CONTENTS

CHAPTER I  INTRODUCTION       1
CHAPTER II  OCCUPATIONAL HYGIENE     5
CHAPTER III  TECHNICAL ADVISORY SERVICES    8
CHAPTER IV  TOXICOLOGY & BIOCHEMISTRY RESEARCH 10
CHAPTER V  ANALYTICAL SERVICES 14
CHAPTER VI  OCCUPATIONAL MEDICINE 16
CHAPTER VII  EPIDEMIOLOGY & SURVEILLANCE 19
CHAPTER VIII IMMUNOLOGY & MICROBIOLOGY 22
CHAPTER IX  PATHOLOGY 24

-----oooOooo----
CHAPTER I

INTRODUCTION

DIRECTOR / PROFESSOR’S REPORT 2001

The NCOH's involvement in international initiatives to promote occupational health here and in the region has grown dramatically over the past few years, but has been neglected in recent Annual Reports.

Historically many of the world's larger national institutes of occupational health have extended their efforts to protect and promote workers' health beyond their national borders. Some have made international programmes a major component of their work. Besides political and social considerations, industrial and economic globalization, the harmonization of regional economies, the export of hazardous work, migrant labour, limited knowledge and resources (especially in our region) and well developed "foreign" solutions to use as models all drive the view that aspects of occupational health are practiced best across countries rather than within them.

For obvious reasons the NCOH has been an exception: although large by continental standards, for a couple of decades we neither contributed to regional programmes nor benefited from outside support in any systematic way. Fortunately, a programme of participation in regional and international initiatives has replaced this lack of engagement.

As hosts of the 1994 Occupational Health in Southern Africa conference in Zithabiseni we became part of the region's occupational health network. Contacts made in Zithabiseni led to the NCOH joining the global infrastructure of International Labour Office's CIS Centres and established a partnership with Zimbabwe's National Social Security Authority (NSSA), a relationship that resulted in the NSSA and the NCOH co-hosting the 12th International Symposium Epidemiology in Occupational Health in 1997. The ambitious WHO/SA Technical Cooperation Programme 1996-2003, initiated by the NCOH and managed by us for the first few years, resulted in numerous southern African initiatives, notably the first regional workshop on training for occupational health professionals held in Johannesburg. In 1996, a collaborative agreement was developed with the National Institute for Occupational Safety and Health (NIOSH), USA that became part of the US/SA Binational Commission and supported a wide range of activities, including exchanges of practitioners. An agreement with the UK's Health and Safety Executive's Health and Safety Laboratory has resulted in support for a number of research projects with significant technology transfer. In the past few years, the NCOH has participated in the Fogarty International Center's programme, established a clearing house for the SADC Health sector, been a founder member of the Toxicology Society of South Africa with the International Union of Toxicology (IUTOX), joined the WHO/ILO Joint Effort in Occupational Health and Safety in Africa, participated in the WHO's Collaborating Centres in Occupational Health programme and has assisted in the development of the SADC/Swedish International Development Agency's proposal for capacity development in the southern African region. Our masters programme in occupational hygiene has received support from Sweden's National Institute for Working Life, the Fogarty International Center, the Birmingham Institute of Occupational Health, the World Health Organization, the American Industrial Hygiene Association, the International Occupational Hygiene Association and the British Occupational Hygiene Society. Contacts between NCOH and regional and international practitioners have flourished and visits are frequent.

Building and maintaining these activities is not without cost, but the benefits to occupational health and to the NCOH far outstrip them.

Some notable activities in the 2001 Report are:

- The launch of a new surveillance programme, of upper limb occupational musculoskeletal disorders (SAMOSA). Epidemiology and Surveillance now manages two large surveillance programmes and is supporting a third (tuberculosis in health care providers). An important purpose of these
Surveillance programmes is to identify risk industries and workplaces (sentinel sites) for targeted hazard control. Surveillance thus adds to our mechanisms for identification of these sites and events which include cases referred to Occupational Medicine, requests for assistance received by the query handling service (Technical Advisory Services), workplaces visited by Occupational Hygiene and specimens received by Analytical Services.

- Our contribution to the experiential training of technikon and university graduate students and to the training programme initiated by the Educational Opportunities Council has grown exponentially. Toxicology and Biochemistry Research, Analytical Services, Immunology and Microbiology and Occupational Hygiene all contributed, with Toxicology and Biochemistry Research supporting a particularly large number of these "interns" in 2001.

- The research publications and NCOH reports reflect the very wide span of work undertaken in the past year: metals, physical agent, microbiological hazards (Legionella and Chlamydia), occupational lung disease, occupational allergy, the microelectronic and hairdressing industries, molecular biology, musculoskeletal disorders and indicators of trends in occupational diseases and occupational health performance all featured.

SORDSA - Surveillance of Work Related & Occupational Respiratory Diseases in South Africa

Publications 2001
SORDSA News Volume 5 (1) January – June 2001
SORDSA News Volume 5 (2) July – December 2001
SORDSA-NAEP Publication: An employer’s guide to occupational asthma
SORDSA-NAEP Publication: An South African workers’ guide to occupational asthma
SORDSA Poster: Lung disease and work (reprinted)

SAMOSA - South African Occupational Musculoskeletal Disorders Surveillance Action Group

SAMOSA Poster: Upper limb disorders

NCOH INTERNAL REPORTS - 2001

1/2001 A Spies Lead exposure assessment at an assay laboratory at a West Rand gold mine
2/2001 C Bartie, G Ramafi Platinum group metals and their effects on health
4/2001 TM Esterhuizen, D Rees, D Kielkowski, N White, R Erlich, E van Schalkwyk, U Laloo Consequences of occupational asthma two to three years after diagnosis
5/2001 H Vergotine A preliminary noise exposure assessment at a steel plant
6/2001 A Baker Assessment of workers’ exposure to airborne oil mist, thermal environment and noise at a steel plant
7/2001 K Renton An assessment of indoor air quality in an office environment
8/2001 K Renton Manganese exposure in a manganese smelter
9/2001 K Lebudi Silicosis in South Africa: Review of current scientific literature
10/2001 D Kielkowski, M Govuzela, D Rees, F Penxa, T Whitford Occupational Health Indicators for South Africa, Part III.

