Occupational HEALTH

SOUTHERN AFRICA

A CANNON MEDICAL MEDIA PUBLICATION

Official Journal of the SA Society of Occupational Health Nurses (SASOHN)
the SA Society of Occupational Medicine (SASOM) and
the Occupational Hygiene Association of Southern Africa (OHASA)

Vol 4 No 4 July/August 1998

ISSN 1024-6274

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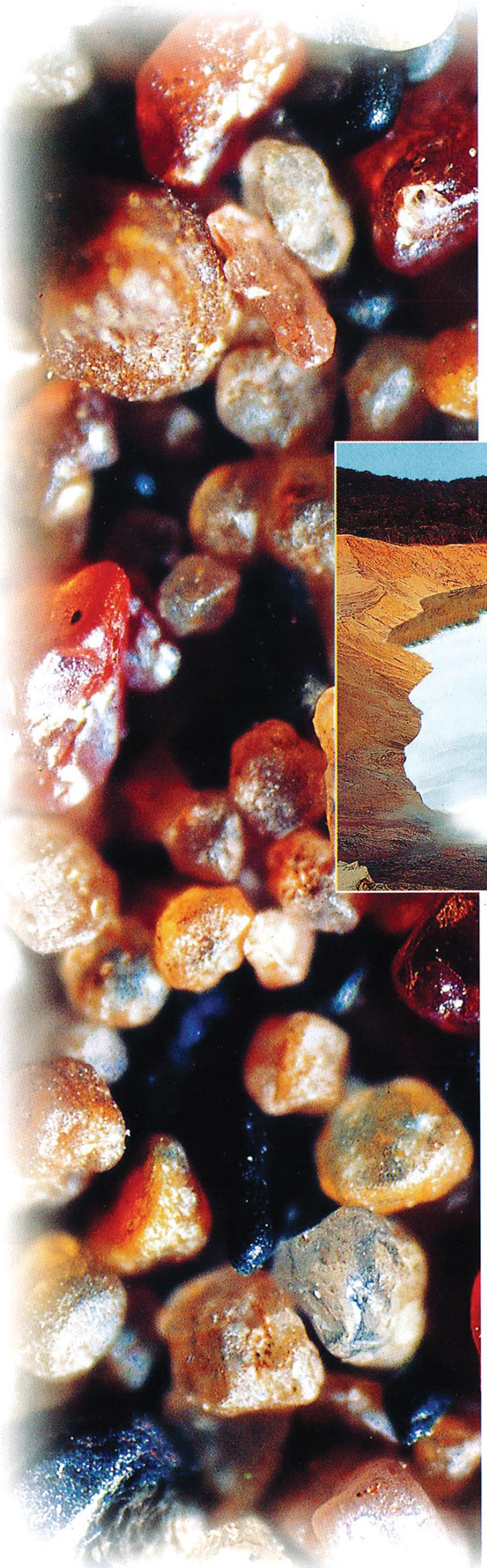

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RBM

Jul/Aug 1998
Vol 4 No 4

This journal focuses on Occupational Health, Medicine, Hygiene and Safety, Primary Health Care at the workplace, Environmental Health and other employee health benefits

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Occupational HEALTH SOUTHERN AFRICA

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Guest EDITORIAL

For the first time, a conference on Occupational Health in the chemistry industry is to take place in Africa. The conference - in Cape Town in September - will be hosted by the international chemical industry association Medichem (a scientific committee of the International Commission of Occupational Health). In my view, the conference carries the potential for opportunities and can encourage innovations that will ensure World Class Health, Safety and Environment not only in the chemical industry but in all industries in South Africa and also extending into Africa. It is my sincere hope that this potential will be realized.

In South Africa, since 1993, virtually all Occupational Health and Safety Legislation has been reviewed, rewritten and redrafted. This is the first time that Occupational Health and Safety has been the focus of such rigorous legislative change. South Africa is becoming more involved with globalization and reforms need to meet international standards. As well, the difficult issue of equitable, affordable health care for all has to be addressed.

The publication of this issue co-incides with the Medichem conference. Lotter, writing about the Chemical Industry's response to world-wide environmental concerns (addressed through the Responsible Care initiative), notes the need for stakeholder participation in decision-making. In this context, it is interesting to notice that the practice of the Department of Water, Environmental Affairs and Tourism is closely aligned with world-wide methodology where a self regulatory framework and participation are primary concerns and to contrast this with Department of Labour practice. Through the Occupational Health and Safety Act (where the basic premise is one of self regulation) - this Department is publishing more and more rigorous, prescriptive legislative requirements. These requirements emphasize aspects which have been neglected and left in the background for many years.

Van der Merwe and Ferrie clarify some of the critical issues in the development of cost effective, efficient and practical occupational health, safety and environmental programmes. Ferrie again highlights the need to consult with all stakeholders and specifically health and safety committees and representatives at the work site. He also refers to the importance of scientific societies in his discussion about the joint OHASA and Department of Labour document on Risk Assessment. (A similar document on medical surveillance by the Scientific Committee on Biological Monitoring (SASOM) will soon be available.)

London and Rother explore the non-acceptance of exposure risk. While chemicals and pesticides may be perceived as common day "necessities" in contemporary society, they argue that - as the custodians of human well-being - we should never let up on our search for alternatives. This search may take various forms : it may be a search (on the ground floor or at the coal face) for the replacement of toxic substances with less toxic ones. It may be a search at policy level, where debate can be used to bring about innovative new approaches.

It is worth noting that at the time of publication of the Hazardous Chemical Substances Regulation in August of 1995, only 15 of the 29 substances for Biological Monitoring could be analysed in South African laboratories. In the intervening three years a database of more than 172 methods has been developed by private, academic and reference laboratories.

London and Rother state that limited coverage is given to aspects of banned pesticides and it is interesting to note that the Department of Agriculture and Industry (through its association AVCASA) is currently retrieving over 800 tons of banned, expired and unused pesticides. Government has allocated R9m for this work.

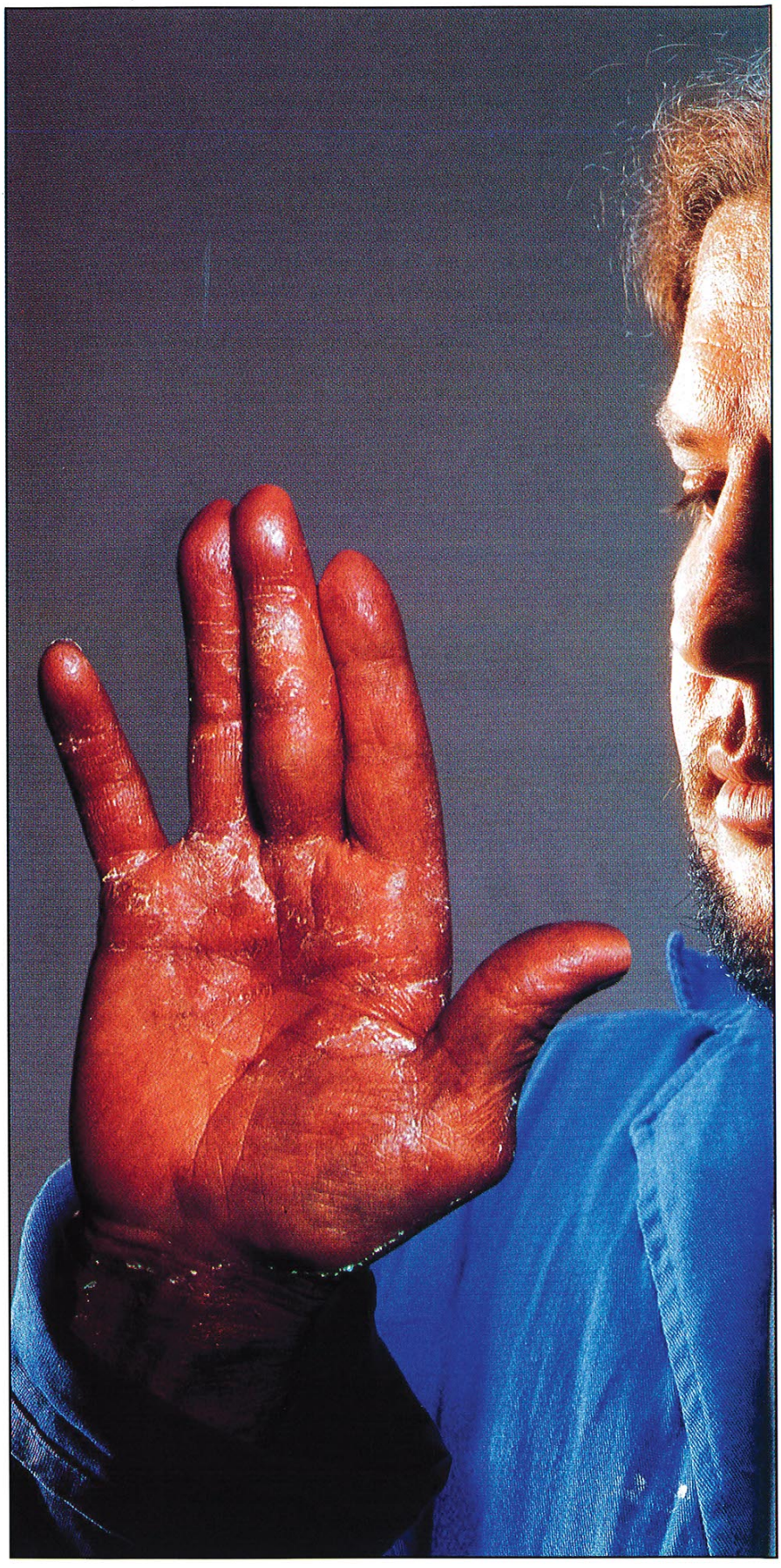
Cantrell, Landless and Coombs (in part two of a series of publications on biological monitoring) indicate clearly the need for further research in order to ascertain the real figures of exposure : how many workers are exposed to chemicals? what sorts of chemicals are they exposed to? what are the levels of exposure? It is the ongoing responsibility of all scientists but, in particular, the Department of Labour, OHASA and SASOM to undertake such research.

What is striking is that all the contributors highlight the need for active stakeholder participation and that the need for this is being identified in South Africa where, historically, there has been very poor stakeholder participation in occupational health - whether in relation to business, labour or government involvement. Now is the time for all stakeholders to develop an interest in active participation and to ensure the dissemination of information on occupational health needs both within South Africa and throughout the African continent. Let us not forget the main principle for occupational health as stated by B Ramazzini (1633 - 1714):

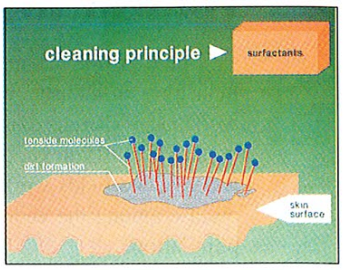
"To work without acquiring a wretched disease is to love and not to curse one's work."

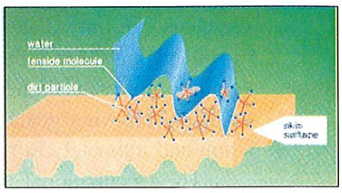
Murray Coombs
GUEST EDITOR

PUT UP YOUR HAND IF YOU HAVEN'T HEARD OF STOCKHAUSEN SKIN PROTECTION



FOR PERFECT SKIN PROTECTION





In industry and in many workplaces the human skin particularly the hands are subject to contact with various kinds of harmful substances and hazards.

This has led to a continual increase in occupational skin disease – in fact industrial dermatitis constitutes over 50% of all reported occupational accidents in South Africa.

At a time when there is a shortage of skilled people, every employer should be automatically involved in safeguarding workers from skin disease.

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Promoting Occupational Health in South Africa

South Africa has a very dynamic and rapidly changing industry - an industry which can ill-afford an unhealthy workplace. Therefore, it is vitally important that Occupational Health Professionals in the safety, nursing, medical and hygiene fields work together to prevent ill health and disease among the economically active sector of our population.

The effective integration of occupational medicine and hygiene can only materialise when individual approaches to managing these aspects are shed. All Occupational Health professionals need to accept the equal role they play in achieving goals that are beneficial to the profession and ultimately to the management of our workforce.

The Occupational Hygiene Association of Southern Africa (OHASA) was established in 1993. Its overall objective is to create ongoing awareness about occupational health issues and to enhance Occupational Hygiene as a discipline in Southern Africa.

The OHASA national council consists of individuals who are actively involved in occupational health, either in an educational role to ensure that competent qualified individuals enter the market or in a leadership role, taking responsibility for various initiatives to further develop Occupational Health in Southern Africa - and some council members work as professionals in industry.

OHASA actively participates, as an associated society, in the activities of ASOSH (The Association of Societies for Occupational Safety and Health). OHASA also acknowledges and underwrites the importance of IOHSA (The Institute of Occupational Hygienists of Southern Africa) to register Occupational Hygienists who meet appropriate standards of formal education and practical experience.

OHASA looks forward to using ***Occupational Health Southern Africa*** as its official journal and as a vehicle to further advance the science, art and practice of Occupational Hygiene and to promote knowledge amongst its members.

Johan Jacobs
GUEST EDITOR

SASOM Coid Training Project

The training of doctors in aspects of the COID Act and its administration is now in full swing.

The courses last for three hours and, at present, are open only to doctors. The course, which is free, is being sponsored by the Compensation Commissioner. Courses are being held all over the country. A complete manual as well as a certificate are given to each candidate.

If any doctors would like to attend the course, they should contact either Dr Brendan Girdler-Brown at telefax (011) 477-0143 or on e-mail hsct@icon.co.za or Dehlia Muller at telefax (012) 667-5160 or on e-mail sasomdm@iafrica.com.

SASOHN/SASOM Healthy At Work Week

Date : 24 -29 August 1998

Venue : Shopping centres

The South African Society of Occupational Health Nurses (SASOHN) and the South African Society of Occupational Medicine (SASOM) - through their Gauteng-based Societies - plan to hold an information week at various large shopping centres between 24-29 August. Displays will be manned by Occupational Health nurses.

The aim of the week is to highlight Occupational Health by giving and promoting information about the following questions: What is Occupational Health? Where do we get Occupational Health? Why do we need Occupational Health?

Topical information will also be made available through television and radio programmes and articles in the press.

For more information, contact :

Gauteng Central (Eastgate - Mr Price Court): Bev Hoggins Cell: 083 449-3263; L. Stokes Telephone: 827-5413.

Pretoria (Sanlam Centre, Centurion): Celeste Diedricks Telephone: (012) 428-6160;: Louwna Pretorius Telephone: (012) 984-833.

West Rand (Westgate): Christine Dunn Cell: 083 602-5696; Kevin Grobler Cell: 083 602-5697.

Please support this important initiative.

New telephone number for SASOM

Here is the new telephone and fax number for the South African Society of Occupational Medicine (SASOM).
SASOM Secretariat (012) 667 5160

SASOM 50 years

The SASOM 50 years logo, as well as lapel pins, are available from the National Office. You can contact Dehlia Müller at (021) 667 5160 or on e-mail sasomdm@iafrica.com to place your orders. The SASOM AGM and dinner will be held on Friday 20th November in Gauteng. This is expected to be a festive occasion to mark the 50th anniversary. Please keep this date open and look out for further details.

New death certificates implemented in July

A new set of forms for death notification will come into effect on 1 July 1998 to replace the existing form. The Departments of Health and Home Affairs, after consultation with MASA and other major role players in the health environment, redesigned the old form in keeping with international requirements. The intention is to improve death registration and to streamline the gathering of information for statistical purposes that is essential to better health planning in South Africa. The new notification form has two parts: page one records the cause of death, while the second part makes provision for the medical practitioner to record the underlying cause of death and the demographic information of the deceased. The Department of Health said the new form would ensure confidentiality of the cause of death, e.g. AIDS, to protect the relatives of the deceased. The forms are available from regional offices of the Departments of Health and Home Affairs in each province. The Department of Health has appealed to doctors to start using the new forms as soon as possible, but said the old death notification forms will still be accepted until the end of August. Doctors can contact the departments listed below for further information.

	Department of Health		Department Home Affairs	
Province	**Person**	**Telephone**	**Person**	**Telephone**
Eastern Cape	Mr R Puchert	(0401) 99-3946	Mr G Ntshinka	(0433) 34-699
Gauteng	Mr S Jikwana	(011) 355-3265	Mr J Chavalala	(011) 476-2336
Free State	Mr B de Winnaar	(051) 403-3161	Mr K Setlogelo	(051) 430-3617
Kwa/Natal	Mr Z Ahmed	(0331) 95-2765	Mr E Delport	(031) 308-7906
Mpumalanga	Mr I Vermaak	(013) 752-2211	Mr F v Rensberg	(013) 752-3100
Norhern Cape	Mr H Thama	(0531) 81-1121	Mr J Leburu	(0531) 82-2882
Northern Province	Mrs S Dumela	(0152) 29-5281	Mr M Luthanda	(0152) 95-9308
North West	Mr C Vundule	(014) 87-5221	Mr M Madou	(0140) 84-5443
Western Cape	Dr N Shaikh	(021) 483-4661	Ms M Mqxashe	(021) 462-4990

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SASOHN Seminar and AGM

Date: 12 – 13 November 1998

Venue: Gateway Woods Hotel, White River

The 1998 Seminar and AGM of the South African Society of Occupational Health Nurses (SASOHN) will be held in the beautiful province of Mpumalanga at the Gateway Woods Hotel just outside White River. As there is space for only 200 people it is essential to book early to avoid disappointment.

For further information contact Linda Tozer on telephone (013) 750-1673 or fax: (013) 751-2650 or Cell: 083 290-1235 or e-mail: tozer@cis.co.za

Address all correspondence to MSOHN, P O Box 1977, Nelspruit, 1200.

