med), MSc
Z Kirsten	NHD Med Tech
N Mansoor	BSc Hons

T Soogreem

BSc Hons

# CHAPTER IX

## PATHOLOGY

Pathology continues to carry out the statutory requirement of examining the cardio-respiratory organs of deceased miners (in terms of ODMW Act 78 of 1973). The post mortem service is utilized by 80% of families of men who die while in mining service. Updating of 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. A detailed report of the database giving demographic data and disease rates is produced annually. During 2000, 2608 cases came to autopsy. The overall disease rates for tuberculosis were 16.1%, emphysema 14.6% and silicosis 14.5%

The pathology section is also a national reference centre for lung pathology, handling some 618 surgical and cytological consultations this year.

Pathology continues to provide 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. To improve this service, a new scanning electron microscope was purchased.

A monthly clinico-pathology meeting is held at the NCOH and is attended by physicians from the University of the Witwatersrand teaching hospitals and pathologists from the South African Institute for Medical Research.

Research is seen as an important function of the Pathology section. The data from Pathaut are used extensively for research purposes. Professor Charles Feldman is the research advisor to the Pathology section. The research interests of Pathology include the following:

- 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

- The relationship between *Chlamydia pneumoniae* the development of atherosclerotic plaques
- The effect of antibiotic treatment on atherosclerotic plaques in coronary arteries
- Mesothelioma and its association with Simian Virus 40
- The occurrence of hand arm vibration syndrome in South African gold mines and identification of the potential effects of whole body vibration
- 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
- Taxonomy of mosquitoes that are vectors for human disease

### TEACHING

- We are actively promoting awareness of the role of autopsies in compensable occupational diseases.
- We have had groups of nurses from the Provinces visit the Pathology section. They are taken through the steps of the compensation process and issued with kits that have been developed in house to render practical assistance, and
- Groups from trades unions received presentations on HIV/AIDS, silicosis & TB.

### PUBLICATIONS

**Churchyard GJ, Kleinschmidt I, Corbett EL, Murray J, Smit J, de Cock KM.** (2000) Factors associated with an increased case-fatality rate in HIV-infected and non-infected South African gold miners with pulmonary tuberculosis. *Int J Tuberc Lung Dis.* 4(8):705-12.

**Corbett EL, Murray J, Churchyard GJ, Herselman PC, Clayton TC, De Cock KM, Hayes RJ.** (1999) Use of mini-radiographs to detect silicosis: comparison of radiological with autopsy findings. *Am J Resp Crit Care Med.* 160:2012-2017.

**Godfrey-Fausset P, Sonnenberg P, Shearer S, Bruce M, Mee C, Morris L, Murray J.** (2000) Tuberculosis control and molecular epidemiology in a Southern African gold mining community. Patterns of transmission of pulmonary tuberculosis in the gold mining industry: conventional and molecular epidemiology. *Lancet.* 356:1066-1071.

**Hnizdo E, Churchyard G, Dowdeswel R.** (2000) Lung function prediction equations derived from healthy South African gold miners *Occup Environ Med.* 57(10):698-705.

**Hnizdo E, Murray J, Davison A.** (2000) Correlation between autopsy findings for chronic obstructive airways disease and in-life disability in South African gold miners. *Int Arch Occup Environ Health.* 73(4):235-244.

**Hnizdo E, Singh T, Churchyard G.** (2000) Chronic pulmonary function impairment caused by initial and recurrent pulmonary tuberculosis following treatment. *Thorax.* 55(1):32-8.

**Jupp PG, Phillips JI, Garton E.** (2000) The pulvillus and empodium in *Culex quinquefasciatus*: visualization with the light microscope and a study of fine structure with the scanning electron microscope. *Amer Mosquito Control Assoc.* (2):166-170.

**Murray J.** (2000) Services offered by the NCOH. *Mine Medical Officers' Assoc SA.* Aug p 9.

**Murray J, Sonnenberg P, Shearer S, Godfrey-Faussett P.** (2000) Drug-resistant pulmonary tuberculosis in a cohort of southern African goldminers with a high prevalence of HIV infection. *S Afr Med J.* 90(4):381-386.

**Nyantumbu B, Phillips JI, Murray J, Dias B, Lowe PJ, Allan LJ, Barber CM, Curran AD.** (2000) Proposed study on hand arm vibration syndrome in SA gold miners. *Mine Med Officers' Assoc SA.* Aug pp 7-8.

**Phillips JI, Shor A, Murray J, Ong G, Taylor-Robinson D.** (2000) Myocardial infarction associated with *Chlamydia pneumoniae*. *Cardiovascular J SA.* 11(1):25-28.

**Shor A.** (2000) The pathology of *Chlamydia pneumoniae* lesions in humans and animal models.

*Trends Microbiol.* 8(12):541-542.

**Shor A, Phillips JI.** (2000) Histological and ultrastructural findings suggesting an initiating role for *Chlamydia pneumoniae* in the pathogenesis of atherosclerosis. *Cardiovascular J SA.* 11(1):16-23.

**Sonnenberg P, Godfrey-Fausset P, Glynn JR, Shearer S, Murray J.** (2000) Classification of drug-resistant tuberculosis in an epidemic area (letter). *Lancet.* 356:1930-1931.

**Sonnenberg P, Murray J, Glynn JR, Glyn Thomas R, Godfrey-Faussett P, Shearer S.** (2000) Risk factors for pulmonary disease due to culture-positive *M. tuberculosis* or non-tuberculous mycobacteria in South African gold miners. *European Resp J.* 15:291-296.

**Sonnenberg P, Murray J, Shearer S, Glynn JR, Kambashi B, Godfrey-Fausset P.** (2000) Tuberculosis treatment failure and drug resistance – same strain or new infection? *Trans Royal Soc Trop Med Hyg.* 94:603-607.

**Walker ARP, Ballard R, Raal FJ, Vermaak WJH, Delpont R, Shor A, Brink A.** (2000) Changing concepts of coronary artery disease – Part 1. *Cardiovascular J SA.* 11(1):32-40.

**Walker ARP, Shor A.** (2000) Coronary heart disease – any likelihood of benefit from the control of *Chlamydia pneumoniae*? *Cardiovascular J SA.* 11(1):7-9.

## **SCIENTIFIC & TECHNICAL STAFF**

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

P Back	MBBCh DTMH DPH DOH
JD Cantrell	Dip Med Tech
J Dibedi	Lab Assistant
EA Garton	Med Technician
K Gerston	BA, MD, Dip ABP
M Humby	Dip Med Tech
D Khoza	Mortuary Services
W Mashele	Mortuary Services
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