OTHER REPORTS


Charalambous S, Churchyard GJ, Murray J, De Cock KM, Corbett EL. 2001 Persistent radiological changes following miliary tuberculosis in miners exposed to silica dust. Int J Tuberc Lung Dis 15:1044-1050


Lebudi K, Kielkowski D, Fourie A. 2001 Occupational risks in hairdressing. S Afr J Epidemiol Infect 16(2,3);87-90

Masoka X, Ramoroka C, Makhubela S, Gulumian M. 2001 Evaluation of DNA damage in human lymphocytes exposed to DDT related compounds in vitro using the Comet assay. Toxicology 164:103


STAFF QUALIFICATIONS OBTAINED – 2001

A Daya was awarded B Tech degree in Biomedical Technology by the Technikon Witwatersrand

Dr B Dias*, Mrs I Naik & Dr S Kgalomono* were awarded the Diploma in Occupational Health by the University of the Witwatersrand [* awarded with distinction]

AE Calverley was awarded a Master of Science degree by the University of the Witwatersrand, for a dissertation entitled Occupational health hazards in the microelectronic industry
CHAPTER II

OCCUPATIONAL HYGIENE

The Occupational Hygiene Section is responsible for:

- 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

Workplace hazard identification was a major function of the section. Emphasis was placed on assistance to government institutions and provincial structures. Most of these institutions are not equipped to undertake occupational hygiene work. Enterprise level support continued as in the past.

Exposure to asbestos fibers and quartz dust is still a major occupational and environmental issue. The sampling and evaluation of these hazardous agents require specialized knowledge, skills and equipment, and the NCOH is the national reference centre for such work. The Occupational Hygiene Section has, for many years, distributed international standard reference (UICC) asbestos fibre samples. During 2001, there was an increased interest in obtaining such samples, and the section was able to provide this service. The storage, packing and distribution of UICC samples has been rationalized to meet international transportation regulations.

Research and routine survey finding were presented in the form of NCOH Internal Reports as listed below:

1/2001  A Spies  Lead exposure assessment at an assay laboratory at a West Rand gold mine

5/2001  H Vergotine  A preliminary noise exposure assessment at a steel plant

6/2001  A Baker  Assessment of workers’ exposure to airborne oil mist, thermal environment and noise at a steel plant

7/2001  K Renton  An assessment of indoor air quality in an office environment

8/2001  K Renton  Manganese exposure in manganese smelter

Short reports:

Baker A  Occupational Health Services

Ntsuba H, Baker A  Occupational hygiene laboratory equipment

Vergotine H  Situational analysis and recommendations regarding the enhancement of occupational health and safety services in the Free State Province

Vergotine H  Preliminary situational analysis and recommendations at a mining site

Vergotine H  Preliminary report on a walkthrough survey conducted at Jubilee District Hospital, Hammanskraal

Vergotine H  Preliminary report on a walkthrough survey conducted at Krugersdorp Correctional Services

Vergotine H  Observation and conclusions on a walkthrough survey conducted at a hydraulic engineering works
TEACHING & TRAINING

Occupational hygiene staff were involved in both formal and informal teaching, lecturing and demonstrations. The principles of occupational hygiene, control and prevention of exposure to hazardous agents, risk assessment, the monitoring of workplace environments, radiation and electromagnetic stressors were the major topics covered. The selection, calibration, use, care and operation of direct and indirect reading instruments and field sampling equipment was demonstrated to a variety of groups including post graduate Diploma of Occupational Health students, occupational health nursing students, and environmental health students from the Witwatersrand Technikon.

Staff from the section were heavily engaged in the running of the postgraduate masters course in Occupational Hygiene at the School of Public Health, University of Witwatersrand. The section also presented various industrial hazard awareness and occupational health and safety courses.

RESEARCH

The Occupational Hygiene section contributed to research by participating in, and supporting, a number of research projects, both internally (NCOH) and externally. The areas involved included:

- environmental asbestos concentrations in SOWETO dwellings with asbestos cement roofs,
- occupational allergy in workers exposed to soybean,
- the preparation of research protocols,
- isocyanate exposure in automotive sprayshops,
- planning for an ergonomic research laboratory at the NCOH.

External projects included:

- continuation of the manganese project, with Prof Myers, University of Cape Town,
- finalizing the SIMRAC project, Simhealth 605, *Assessing hazards created by fumes, gases and UV radiation during welding / cutting in the South African mining industry*,
- preparation of three research protocols in collaboration with the SA Medical Research Council.

SPECIALIZED & TECHNICAL SERVICES

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

- ASOSH 8
- SABS 7
- Department of Minerals & Energy 2
- Group Environmental Monitoring 5
- Gauteng Provincial Government 3
- SAIOH 6
- Philips XRD users 3

Furthermore specialized testing was carried out, in the form of asbestos fiber and crystalline silica evaluation using x-ray diffraction. Thirty bulk specimens and 15 air samples were analyzed.

Occupational Hygiene implemented a compliance campaign at the NCOH for both hazardous chemical and biological agents.

RECRUITMENT AND STAFF DEVELOPMENT

During the year:

- one vacant post of Assistant Director was filled
- a technician joined the section from Analytical Services
- five staff members were supported to undertake tertiary education
- one member of staff is studying towards a Higher Diploma in safety management, and another worked
towards his matric

- a hygienist attended the Research Ethics 2001 workshop
- a member of staff attended a research methodology course organized by SIMRAC

The occupational hygiene section continued the practice of taking newly graduated environmental health interns for mentoring, professional supervision and in-house training. This programme added to their experience and confidence and assisted them in obtaining appropriate employment.

**CONFERENCES ATTENDED**

**A Spies and K Renton** presented *Lessons learned by reviewing the results of assessments of workers’ exposure to airborne contaminants* at the ASOSH conference SHE 2001, Fourways, Johannesburg

**V Yousefi** presented *An objective assessment of the present method of asbestos fibre evaluation* at the X2001- Exposure Assessment in Epidemiology & Practice Conference, Gotenberg, Sweden

**V Yousefi** was invited to chair a session of the ASOSH annual conference - SHE 2001 - held at Fourways, Johannesburg

**V Yousefi** presented two papers at the Enviromin 2001 Conference at Skukuza, 14-18 July 2001
- **V Yousefi, K Voyi** Environmental and health impact assessment of gold mine waste dumps in Gauteng Province, South Africa
- **V Yousefi, ML Pressend, S Moodely, D Mthetwa, RS Strydom** Case study of impact assessment of unrehabilitated mines

**PUBLICATION**


**STAFF**

V Yousefi  **Head:** MSc, MSPH, MPhil, DOccHy
A Baker  BTech
R Khakhu  Provisioning services
L Khumalo  Secretary
E Makhudu  Chief Technical Officer
JT Mohasoane  Technician
JF Moseboa  Technician
KA Renton  MSc, MSc (Ind Hyg)
A Spies  BSc Hons, MSc
H Vergotine  BTech, BSc Hons (Ergon)
CHAPTER III

TECHNICAL ADVISORY SERVICES

TEACHING & TRAINING

Dr Cantrell, together with Dr Felix of Occupational Medicine, co-ordinated and contributed to the teaching of the postgraduate Diploma in Occupational Health (DOH) for the University of the Witwatersrand during 2001. The two-year course culminated in 27 candidates being awarded the Diploma in November. These candidates were drawn from six of the nine national provinces, while three were from other SADC countries. Dr Cantrell was involved also as visiting lecturer on DOH 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.