Calendar of Congresses and Conferences

August			
24 - 26	First International ICOH Conference on Psychosocial Factors at Work	Copenhagen, Denmark	Ole Teller, The Danish Working Environment Fund, Vermundsgade 38, DK-2100 Copenhagen, Denmark Tel: +45 39 16 05 00 Fax: +45 39 16 05 80 e-mail: AMFUDD@inet.uni-c.DK
September			
8 - 11	Medichem 1998: New Horizons - Old concerns	Cape Town, South Africa	Medichem 1998, Occupational & Environmental Health in the Chemical Industry, PO Box 781811, 2146, Sandton, South Africa. Tel: 27 11 780 3600 Fax: 27 11 884 6932 email: Medichem@Sandton.Senchem.co.za
9 - 11	Global Ergonomics Conference	Cape Town, South Africa	Deborah McTeer, Postgraduate Conference Division, University of Cape Town Medical School, Observatory 7925, South Africa Tel: +27 21 406 6348 Fax: +27 21 448-6263 email: deborah@medicine.uct.ac.za
17 - 19	Occupational Safety and Health Asia	World Trade Centre, Singapore	Petra Hartmann, Tel: ++49 211 456-0991
21 - 25	PRESMUS-ISEOH '98 3rd International Scientific Conference on Prevention of Work-related Musculoskeletal Disorders 13th International Symposium on Epidemiology in Occupational Health	Helsinki, Finland	Ms Mirja Kallio, Finnish Institute of Occupational Health, Topeliuksekatu 41 a A, FIN-00250 Helsinki, Finland Tel: 358 9 47 471 Fax: 358 9 4747 548 e-mail:mkal@occuphealth.fi
23 - 25	The 4th International Symposium on Biological Monitoring in Occupational Health	Seoul, Korea	Se-Hoon Lee, MD, Secretary General, Biological Monitoring, c/o Dept. of Preventive Medicine College of Medicine, Catholic University of Korea 505 Banpodong, Sochoku, Seoul 137-701, Korea Tel: +82 2 590 1236 Fax: +82 2 532 3820
28 - 2 Oct	Minesafe International '98	Sun City, South Africa	Tel: (011) 498-7100 or visit the website www.mining.co.za/minesafe.htm
October			
6 - 8	The 2nd Emergency Services Exhibition	Kyalami, Johannesburg	Debbie Turncliff, Tel: (011) 466-2299 Fax: (011) 466-1318
13 - 15	Safety, Health and Environment "98 Exhibition	Gallagher Estate, Midrand	Joan De Beurges, PO Box 652495, Benmore, 2010. Tel: (011) 444-3937 or 444-7954 or Fax: (011) 444-7987 E-mail:raisa@iafrica.com
November			
22 - 27	Noise Effects '98 7th International Congress on Noise as a Public Health Problem	Sydney, New South Wales, Australia	Congress Secretariat, Noise Effects '98, GPO Box 128 Sydney, NSW 2001, Australia Tel: 612 9262 2277 Fax: 61 2 9262 2323 e-mail: tourhosts@tourhosts.com.au

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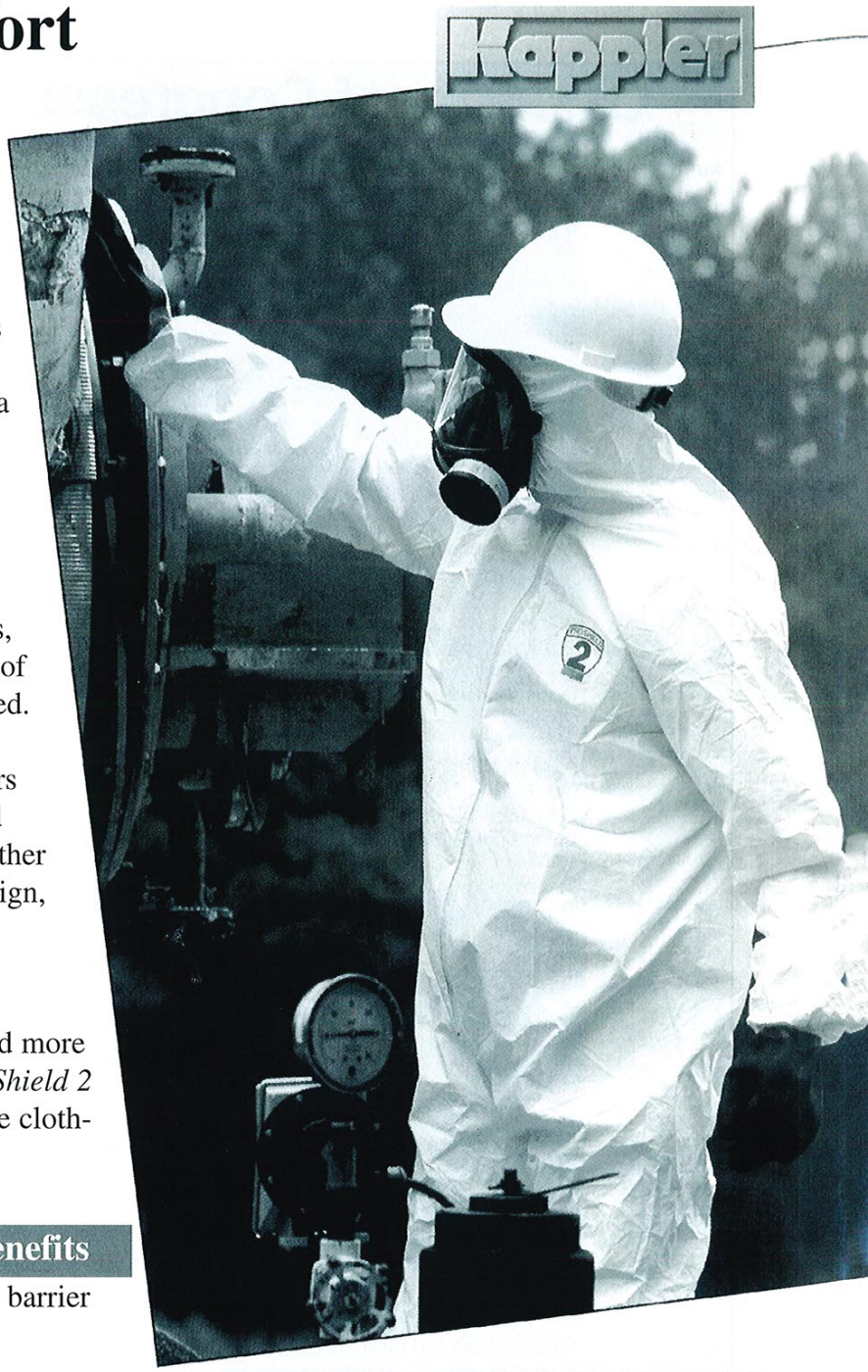

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- Pesticide Spraying
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- Metal Dust Environments
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Occupational health risk assessment: current status in South Africa

R Ferrie
Group Occupational Hygienist, AECI Ltd

Occupational Health SA 1998; Vol 4, No 4: 9-12

Abstract

With the implementation of the Regulations for Hazardous Chemical Substances in 1995, employers are required to assess the health risks of workers exposed to hazardous chemicals and to implement control measures to prevent those risks or reduce them to acceptable levels.

The Regulations deliberately do not provide a preferred format for the assessment, nor do they specify the person or persons who should carry out the assessment. The intention is to allow the employer to use the most cost-effective means of compliance whilst taking the seriousness of the risks into account.

The lack of clear guidelines on these issues however appears to have encouraged the automatic use of external consultants to produce highly technical assessments at considerable expense. The absence of direct involvement in these assessments by management and employees (and their consequent lack of comprehension of the health issues identified) can lead to the conclusions and recommendations being questioned or even ignored.

This paper outlines the background to the Regulations and proposes an incremental approach to risk assessment. This approach encourages the involvement of the local management and employees to produce simple but readily understandable assessments with practical recommendations, where necessary, for reducing any risks identified.

Occupational health risk assessment

Most employees have personal experience or knowledge of colleagues who have suffered an industrial accident like losing a finger or falling off a ladder. This allows them to make some form of subjective judgement on the safety risks associated with different types of work or actions.

Occupational health issues can be very different. Many years may pass between the time of the last exposure to a hazardous chemical substance and the appearance of a resulting health effect. In addition, some of the diseases or illnesses which can arise from work exposure are the same as those present in the general population due to natural causes. This means that the link to previous work exposure may easily be overlooked. Personal experience is therefore rarely a reliable guide to the real risks associated with exposure to hazardous chemical substances.

Hazard can be defined as the potential for harm. We have known for centuries that exposure to some chemicals can result in disease and illness in workers and so these are known as hazardous chemical substances. Risk, however, is the probability of that harm occurring under the particular conditions prevailing in a specific workplace. Unfortunately there is no simple formula for determining with any degree of certainty the likelihood of an individual contracting a disease or illness from a known exposure to any substance or combination of substances. An element of judgement is therefore necessary.

The definition of industrial or occupational hygiene as "*That science and art devoted to the anticipation, recognition, evaluation and control of those environmental factors or stresses, arising in or from the workplace, which may cause sickness, impaired health and well-being...*"[1] may be regarded as simply another way of describing the risk assessment process. It is unfortunate that occupational hygienists have not more actively

explained the full scope of their proper role in workplace health issues. This would go a long way to dispelling the popular notion that occupational hygiene is merely the process of sampling the workplace air and comparing the result to some predetermined list of safe levels.

The difficulty with judgement decisions is that there is never a "correct" result. It depends on the viewpoint of the person or persons making the judgement and the social environment prevailing at the time. This uncertainty is often troubling for employers and other decision-makers. The high cost of implementing engineering controls allied with the potentially severe penalties that can be imposed under the Occupational Health and Safety Act, impel the employer to demand a degree of certainty that employees and the authorities will accept the findings of the risk assessment.

An effective occupational health risk assessment should therefore give rise to a document which clearly details not only the published hazard data but also the thought process that went into deciding on the level of risk arising in that particular work situation. It should also be evident from the assessment that the measures recommended to reduce any risk are practical and cost-effective relative to the level of risk identified. This document is extremely valuable for demonstrating, in a court of law if necessary, that a reasonable attempt was made to identify and address occupational health issues.

International legislation

The trend internationally over the past decade has been for risk assessment to replace the previous command-and-control approach for regulating workplace health and safety issues. In 1988 the UK introduced the Control of Substances Hazardous to Health Regulations requiring employers to carry out an assessment of health risks created by work involving substances hazardous to health. A large number of international bodies and governments (including the International Labour Organisation, the European Union and the Australian government) have similar requirements for health risk assessments in their respective conventions, directives and regulations.

This more flexible approach allows employers a considerable amount of freedom to develop occupational health strategies, systems and procedures that are appropriate to their particular operations. Employers must nevertheless ensure that the assessments are carried out in such a way that all hazards in the workplace can be readily identified and that appropriate control measures to protect the health of the employees are determined. The regulator is similarly freed from the constraints of a strict interpretation of the wording of legislation and can use his time more effectively to assist industry with compliance.

Local legislation

Assessment was specifically defined in the South African Occupational Health and Safety Act for the first time in August 1995 in the Regulations for Hazardous Chemical Substances. The Act itself however has always required employers to establish "*...what hazards to health or safety...are attached to any work...and...what precautionary measures should be taken...*"[2] It might therefore be expected that the principles as well as the practicalities of assessing health risks would have been long established in South African industry.

The Department of Labour however recognised that the terms and concepts associated specifically with occupational health risk assessments would be new to many South African employers and therefore appended a comprehensive set of explanatory notes to the Regulations. Despite this it has been stated[3] by the Chief Inspector of Occupational Health and Safety at the Department of Labour (Ms Faiza Salie) that the Department's inspectors are finding that the risk assessment process is often being confused with exposure monitoring. She has also confirmed that many companies handling hazardous substances are not recognising them as such and consequently not realising that the Regulations apply to them.

Occupational Health Risk Assessment

There are a number of issues to be considered.

The Regulations are not specific about the form or content of the required risk assessment. They do require, however, that the following aspects have to be taken into account when arriving at a conclusion about the possible health risks:

- The substances to which an employee may be exposed
- The potential effects of the substance on the employees
- The physical form of the substance and where it is present in the workplace
- The routes of intake for exposure
- The work processes and the effect of a deterioration or failure of any control measures

Local practice

With the exception of a few responsible chemical manufacturers, the requirement that occupational health risk assessments be carried out in all workplaces where employees are likely to be exposed to hazardous chemical substances appears to have been largely ignored in South Africa. According to recent information in a personal communication from the Director of Occupational Health and Hygiene at the Department of Labour, factory inspectors issued 536 improvement notices and initiated 11 prosecutions in 1997 under the Regulations for Hazardous Chemical Substances.

Region	Notices	Prosecutions
Bloemfontein	16	0
Cape Town	100	0
Durban	237	4
East London	68	0
Johannesburg	0	7
Kimberley	0	0
Klerksdorp	3	0
Pietersburg	12	0
Pretoria	0	0
Witbank	100	0

Some of the Inspection Authorities, approved by the Department of Labour, also appear to have misunderstood the Regulations. A number of risk assessment reports from some of these consultants contain little more than some air monitoring results with a few cursory recommendations. Other assessments utilise highly detailed and complex quantitative procedures even when the risks are obvious. These often include the assignment of subjective numerical values to various risk factors followed by a mathematical manipulation to arrive at an overall risk value of doubtful meaning.

These assessments are often so focussed on the assessment process itself that they fail to provide a clear indication of the degree or type of health risk in the workplace in terms that are understandable to the management and workforce. Similarly there is often a lack of specific, practical and cost-effective recommendations on how the risks which are present can be reduced to acceptable levels.

The incremental approach

A key requirement of any high quality Occupational Health Risk Assessment is that it should be easily understandable to management and the employees affected. Appropriate and practical interventions to reduce any risks to acceptable levels should also be clearly identified.

While a detailed and professional risk assessment will be necessary in some cases, the cost and effort may not be justified for the vast majority of chemical exposures in general industry. The employer, in consultation with the affected employees, should rather agree beforehand on an approach that provides them both with the information they need to address any health risks arising from their particular workplace conditions. A fairly simple initial assessment by a small team from the workplace involved can often prove very effective in addressing many of the low to medium risks.

A simple approach to an initial risk assessment:

- Clearly identify the area to be assessed
- Look for hazards that might be expected to result in significant harm to health under the conditions prevailing in that workplace
- Identify the people, or groups of people, that could be harmed - remember to consider visitors, cleaners, maintenance staff etc
- Identify existing control measures and decide whether the risk has been reduced to an acceptable level
- Determine what more could reasonably be done for those risks that are not adequately controlled at present

If this first attempt shows that there is little or no significant risk to health then nothing more needs to be done other than simply documenting the conclusions along with the assessor's reasoning. When the risk is assessed to be moderate then the conclusion and the reasons need similarly to be documented and, if practical, recommendations on ways to reduce the risks still further should be made. If, however, a serious health risk is identified or if the team is unsure of the risk, then professional advice may be necessary. An in-house occupational hygienist, medical or safety professional could in the first instance facilitate the process. Only where this process does not lead to an acceptable degree of certainty about the risks and the additional measures required, might a specialist in the particular hazard concerned need to be contracted to give a formal opinion. More detailed assessments should still involve the workforce but the specialist should provide rigorous scientific evidence to back up any conclusions drawn.

This incremental approach ensures that the assessment is always suitable and sufficient for the severity of the risks identified. It also requires the involvement of the workforce and therefore increases the likelihood of their consequent participation in the continuous improvement of occupational health conditions.

Involvement of Health and Safety Committees

The Regulations for Hazardous Chemical Substances require that before carrying out the assessments, employers must consult the Health and Safety Committee on how it is planned to handle the process. The Committee must also be allowed time to comment on these plans as well as on the conclusions resulting from the assessments.

It therefore makes sense to encourage the members of the Health and Safety Committee to become involved in all stages of the assessment wherever possible. A team approach involving a cross-section of the workforce can allow agreement to be reached on the level of residual risk that will be acceptable to all.

Acceptable Risk

There is unfortunately no clear consensus on absolute values for acceptability of risks. There are however three basic approaches[4] to deciding on the acceptability of any risk:

- Comparison (which situation has the lower risk attached?)
- Cost effectiveness (does the cost outweigh the benefits obtained?)
- Preference (which situation does the affected party find least objectionable?)

Perhaps a more practical approach to determining acceptability in the workplace would be to determine the level of a particular hazard that would be regarded by all the parties as unacceptable and similarly at what level would the risks be regarded as trivial. The problem is then reduced to a grey area where risk reduction is desirable subject to the concept of "reasonable practicability".[5] An effective and realistic assessment is dependent on a thorough appreciation of what actually happens in practice in the workplace. The Health and Safety Representatives along with the employees doing the work are often in the best position to identify the real hazards and to suggest practical and cost-effective measures to reduce any risks.

Conclusions

It is proposed that an incremental approach be taken to assessing health risks in the workplace. A simple qualitative model can be used initially.

It is recommended that a small team from the workplace involved carry out the initial assessment. Only if this assessment demonstrates that there are potentially serious health risks present or if the risk cannot be determined then a more in-depth assessment and professional advice may be necessary.

This incremental approach is explained in more detail in a guide[6] to conducting occupational health risk assessments which has been published by the Institute for Occupational Hygienists of Southern Africa. This guide has been written in simple language and uses many examples from a wide range of South African work situations. The emphasis is on practical approaches and it also gives some useful insights into the meaning of "reasonably practicable" and the skills required by the assessment team members.

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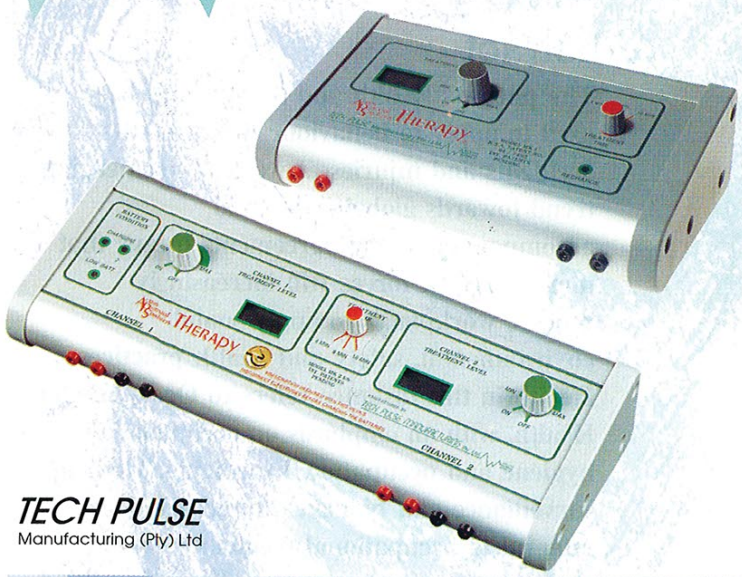

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Medical surveillance and biological monitoring: overview and guidelines for a simplified "task-health-risk zone" based approach

Hans van der Merwe
Group Medical Officer, Polifin, Sasolburg

Occupational Health SA 1998; Vol 4, No 4: 14-18

Abstract

The phrase "Health and Safety"[1] has been used to apply to behaviour that prevents accidents and injuries at work. The emerging trend towards globalisation and accompanying trade agreements means that market driven forces will increasingly require workplaces to apply sound environmental, safety and health practices. Health in this instance refers to Occupational Health, with an emphasis on occupational hygiene and occupational medicine. Medical surveillance and biological monitoring are integral to occupational medicine. This overview proposes guidelines for a simplified "task-health-risk-zone" based approach.

Introduction

Medical surveillance and biological monitoring form an integral part[2] of occupational health. These approaches can be used to determine the effect of work (for example, hazardous exposure) on employees' health. They can also be used to ascertain the effect of employees' health on their work performance (for example, dizziness when working at a height).

Scope

Different task groups (for an individual employee or employee job category) are identified for the introduction of a "task-health-risk-zone" based approach for medical surveillance and biological monitoring programmes. (Refer Figure 1.)

These programmes are introduced in areas with a potential to cause:

- Specific work-related disease (for example, without appropriate precautionary measures, drilling with dust emission can cause pneumoconiosis)
- Non-specific work-related disease (for example, sweeping general dust can cause upper respiratory tract irritation, sneezing, coughing and discomfort)
- Aggravation of a pre-existing disease (for example, solvents can cause further liver damage or dermatitis)
- Unsafe practices from non-work related health risks (for example, substance abuse or from hobbies or part-time work - including medical incapacity, age and gender state.
- Unsafe work practices from exposure to work related health risks[3] (for example, in relation to on-going general health and fitness of employees requiring additional precautionary control measures and personal protective equipment.)

Similarly, individual employees (as required and indicated) undergo medical checks at various stages (pre-employment, pre-placement, periodic, post-employment or exit and disablement or medical incapacity with permanent/temporary and total/partial impairment), checks that include follow-up review, medical surveillance and biological monitoring.

Purpose

The primary goals of the programme are to:

- protect the health of employees at work
- prevent and detect adverse health effects from work-related health risks at an early stage
- promote control measures

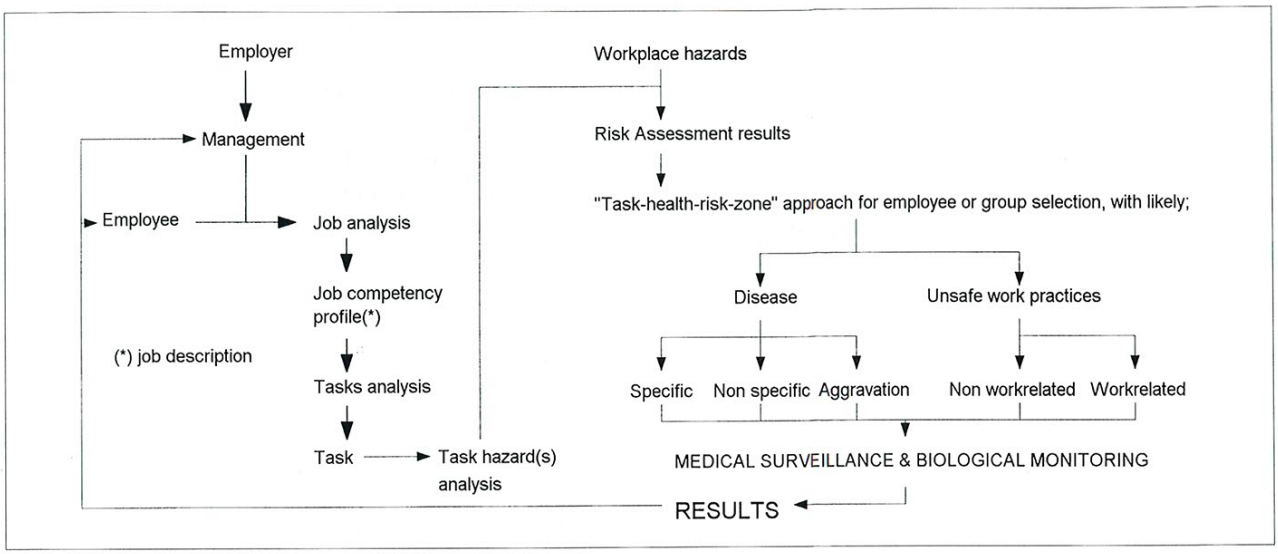

Figure 1: Summary of "task-health-risk-zone" based approach

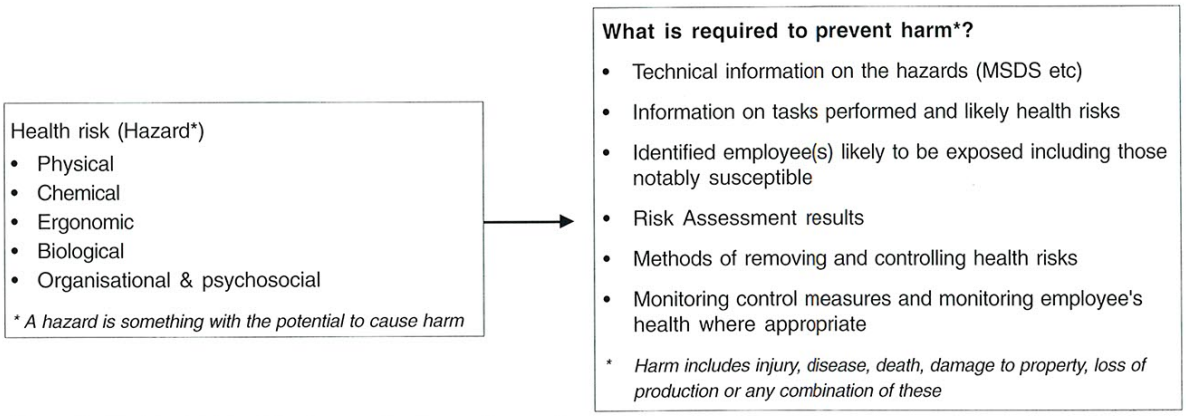

Figure 2: Health risk identification, evaluation and control

Achievement of these goals needs to be approached in a pro-active manner in order to protect employees against health risks at work and to promote, establish and maintain the highest possible level of physical and mental well-being in the workplace and within the local community. (Refer Figure 2)

General South African principles, concepts and definitions are available at Appendix 1.

Classification of hazards

These are detailed in Figure 2.

Criteria

The following criteria[4] can be used to determine the need for medical surveillance and biological monitoring on work-related health risks:

- if an identifiable health risk requires further investigation
- if an identifiable disease, even at a sub-clinical level, could be present
- if additional precautionary control measures need to be considered
- if valid investigation methods are available

It is important that the respective methods and the results used for this purpose are:

- safe, easy to perform, non-invasive and acceptable to employees
- specific and sensitive

Selection

To keep the process practicable and simple, employees performing red and amber tasks must attend for medical surveillance and biological monitoring while those doing green tasks are merely required to attend for non-work related health risk medical screening. It is good practice to simultaneously apply the latter requirement to employees performing red and amber tasks as well. (Refer Figure 3.)

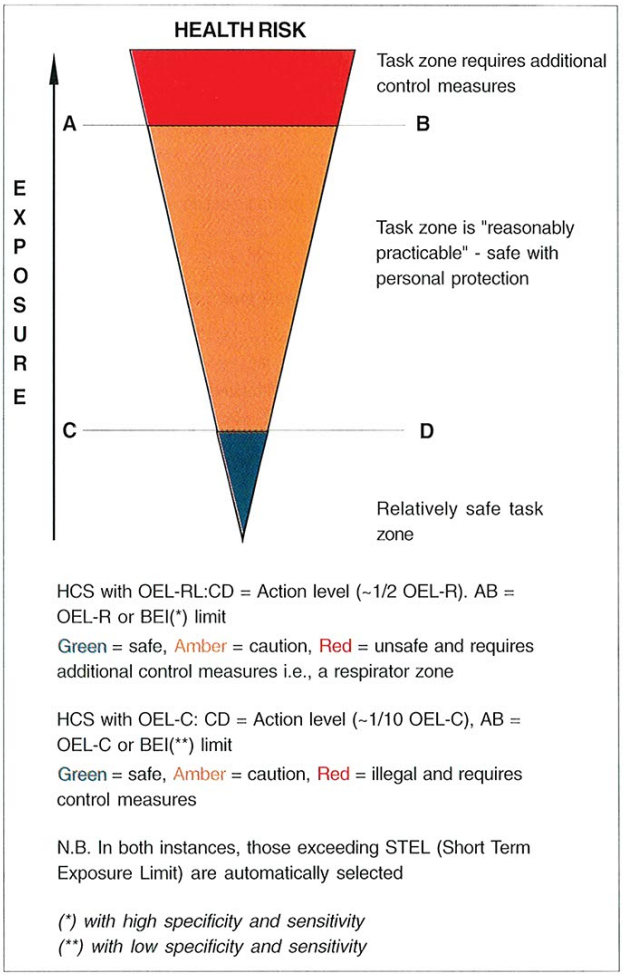

Figure 3: Task zones used for employee/group selection in HCS exposure

Service levels

There are 4 distinct levels of services[5] to be considered when introducing a medical surveillance and biological monitoring programme. Employers need to consider these in relation to their employees:

Level 0: Nothing as yet. This applies mainly in the informal business sector.

Level 1: Legal compliance. The programme is used to identify, evaluate and control health risks in the workplace, to perform medical surveillance and biological monitoring, to provide training on the health risks concerned and to issue safety protection equipment by an acknowledged trainer, occupational hygienist, occupational medicine practitioner, occupational health nurse (*) and occupational safety practitioner team.

(*) A crude guideline[6] for every 50 employees is determined by the nature and extent of hazardous exposure, the work performed by employees and the service level required, 1 hour occupational medicine practitioner time per week and 1 hour occupational health nurse practitioner time per day.

Level 2: Basic Occupational Health service. The programme is used to identify, evaluate and control health risks in the workplace, to provide for non-work related treatment of minor ailments and emergency care, to perform medical surveillance and biological monitoring at pre-employment and periodic intervals, to provide training on the health risks concerned and to issue precautionary protective equipment and training by an acknowledged trainer, occupational hygienist, occupational medicine practitioner, occupational health nurse and occupational safety practitioner team.

Level 3: Comprehensive Occupational Health service. The programme uses a task-based approach to identify, evaluate and control health risks in the workplace and within the local community (for pollution and effluent control purposes), to perform non-work related primary health and emergency medical care, health education, counselling, rehabilitation as well as work-related medical surveillance including biological monitoring at pre-employment, periodic, pre-placement, exit, for medical incapacity and follow-up review, to provide training on the health risks concerned in the issuing, training and education aspects of precautionary protection measures and equipment by an acknowledged trainer, occupational hygienist, environmentalist, trained nursing staff, social worker, physiotherapist, industrial psychologist, occupational medicine practitioner, occupational health nurse and occupational safety practitioner team.

Planning

In addition to promulgated legislation, self-regulation[7] is required by an employer. The following 5 step approach is used for this purpose:

- a general health policy is issued and displayed in the workplace
- objectives are specified to reduce health risks
- performance target standards are set, based upon the health policy and specified objectives to meet in-house, legal and global (that of trading partners) compliance
- safe systems of work are developed, implemented and verified by applying a suitable medical surveillance and biological monitoring programme
- regular internal auditing is done to determine actual performance against set standards for decision making and corrective action required with follow-up review

Organisation

An organogram is used to organise the work load of the occupational medicine/health practitioner, additional team members and other resources like money, materials, machinery, methods and maintenance in order to provide the most effective service.

A job task analysis is used to compile a collective activity/task hazard analysis for an individual employee or preferably for employee job category groups.

Risk assessment - using a task-based approach - is a fundamental tool in gathering information about potential health risks enabling different exposure zones to be identified and built into the medical surveillance and biological monitoring programme. (Refer Figure 3)

high/unsatisfactory or red(*) task zone = OEL-C or = BEI(#)

medium/caution(**) or amber task zone = Action Level but < OEL-R, = BEI(##) low/satisfactory or green task zone < Action Level.

(*) without precautionary control measures (**) especially in susceptible employees.

(#) those with high specificity or sensitivity (##) those with low specificity or sensitivity.

Implementation

All employees (including contractors who qualify for an abridged version unless otherwise indicated) undergo a non-work related as well as a work-related medical examination and biological monitoring as indicated. (Refer Figure 4.)

With informed employee consent, appropriate personal medical details (excluding HIV), family medical details, work history (including basic routine and health risk directed examination and investigation results) are recorded for 30 years record-keeping for management action.[9]

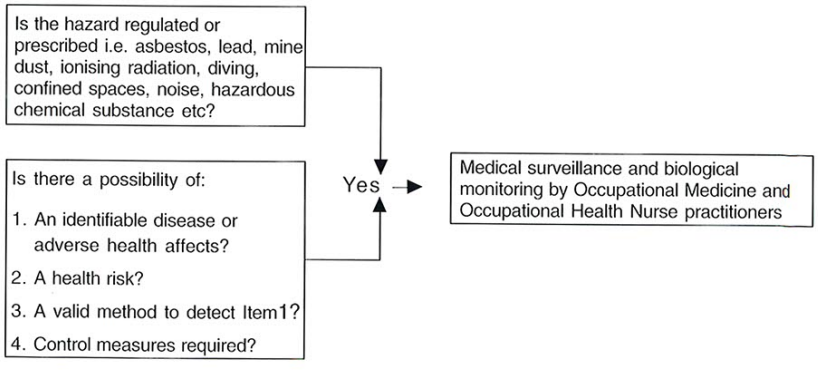

Figure 4: Who needs to undergo work-related monitoring?

In the biological monitoring of chemicals, knowledge of the half-times[8] is important as these reflect the equilibrium between daily intake and excretion during the sample taking procedure, in addition to the observed and corrected results recorded. A critical step[10] in this regard is to communicate the results.

Control

Results recorded are used for follow-up review and health risk reduction purposes. It becomes possible to design and implement more effective strategies[11] for controlling workplace exposures.

Employers need to pay attention to the following details:

- Only permit a safe amount or a particular type of health risk necessary for a specific activity or task
- Limit the number of employees who will be exposed to potential health risks
- Use and apply substitutes for potential health risks
- Limit the period of employee exposure to potential health risks
- Engineering control measures (which must be examined and tested by an approved inspection authority at intervals not exceeding 24 months) and safe working procedures including personal protection provided to employees are priority issues

Conclusion

Risk assessments and the ensuing results can be cumbersome and clumsy.[12] They need to be simplified. This will facilitate the selection of employees to undergo appropriate medical surveillance and biological monitoring and also ensure that personal protection and added control measures can be introduced promptly in workplaces.

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Appendix 1

General South African principles, concepts and definitions

It is important to be familiar with the following general principles, concepts and definitions :

Section 29 of the South African Constitution states, "every person shall have the right to an environment that is not detrimental to his or her well-being".

Section 24 of the Bill of Rights effectively provides for the right of any person to take legal action to protect his or her environment and other rights, even where the government has no obligation in terms of other statutes to these rights.

Section 8(1) of the OHS Act in terms of the general duties of employers to their employees provides that every employer shall provide and maintain, as far as reasonably practicable, a working environment that is safe and without risk to the health of employees.

Section 14 (a) of the OHS Act in terms of the general duties of employees at work provides that every employee shall take reasonable personal care for health and safety and that of other persons who may be affected by an act or omission.

Activity is a specific job function responsibility in terms of the job description i.e. bag handling - refer task.

Biological monitoring(*) means a planned programme of periodic collection and analysis of body fluid, tissues, excreta or exhaled air in order to detect and quantify the exposure to or absorption of any substance or organism by persons.

Biological Exposure Indices means a reference value intended as a guideline for the evaluation of potential hazards as listed in the Regulations for Hazardous Chemical Substances, table 3 of Annexure 1.

Employee job category group is the collective job title for a specific job design.

Exposure(*) means the measured or estimated amount of employee contact to a hazard.

Hazard(*) means a source of danger causing work-related injury, disease or harm (adverse health effects).

Healthy(*) means free from injury or disease attributable to occupational causes.

Health risk is a hazard with the potential of causing disease or harm (adverse health effects - refer figure 2.

Medical screening is a planned prevention/diagnostic monitoring programme searching for clinical symptoms, signs and test results before/during/after a disease occurred.

Medical surveillance(*) means a planned programme of periodic examinations (which may include clinical examinations, biological monitoring or medical tests) of employees by an occupational health nurse practitioner or, in prescribed cases, by an occupational medicine practitioner.

Monitoring(*) means a planned programme used in assessing the health risks in employees from exposure to a hazard i.e. chemicals and concerns;

- Ambient monitoring of the work environment (static monitoring) or employee (personal monitoring)
- Biological monitoring of exposure in terms of absorption, metabolism and excretion.
- Medical surveillance or biological monitoring of determining adverse health effects in an employee's health status at work.

Occupational health practitioner(*) means an occupational medicine practitioner or occupational health nurse practitioner who holds a qualification in occupational health recognised as such by the newly formed Professional Health Council.

Occupational hygiene(*) means the anticipation, recognition, evaluation and control of conditions arising in or from the workplace which may cause disease or adverse health effects to employees.

Occupational medicine(*) means the prevention, diagnosis and treatment of injury, disease and adverse health effects associated with a particular type of work.

Reasonably practicable(*) means practicable having regard to:

- the severity and scope of the hazard or risk concerned
- the state of knowledge reasonably available concerning that hazard or risk and any means of removing or mitigating that hazard or risk
- the availability and suitability of means to remove or mitigate that hazard or risk
- the cost of removing or mitigating that hazard or risk in relation to the benefits deriving therefrom

Risk(*) means the probability of causing a work-related injury, disease or harm (adverse health effects).

Risk Assessment is the process of identifying hazards and assessing the likely health risks thereto.

Safe(*) means free from any hazard causing harm.

Substance(*) means any solid, liquid, vapour, gas or aerosol, or combination thereof.

Task is an element of job action to a work activity i.e. bag filling or lifting.