Dr Cantrell was appointed Honorary Associate Professor in the School of Public Health at the University of the Witwatersrand in August, in recognition of his continuing contribution to the teaching of occupational health. This appointment further highlights the commitment of the NCOH to specialist training in occupational health.

SPECIALIST INFORMATION SERVICES

A core function of the NCOH is to provide a specialized information service in occupational health and safety. An expanding user base was provided with technical and scientific information covering a wide range of topics in occupational health and safety. Queries were received from all nine of the South African provinces, from the Southern African Development Community (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 within the NCOH and elsewhere, to ensure that accurate and appropriate answers were given. 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.

The NCOH responded to a request by the Department of Minerals & Energy to present an overview of the toxicity of hazardous chemicals to which workers may be exposed to during the mining and beneficiation of vanadium ore. Prof Cantrell presented expert evidence at the departmental Vanadium Technology Inquiry at Steelpoort on 9-10 October.

PRESENTATIONS

The Section co-ordinated a number of 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. Delegations from NEHAWU and CEPPAWU were involved in successful visits to the Centre.

EXTERNAL COLLABORATION

Staff of the section have been involved in two related initiatives to promote occupational health and safety issues in the Southern African region. The NCOH was tasked by the SADC Health Sector and WHO/ILO Joint Effort in Occupational Health and Safety in Africa to establish and manage an OH&S Information Clearing House, and also to develop a website to serve the region.

Lincoln Darwin and Nelson Sesoko have been involved in setting up the Clearing House. Following meetings with senior officials from the WHO, possible collaborators in 14 countries were approached asking them to forward all their national occupational health and safety legislation to form the basis of the information databank. Contributions have so far been received from Zimbabwe, Namibia, Tanzania, Botswana and Swaziland. The networking of interested practitioners in the field is another priority, as it the collection and collation of data on training and teaching, research, practical solutions to African OH&S problems, and current collaborative initiatives between regional practitioners and those elsewhere in the world.
Theresa Whitford has collaborated with Dr David Stanton from the Association of Societies for Occupational Safety & Heath [ASOSH] to develop a webpage in parallel to the clearing house. This forms the internet portal to OH&S information in the region, and will be launched early in the new year.

**COLLABORATIVE PROJECTS**

The Department of Labour was asked by Correctional Services to assist them in identifying occupational health problems, and to assist in training on these aspects where necessary. The NCOH was invited to take part in an inter-departmental intervention. Teresa Whitford and staff from occupational hygiene, epidemiology, occupational medicine, analytical services and immunology were involved in the project. Walk-through surveys were held with the Department of Labour in three facilities in Gauteng. A report on all the occupational health issues was submitted to the Acting Director: Offender Control and various other senior members in the Correctional Services.

After a series of presentations to directors of different departments in the Services, a plan of action for training, to be run by NCOH, was developed. Later in the year, 2 two-day workshops for Correctional Services personnel responsible for occupational health in each facility were held at NCOH. Approximately 55 staff attended each workshop. The result of this initiative was that action plans for occupational health were formulated, and were to be instituted within a set time-frame. As a spin-off from these workshops, other components of Correctional Services have requested training and information regarding occupational health programmes.

A multi-disciplinary intervention task team (MITT) was established during the year. This is a group of staff drawn from all the sections at the NCOH. The aim is for sections to cooperate in providing services / interventions covering all aspects of occupational health, and to provide a total service for the well-being of the worker. Teresa Whitford was involved in an isocyanate project aimed at documenting isocyanate exposure in automotive sprayshops in Gauteng.

**CONFERENCES & MEETINGS ATTENDED**

AC Cantrell attended the SASOM Summer Congress on 23rd March in Stellenbosch, and met with the staff at the Tygerberg Poison Centre to establish formal links with the NCOH Industrial Toxicology Information Service on 24th March.

AC Cantrell & L Darwin attended a Workshop on Toxicology in the African Setting. NIEHS/IUTOX/ASTS/TWMRF Workshop. Stellenbosch 14-15 May 2001. Prof Cantrell was elected to serve on the Interim Executive Committee of the newly formed Toxicology Society of SA at its inaugural meeting.


AC Cantrell, WHO-HQ/AFRO Conference on chemical safety in Africa: Preparing the Health Sector for the challenges of the 21st Century in co-operation with partner organizations. Cape Town 24-27 July 2001 - Representing Toxicology Society of SA.


**STAFF**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Cantrell</td>
<td>Head: MSc (Agric), PhD, COCOH</td>
</tr>
<tr>
<td>L Darwin</td>
<td>BSc (Hons)</td>
</tr>
<tr>
<td>S Mabona</td>
<td>Library Messenger</td>
</tr>
<tr>
<td>M Marshoff</td>
<td>Network Controller</td>
</tr>
<tr>
<td>KM Hlazana</td>
<td>Senior Network Controller</td>
</tr>
<tr>
<td>E Mokotedi</td>
<td>BBibl</td>
</tr>
<tr>
<td>EK Semenya</td>
<td>Operator</td>
</tr>
<tr>
<td>NE Sesoko</td>
<td>BA (Hons)</td>
</tr>
<tr>
<td>D Traub</td>
<td>BA (Hons) Dip Lib Sci</td>
</tr>
<tr>
<td>DL Thompson</td>
<td>MSc, Dip Data</td>
</tr>
<tr>
<td>T Whitford</td>
<td>BA, TTHD</td>
</tr>
</tbody>
</table>
CHAPTER IV

TOXICOLOGY & BIOCHEMISTRY RESEARCH

Research in biological markers has continued and the list of markers that can be measured in the section has expanded. A new project has been introduced on the speciation of manganese and one on the effect of solvents on the health of children from glue sniffing. Expansion in training workshops has also featured prominently in the activities of the section. Three workshops in Occupational Toxicology and a workshop on pesticides were organized and presented.