** As taken or adapted from the Occupational Health and Safety Act number 85 of 1993*

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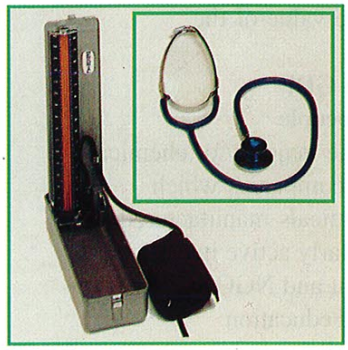

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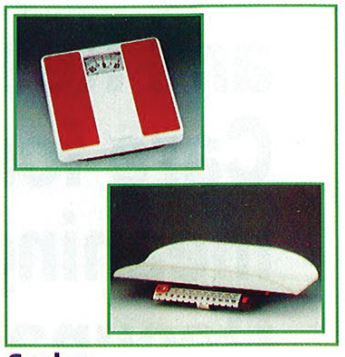
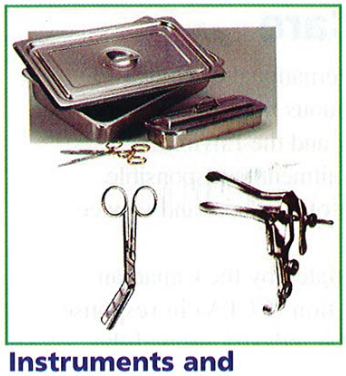


Scales, Height measures



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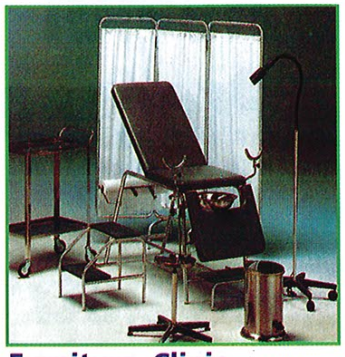

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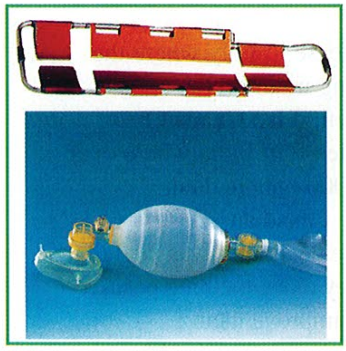
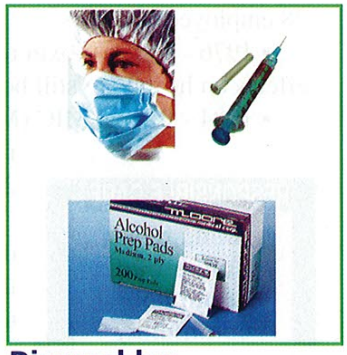
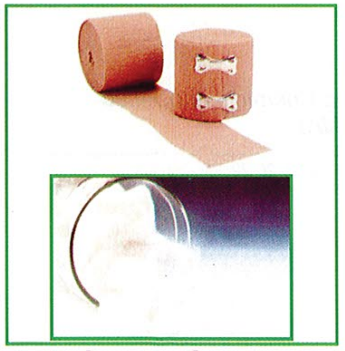


Emergency equipment



Disposables



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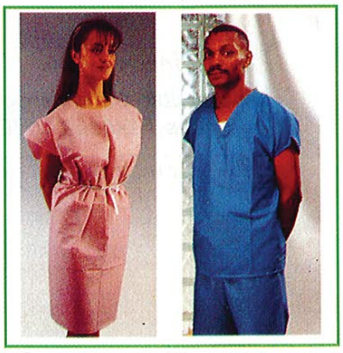

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The role of CAIA and Responsible Care for meaningful Occupational Health Programmes in the Chemical Industry

Liz Anderson
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Occupational Health SA 1998; Vol 4, No 4: 20-22

Introduction

CAIA is the Chemical and Allied Industries Association. It was established in 1993 from the Transvaal Chemical Manufacturers Association (TCMA) which was formed just over 50 years ago. It was vital to establish CAIA in order to expand the base of the TCMA to represent both the chemical industry and its 'allied' support industries on a national basis, to give better co-ordinated representation and a 'respected' voice in both business and legislative spheres in our rapidly changing world, to provide common standards and practices, to improve industry performance and to enhance credibility to compete in the world market.

The Chemical Industry plays an important role in South Africa's economy. The industry:

- accounts for 25% of the value of the manufacturing sector
- contributes 5.3% to the GDP
- employs over 200,000 people

CAIA today represents the majority of chemical companies in South Africa, companies which account for 90% of the chemicals manufactured in the country. CAIA is particularly active in:

- liaison with Government and NGOs on tariffs, environmental legislation and education
- public affairs and education
- promoting and monitoring Responsible Care

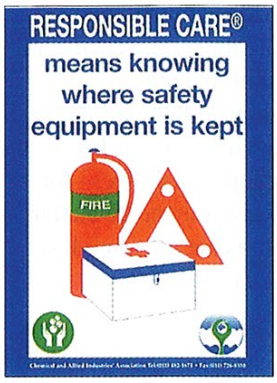
Responsible Care

Responsible Care is the International Chemical Industries' initiative for continuous improvement of performance in Health, Safety and the Environment. The initiative is a public commitment to responsible management and stewardship of products and service from the cradle to the grave.

Responsible Care was initiated by the Canadian Chemical Producers' Association (CCPA) in response to a number of disasters in the industry around the world. These disasters included:

- 1974 - Flixborough explosion in Britain where 28 employees died
- 1976 - severe dioxin release in Italy where the effects on health are still being monitored
- 1984 - Bhopal MIC (Methyl Iso Cyanate) release in India where over 2 000 people died.

Canadian industry decided that it was vital that they did something positive to improve their environmental, health and safety performance and to **communicate** what they were doing to the public. They recognised that industry credibility depended on being pro-active and sharing performance and emergency plans with people so that they would become aware of any potential problems. This awareness could help minimise impacts on health, people safety and the environment. Canada took the lead in designing the concept of Responsible Care - a programme which was adopted subsequently by industry in 42 countries around the world.



In South Africa, CAIA launched Responsible Care as one of its main programmes in May 1994. Merely four years later, Responsible Care has 120 signatories. These signatories include companies from a variety of sectors like storage, transportation, trading, manufacturing and distribution.

Responsible Care is an ethic, a culture and a way of life. It requires total commitment and a culture change to continuous improvement in environmental, health and safety performance. Responsible Care is applied in all aspects of a product's life cycle – from the research and planning of a new product all the way through to its final end use and disposal. Responsible Care requires open and honest communication with the public and sharing with surrounding communities. Environmental, Health and Safety performance needs to be monitored, tracked and reported - the chemical industry must open its door to a sceptical public and demonstrate what is being done to bring about change. Of course, there are costs involved with implementing programmes like these. On the other hand, the benefits are obvious and make good business sense. The benefits include:

- reduced accidents and incidents
- improved employee health
- improved community relations
- lower consumption of water and energy
- reduced waste, effluent and emissions
- cleaner factory and environment
- improved productivity
- lower costs for effluent and waste disposal
- reduced insurance premiums
- improved company image

The Responsible Care programme is a **voluntary** initiative by industry to be pro-active and respond to public concerns about the manufacture, transport, use and disposal of chemicals and packaging. It reflects the concern of the South African chemical industries for:

- the health and safety of its employees and the public
- environmental protection and rehabilitation
- introducing cleaner technology and production
- sustainable development

To assist its members implement Responsible Care, CAIA has drawn up **6 Management Practice Standards**, together with guidelines for implementation and self-assessment questionnaires to measure progress for each:

- **Health and safety of persons**

To protect the health and safety of persons working on site and those in the surrounding community

- **Storage and distribution of chemicals**

To minimise storage and distribution-related incidents, improve emergency response systems and address community concerns

- **Transportation of chemicals**

To minimise transportation related incidents, improve emergency response systems to safeguard the community and the environment

- **Waste management and pollution control**

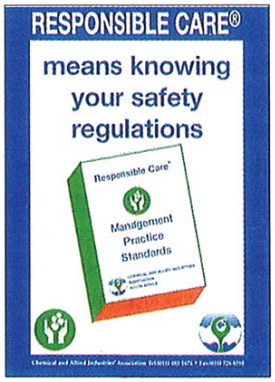
To achieve responsible waste management, reduce waste and prevent pollution to protect the public and the environment

- **Community Awareness and Emergency Response (CAER)**

To communicate with and raise community awareness about possible emergency incidents, to share emergency plans, to safeguard people and minimise damage to property and the environment

- **Product Stewardship**

To take ownership of products and to responsibly manage a product or a service throughout its life cycle (from the planning or cradle stage to the grave stage of final use and disposal)



The Responsible Care Management Practice Standards provide a holistic approach to management in the chemical industry highlighting that *early planning for environmental health and safety* is **vital** to all aspects of our business and *essential for survival and growth into the next century.*

In addition, a set of quantitative indicators of performance (QIPs) have been developed to publicly demonstrate performance and track year on year change. The first round of these are currently being evaluated and include statistics on:

- Disabling injuries
- Occupational disease
- Transport incidents
- Water and energy used
- Waste, effluent and emissions

• Community communication and visits
• Complaints

The last four years have seen major changes both in South Africa and globally. CAIA has been actively involved on behalf of its members in all of the main environmental and relevant legislation changes. In a dynamic world, it is vital to keep CAIA members informed. This is done via the journal ***Chemical World*** and revision committees to update the Management Practice Standards – work that is currently in progress. The QIPs will be evaluated and if necessary, revised to keep South Africa in line with international trends and to assist benchmarking progress in South Africa's industry.

From the programmes outlined above, it is clear that a large emphasis is put on protecting the health of both workers and the public in all aspects of the chemical industry's business. A major area of concern is to reduce employee exposure to both chemical emissions and skin contact which could lead to a variety of potential health problems related to the respiratory system, eyes and skin.

How severe is the problem?

Everything in the universe is made from chemicals. We depend on many chemicals for life (for instance: water, air and food) and others provide the high-tech standard of living to which we have become accustomed!

A common misconception is that all chemicals found in nature are safe and healthy, whereas those made by industry are dangerous and unhealthy. Nothing is further from the truth as some of the toxins produced by fungi and bacteria (for example: Clostridia toxin in meat and fish and Aflatoxins found in grain) count amongst the most dangerous chemicals known - in fact, they are over 100 times more toxic than Cyanide. Many other chemicals contained in plant material are also highly toxic.

However, through Responsible Care, industry recognises its responsibility for the large quantity of chemicals produced and the necessity to protect both its workers and the public. Statistics are not well documented but the National Safety Council of the USA estimates that 1 in 4 workers may be exposed to skin irritants:

• there are about 3,500 potential skin sensitisers
• there are about 35,000 skin irritants

A recent German survey showed that out of 22 worker occupations (including chemical workers), the most common incidence of occupational illness for over 50% of the occupations was ailments related to the skin. This was followed by noise / hearing loss and well below these are respiratory ailments, poisoning and physical damage.

In South Africa 11% of compensation payments were made for contact dermatitis for the year ending 31/1/98, making it a major area for concern and action. Skin damage by chemicals is usually caused by acids, alkalis or solvents in the form of a gas, liquid or solid and contact may be:

• **direct** through spills, sprays or inhalation
• **indirect** through contamination of clothes or equipment, permeation through gloves, clothes or equipment or condensation from the atmosphere. These routes can lead to both irritant contact dermatitis or allergic dermatitis both of which can be extremely distressing and aggravated by environmental factors like heat and humidity.

While removal from exposure and medical treatment can alleviate both, reduction of a potential source - together with provision of appropriate personal protection for the types of exposure - are high priority for Responsible Care companies. Risk assessment at all stages in the life cycle of a product is part of Product Stewardship and should be carried out to identify areas for engineered solutions as first priority, followed by provision of the correct personal protective equipment appropriate for hazard and adequate training of employees to ensure understanding of the hazard and consequences of mishandling.

Responsible Care has a strong emphasis on education and awareness to empower employees to play their part in taking responsibility for their actions in order to protect their own health and safety as well as that of their co-workers, the public and the surrounding environment in their daily work.

For further information on Responsible Care, contact Liz Anderson, Responsible Care Manager at CAIA on telephone (031) 560-1130 or fax (031) 579 2318 or e-mail: liza@nco.co.za

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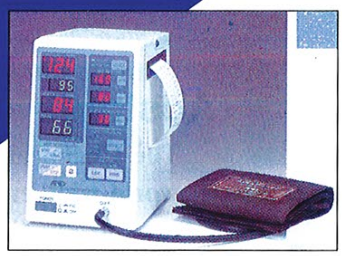

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New environmental policy and legislation: a response from the SA chemical industry

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Occupational Health SA 1998; Vol 4, No 4: 24-27

Abstract

The Chemical Industry is responding to world-wide environmental concerns through the introduction of a Responsible Care initiative. It is essential that all stakeholders participate in this initiative.

Introduction

In 1875, for the first time it seems, the link between polluted water and the spread of certain diseases was made. This discovery marked the birth of the environmental movement.

While more than 100 years have passed since this discovery, there are many developing countries which have had little opportunity to make progress with environmental conservation. Over the past century, in countries like these, the emphasis has tended to be on basic survival needs, issues of politics and economic development. Now, however, the need to improve the quality of life for inhabitants of countries in Africa is taking hold. All over the continent this move is evident in the number of programmes being introduced to uplift living standards and to improve provisions for infrastructure.

While any improvement in living standards is linked inseparably with economic growth and the enhancement of the quality of the environment, important differences need to be recognized between developed and developing countries in this regard. For instance, governments in developed countries usually have the wealth to clean up freshwater resources while governments in developing countries face the challenge of creating wealth and achieving environmental sustainability at the same time.

The World Commission on Environment and Development (WCED) was established by the United Nations in 1983. Under the chairmanship of Gro Harlem Bruntland, the Prime Minister of Norway, its first task was to identify development problems globally and to propose solutions. Eight priority areas were identified as part of an agenda for sustainable development. Pollution and the shortage of freshwater resources were amongst these priorities.

Water resource management

Traditionally, the management of water resources has been linked to the process of urbanisation. People tend to settle around rivers. It is not difficult to understand the reasons for this. Rivers provide a source of drinking water, a method of disposing of waste and, in many cases, a means of transport. As populations grew and relationships between people became more complex, so the number of political boundaries cutting across rivers increased. State sovereignty required that each nation should control its portion of the river.

By the twentieth century, many countries were realising that there are numerous disadvantages to allowing political boundaries to interfere with national water management areas. This realisation led to the development of the concept of catchment management. This concept is becoming increasingly popular. And if we consider the circumstance that almost 40% of the world's population lives in river basins shared by more than two countries, then the need for methods of co-operative management becomes even more apparent.

The failure of traditional water management processes has forced countries to consider new approaches. In an address to the Eighth International Water Resources Association in Cairo in 1994, the Vice-President of the World Bank outlined four key strategies to follow in a new approach to water resource management:

- Water should be seen as an integral part of a long term vision for national development
- Water should be managed within a comprehensive framework that recognises the interactions between various elements in a river basin eco-system
- Decentralisation and greater stakeholder participation are essential for proper waste management
- The economic value of water should be understood

In South Africa, factors like the population growth rate, the rapid pace of urbanisation and the demand and expectation for redistribution of resources are placing increasing pressure on water resources and the water environment. This is clearly reflected in the conditions in the informal settlements which are burgeoning in many cities. The provision of a sewer infrastructure has often been neglected and, in many cases, this is causing severe water pollution problems. Meeting the demand for redistribution of resources as well as improved services would reverse this negative trend and contribute to the protection of the environment.

Another consideration to be borne in mind is that development will place additional demands on water resources. Unless water is used efficiently, meeting these demands will be difficult.

Water Services Act

In recognition of the fact that historical approaches had been inadequate, the Minister of Water Affairs embarked on a Water Law Review process. By June 1997, the Water Law Principles had been formulated. These Principles form the basis of a new National Water Policy for South Africa. Legal teams were constituted to draft new legislation and in November 1997 the Water Services Act was promulgated. The main objective of this legislation is to extend water services to all South Africans. Water service institutions, with responsibility for ensuring the achievement of this objective, were established.

In terms of industry, the Act requires that industries which use water services other than those provided by the local authority must obtain permission from the local authority to continue using the alternative service.

The Act also requires all water services institutions - in consultation with its stakeholders - to prepare a water management plan. This requirement offers industry an opportunity to ensure that its future water requirements are included in water plans. Further, as water services institutions are required to report annually on their financial performance, industry has the opportunity to evaluate the extent to which cross subsidisation of other services from water services revenue is taking place.

National Water Bill

The National Water Bill is the second piece of legislation to give effect to the Water Law Principles. This Bill is currently in parliamentary process and is expected to be promulgated in June 1998. The Bill makes provision for the management of water resources and includes reference to the allocation of water, the regulation of all types of water use and the control of water pollution. Another feature of the proposed Bill is that it provides for water resource management to be implemented according to water management areas which are not necessarily entirely catchment based. The National Water Bill also makes provision for the introduction of a water pricing policy. It is expected that a water pricing policy for the supply of raw water will be published for public comment in September 1998.

The Water Services Act aims to extend water services to all South Africans

Meanwhile, South Africa's transition to a participative democracy has created a climate for transforming environmental governance. A holistic partnership approach is coming to replace a situation where fragmented unenforceable legislation often led to unacceptable levels of environmental degradation.

Alongside developments like these, two major policy initiatives were launched by the Minister of Environmental Affairs and Tourism. By June 1997 these had resulted in a Draft White Paper on National Environmental Policy and a Discussion Document on Integrated Pollution Control and Waste Management. Both policy processes were managed by multi-sectoral stakeholder project committees comprising

representatives of industry, labour, NGO, CBO and government sectors. The White Paper on Environmental Policy was published in May 1998. The publication of the draft White Paper on Integrated Pollution and Waste Management is expected in June 1998. In a parallel Law Reform Process, the Department of Environmental Affairs and Tourism is currently drafting a Framework Act on Environmental Management. This will replace the current Environment Conservation Act and give practical effect to the requirements of the Constitution with regard to environmental management.

SA Chemical Industry

On the economic front, the chemical industry in South Africa contributes 5.3% to the Gross Domestic Product of the country. The volume of sales in this sector amount to approximately 23% of the manufacturing sector. With the democratisation of the country, a philosophy of national self-sufficiency and import replacement has altered to accommodate the newly acquired access to world markets. This not only provides an opportunity for the chemical industry to increase its export market (as envisaged by the Government's macro-economics policy) but it also presents a number of challenges to environmental management. Not least among these challenges is how best to contribute to the management of the scarce water resources of the country.