The Section was instrumental in organizing the first meeting of Research & Training in Environmental and Occupational Health in Southern Africa: Lessons of the recent past and the way forward - a Fogarty International Centre Conference, Heia Safari Ranch, Gauteng, 25 - 27 February 2001 as well as Toxicology in South Africa under the auspices of the International Union of Toxicology (IUTOX) held in Stellenbosch, May 2001.

TEACHING AND TRAINING

- Training of technikon and graduate students:
The Section has continued participating in a training programme initiated by the Educational Opportunities Council (EOC) to train university graduates in occupational toxicology. Similarly, the training programme for technikon graduates on methodologies available in the section was continued in 2001, where twelve students and technikon graduates were trained. In addition, the following graduate students from various universities spent time at the NCOH: Nomawabo Bolane, Abigail Motspe, Nokukhanya Khanyile, Ruphats Morena, Bheki Mbatha and Edith Mpepele.

- Toxicology Training Courses:
Toxicology literature was collected for the training of medical practitioners, nurses, health and safety officers, forensic analysts, and students from tertiary institutions (universities and technikons). The training programme is organized in the form of one-day seminars and a workshop on pesticides to be held over 3 to 4 days in 2002. Members of the Toxicology and Biochemistry Research Section and other experts from different sections and other organizations presented various toxicology topics. Funding was received from the World Health Organization (WHO) towards the end of 2001 for three workshops/seminars. One WHO-sponsored seminar was held in 2001: Focus on Occupational Toxicology, 28th Nov 2001.

- Training students on specific projects:
With funds obtained from WHO, two students were trained on specific projects relating to pesticides and solvents.

  - Ad hoc training:
    . Vista University students: Techniques used for mineral particles surface characterization, Mpho Semano
    . Dr Gulumian gave tutorials to Honours students from the department of Haematology & Molecular Medicine, University of the Witwatersrand, and a lecture to Diploma in Occupational Health students
    . Claudina Nogueira tutored factory visits by 4th Year students to NUFCOR
    . Dr Gulumian acted as supervisor for a PhD student at the University of the Witwatersrand: M. Tikly. Aspects of aetiopathogenesis of systemic sclerosis

SERVICE PROVISION

Established methodologies in genotoxicity formed part of service delivery to clients investigating a number of environmental agents as well as following nutritional intake of toxic chemical and physical agents. An example of the former included environmental exposures to particles and their effect on asthma. Examples of the latter included the effect of radiation on nutritional supplements administered to ICU patients as well as the effect of iron overload on the liver.

RESEARCH

Mineral dusts and fibres: Mrs Sharon Makhubela has continued her investigations pertaining to increased predisposition to infection with Mycobacterium tuberculosis following exposure to silica. Miss Mpho Semano has
expanded her work on surface characterization of mineral particles to include more iron-containing mineral dusts and fibres using the Transmission Mössbauer Spectrometer housed in the Department of Physics, University of the Witwatersrand as well as X-ray Photoelectron Spectroscopy housed at the CSIR, Pretoria. Mr Caiphus Ramoroka has established new methodologies in the measurement of lipid peroxidation products including isoprostanes in biological fluids. Finally, Dr Mohammed Tikly has completed his PhD work on the *Aetiopathogenesis of systemic sclerosis*.

Immunohistochemical methodologies for the detection of oxidative damage in tissues were also initiated. In vitro studies involving human mononuclear cells treated with various chemical agents, e.g. H$_2$O$_2$ and silica, were started, using antibodies against protein and DNA adducts. The studies involve labeling and staining using both specific routine stains (e.g. Biotinylated StreptAvidin) and immunofluorescence. The latter methodologies were used on rat liver specimens exposed to high levels of iron for a collaborative study with the University of the Witwatersrand. This involves immunohistochemical detection using the same antibodies as above but on paraffin sections.

**Pesticides:** Mr X Masoka continued research on the multidisciplinary programme on pesticides. This included laboratory testing of the genotoxicity of DDT and its metabolites, preparation for a workshop on pesticides and compilation of a publication on research conducted on pesticides in South Africa.

**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:** Contract research work has been done on 'Glue sniffing'. The first part of the work involved a literature search and analysis of the problem of glue sniffing in South Africa. A preliminary report on this work has been compiled and was submitted to the Department of Health. The next phase will involve various relevant organizations such as street children organizations and support groups, with the aim of collecting data on the problem. Ms Khathutshelo Thukutha is sponsored by the WHO to work on this study as the primary investigator.

**PUBLICATION**


**PUBLISHED ABSTRACTS**


Masoka X, Ramoroka C, Makhubela S, Gulumian M. 2001 Evaluation of DNA damage in human lymphocytes exposed to DDT related compounds in vitro using the Comet assay. Toxicology 164: 103


**REPORTS**

Thukhuta KM, Siziba KB, Masoka X, Gulumian M. 2001 *Glue sniffing*: Technical WHO Report

Masoka X, Gulumian M. 2001 *Pesticide risk management: from use & exposure to control measures*: WHO Report


EOC Programme and technikon students produced a total of 20 technical reports under supervision, as part of their training.
CONFERENCE PRESENTATIONS

M Gulumian, S Makhubela, M Semano, C Ramoroka, P Bianci. Lipid peroxidation in mineral particle-induced pathology. 9th IUTOX, 8-12 July, Brisbane, Australia.

X Masoka, C Ramoroka, S Makubela, M Gulumian. Evaluation of DNA damage in human lymphocytes exposed to DDT related compounds in vitro using the Comet assay. 9th IUTOX, 8-12 July, Brisbane, Australia.

C Nogueira, P Theodorou, HB Rollin. Occupational aluminium exposure and status of essential metals in smelter workers. 9th IUTOX, 8-12 July, Brisbane, Australia.

M Semano, B Mbatha, S Ntrenteni, G Hearne, M Gulumian. Surface properties of crocidolite fibres responsible for lipid peroxidation reactions. ICAS 2001, 3-11 August, Waseda University, Tokyo, Japan.


SEMINAR AND WORKSHOP PRESENTATIONS


CHAIRING SCIENTIFIC SESSIONS AND PARTICIPATION IN A WHO FINAL REVIEW BOARD

M Gulumian was invited to chair a session Cancer at the 2nd International Conference of the Society for Free Radical Research - Africa, 15 -19 July 2001, University of Mauritius, Reduit, Mauritius.

S Makhubela was invited to chair a session Oxidative stress and the Environment during the 2nd International Conference of the Society for Free Radical Research - Africa, 15 -19 July 2001, University of Mauritius, Reduit, Mauritius.
M Gulumian was also invited by WHO to serve on the 9th Final Review Board Meeting for Concise International Chemical Assessment Documents (CICAD) discussing documents on Acrolein, Bromoethane, 4-Chloroaniline, Polychlorinated Biphenyls, Diethyl Phthalate, Carbon Disulphide, Silver, and Ethylene Glycol.

M Gulumian was invited to chair a session entitled *Biotechnology in agriculture: An African Perspective* 1st Biannual Molecular and Cell Biology Symposium, 23rd May 2001, Technikon Witwatersrand, Johannesburg.

**TRAINING OF STAFF**

Micronucleus Test: presented by Dr Raymond Tice in Stellenbosch (May 2001). Those who attended: S Makhubela, K Siziba, X Masoka, M Semano, C Nogueira

Management support for change through skills development: attended by C Nogueira

Hands-on training on microarray techniques by C Nogueira in Australia - University of Sydney, Department of Pathology, in the laboratory of Prof Nicholas Hunt 15 July - 5 October 2001

Molecular approaches to AIDS research & therapy. attended by C Nogueira, S Makhubela, M Gulumian

Short practical course on application of Chemometrics for analytical and environmental problem solving, held at the University of the Witwatersrand: 3-6 April 2001. Attended by K Siziba


Laboratory Accreditation Course: attended by K Siziba

Induction course of the Department of Health: attended by K Siziba

GC-MS course, Pretoria Technikon, Dec 2001: attended by C Ramoroka

Basic and advanced HPLC course: attended by M Semano

Health & Safety Representative Course: attended by M Semano

**STAFF**

<table>
<thead>
<tr>
<th>Name</th>
<th>Head: MSc, PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>M Gulumian</td>
<td></td>
</tr>
<tr>
<td>S Makhubela</td>
<td>MSc</td>
</tr>
<tr>
<td>X Masoka</td>
<td>BSc Hons</td>
</tr>
<tr>
<td>CMCA Nogueira</td>
<td>MSc</td>
</tr>
<tr>
<td>C Ramoroka</td>
<td>MSc</td>
</tr>
<tr>
<td>M Semano</td>
<td>BSc Hons</td>
</tr>
<tr>
<td>K Siziba</td>
<td>PhD</td>
</tr>
</tbody>
</table>
CHAPTER V

ANALYTICAL SERVICES

Analytical Services continued rendering specialized analytical services in environmental and biological monitoring, during 2001, to support the practice of occupational and environmental health. 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.

ANALYSIS CONDUCTED

Samples submitted during the year for analysis included blood, urine, tissues, bulk, filters, water, soil and charcoal absorption tubes. Analysis included assays on toxic metals mainly for lead, cadmium, mercury, manganese, copper, zinc, nickel, chromium and aluminium. Organic assays included red cell and plasma cholinesterase, acetic acid, trichloroethylene, trichloroacetic acid, mandelic acid, toluene, styrene, phenol, o-cresol, isoprostane, methyl ethyl ketone 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 national Regulations for Hazardous Chemical Substances.

New methods developed to measure organic contaminants included mandelic acid, N-methylformamide, methanol and trichloroacetic acid in biological samples, and xylene and formaldehyde in air samples. Methods under development include isocyanates and ethylene oxide in air samples.

In the Inorganic Laboratory new methods developed were for the measurement of mercury levels in water and soil and lead levels in teeth.

RESEARCH

A large collaborative study titled The neurological effects of occupational & environmental exposure in workers in a South African manganese smelter conducted by the university of Cape Town, the US National Institute for Occupational Safety & Health (NIOSH) and the NCOH was completed during the course of the year. Analytical Services was responsible for all the manganese analyses on blood, urine, filters and bulk samples.

A validation study titled Draft sampling programme for three occupational hygiene studies to assess the differences between the DME and IOM/NIOSH methods for measuring manganese dust was conducted during the year with all the assays being done by Analytical Services.

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.

A collaborative project between NCOH, the 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 will continue over a two-year period from eight provinces.

STAFF DEVELOPMENT

- **K Channa** visited NIOSH, Cincinnati, Ohio, from 22 Oct to 2 Nov for practical training on desorption techniques used for quantitation of organic solvents in environmental samples
- **A Daya** completed a B Tech in Biomedical Technology, Technikon Witwatersrand
- **I Naik** completed the Diploma in Occupational Health (DOH) through the University of the Witwatersrand
- Staff members in the section attended courses on HPLC, GC and laboratory accreditation
CONFERENCE ATTENDANCE

I Naik presented a poster entitled Biomarkers for environmental manganese exposure: useful ranges for different exposure scenarios at the Fifth International Symposium on Biological Monitoring in Occupational and Environmental Health which was hosted by the Department of Pharmacology and Therapeutics, Faculty of Medicine, University of Calgary in Banff, Alberta, Canada 18–21 September 2001

I Naik attended the workshop on Children, environment & health-building research capacity in South Africa hosted by the SA Medical Research Council (MRC) and the National Institute for Environmental Health Sciences (NIEHS) 16-18 May 2001 in Stellenbosch

P Theodorou attended two conferences and presented the following:

- **Comparison of two analytical methods for the determination of airborne manganese** at the Post-CSI XXXII International Conference on environmental & health aspects of mining, refining and related industries, ENVIROMIN 2001, Skukuza 14-18 July 2001
- **Characterization of aluminium containing dust In a primary aluminium smelter** at the Colloquium Spectroscopicum Internationale CSI XXXII, Pretoria 8-13 July, 2001, South Africa. (International)

NEW APPOINTMENTS

Mr LK Makoena was appointed as a Medical Technician in August 2001
Ms Cristal Graf was appointed as a Senior Medical Technologist in November 2001