In response to these challenges - and recognising that a new approach to environmental, health and safety management is an essential component of a successful move towards global success in the 21st century - the South African chemical industry has adopted the international Responsible Care initiative.

Responsible care

The Responsible Care initiative was launched in South Africa in 1994. Initially, 15 companies committed themselves to the initiative. By 1997, 110 chemical plants or companies had signed up and six Management Practice Standards had been distributed: These Standards covered the following topics :

- Health and safety of persons
- Storage and distribution of chemicals
- Transportation of chemicals
- Waste management and pollution control
- Community Awareness and Emergency Response
- Product Stewardship

The Responsible Care Management Practice Standards were developed by specialised task teams made up from representatives of member companies with experience in the area covered by the specific code. Implementation of each Management Practice Standard involves a number of elements: the Standard itself (which defines what is expected of a company), criteria by which a company can evaluate progress and assistance with implementing results. This assistance might include things like seminars, printed materials and networking activities.

Implementation of the Responsible Care initiative in South Africa has been guided by experience in other countries. The further development of the Initiative is being undertaken in consultation with the Responsible Care World Leadership Group. This Group meets once a year as part of the International Council of Chemical Associations' promotion of networking amongst Responsible Care Countries.

In terms of the Responsible Care initiative, chemical companies are committed to continuously improve health, safety and environmental performance. Within the philosophical framework of Responsible Care, the chemical industry has initiated a number of projects. These projects give practical effect to the principles of the initiative and aim to meet the challenges of sustainable development, one of which is dealing with increasing water scarcity. The projects include:

- active participation in government policy initiatives
- collection of industry wide baseline environmental data
- evaluation of performance in implementation of the initiative
- formation of community interaction groups

Stakeholder participation

In South Africa, the integration of economic development and environmental management envisaged by the constitution has the potential to promote tension between economic development and environmental protection. For this potential tension to be managed effectively, stakeholder participation from all sectors will be necessary. This does not mean interference in the government's responsibility to govern. Rather, it is intended as a mechanism to promote a more balanced set of options to be presented for political decision-making. As a sustainable approach to environmental management affects every citizen, it is necessary to take cognisance of a broader civil society view than was the case with the traditional approach.

Stakeholder participation could achieve the following objectives:

- provide a broad range of public views
- promote a shared vision
- promote mutual understanding of problems
- obtain commitment to common goals
- promote optimum use of available information and experience

Participation mechanisms will depend on the level of government activity. For example, the mechanisms appropriate for the policy formulation process may not be the same as for policy implementation. For the former, mechanisms should facilitate the bringing together of a range of stakeholders for a specific project while for the latter, mechanisms would be required to create permanent stakeholder bodies to provide input - on an ongoing basis - to implementation of policy.

The Responsible Care initiative can provide an overall framework within which mechanisms to measure continuous improvement in performance are continuously reviewed. It is a response in recognition of the fact that future government policy initiatives will require much better industry data to facilitate government/industry interaction. It offers a mechanism to develop a series of indicators of performance which can enjoy widespread industry acceptance.

In developed countries, there is a growing trend towards allowing industry maximum flexibility in choosing how to respond to environmental goals. To some extent, this is reflected in the approaches of both the Department of Water Affairs and Forestry and the Department of Environmental Affairs and Tourism in South Africa. Now it is up to industry to take advantage of the opportunities offered by this approach. There is a need to develop cost- effective mechanisms to achieve environmental goals and to concentrate energy in designing and implementing strategies to continuously improve performance in this area. It would be a dissipation of energy to seek ways to avoid inspection and the attempted enforcement of standards which do not promote the achievement of environmental goals. The Responsible Care initiative provides an ideal vehicle for the chemical industry to respond to the challenge posed by new policy initiatives. Responsible Care has the potential to promote conservation of scarce resources while at the same time facilitating the growth of the chemical industry.

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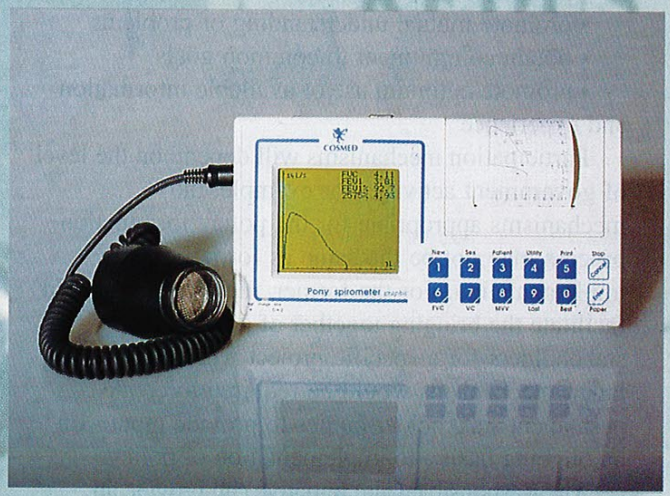

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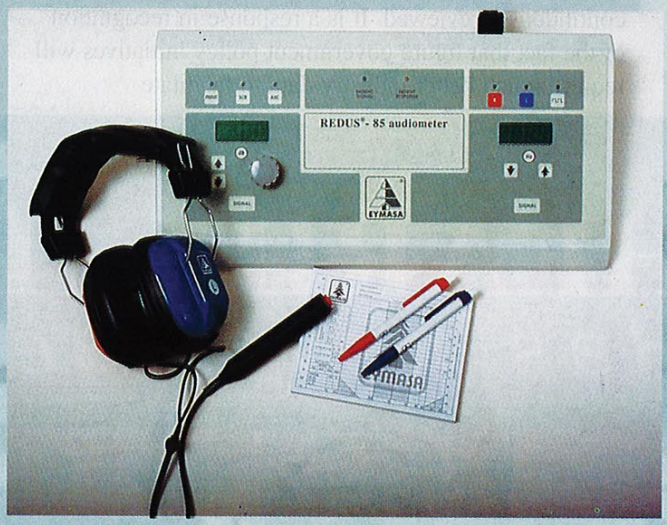

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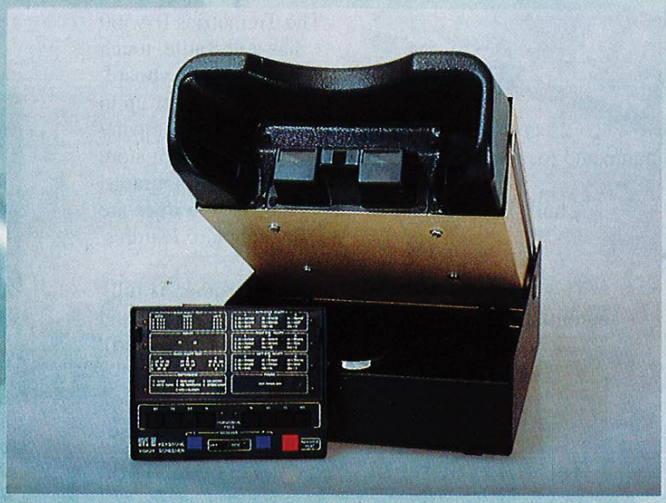

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Pesticides in Occupational Health: Implications of Policy Reform

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Abstract

Pesticides used widely in South Africa pose considerable health hazards to exposed workers. At present legislative and policy frameworks are fragmented, poorly enforced and unco-ordinated and they provide limited protection to exposed workers. Civil society groups - particularly those most vulnerable to the adverse effects of pesticides and whose experiences should therefore play an important role in shaping policy - are effectively excluded from policy decisions regarding pesticides. Numerous problems in the legislative framework relating to the registration of chemicals, surveillance, enforcement, training and monitoring are evident. Recommendations are advanced for policy changes to promote workplace health and safety. Given the current plethora of policy processes in South Africa, extensive opportunities exist to improve health and safety practice related to pesticides.

Introduction

Pesticides are widely used in agriculture and public health to control pests and insect vectors responsible for disease. Despite the role pesticides play in promoting crop protection and controlling vector-borne disease, increasingly it is being recognised that pesticides may pose substantial short- and long-term health risks.[1] For example, as scientific knowledge expands, an increasing number of pesticides are being recognised as possible causes of cancer, immune deficiencies, reproductive problems and neurological deficits.[2-5] Moreover, the adverse effects of many chemicals on the environment and their persistence in natural ecosystems have resulted in a global movement to re-think the value of reliance on chemical control of insect and weed pests.[1,6]

As a result, new methods of pest control have been developed. These aim to lessen dependence on potentially hazardous chemicals, either by replacing pesticides with non-chemical controls or by using alternatives in an integrated system that includes chemicals yet lessens the requirements for - as well as the toxicity - of pesticides.[7] This approach, called Integrated Pest Management (IPM), is well established in other parts of the world.

The benefits of approaches to pest control that avoid reliance on chemicals accrue not only to the environment and the consumer but also, if properly managed, to workers in agriculture and industry who are exposed to pesticides. Given the current plethora of new policies and draft legislation with regard to health and the environment in South Africa, this article will explore the possibilities for policy reform in South Africa with regard to pesticides and also, the possible implications for occupational health practitioners.

Pesticides - the situation in South Africa

Pesticides are widely used in South Africa and expenditure has increased rapidly over the past 10 years.[8] In fact, South Africa is currently the main agrochemical market in sub-Saharan Africa. When comparison is made with other developing countries, the number of different types of pesticides in use in South Africa is high,[9,10] a circumstance which increases the potential for hazardous interactions between different chemicals. IPM is relatively underdeveloped as a serious pesticide reduction strategy in agriculture. The exception to this is the

Table 1: A short-cut guide to the laws affecting pesticides in South Africa

Law	Department	Aim and content
Fertiliser, Farm Feeds and Agricultural Remedies Act No. 36 of 1947	Agriculture	* Establishes a Registrar's Office* Registration of Pesticides * Toxicity classification * Registers Pest Control Operators * Controls labeling, advertising, disposal, sale, importation and use of pesticides
Agricultural Products Standards Act No. 119 of 1990	Agriculture	* Maximum residues of pesticides permitted in products intended for export follows EU Harmonised Chemical List and Codex Alimentarius
Agricultural Pests Act No. 36 of 1983	Agriculture	* Control of import of foodstuffs that may contain pests * Allows the Department to spray to eradicate pests
Conservation of Agricultural Resources Act No. 43 of 1983	Agriculture	* Provides for the use of weed killers to combat weeds and invader plants at the discretion of the Department * Allows inspectors to enter premises to determine the extent of water pollution by farming activities
Health Act No. 63 of 1977 poisonings	Health	* All poisonings to be notified to the Department * Local authority health inspectors can control health hazards, follow up
Hazardous Substances Act No. 15 of 1973	Health	* Classification of Hazardous Substances * Measures for disposal and procedures to follow * Prohibits use of Class I hazard containers for any unintended use (water or food torage or cooking)
Medicine and Related Substances Act No. 101 of 1965	Health	* Registration of medicines containing pesticide agents for human use
Foodstuffs, Cosmetics and Disinfectants Act No. 54 of 1972	Health	* Maximum residues permitted in foods (fresh foods only) * Generally follows CODEX Alimentarius directives for residues
Occupational Health and Safety Act No. 85 of 1993	Labour	* General obligation on employers and employees for a safe workplace * Establishes health and safety representatives and committees
Hazardous Chemical Substance Regulations No 5549 of 1995	Labour	* Rights to information and training * Obligation to do workplace risk assessments * Monitoring of workplace environment and workers health * Hierarchy of controls to prevent chemical exposures * Rights to protective clothing and equipment
Compensation for Occupational Injury and Diseases Act 1993	Labour (Compensation Commissioner)	* Covers compensation for work-related poisoning by pesticides
Water Act No. 54 of 1956	Water Affairs and Forestry	* Control of discharges into water sources * Licensing of waste disposal sites * Follow the International Maritime Dangerous Goods Code (IMDG 1993) for contro of pesticide shipping and dumping at sea, and for safe use of pesticides on ships
Environmental Conservation Act No 73 of 1989, under review	Environmental Affairs and Tourism	* General environmental provisions (under review) * Control of litter and waste * Waste Management * Air Pollution control * Provisional responsibility for Prior Informed Consent (PIC)
Customs and Excise 1964	Trade and Industry	* Import and export of goods including pesticides
National Road Traffic Act No. 93 of 1996	Transport	* Transport of Dangerous Goods

** Highlighted sections represent the major laws dealing with pesticides*

export sector. For instance, in the fruit industry, market preferences have imposed greater restrictions on the use of pesticides and therefore greater care in the use of pesticides.[9]

The legislation controlling pesticides in South Africa is extraordinarily fragmented [8,9] with at least 14 Acts addressing different aspects of pesticides across 7 government departments (Table I). As a result, there is huge inefficiency with duplication and gaps in the control of pesticide hazards. For example, there are presently no requirements that a person purchasing a pesticide for use must have any

training or certification to ensure that they do not cause damage to human or environmental health. In addition, other than a working relationship between industry and government with regard to registration decisions,[8] public participation in processes and policy decisions relating to pesticides has been minimal.

The primary piece of pesticide legislation lies with the Department of Agriculture (Act 36/1947).[11] This establishes a Registrar's office responsible for registering all pesticides used in agriculture as well as licensing all commercial pest control operators in South Africa. To assist the registrar, a non-statutory advisory committee (known as the Inter-departmental Advisory Committee for the Safeguarding of Man against Poisonous Substances or INDAC) composed of participants from the different government sectoral departments, including Labour, provides input to the Registrar's decisions.

The Department of Labour's statutory role in controlling pesticide hazards is expressed through the general provisions of OHSA[12] and its regulations concerning the provision of material safety data sheets,[13] measures to control exposure to hazardous substances[14] and the safety of major hazardous installations.[15] In particular, the Hazardous Chemical Substance Regulations[14] place a substantial onus on the employer to provide safety training, information, risk assessment, environmental and biological monitoring as well as personal protective equipment to workers potentially exposed to hazardous pesticides. These regulations have brought principles of modern industrial practice[16] into the farm environment - a setting typically immune from regulation in the past in South Africa.

Health and exposure surveillance in SA

Surveillance for health problems associated with pesticides is primarily effected through the Health Act[17] which mandates the reporting of pesticide poisoning as a notifiable condition to the Department of Health. In addition, OHSA requires all medical practitioners to report work-related pesticide health problems to the Chief Inspector for Occupational Health and Safety.[12] Based on the system of routine passive notifications, about 100 to 200 cases of pesticide poisoning are reported every year to the Department of Health.[18,19] However, a number of studies have shown that the true rates are anything between 5 and 20 times as high.[19-23] It is particularly farm workers and their families who suffer the burden of ill-effects of pesticides. Typical cases involve workers poisoned while applying pesticides[20,21,23] or workers exposed indirectly from drift.[23] Children of farm workers may be poisoned by accidentally swallowing pesticides in an unlabelled container or through using hazardous pesticides inappropriately for domestic pest control.[20] Re-use of the empty pesticide containers for water or cooking, while illegal, continues to be a major cause of serious poisonings.[19] Amongst rural farm workers, misconceptions relating to how containers may be cleaned safely (for example, with washing powder or dung) paradoxically increase the risk of exposure.[8] Recent research suggests that women are under-represented in the routine data collected on pesticide poisoning and that, in contrast to the male predominance found in routine data reported to the Department of Health, it is really women who suffer more poisonings from pesticides.[23]

Moreover, surveillance for chronic health problems arising from gradual and long-term exposure to pesticides is extremely difficult because of the difficulties in outcome definition, the lack of exposure characterisation, the long lag phase before symptoms arise and the resultant complexities of establishing causation for multi-factorial conditions. However, there is some evidence for the fact that long-term pesticide exposures may be responsible for chronic health impacts amongst South African farm workers. Bouwman *et al* found abnormal liver function changes amongst DDT applicators in the malaria control programme[24] and Dalive *et al* found subclinical lung function changes amongst sprayers with long-term exposure to the herbicide paraquat.[25] This indicates the need for policies to reduce exposures, particularly long-term situations faced by labourers and farm workers.

Problem Areas

Registration

The process by which pesticides are registered has recently come under review.[8] Some of the problems identified have included a lack of transparency with regard to what data is publicly accessible and the lack of public participation in registration decisions and reviews. Unlike other countries,[26,27] South Africa's registration process treats all data submitted as part of the registration process as proprietary. A key challenge for INDAC is to find a way to structure meaningful participation of civil society groups (including organised labour) in the registration process in a manner analogous to the

principles of worker participation contained in the health and safety representatives introduced in the OHSA.

Moreover, South Africa's registration system continues to permit the use of a small number of pesticides - like paraquat, aldicarb and parathion - that are either banned or severely restricted in other countries.[27,28] Based on experiences of poisonings brought to the Committee's attention as well as on regulatory changes in other countries, particularly in the European Union,[8] some measure of review is implemented through INDAC.

From the perspective of workplace health and safety, one of the key requirements for biological monitoring would be information on methods of appropriate biological monitoring available for every new chemical registered. However, at present, the registration process does not require companies to submit such data. Effectively, this means that for most pesticides - other than a handful of cholinesterase-inhibiting compounds (organophosphates and carbamates) - no biological monitoring is practically available in South Africa. Given that the relevant legislation is due to be rewritten, an opportunity exists for the Department of Labour to ensure that pesticide registration requirements are altered to solicit data that will enable practical compliance with the HCS Regulations for biological monitoring.

Surveillance

There is no current system for effective monitoring of potential exposures and little reliable data on quantities of pesticides manufactured or used in the country.[8,10] Even where statute exists to monitor potential exposures, these are not applied. For example, although the Department of Agriculture has legislation which requires the agrochemical industry to report turnover of their pesticide products to the Registrar of Pesticides, this practice was discontinued in the mid-1970's because of staff shortages to process the data.[8] Similarly, the Department of Health mandates the recording of the sale of all Class I hazardous substances on a register in terms of the Hazardous Substances Act[29] but no use appears to be made of such a statutorily mandated reporting system.

Critical opportunities therefore exist for improving surveillance. The establishment of a type of toxic inventory is one of the proposals contained in the Environmental Management White Paper.[30] At the very least, attempts to improve passive surveillance could benefit from the sharing of data between departments so as to maximise the capture of adverse health events, particularly those involving the Departments of Labour and Health.