STAFF

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Naik</td>
<td>Head: MSc, DOH, Dip Med Tech (Chem Path, Micro &amp; Haem)</td>
</tr>
<tr>
<td>K Channa</td>
<td>Head Organic Tox; MSc</td>
</tr>
<tr>
<td>A Daya</td>
<td>Head Lab: B Tech, H Dip Med Tech</td>
</tr>
<tr>
<td>C Graf</td>
<td>Dip Med Tech</td>
</tr>
<tr>
<td>J Mgxotwa</td>
<td>Admin Clerk</td>
</tr>
<tr>
<td>LK Mokoena</td>
<td>Dip Biotech</td>
</tr>
<tr>
<td>H Tassell</td>
<td>Dip Pharm Tech</td>
</tr>
<tr>
<td>P Theodorou</td>
<td>Head QA: BSc (Hons)</td>
</tr>
</tbody>
</table>
CHAPTER VI

OCCUPATIONAL MEDICINE

The Occupational Medicine Section conducts field surveys and research, and provides education and training to occupational health practitioners. The section offers clinical and radiological services and assists in the processing of compensation claims.

SURVEYS

Three factory surveys were conducted utilizing the mobile X-ray van at Eclipse Foundry, Consol Glass and Salcast Foundry. Workers exposed to silica dust were investigated for radiographic changes in the lungs.

RESEARCH

924603: Dust control and silicosis in South African foundries: a qualitative study. The objectives of the study are to investigate changing practices of dust control, examine perceptions of progress and problems in implementing dust control and to consider possible policy recommendations relevant to dust control.

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 was conducted in one of SA's gold mines to determine the prevalence of HAVS in gold miners. This project has been completed and a report compiled.

925401: South African Musculoskeletal Occupational Surveillance Action (SAMOSA) Group: A pilot study of upper limb disorders in Gauteng Province. The aims of the project are to determine the extent and nature of upper limb work-related musculoskeletal disorders and to develop control measures to prevent them.

926601: Health effects associated with exposure to hexamethylene diisocyanate (HDI) in automotive spray-painting processes in small, medium and micro enterprises. The study will be conducted in randomly selected establishments in Gauteng. The aims of the study are to identify and quantify exposure to HDI and to propose recommendations for reducing exposure.

TEACHING AND TRAINING OF MEDICAL PRACTITIONERS

The following teaching and training was carried out by members of the section:

- Diploma in Occupational Health: University of Witwatersrand, University of Pretoria.
- Masters in Public Health: University of Witwatersrand.
- X-Ray Teaching: Department of Radiology, Johannesburg Hospital, Open weekly sessions at NCOH, Friday meetings for discussion of occupational health cases- NCOH and MBOD.
- Lung Function Courses: Five 2-day courses were offered to nurses and doctors.
- Workshops and Seminars presented:
  - The Webster Memorial Seminar: This is an annual event and the topic for 2001 was Chronic Obstructive Pulmonary Disease.
  - Latex Seminars: presented to nurses at Johannesburg Hospital to raise awareness about latex allergy.
  - Prisons Workshop: The workshop was about establishing an occupational health service in prisons.
SAMOSA Workshops: These workshops provided special training to nurses to be able to recognize work-related musculoskeletal disorders at their workplaces.

HIV/AIDS Workshops: These were organised for the staff of NCOH, MBOD and CCOD.

. X-Ray Reading: Prof Solomon was involved in reading of chest X-rays and consultations for the NCOH clinic, Glen Douglas Dolomite, Amcoa, Afrox, Anglo Gold, City Council of Pretoria, Corrobrick, Cape Asbestos and Havelock Mine in Swaziland.

OCCUPATIONAL MEDICINE CLINIC

Two hundred and fifty eight workers were seen at the Occupational Medicine Clinic in 2001. Dermatitis, occupational asthma and asbestosis were the most common diagnoses. Other conditions diagnosed included silicosis, 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

<table>
<thead>
<tr>
<th>Condition</th>
<th>Workers seen (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermatitis</td>
<td>18</td>
</tr>
<tr>
<td>Asthma</td>
<td>11</td>
</tr>
<tr>
<td>Asbestosis</td>
<td>11</td>
</tr>
<tr>
<td>Respiratory conditions due to inhalation of fumes</td>
<td>10</td>
</tr>
<tr>
<td>Silicosis</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>6</td>
</tr>
<tr>
<td>Non-occupational diseases</td>
<td>29</td>
</tr>
</tbody>
</table>

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 that the workers were exposed to.

Table 2: Hazardous Agents

<table>
<thead>
<tr>
<th>Hazardous Agent</th>
<th>Workers exposed (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica dust</td>
<td>22</td>
</tr>
<tr>
<td>Chemicals</td>
<td>20</td>
</tr>
<tr>
<td>Asbestos</td>
<td>15</td>
</tr>
<tr>
<td>Fumes</td>
<td>10</td>
</tr>
<tr>
<td>Latex</td>
<td>6</td>
</tr>
<tr>
<td>Other</td>
<td>27</td>
</tr>
</tbody>
</table>

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

Table 3: Referring Industries

<table>
<thead>
<tr>
<th>Industries</th>
<th>Percentage of workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>30</td>
</tr>
<tr>
<td>Foundries</td>
<td>15</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>7</td>
</tr>
<tr>
<td>Chemical</td>
<td>7</td>
</tr>
<tr>
<td>Power</td>
<td>6</td>
</tr>
<tr>
<td>Transport</td>
<td>5</td>
</tr>
<tr>
<td>Health</td>
<td>5</td>
</tr>
<tr>
<td>Food processing</td>
<td>4</td>
</tr>
<tr>
<td>Construction</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>18</td>
</tr>
</tbody>
</table>
All the 37 cases submitted to the Compensation Commissioner are shown in Table 4.

Table 4: Cases submitted for compensation

<table>
<thead>
<tr>
<th>Occupational Disease</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>16</td>
</tr>
<tr>
<td>Asbestosis</td>
<td>7</td>
</tr>
<tr>
<td>Silicosis</td>
<td>6</td>
</tr>
<tr>
<td>Latex allergy</td>
<td>5</td>
</tr>
<tr>
<td>Mesothelioma</td>
<td>2</td>
</tr>
<tr>
<td>Dermatitis</td>
<td>1</td>
</tr>
</tbody>
</table>

**PUBLICATIONS**


**CONFERENCES & PRESENTATIONS**


Rees D. Does South Africa need a National Institute for Occupational Health? ASOSH Conference, Sandton, 27-28 August 2001


CONTINUING EDUCATION

Dias B, Kgalamono S & Venter E attended a project management course at the Department of Health

Dias B, Kgalamono S were awarded the Diploma in Occupational Health

Dias B, Kgalamono S, Felix M attended a course on AMA Guides on disability and impairment

Dias B, Kgalamono S, Nyantumbu B attended a course on Human Vibration from the University of Pretoria

du Preez D received training in Logistical Information System (Logis)

du Preez D, Mota B attended a customer care course organized by the Department of Health

Kgalamono S, Nyantumbu B received specialized training on Hand Arm Vibration Syndrome at the Health & Safety Laboratory in Sheffield

STAFF

JCA Davies MBBS, DPH, FFPHM, FFOM (supernumary)
Dias B MBCh, DOH
Dlamini T RN
Du Preez D Admin Clerk
Felix M MBCh, DOH, PhD
Kgalamono S MBCh, DOH
Mota B Admin Clerk
Nyantumbu B BSc, DOH, Adv Dip Occ Safety Hlth, Cert Erg
Solomon A MBCh, MMed (Rad)
Venter E MSc
CHAPTER VII

EPIDEMIOLOGY & SURVEILLANCE

During this year we focused on strengthening our surveillance component, and dissemination of results obtained from the programme. Teaching, training and advisory services were delivered to occupational health practitioners in different disciplines. Research was not overlooked, and included project designs that would aid policy decisions. Findings from several completed projects were published, ongoing projects continued whilst proposals were developed for future projects in new areas. Development and training of staff members was another area that received attention.

SURVEILLANCE

SORDSA - Surveillance of Work Related & Occupational Respiratory Diseases in South Africa

SORDSA members were kept up to date with two newsletters, and the Lung disease and work poster was reprinted and distributed. Results appeared in one international and three local publications. Presentations describing and promoting SORDSA were made to nursing professionals in occupational and public health as well incorporated in epidemiology teaching modules for postgraduate students. SORDSA was invited by the ILO/WHO to join the Global Elimination of Silicosis Programme.

A study was completed on the consequences of occupational asthma on the lives of patients who were followed up for 3 years after diagnosis. Findings were issued in an NCOH report, presented at a local congress and communicated to participating workers and their doctors in an appropriate format.

SAMOSA - South African Occupational Musculoskeletal Disorders Surveillance Action Group

The NCOH research committee and the ethics committee of the University of the Witwatersrand approved the protocol for the surveillance of work related musculoskeletal disorders of upper limbs. The surveillance was endorsed by the South African Societies for Surgery of the Hand (SASSH); Occupational Medicine (SASOM); Occupational Health Nurses (SASOHN), and Hand Therapists; and their members were invited to participate.

Two of the first group of three workshops to train occupational health nurses in the identification of musculoskeletal disorders were held. More are planned for next year.

TEACHING

The occupational health component of factory visits and tutorials, and end of year examination, for 186 4th Year undergraduate medical students, were facilitated by A. Calverley.


Additional teaching included lectures on: principles and understanding of the ICD coding system, for occupational health doctors from the Department of Minerals & Energy, and vital registration, certification and cause of death, for general practitioners in Pretoria.

Dr Kielkowski supervised two research projects for Masters degrees at the Universities of the Witwatersrand and Pretoria.

RESEARCH

Occupational health research to allow better informed policy development included a project to produce a set of
research indicators to monitor the progress in delivery of occupational health services in South Africa. A third report was published on this ongoing project. Another project that focused on identifying research questions considered important to role players in occupational health was completed, and is being prepared for publication. Studies in the Northern Cape community of Prieska, centred on long term asbestos exposure and disease, continue. Follow up data were obtained on the survivors and 80 deceased members of the cohort of residents born in 1916-36. Data will continue to be collected until information on the causes of death is forthcoming. In addition, a questionnaire survey to estimate potential asbestos exposure was conducted among cohort survivors. As a lack of reliable birth certification excluded the coloured community from the birth cohort, burial records are being examined to establish their burden of asbestos related disease.

**STAFF**

*Training and development*

- AE Calverley was awarded an MSc (Med) by dissertation
- T Esterhuizen is currently registered for an MSc in Epidemiology
- M Govuzela completed 2nd year BSc (Hons)

*Short courses attended*

- D. Kielkowski: LOGIS workshop, and Grievance procedures course held at Civitas
- S. Chauhan: induction to public service course, and the Thusano School of Public Health course Introduction to communicable disease control
- T. Esterhuizen: IARC International course on cancer epidemiology, and two courses on SAS - Advanced Programming and Categorical data analysis using logistic regression
- M. Govuzela: the SAS Advanced programming course

*Other activities included:*

- M Govuzela served as the elected NCOH representative for NEHAWU, and
- S Mathinya as a member of the Non- Personal Health Services HIV/Aids Committee
- Dr D. Kielkowski and A. Calverley are honorary lecturers for the School of Public Health, University of the Witwatersrand
- Dr Kielkowski served as a NHISA committee member
- T Esterhuizen was elected as secretary to SATS Occupational Lung Disease Assembly

**PRESENTATIONS**


Epidemiology and surveillance in occupational health. **A Calverley**. ASOSH Conference, Indaba Hotel 27-29th August 2001

**NCOH INTERNAL REPORTS**


Consequences of occupational asthma two to three years after diagnosis

10/2001 **D Kielkowski**, **M Govuzela**, **D Rees**, **F Penxa**, **T Whitford** Occupational Health Indicators for South
Collaborative Report


MSc Dissertation
Calverley AE. Occupational health hazards in the microelectronic industry. Faculty of Health Sciences, University of the Witwatersrand 2001

SORDSA - NAEP publications, August 2001.
- An employer’s guide to occupational asthma
- A South African worker’s guide to occupational asthma

PUBLICATIONS


STAFF

D Kielkowski  Head: PhD
A Calverley  MSc
S Chauhan  BSc Hons
T Esterhuizen  BSc Hons
MH Govuzela  BSc
K Lebudi       BSc Hons
S Mathinya     Data capturer
F Penxa        Data capturer
T Duma         Nat. Dip. Admin. (SORDSA Office)
During 2001 the Immunology and Microbiology Section continued to provide service, training and research in the field of occupational health for all sectors of the South African workforce.