Enforcement

Prosecution for transgressing the laws that do pertain to pesticides has been the exception rather than the norm. At present, the key legislative measures for regulating pesticide safety at present lie with the Department of Agriculture.[11] In the registration procedures for toxicological assessment of health and environmental effects of new pesticides, data for these assessments is not based on indigenous conditions.[8] It appears that the major pieces of pesticide legislation are geared primarily to serving the interests of the agricultural sector rather than being primarily concerned with promoting health. Moreover, the understaffing of the inspectorates of each Department has severely compromised the ability to enforce legislation, particularly in the field of Occupational Health and Safety. For example, in 1998, there are only 12 health and safety Department of Labour inspectors in the Western Cape to cover about 6 000 farms as well as all other industrial sectors. As a result, few labour inspections are conducted on farms where health problems from pesticides may be substantial. Moreover, the practice of self-regulation (as encouraged by new regulatory approaches) has little chance of success in an agricultural setting where the culture and historical experience is one of near independence from State regulation.

Training and prevention

While the HCS regulations establish training as a key element in the hierarchy of controls, there is little evidence that such training is available to workers outside of the industrial sector. Surveys of farm workers prior to the introduction of the regulations[20,21] found scanty evidence of specific training on pesticides and more recent evidence[31] suggests that little has changed in that regard. For example, investigations of farm-based pesticide poisoning notifications in 1994/5 in the Worcester region[23] found that no specific training in safe handling of pesticides had been provided on farms prior to the events.

Training, therefore, is a critical priority for prevention of pesticide poisoning. Such training needs not only to comply with the provisions of the HCS regulations but also to address the role of alternative forms of pest control so as to challenge the "pesticide culture"[8] which assumes that chemical

Table 2: Methods for the control of exposure to pesticides

Strategy	Example
Substitution	• Use another pesticide that is less toxic • Use non-chemical means of pest control
Change of application method	• Use of granules rather than spray or volatile mixtures • Use of a closed system to apply chemicals • Use of irrigation systems to apply systemic pesticides • Spray systems that ensure less drift (e.g. electrostatic spraying)
Ventilation	• Place exhaust ventilation in rooms where pesticides are stored or mixed
Enclosure	• Enclose the worker in a cab on tractor • Enclose the spray operation (greenhouse) away from workers
Administrative controls	• Fewer workers in contact with pesticides • Shorter periods of contact
Work procedures	• Handle carefully • No smoking or eating in proximity • Washing and changing of clothes • Avoid spray in windy environment • Keep mixing and storage areas tidy • Maintain equipment properly • Monitor workers for early effects of pesticides
Person Protective Equipment (PPE)	• All PPE provision to be accompanied by training • All PPE must be properly maintained • Proper storage of PPE • Separate washing of PPE • Masks must be functional – fitted, maintained, filters replaced • Gloves must prevent skin absorption • PPE should be comfortable to use

control is the only viable method of supporting pest control in agriculture. Moreover, training typically focuses on the use of personal protective equipment (PPE) as the first (and usually only) form of prevention. Training on the use of PPE needs to be implemented as part of a hierarchy of controls which would include engineering and administrative controls as well as substitution. (See Table 2 above).

Monitoring

Biological monitoring of workers exposed to hazardous chemicals is one of the main requirements imposed by the HCS regulations relating to the expertise of occupational health practitioners. In the case of exposure to cholinesterase-inhibiting pesticides, procedures and objectives for such monitoring have been well described in this journal previously.[32] However, in the case of pesticides where the biological marker is less well characterised, the situation is more diffficult. While a manual for monitoring such pesticide exposures is available,[33] the practical availability of such analyses in South Africa is severely constrained by a variety of factors. These include the lack of skills and equipment for such analyses, a lack of familiarity with the methods and the high costs of such analyses.[8] Regulatory changes in both the Departments of Labour and Agriculture could assist in providing easier and cheaper access to necessary test analyses through mandating additional registration requirements providing methods of biological monitoring and supporting laboratory capacity to effect such analyses.

Similar constraints face attempts to measures pesticides in the environment. Here complex methodologies requiring expensive equipment and high skills mean that few laboratories are able to do such analyses with any degree of validity or reliability or at costs that are practically accessible for purposes of workplace hygiene monitoring. This means that if the Department of Labour is serious about the practical implementation of its regulations to promote health and safety, then it will have to develop methods to ensure that environmental and biological monitoring of pesticides is made practically available to workplaces handling such chemicals.

Policy opportunities – SA legislation in flux

South African occupational and environmental law is experiencing an enormous set of changes at present. In the labour sector, the passing of the HCS regulations has posed substantial challenges to industry, challenges which are even more formidable for the previously sparsely-regulated agricultural sector. Moreover, the Department of Environmental Affairs and Tourism White Paper on Environmental Management[30] attempts to set out the framework for future environmental management strategies within which the kernel of an overarching institutional structure to manage pesticides and other environmental hazards may be developed. This may give rise

to an "EPA-type" structure in which to deal with both the environmental and occupational hazards of pesticides. At the minimum, these policy changes offer the opportunity of establishing greater co-ordination of existing agencies in ways that avoid the duplication, overlaps and gaps of present legislation. It is clear that initiatives to reduce worker exposure to pesticides like IPM or to control the use of pesticides more generally need to be embraced as a national policy.

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The effectiveness of ventilation controls in reducing symptoms of formaldehyde exposure among medical students in a human anatomy laboratory

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Abstract

• Objectives

To evaluate the effectiveness of an environmental intervention (in the form of a new ventilation system) in reducing symptoms of formaldehyde exposure among medical students in a human anatomy laboratory.

• Methods

Self-administered questionnaires (relating to the symptomatology of formaldehyde exposure) were obtained from anatomy students and their controls over a two year period.

• Results

Ambient levels of formaldehyde vapour exceeded the American (ACGIH) Threshold Limit Value (TLV). An intervention in the form of ventilation controls was implemented and proved to be effective in reducing formaldehyde vapour levels. Exposed students overall demonstrated a non-significant reduction in irritational symptoms following intervention, although there were some symptoms showing a significant reduction.

• Conclusions

There is evidence that reduction of the formaldehyde vapour levels in this study has improved some symptoms, but whether the reduction in these levels is sufficient to prevent long term health effects such as neoplasms and sensitization remains to be established.

Introduction

Human cadavers used for dissection are traditionally embalmed with solutions containing formaldehyde, which is responsible for the pungent and irritating smell experienced in anatomy laboratories.

Formaldehyde vapour is detectable at very low levels (below 1 ppm) and is responsible for a variety of symptoms such as nose and throat irritation, bronchitis, pulmonary oedema, chemical pneumonitis, irritation, coughing, chest pain, dyspnoea, tissue damage and dermatitis. There is also weak evidence that it may be a sensitiser. Formaldehyde is listed as an animal positive, human indefinite carcinogen.[1,2,3] Formaldehyde presents potential environmental health hazards to anatomy staff and students. Occupational exposure to formaldehyde may be direct (through physical contact) or indirect (by inhalation of air borne) vapours. Exposure levels are determined by a host of interdependent factors. These include the volume and concentration of embalming solutions, the region of dissection (body cavities hold higher concentrations

than limbs), the quality of the ventilation system, room temperature, the number and activity level of students working in the environment, the number and location of cadavers relative to room size and ventilation avenues as well as the use of protective clothing like gloves or respirators.[4] The issue of formaldehyde exposures in anatomy laboratories has become increasingly controversial and academic institutions are obliged to evaluate and control formaldehyde levels in their facilities. Conflict may exist between the maintenance of a cadaver's biological hygiene and reducing formaldehyde concentrations to acceptable levels. Ethical and legal considerations do however warrant the control of these vapours.[5]

Aim

The aim of this study was to determine the levels of formaldehyde vapour students were subjected to and to evaluate control options available in order to make financially acceptable recommendations to control excessive exposures within the existing facility.

Methods

Study design

A cross sectional descriptive study was conducted during the period July 1993 to June 1994. Following completion of the environmental control recommendations, the study was changed to an intervention (follow up) study which extended the study period until October 1995.

Environmental sampling

This was conducted at various stages of dissection during the period July 1993 to June 1994. It was designed to collect and analyse data related to air flow patterns and velocities as well as formaldehyde vapour concentrations in the laboratory environment. Upon implementation of our environmental control recommendations made to the safety committee of the University, the laboratory environment was re-evaluated in order to measure the effectiveness of the new ventilation system that had been installed in the Anatomy Laboratory (intervention). At the time of sampling, two rows of dissecting tables were arranged across the length of the rectangular anatomy laboratory with 17 on one side and 18 on the other (35 in total). The tables were about 1 metre apart with a passage of approximately 2 metres wide down the centre of the hall. The anatomy laboratory is 9.30 M X 30.8 M and 2.85 M in height. All windows are closed and ventilation is mechanical.

Ventilation

Smoke tubes were used to visualise air flow patterns in the laboratory in order to subjectively evaluate the effectiveness of contaminant capture by the exhaust air system. The efficiency of the ventilation system was measured before and after the installation of the new ventilation system with the aid of a calibrated metrosonics hot wire anemometer as well as a wet and dry bulb thermometer with psychometric chart and smoke tubes.

Formaldehyde vapour sampling

Formaldehyde samples were collected by passive diffusion with the aid of 3M monitors. The monitors were used as personal samplers and were clipped onto the collars of individuals as close to their breathing zone as possible. Formaldehyde was measured at various stages of the dissection process during 1993, 1994 and 1995. These data were related to activities taking place in the laboratory at the time of the survey as well as the ventilation system in use at the time. In each case, the time period of formaldehyde sampling in was for the full duration of a laboratory session (3 hours). The 35 cadavers are considered to be the principle source of formaldehyde contamination of the air. Bodies were laid out in a near perfect grid, providing for a homogenous distribution of the contaminant in the sampling environment. Sampling positions were selected randomly from the "grid" in order to evenly distribute the samples throughout the anatomy laboratory. All chemical samples were taken and analysed in accordance with 3M analytical method 4D (1985), this being the prescribed method for 3M monitor # 3720 or # 3721. The analysis was undertaken by an independent SABS approved laboratory in Johannesburg. A control monitor or "field blank" was subjected to the same environmental conditions as the other formaldehyde monitors by placing an unopened monitor in the laboratory environment. The blanks were sent together with the batches of samples to the laboratory where they were also analysed, as specified by the manufacturer. Humidity, atmospheric pressure and phenol levels were taken into consideration during the analysis of the samples but the use of correction factors was not necessary as the acceptable parameters were not exceeded.

After implementation of the environmental controls in the form of a new ventilation system, the sampling regimen of 16 July 1993 was repeated on 29 September 1995. The reasoning behind this was that cadavers were at a similar stage of dissection to

what they had been during the 16 July 1993 sampling period. By taking formaldehyde samples and ventilation measurements in the same positions as in 1993 (prior to intervention), one could hypothesise that a comparison of these formaldehyde vapour results would be a measure of the effectiveness of the ventilation intervention. Ventilation was not measured during 1994 as installation of the new ventilation system had not been completed.

Study populations

All second year anatomy students of 1994 and 1995 present in class on the days of sampling were included in the study. The following two study groups were distinguished. **Group 1** consisted of all the second year anatomy students present in class at the time of sampling. These students were exposed to the laboratory environment during 1994 (n = 107) and were followed through to their third year of study in 1995 (n = 55) where they were no longer exposed. **Group 2** consisted of all the 1994 first year students present in class on the day of sampling. These students were not exposed to formaldehyde during 1994 (n = 82) and the group was followed through to 1995 where they became the exposed group (n = 97).

Data relating to symptoms associated with formaldehyde vapour exposure were obtained from the respective study populations during July 1994 (Group 1) and September 1994 (Group 2) with the aid of self administered, questionnaires.[6] Both study groups were requested to repeat the questionnaire survey during September 1995 (Group 2) and October 1995 (Group 1) in order to measure the effectiveness of the intervention as well as the effect of both the initiation and cessation of exposure. The data obtained from the health questionnaires was analysed by the South African Medical Research Council, using various statistical tests. The following potential confounders were controlled for in the statistical analysis: age, gender, race and whether the person lived in an industrial area. Other potential confounders that were not controlled for included exposure to phenol and stress due to curriculum pressures.

Results

Formaldehyde vapour levels

Results of mean formaldehyde concentrations measured prior to and after the installation of the new ventilation system were analysed. Figure 1 shows that there was a significant (post intervention) decline in formaldehyde levels and all measurements were well within internationally acceptable limits. Statistical analysis demonstrated a significant decrease of formaldehyde levels at the 1% level of significance.

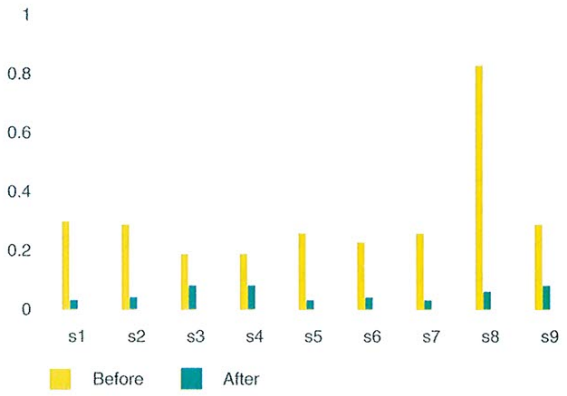

Figure 1: Formaldehyde vapour levels before and after intervention

Symptomatology from questionnaires

The overall response rate of all three groups and controls was very good and varied between 83.35% to 100%. Table I represents a summary of the symptoms experienced by students. There was a strong association between symptoms and formaldehyde exposure in both groups. Group 1 (while exposed to formaldehyde) suffered significantly from depression, lacrimation, dry skin, disturbed sleep, eye irritation and menstrual irregularities when compared to themselves after their removal from exposure for a period of 1 year.

Group 2 were exposed to a much lower mean formaldehyde level (0,05 ppm) following the intervention. This group suffered from lacrimation, eye irritation, headache, throat irritation and thirst upon awakening when exposed to the anatomy environment for the first time.

The effectiveness of the intervention (ventilation system) in terms of relieving the symptoms of formaldehyde vapour exposure was evaluated by comparing symptom frequency in the two exposed student groups (1994 and 1995). Statistical analysis showed no significant difference. However, there was a reduction in symptom frequency of eye irritation, lacrimation, blocked and runny nose as well as menstrual disorders.

One pack of cigarette smoke contains approximately 0.82 mg of formaldehyde.[7] It is possible that symptoms reported may have been influenced by the increasing smoking prevalence

among students: from first year (6.1 %) to second year (12.4 %) and from second to third year (16.36 %). This trend was statistically significant and is a cause for concern.

Discussion

In an analysis of the questionnaire data on symptom prevalence it was found that exposed students suffered from irritational symptoms normally associated with exposure to formaldehyde vapour. The most significant symptoms measured in all groups were eye irritation and lacrimation, depression, dry skin, menstrual irregularity, headache, throat irritation and thirst upon awakening.

In the USA, in a study of 103 medical students, it was found (as in this study) that itchy eyes, burning eyes, watery eyes and burning nose were significant symptoms ($p<0.001$) of formaldehyde exposure.[8] In addition, it was reported that students suffered significantly from Rhinorrhea ($p<0.001$). Depression was identified as a possible symptom of formaldehyde exposure[2] and was also found to be a significant symptom among students in this study.

In a study of Anatomy Laboratories, also performed in the USA, it was found that 88% of students suffered from eye irritation, 74% from nose irritation and 29% from throat irritation[1] as compared to the results of this study, where eye irritation was reported by 52.6% (Group 2) and 62.3% (Group 1), blocked nose was reported by 60% (Group 2) and 61% (Group 1) and throat irritation was reported by 50% (Group 2) and 58.5% (Group 1). The large difference in the frequency of symptoms reported in this study as opposed to that done by Akbar Khanzadeh *et al* (1994)[1] can be attributed to the fact that formaldehyde vapour levels measured in their study were significantly higher than those measured in this study. (94% of their samples taken over a period of six weeks exceeded 0.3 ppm formaldehyde.)

While headache among students in this study was found to be a significant problem, it is hypothesised that the aetiology of the headaches was not related to formaldehyde exposure but to some other cause. The reason for formulating this hypothesis is that other studies of formaldehyde exposure in industry[7,8] and of medical students[9,10] did not identify headache as a symptom of formaldehyde exposure. Also, symptoms of headache did not improve significantly upon removal from exposure. It is unlikely that the high frequency of headache symptoms is associated with building air quality. It is more likely to be related to other factors such as curriculum pressures and stress.

The irritational symptoms experienced by exposed students improved significantly upon their removal from the laboratory environment and the symptoms of non-exposed students increased significantly upon the initiation of their exposure. There was a slight (statistically non-significant) improvement in symptom frequency among the student group exposed to the improved laboratory environment (post intervention) when compared to the group exposed to the laboratory environment prior to intervention. Symptoms of irritation therefore continue to occur at levels well below the TLV.[10]

Conclusions

Due to the high levels of formaldehyde vapour measured during 1993 and 1994 specific environmental control recommendations were made to the University. The University authorities responded promptly and implemented the recommended ventilation controls. These were re-evaluated in 1995 and were deemed to be effective in terms of reducing formaldehyde vapour concentrations.[11] In addition, the frequency of formaldehyde associated symptoms was reduced although some symptoms still persisted.

Recommendations for formaldehyde when it is used as a preservative

- Regular environmental monitoring must continue in order to ensure that engineering controls are operating efficiently and to ensure compliance with legal limits.
- Regular maintenance and cleaning of the ventilation system is essential in order to ensure adequate performance of the system.
- In spite of the increase in operational costs it is important that the ventilation system should remain operational 24 hours a day, including week-ends, in order to prevent a build up of formaldehyde vapour, resulting in high exposures upon "return to work" in the morning.
- Laboratory practices such as the storage of brain specimens in open containers should be discontinued in order to prevent the high formaldehyde vapour levels experienced during brain dissection procedures.
- The exposed students need to be informed of the hazards present in the anatomy laboratory and their own duties and responsibilities regarding the reduction of formaldehyde vapours must be made clear.

Table I: Symptoms experienced by all student groups

		Post-intervention	Pre-intervention	
Symptom	**Pre Exposure First Years Group 2 1994 (n=82)**	**Exposed Second Years Group 2 1995 (n=97)**	**Exposed Second Years Group 1 1994 (n = 107)**	**Post Exposure Third years Group 1 1995 (n=55)**
HEADACHE	55.6 %	80.2 %	74.5 %	64.2 %
EYE IRRIT.	22.8 %	**52.6 %**	**62.3 %**	44.2 %
LACRIMATION	19.8 %	**62.5 %**	**64.5 %**	34.0 %
BLOCK NOSE	48.8 %	60.0 %	61.0 %	60.0 %
RUNNY NOSE	46.3 %	51.0 %	62.6 %	52.9 %
THROAT IR	30.5 %	50.0 %	58.5 %	47.1 %
DRY THROAT	17.1 %	26.0 %	33.0 %	19.6 %
COUGH	41.5 %	42.7 %	45.8 %	30.0 %
PHLEGM	15.9 %	22.9 %	24.3 %	20.0 %
TIGHT CHEST	12.2 %	18.8 %	26.2 %	14.0 %
LOSS SMELL	4.90 %	11.6 %	17.9 %	14.0 %
DRY SKIN	29.3 %	**35.4 %**	**50.0 %**	26.0 %
DIST. SLEEP	34.1 %	**35.4 %**	**50.5 %**	32.0 %
DEPRESS.	36.6 %	**50.0 %**	**57.5 %**	22.0 %
THIRST/AWAKE	12.2 %	26.0 %	27.6 %	16.0 %
MENST. DIS	19.6 %	**21.6 %**	**26.3 %**	6.10 %
TIME OFF	6.30 %	27.6 %	16.7 %	15.2 %

Symptoms highlighted in bold show a significant reduction in symptoms ($p < 0.05$) pre- and post- intervention.

Additional recommendations for further research and investigation

• The curriculum requirements of medical students need to be established in order to investigate the feasibility of introducing alternative methods of teaching anatomy - such as computer aided methods (virtual reality).

• Alternative methods of embalming or preserving cadavers should be investigated.

• The long term formaldehyde exposure effects upon an exposed human population must be established and a biological method of screening for formaldehyde exposure effects in exposed persons should be developed.

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Combining our Resources for the Benefit of the International Mining Workforce

Health for all at work*

Dr M. Mikheev
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Occupational Health SA 1998; Vol 4, No 4: 42-45

Abstract

Despite the fact that most hazardous conditions of work can be avoided through effective health and safety programmes, "silent" epidemics of work-related occupational diseases and injuries, involving the most tragic human cost, still occur worldwide. This circumstance has led to the establishment of the Global Strategy for Occupational Health for All by the WHO.

Introduction

The constitutional objective of the World Health Organization is the "attainment by all peoples of the highest possible level of health". Based on this general objective, WHO's goal of "Health for All" was adopted by the World Health Assembly in 1977. Since then, "Health for All" has become a goal for all countries and it has made an important contribution to the achievement of better health throughout the world.

The global labour force is 2.6 billion people which constitutes about half of the world population, with 80% of the working people living in the developing world. Consequently, Occupational Health has been a component of the WHO Health for All strategy and has contributed to the improvement in health of the working populations. In spite of these efforts, a growing breach between developed and developing countries in the field of health - and occupational health in particular - has been observed over the past years. Therefore, in order to promote health at work, the WHO Global Strategy for Occupational Health for All has been established.[1] This strategy concurs with the Universal Declaration of Human Rights which recognises the right of all people to just and favourable conditions of work.[2]

** Presented at PACOH '97, Durban, 31 August - 4 September 1997*

Potential risk factors at work

The workplace is often a hazardous environment. Occupational health and safety hazards are common in many economic sectors and affect large numbers of workers. Globally, about 100,000 chemicals, some 50 physical factors, about 200 biological agents, some 20 adverse ergonomic conditions as well as a variety of psychosocial factors contribute to the risk of occupational injuries, diseases and stress reaction. Pneumoconiosis, occupational cancer, occupational asthma and allergic dermatosis are frequent occupational diseases. Many tropical diseases such as malaria and other communicable diseases can often be work-related. In addition, the steadily growing HIV/AIDS epidemic has become the preoccupation of occupational health professionals and all social partners like employers, trade unions, and governments.

Improvements and challenges

During the past decade, improvements in basic health indicators like an increase in life expectancy, a decrease in infant mortality and better access to basic health services have been observed.[3] Striving with diseases, WHO continues to give high priority to the control, elimination and eradication of preventable diseases, among which should be occupational diseases and injuries. However, from a historical perspective, it is evident that lessons learned in the occupational health area have not been fully appreciated and acknowledged by society. This is seen clearly in the fact that the majority of the working population is still not covered by appropriate occupational health services and millions of workers throughout the world do not benefit from available knowledge and experience in occupational health. The estimated annual global figure of occupational illnesses (which includes the whole range of occupational diseases as defined by the WHO) involves 160 million cases each year.

The annual estimated number of occupational illnesses in countries of the African Region (AFRO) is approximately 14 million. According to the last estimates from the ILO, also based on the present world labour force, workers suffer 250 million accidental injuries with 330,000 fatalities. About 10% of these illnesses lead to long term or permanent reduction of the ability to work - and they may even lead to disability.

Although some progress has been made on a number of health issues, the health situation in Africa gives cause for concern. Health indicators vary from country to country on the continent and among the population groups within the same country. For example, life expectancy at birth (1990-1995) varies from 51 for Sub-Saharan Africa to 74 in countries of more developed regions and infant mortality rates fluctuate from 101 to 10 respectively. The main causes of illness and death in countries of the African region are communicable diseases (either singly or in combination) against a background of protein-energy and micro-nutrients malnutrition. The impact on health of work-related injuries and occupational diseases also plays an important role. However, statistics on these illnesses are very limited and remain hidden in the general health statistics.

Illness and occupational hazards

What kind of illness is related to occupational hazards? The Priority List of Ten Major Work-Related Illnesses is based on three main criteria: frequency of occurrence, severity in individual cases and the potential for prevention. The List has been defined as follows:

- respiratory diseases
- musculoskeletal disorders
- cancer
- injuries, including fatal cases
- cardiovascular diseases
- reproductive disorders
- neurotoxic disorders
- noise-induced hearing loss
- dermatological disorders
- psychological disorders

With all the changes in working life that have been observed towards the end of this century, the role of occupational risk factors in the development of so-called multi-factorial health disorders is increasing. These work-related diseases of public health importance together with the combined occupational and non-occupational risk factors (as defined by a WHO Expert Committee) are given below:

- Behavioural and psychosomatic disorders

Risk factors: overload, underload, shift work, role in the organization, interpersonal relationships, life style factors (smoking, alcohol abuse, etc)

- Hypertension

Risk factors: body weight, a high salt intake, dietary factors, high alcohol consumption, physical inactivity, psychosocial factors including stress

- Ischaemic heart disease

Risk factors: hypertension, smoking, diet, psychosocial factors, stress

- Chronic nonspecific respiratory diseases

Risk factors: pollution, climate, smoking, genetic factors, an atopic predisposition, bronchial reactivity, childhood respiratory diseases

The priority concerns of occupational health in Africa are of great importance to the development of political and financial commitment. Action is needed to ensure a clear understanding of the basic concept of Occupational Health for All. To this basic understanding, social and health dimensions can be added and then integrated into the primary health care services of community-based health programmes. These programmes can be related to preventive and control measures for occupational hazards, occupational diseases and injuries.

In many African countries, trained staff and financial resources are lacking. Also, there is often an absence of the necessary infrastructure for occupational health services. One of the vital challenges faced by countries on this continent is to find appropriate ways to develop occupational health and safety measures.

The economic burden

Quite apart from unacceptable human suffering and the social costs resulting from occupational illnesses, there is another factor to consider: the huge burden on the economy. Poor occupational health leads to occupational and other work-related illnesses. These illnesses result in the reduced working capacity of workers and can cause tremendous economic loss, loss equivalent to 4% of the world's gross national product.

In this context, let's look at the experience of some developed countries :

- in the European Union, in 1992, the direct cost paid out in compensation for approximately 10 million occupational diseases and accidents was about 27 billion Ecus[4]
- in Germany, in 1989, the economic loss due to 1,775,132 notifiable accidents cost about US$29 billion
- in Australia, where 650,000 workers (one in 12) was affected, the total direct loss due to occupational injuries and diseases was around $20 billion
- in the USA, in 1993, compensation costs to workers totalled US$57 billion compared with US$6 billion in 1972, with the annual growth rate being 12.5%

We need to remember that costs like these reflect only a small portion of the social and economic consequences of occupational injuries and illnesses.[5]

These economic losses could be reduced significantly by improving productivity through better working conditions. According to a World Bank estimate, two thirds of occupationally determined loss of disability-adjusted life years (DALYs) could be prevented by occupational health and safety programmes. Yet, in spite of the tremendous health and economic burden, the impact of occupational hazards on the total health of the population has not yet been fully assessed and appreciated. It may be a difficult task but it is one that is achievable. Further research in this area is essential.

The WHO Global strategy

In the early 90s, the WHO Programme on Occupational Health set up a new agenda - *Work, Development and Health*. This led to the development of the WHO Global Strategy for Occupational Health for All. This strategy was adopted by the 49th World Health Assembly in May 1996 (WHA49.12). It urges Member States to devise national programmes on occupational health for all. The programmes can be based on the global strategy, with special attention to full occupational health services for the working population (including migrant workers, workers in small industries and in the informal sector) and other occupational groups at high risk and with special needs, including child workers.[6] The Assembly requested the Director-General of WHO to promote the implementation of the Global Strategy for Occupational Health and Occupational Safety for All within the framework of the Ninth General Programme of Work (1996-2001).

The Global Strategy is an integrated, comprehensive approach which encourages countries to develop appropriate health services at work, with full coverage of the working population, thus promoting equitable access to adequate occupational health services. It is in concurrence with the new WHO policy for *equity, solidarity and health* on which the renewal of the Health for All strategy for the 21st century is based.

The Global Strategy for Occupational Health was considered an appropriate mechanism through which to promote multi-disciplinary and multi-sectoral collaboration and co-operation. The WHO Member States of Africa actively endorsed the Strategy for Occupational Health for All with its ten very practical objectives.

Objectives

The objectives are:

- strengthening of international and national policies for health at work and development of policy tools
- development of a healthy work environment
- development of healthy work practices and promotion of health at work
- strengthening of occupational health services
- establishment of appropriate support services for occupational health
- development of occupational health standards based on scientific risk assessment
- development of human resources for occupational health
- establishment of registration and data systems, development of information services for experts, transmission of data, and raising of public awareness through public information
- strengthening of research
- development of collaboration in occupational health and with other activities and services

Occupational Health and Safety for All can be attained if the joint efforts of social partners work in a synergistic manner and if the combined aims of government through legislation, administration, research and practice with training and education - with the commitment of a nation as a whole - are achieved. Occupational Health for All is an important strategy not only to ensure the health of workers but also to contribute positively to productivity, the quality of products, the total health of population work motivation and job satisfaction and ultimately to the overall quality of life of individuals and societies. It is also a cost-effective strategy - only a healthy labour force can be productive.

The WHO Global Strategy for Occupational Health for All, with its ten objectives, provides the following:

- an organization-wide strategy and objectives in occupational health
- a unifying framework in technical co-operation and action programmes at the international and national level
- a tool to create awareness and political commitment at all levels
- a mechanism to promote international collaboration and inter-sectoral co-operation and co-ordination.

The concept of Occupational Health and Global Strategy has been developed through the Global Network of the WHO Collaborating Centres which consist of 58 institutions in 35 countries.[7]

Conclusion

The WHO Global Strategy for Occupational Health for All is a new step forward. The strategy is an integrated and practical response designed to meet the challenges and emerging problems of occupational health in the years to come. The main objective of the Global Strategy is to offer the entire working population, including the so-called informal sector, adequate occupational health services using the primary health care approach, specific health care services and other nationally available channels of health care and safety services.

Political action for the implementation of the Global Strategy is a crucial element at the national and international level. At the global level, it has been endorsed by the World Health Assembly. On a national level, it requires a strong commitment by a Government and all social partners.

The key to the successful implementation of the Global Strategy is the involvement of all partners at all levels (like the ILO and other UN agencies) at global and regional levels, non-governmental organizations, (like the International Commission of Occupational Health and its scientific committees), the International Occupational Hygiene Association, the International Ergonomic Association, the International Social Security Association, national professional associations, trade unions, employers' associations and others. The continuous development of occupational health and safety as well as collaboration and co-ordination at all levels are the keys to successfully implementing the *WHO Global Strategy for Occupational Health for All* in Member States.

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South African biological monitoring report

Part II - Heavy metal exposures during 1998

A SCBM:SASOM PROJECT

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Introduction

This report is one in a series of articles commissioned by the SA Society of Occupational Medicine (SASOM) Scientific Committee for Biological Monitoring (SCBM).[1,2] The intention is to foster awareness of the use of biological monitoring in the management of workers exposed to hazardous chemicals. Readers are referred to the previous article[2] which discussed in some detail the impact of the Regulations for Hazardous Chemical Substances[3] and the need for an understanding of the significance and interpretation of laboratory results generated during biological monitoring.

Biological monitoring

Five South African laboratories which perform a substantial proportion of the biological monitoring analyses for heavy metals supplied details of their recent results, although certain laboratories do not analyse the full range of metals. The period covered was the first six months of 1998. Each patient record was stripped of all but its numerical value before submission and results were then pooled as detailed in Table 1.

Discussion of results

These results should not be used to estimate the exact number of tests carried out annually. Rather, they give a representative picture of the range of tests available and the values currently found in local workers subjected to biological monitoring. Furthermore, this data should not be extrapolated to apply to the entire workforce. The reason for this is that any spread of results is determined by a variety of monitoring strategies and these will vary from workplace to workplace.

In general terms, however, tests for at least twelve metals are currently available. From the data in Table 1 it is obvious that only a small proportion of the workers tested had levels in excess of recommended permissible concentrations.

Care should be taken, however, with the figures for mercury in blood and urine. Some of the individuals tested may have had excessive illicit exposure to elemental mercury. Non-occupational exposures should always be considered as possibly contributing to raised metal levels.

Of note are the values for blood lead. In our 1995 survey, the number of specimens exceeding 80, 70 and 60 mg/dl were 1.5%, 5.1% and 12.4% respectively.[1] As gender data is not available, the cut-off values used in this calculation are for male workers. The current data at 0.8%, 2.0% and 5.4% respectively reflects a decrease in the exposure of lead workers. Hopefully, this indicates a significant trend in the industry.

Acknowledgement

On behalf of SCBM:SASOM, the authors would like to thank all those who co-operated in supplying the data without which this study would have been impossible.

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Table 1: Biological monitoring of exposure to metals

Test	Unit	Specimens	Range	BEI*	% above BEI
IN URINE					
Aluminium	µg/l	18	10-80	(240)[TMPC]	0%
Arsenic	µg/g creat µg/l	53 290	0.1-56 <4-656	50 (80)	2% 7%
Cadmium	µg/g creat µg/l	55 4	0.5-9.6 0.0-4.5	10 (16)	0% 0%
Chromium	µg/g creat µg/l	71 456	0.1-20.4 0.1->200	30 (48)	0% 15%
Cobalt	µg/g creat	22	1.7-14.1	30[TMPC]	0%
Copper	µmoles/l	31	0.04-6.9	-	-
Lead (organic)	µg/g creat µg/l	35 302	3-125 <1->200	(90)[LR] 150[LR]	1% 1%
Manganese	µg/l	5	0.5-5	-	-
Mercury	µg/g creat µg/l	112 471	0.0-50 0-496	35 (56)	1% 2%
Molybdenum	µg/l	8	14-133	-	-
Nickel	µg/g creat	95	1.2-31.8	30[TMPC]	1%
Zinc	µmoles/l	4	1.1-26.5	-	-
IN BLOOD					
Cadmium	µg/l	60	0.3-5.1	10	0%
Chromium	µg/l	2	0-0.2	-	-
Lead (inorganic)	µg/dl	4152	0-174	80[LR] [70] [60]	0.8% 1.9% 4.9%
Manganese	µg/	64	8.1-67.7	-	-
Mercury	µg/l	241	0-21	15	0.3%
IN SERUM					
Aluminium	µg/dl	2	2-2.6	-	-
Copper	µmoles/l µg/dl	184 381	7.7-64 57-289	- -	- -
Zinc	µmoles/l µg/dl	130 323	8.6-62 34-336	- -	- -

* The recommended permissible concentrations reflected in this column are drawn primarily from the Biological Exposure Indices (BEI) as published in Table 3 of the Regulations for Hazardous Chemical Substances[3] and the Lead Regulations (LR).[4] The recommended figures for Al, Co and Ni are Tentative Maximum Permissible Concentrations (TMPC) published by the WHO.[5] Figures in parentheses ( ) are derived from published values using a factor of 1.6x to convert between units expressed per gram creatinine and per litre.

Mortality statistics - potential role for SASOM

To the editor

For some time I have been concerned about our inability to adequately monitor the epidemiology of Occupational Health issues in this country. It is well known that the mortality statistics are the crudest but often the only statistics available.

In terms of Occupational Health problems, mortality statistics are not freely available in South Africa.

I am writing this letter to propose that SASOM, in its official capacity, enter into correspondence with the appropriate authorities regarding death certificates. The objective would be for each company to be notified when an employee has passed away and to be given access to the cause of death. How this system would operate would be for negotiation. I suggest that the easiest way would be for companies to submit to the relevant authority the Identity Numbers of all workers who have retired on annual basis and for this to be updated with the names of those who had passed away in the previous year, as well as the cause of death.

This approach would allow each company to at least gain access to mortality statistics. Occupational Medicine practitioners could track these deaths and their causes. This is a crude but relevant assessment and I think the mechanism to allow this should be developed in South Africa.

Thank you for publishing this proposal. It could be debated in our journal. I look forward to your reply.

Greville Wood
Suite 110
Hiway Medical Centre
Westville Hospital
Durban
4001

Editor's comment: There is an item about new death certificate forms on page 6 of this issue of ***Occupational Health****. These certificates have been designed to improve death registration and to streamline information for statistical purposes. However, a crucial issue still remains in South Africa, whether old or new forms are used. This is that many death certificates are inaccurate and completed badly.*

Occupational Health Management at Richards Bay Minerals

Richards Bay Minerals (RBM) is a mining and minerals processing operation situated along the KwaZulu Natal North coast of South Africa. The company employs 2 200 people and supplies about 25% of the world demand for titania slag, zircon, rutile and ductile iron.