**SERVICES PROVIDED**

Services took the form of skin prick tests (48), patch tests (43), radioallergosorbent assays (RAST) and a total of 19 on-site visits. A fairly 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 the employers to modify the workplace activities for those affected so as to avoid or reduce the levels of exposure that could eventually lead to occupational disease. On a large scale, services in the form of skin prick tests and patch tests were provided to Ga-Rankuwa/Medunsa hospital and hospital staff from around Johannesburg for latex allergy testing.

**TRAINING AND DEVELOPMENT**

Grace Ramafi attended a project management course to acquire the competency for effective management of the Immunology & Microbiology Section.

Delene Bartie visited the Water Centre at the Tennessee Technological University in Cookeville, USA for in-house training in the isolation and identification of legionella-like amoebal pathogens.

Delene Bartie and Tanusha Soogreem attended a seminar entitled *Bed and breakfast with Legionnaires disease*, relevant to our Microbiology Laboratory, as this section is focusing on microbial contamination, with special reference to water distribution systems.

Other members of the section attended courses including:

- A laboratory management course to enable Immunology & Microbiology to work towards accreditation,
- a workshop on Health and Safety issues offered by NOSA, and
- a molecular biology seminar on HIV/AIDS status using molecular biology techniques.

A presentation on latex allergy was given to nurses at the Johannesburg General Hospital, while one on contact dermatitis was given to workers at a platinum refinery in Brakpan.

**RESEARCH PROJECTS**

923105 The pro-inflammatory effects of platinum in human neutrophils in vitro: G Ramafi, R Anderson and A Theron. This is a collaborative study by the Immunology & Microbiology section, NCOH and Immunology Department, 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 and cough and asthma. Asthma is believed to result from both IgE and cell mediated immune responses to platinum, although specific sensitization 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 sensitises the airways. Is it IgE-mediated or due to a non-specific irritant mechanism or to both of these? This is a new project.

923502 Detection methods for Legionella in industrial cooling water systems: D Bartie.

Water quality and safety are important issues in South Africa 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 aimed at the standardization of identification methods for Legionella in South Africa.

This project has now been extended to investigate the interactions between Legionella and amoebae, and to study the prevalence of legionella-like amoebal pathogens (LLAPs) in water systems (protocol in preparation). These pathogens have not been studied in South Africa to date. Results from the above project indicate that these pathogens may be present in industrial cooling waters.

A PhD thesis has been submitted, a report made to the Water Commission and papers published on the subject.

923801 Detection of Legionella in dental unit water lines using different techniques: Tanusha Singh.

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 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 now complete and an MSc thesis has been submitted.

92340299 Occupational allergy in workers exposed to soybeans: N Mansoor.

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 completed and an MSc thesis is being written.

92330298 Contact dermatitis amongst hairdressers in greater Johannesburg: A Fourie and K Lebudi.

Chemicals in the products used by hairdressers can cause airway irritation or sensitization or both, 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 ongoing and it is hoped it will provide a better understanding of the pattern of health problems among hairdressers.

923503 Sensitisation 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 sensitization 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.

**CONFERENCES ATTENDED**

Tanusha Soogreem presented a poster Detection of Legionella in dental water lines at the 35th Scientific Meeting of the SA Division of the International Association for Dental Research (IADR). Alpha Conference Centre, Magaliesburg, on the 29-30 August 2001.

**WORKSHOPS AND COURSES**

A successful workshop entitled Platinum Group Metals and their health effects was organized by Dr Ramafi and held at the NCOH on the 2nd of March 2001. Delegates from the NCOH, Lohnmin Platinum, Western Platinum, Anglo American Platinum, Impala Platinum, and the Universities of the Witwatersrand and Pretoria attended the workshop.

The Microbiology section of Immunology & Microbiology organized a one-day course on Legionella prevention on the 13th of August 2001. The presentation was made by Mr Matt Freije from HC Information Resources Inc., Fallbrook, USA.

**PUBLICATIONS**


REPORTS


STAFF

G Ramafi  Head:  BSc, PhD

C Bartie  NHD Med Tech, MSc (Med)

A Fourie  BSc (Lab Med), MSc

Z Kirsten  NHD Med Tech (Immuno)

N Mansoor  BSc Hons

T Soogreem  BSc Hons
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 and will be operational in 2002. 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 2000, 2608 cases came to autopsy compared with 2531 cases during 2001. In 2000, the overall disease rates for tuberculosis was 160 per 1000, for emphysema 146 per 1000 and for silicosis 145 per 1000.

The pathology section is also a national reference centre for lung pathology, handling some 519 surgical and cytological consultations this year.

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. To improve this service, a new detection system was purchased. The new system enables accurate chemical identification of small particles of dust and fibres that previously could not be analyzed.

**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 is 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 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. Despite these constraints, Pathology section members were authors of a book chapter and 6 refereed articles, compared with 18 articles in 2000.

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 and 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.
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 is the most commonly compensated disease in the United Kingdom. While this vibration induced disease exists in South Africa, it has not been diagnosed. The diagnosis is complicated relying on clinical examination and objective testing. In collaboration with the Health and Safety Laboratory, UK (with whom the NCOH has a formal collaboration agreement) and SIMRAC, doctors and medical technologists have been trained in the diagnosis of hand-arm vibration syndrome. A workshop for over 100 health care professionals has been held to further disseminate the acquired expertise.

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**

Charalambous S, Churchyard GJ, Murray J, De Cock KM, Corbett EL. 2001 Persistent radiological changes following miliary tuberculosis in miners exposed to silica dust. Int J Tuberc Lung Dis 15:1044-1050


REPORTS


CONGRESS PRESENTATIONS


Phillips JI, Murray J. Disease rates and trends from the NCOH Pathology data base Pathaut. ASOSH Meeting, Indaba Hotel, Gauteng. 27 August 2001.

Rikhotso, R; Cantrell, JD; Humby,M; Khoosal,N; Back,P; Murray,J. Nocardia asteroides demonstrated in post mortem cases from deceased South African Miners. 16th National Congress of the Society of Medical Laboratory Technologists of South Africa, 1-4 May 2001. Midrand Gauteng.


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
N Khoosal  Dip Med Tech
D Khoza  Mortuary Services
W Mashele  Mortuary Services
P Mbontsi  Mortuary Services
J Mkhize  Med Technician
N Ngutshane  Med Technician
JI Phillips  BSc (Hons) PhD
G Rani  Mortuary Services
R Rikhotso  Dip Med Tech
A Shor  MBBCh, M Med (Path)