Keith Rumble, RBM managing director, attributes the success of the organisation's environmental, health and safety (EHS) management systems to the fact that local and internationally recognised systems have been combined and integrated in the workplace. As he says, "The ISO 9002 QA (Quality Assurance) system, the ISO 14001 EMS (Environmental Management System) and NOSA Occupational Health and Safety Systems have been successfully grafted into a single safety, health, environmental and quality (SHEQ) management program.

Within the SHEQ management system, the imperative of the program has become the responsibility of all RBM employees - they are a vital component of the EHS team. These are the people who - on a daily basis - identify and manage environmental, health and safety risks related to their work. It is through their input and co-operation that RBM's EHS programmes have achieved such a high level of performance. This has resulted in the company retaining it's coveted NOSA 5 star rating and receiving a DIFR of 0.69 per 200 000 man hours during 1997. This compares extremely well with the rate of 3.5 for mining in the USA and 2.0 for mining in Western Australia during the same year."

Keith Rumble stresses that in addition to the EHS procedures in the workplace, occupational health services are provided by a team of professionally qualified occupational health nurses and hygienists. "Occupational medical services are an important component of their work, with the emphasis on preventing occupational disease through monitoring the health of all employees. Nursing staff attend to people injured in accidents and provide primary health care to ill employees. First aid and general health care training are also provided while a Medical

Keith Rumble, RBM Managing Director

Emergency Response Team - comprising volunteers training in advanced life support techniques - is able to assist the nursing staff during emergencies. An Occupational Hygiene group is responsible for identifying, monitoring and evaluating occupational health hazards arising from possible chemical substances, physical agents and biological agents in the workplace. They initiate corrective actions, advise on personal protective equipment and perform training in risk assessment."

Keith added, "Multi-disciplinary groups have also been created. They are responsible for developing control methods and engineering abatement solutions. Participation in these groups is encouraged as they play an enormously important role."

Emergency contraception now in South Africa

The new emergency contraceptive pill is now available. The pills contain hormones that act to prevent pregnancy if taken up to three days (72 hours) after unprotected sex has taken place (sex without the use of a family planning method or failure of other methods, like a condom).

The contraceptive pack consists of four brown tablets. The first two tablets can be taken up to three days after unprotected sex has taken place. The second two tablets must be taken 12 hours after taking the first two tablets.

Most women can safely use the emergency contraceptive pill. Contra-indications include:

- pregnancy
- unprotected sex earlier in the same menstrual cycle or if a period is late
- severe pain in the legs, stomach or chest
- changes in eyesight or breathing, yellowing of the skin or eyes, numbness or any trouble speaking

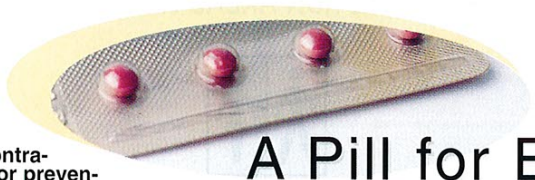
The emergency contraceptive pill is available at doctors and pharmacies and will soon be available at family planning clinics.

For more information, contact Sakkie Nakene (Product Manager) on telephone (011) 313 9700 or fax (011) 313 9793 or e-mail schering@icon.co.za.

Netcare 911

Three private companies have stepped into the breach left by Johannesburg's ailing emergency services and are providing emergency medical services to all who need it in Greater Johannesburg - whether they can afford to pay or not. Patients covered by medical aid or insurance will be billed for all services. Netcare 911 is the first private emergency response of its kind in South Africa .There are plans to extend Netcare to Durban within a few months.

Premier Mathole Motshekga, guest speaker at the launch of Netcare 911, said the new service would "bolster current structures" and provide life-saving emergency medical care to people in Johannesburg, Alexandra, Randburg, Roodepoort, Sandton and Soweto.



E-Gen-C is an emergency contraceptive for prevention of pregnancy within 72 hours of unprotected sexual intercourse or the recognisable failure of mechanical methods.

e-gen-c
Reg No 31/21.8.2/0204

A Pill for Emergency Contraception

...when contraception becomes an emergency, it can be worthwhile to try E-Gen-C.

The E-Gen-C contraceptive pack consists of four brown tablets, each containing 0,25 mg Levonor-gestrel and 0,05 mg Ethinylestradiol, E-Gen-C acts as a contraceptive by preventing implantation of a fertilized ovum in the endometrium.

A condition for good effect is that E-Gen-C should be taken according to the instructions. The earlier E-Gen-C is taken after unprotected intercourse, the better the effect. The first two tablets are taken as soon as possible after unprotected sex, up to 72 hours at the latest, and the other two are taken 12 hours later. All further unprotected sex must be avoided until the next menstrual period.

E-Gen-C is intended for emergencies only and is completely unsuitable for regular contraception. Its reliability is not as high as that of the normal contraceptive pill. It should preferably be used once during the menstrual cycle. The side effects most commonly reported are nausea, vomiting and tension of the breasts.

The simultaneous use of an antiemetic helps avoiding nausea. Should vomiting occur within 2 hours of E-Gen-C, it is advisable to repeat the dose.

The next menstrual period might be later or sooner than usual. Under all circumstances the patient should re-visit the health practitioner 3 weeks after the treatment, regardless of whether she has had her period or not.

The use of E-Gen-C is contra-indicated in cases of existing pregnancy or in thromboembolic processes in arteries and veins and conditions which predispose to such diseases.

Most women can safely take E-Gen-C. However they must not take it if:

- they know or suspect that they are pregnant,
- more than 72 hours have passed since unprotected sex took place.

The benefit/risk ratio must be carefully considered by the health practitioner in the following diseases:

- Severe disturbances of liver function
- Jaundice or persistent itching during pregnancy
- Dubin-Johnson/Rotor syndrome
- Thrombophlebitis and sickle-cell anaemia.

E-Gen-C will be available at family planning clinics, doctors and pharmacies.

For more information,
contact Sakkie Nakene (Product Manager) at Schering:
Tel: (011) 313 9700 or Fax: (011) 313 9793
e-mail schering@icon.ca.za

The service has a helicopter, nine emergency vehicles and 16 highly qualified paramedics for use in the Greater Johannesburg area. The service is backed by Vodacom - which is providing R5 million in terms of sponsorship to Netcare Holdings, South Africa's largest private hospital and clinic group - and by Europ Assistance, an international medical rescue company.

"Irrespective of who you are, where you live, what you earn, Netcare 911 will be there for you," says Dr Richard Friedman, Netcare's chief operating officer.

Based on the American 911 emergency system, Netcare 911 can be contacted on 082 911.

Use of APS in industry

Action potential simulation (APS) is a new development that has overcome obstacles encountered with other electrotherapy devices in the management of pain. This device works by simulating the body's natural nerve impulses (called action potentials). APS then results in the release of specific neurohormones in the body such as melatonin and leucine enkephalin.

As a result, after using APS, six important outcomes can result: relief of pain, control of the emotional aspects of pain, breakdown of inflammation, limitation of tissue damage, increase in mobility and increase in local blood circulation. This means that APS is indicated for acute and chronic pain, inflammation, joint stiffness, tissue damage due to inflammation and poor local blood circulation.

APS therapy can also have a marked impact on treating employee musculoskeletal problems due to manual work, repetitive movements and work position - ailments that are the second most common presentation of all disorders in industry. The use of APS can return employees back to full productive work quickly.

Several scientific evaluations have been performed on APS therapy. These include results of treatment as well as measurement of neurohormones like melatonin, B-endorphins, leucine, enkephalin etc. These studies are available on request.

For further information contact Techpulse on telephone (012) 349-1744.

Why UHC Health Care Services changed its name and what Capital Alliance Health offers

UCH Health Care Services was developed to deliver health care services for the emerging market in South Africa. The services offered by UCH focus on two levels of care:

- Occupational Health care
- Delivery of managed health care.

The company was to be a joint venture between Capital Alliance Life Limited and Clinic Holdings. Negotiations started during the first quarter of 1997 but due to the take over of Clinic Holdings by Net Care, a decision regarding UHC had to be delayed. Net Care took a strategic decision not to involve themselves in the delivery of primary and tertiary care through UHC. Rather, the focus would be on occupational health care only.

The company was formed in November 1997, headed by Dr Richard Malkin who had initially started UHC Health Care Services. It made sense to link Occupational Health care into the products as Capital Alliance Life's market was group business within the major industrial areas of the country. Here a demand existed through the Occupational Health and Safety Act for the delivery of Occupational Health care at facilities where Capital Alliance Health provided employee benefits.

The Occupational Health Care Division is well established - even though less than a year old. At present, Occupational Health Care is delivered to over 4 000 people in fourteen different facilities in the Witwatersrand area and areas are opening in Cape Town and Durban during the month of June 1998.

Capital Alliance Health has just won a tender to deliver Occupational Health Care screening for Spoornet on a national

basis. This unique project, covering approximately 40 000 lives, will be undertaken through five mobile screening units with self- contained facilities. The equipment housed in these units will include:

- Visual screening operators
- Lung function teats
- Audiology screening
- Pathology screening chest x-rays
- General examinations

Capital Alliance Health also delivers passenger assistance at Durban and Cape Town airports as well as down the line delivery of acute and emergency medical services at these airports. The organisation also offers risk analyses of an environment.

Capital Alliance Health is in the process of registering a Medical Aid Scheme to deliver a highly affordable, comprehensive quality health product. The first area to open will be Selby Park Hospital where an outpatient and in-patient service will be available. The tentative launch date is August.

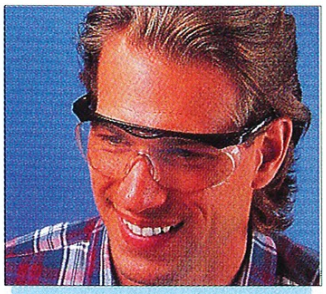
For further information, contact Sr Sonja de Villiers on telephone (011) 330 1245.

Uvex Safety's new spectacles

Initially launched in Australia in October last year, Uvex Safety's new safety spectacle, the Skyper, has already sold over 200 000 units there in the first four months. Uvex Safety South Africa launched the new Skyper range during the Noshtex '98 Show. 200 free pairs of safety spectacles were given away during the Show.

The new Skyper was designed in response to the growing demand world-wide for safety spectacles that offer a sporty and fashionable style and yet, at the same time, offer a level of safety superior to anything achieved previously. The Skyper is now setting new standards in the area of comfort, fashion and safety.

The Skyper accomplishes its tough design brief through its super lightweight stylish and sporty optically correct one-piece curved lens which meets and exceeds the maximum international impact standards. Its ergonomically designed tough nylon frame features a new patented inclination system to ensure a perfect fit to a



variety of faces plus the new full length adjustable permaflex side arms provide a firm fit without pressure behind the ears. It also has a simple lens replacement system. In addition to the above features, all Skyper lenses - even the clear - feature 99.93% absorption of UV rays up to the newly defined dangerous 400 NM level. Initially, the Skyper will be available with clear lens or Uvex's unique SCT 400 rosel lenses that offer the highest degree of sun protection plus they can be absorbed with a choice of either Uvex's Optidur 2002 anti-scratch coating or the new Supravision coating which combines a durable anti-scratch coating with an anti-fog coating on the inside of the lens.

Unlike the current flood of cheap no- name brand fashion-styled safety spectacles, the Uvex Skyper is manufactured in Germany to ISO 9001 and meets the stringent EN 166 safety standards offering end-users and safety practitioners total peace of mind.

For further information, telephone (031) 21-5153.

Are your IOD claims a chore?

An innovative new programme from Data Dynamics Holdings is currently being promoted on the South African Health Care Market. All companies employing people in a manufacturing environment know what a time-consuming task it is to process IOD claims to the compensation commissioner (or the Workmen's Compensation Office as we knew it). Disease and death claims follow a similar process.

But help is at hand. Computers are wonderful machines that make a light task of repetitive and time-consuming work. Claim Manager is a software package that turns a computer into a wonderful assistant in the claims offices of any company.

Claim Manager simplifies the claims process by leading the user along a step-by-step path with every claim. Necessary forms will be automatically completed and printed as they are needed. Data redundancy is kept to a minimum to reduce the amount of information entered. The powerful data base features ensure that you never outgrow Claim Manager. And the statistics module allows you to extract trends and problem areas within your company.

The programme makes the claims process simple by prompting the user on a daily step-by-step process through every claim. You will be reminded of uncompleted steps and the programme will make recommendations on what to do next. On-screen help will guide you and there is further context-sensitive help a key press away. The necessary forms will automatically be completed and printed by the programme when they need to be sent to the commissioner of compensation. Staff changes will never again affect the process as the programme will prompt the unfamiliar user in what to do next. In addition, an extensive statistics module will allow management to extract graphical reports highlighting employee groups that constitute an abnormally high portion of the claim volume. This allows effective prevention policies to be implemented timeously.

Additional features inlude a complete employee and contractor database, handling of multiple divisions within organisations, data back-up and restore, pre-set statistical queries and too many more to mention here.

Contact Gavin Phoenix on (031) 262-8240 for further information.

4H Gloves and accessories for best chemical protection

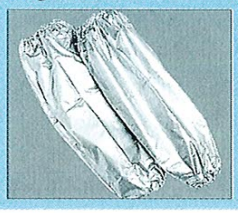
Before you handle a hazardous chemical be sure you are wearing the proper gloves. Chemicals can be very hazardous to your health. Dry and irritated skin rashes, eczema and/or allergic reactions are all the result of skin exposure. When entering the bloodstream, the chemical can cause damage to the central nervous system. Your liver and kidneys may be damaged as well. It is a well known fact that some chemicals can cause cancer and sensitisation.

Permutation tests have demonstrated that the 4H glove has superior chemical resistance. It has been permeation tested against more than 280 chemicals and chemical mixtures and has proven to be the best glove for chemical protection.

In certain applications, such as some types of lab work, 4H gloves can be worn by themselves. But in applications where cuts, punctures or abrasions are a real possibility, the 4H glove makes an excellent permutation resistant liner under a protective glove.

Other 4H products

The 4H sleeve can be worn together with the 4H glove and often the Apron as well. They provide added protection for the upper arm and shoulder. Elastic bands at the shoulder and wrist ensure a strong fit.



The 4H Bootie can be worn as a liner under regular boots or as a cover over shoes or boots.

The 4H Apron protects against splashes and spills. It is large enough to cover the front of the body.

For further information, contact Delta Health & Safety on (011) 455-2196.

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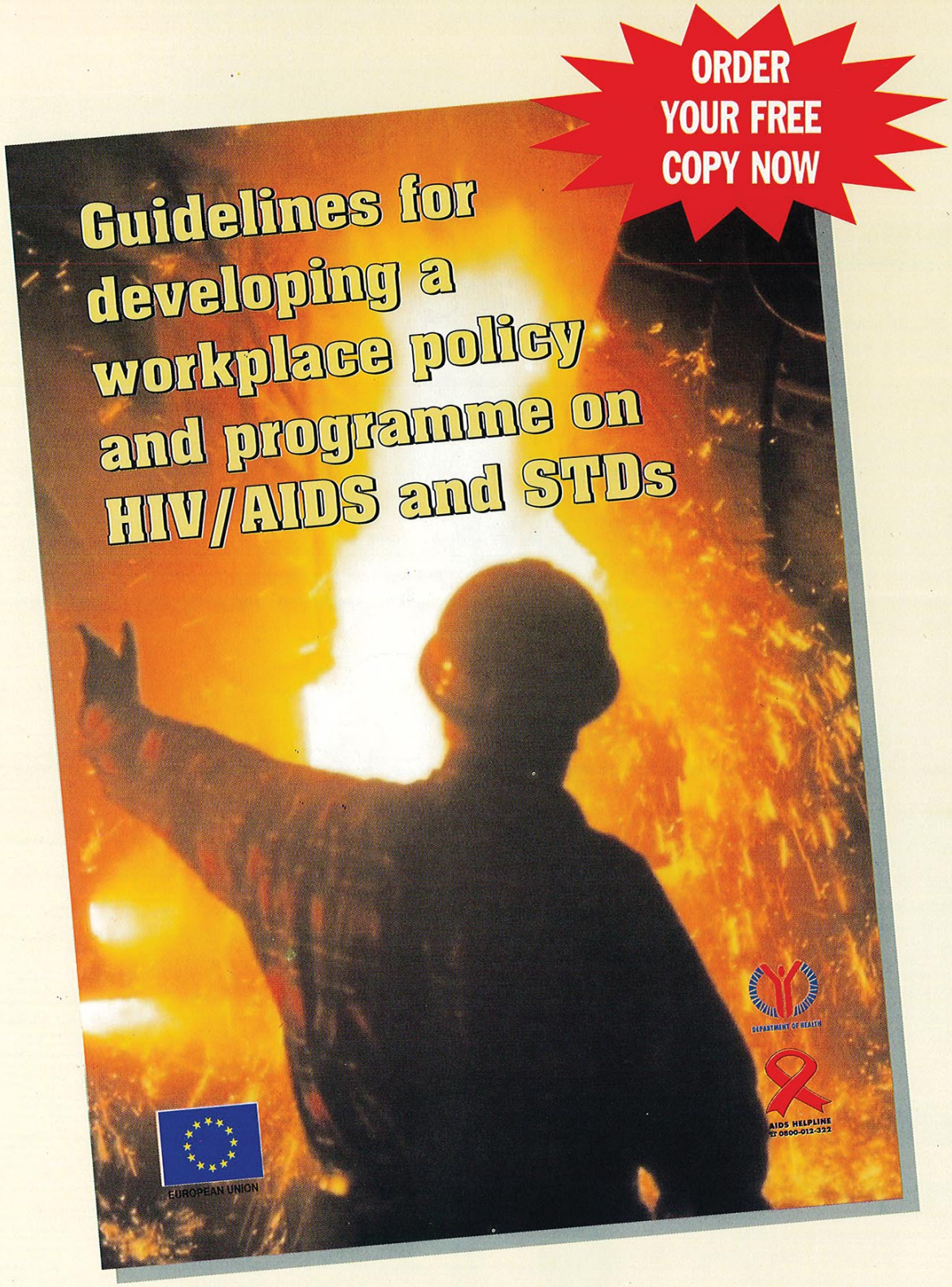

This manual provides a clearly written basic framework for responding to HIV/AIDS issues in the workplace. It is suitable for managers, unionists, owners, employees, health workers and others working in the HIV/AIDS field.

To receive a free copy of the manual contact Ria Schoeman at:
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