



# *Occupational* **HEALTH**

SOUTHERN AFRICA

*Official Journal of the SA Society of Occupational Health Nurses (SASOHN)  
and the SA Society of Occupational Medicine (SASOM)*

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**Vol 2 No 6 November/December 1996**



Primary Health Care at the work place has always been considered an integral function of Occupational Health Practice in Southern Africa.

It would appear that there are moves currently afoot to inhibit the dispensing of medication for Primary Health Care at Industrial Clinics, and this is of major concern to all Occupational Health workers. The reasons appear to be unclear at present, and considerable discussion and debate with the two respective Societies (SASOM and SASOHN), have led to representatives of the Societies taking up issues with the Department of Health officials to identify and clarify specific reasons behind this initiative.

Furthermore, more active intervention is sought by the two Societies, including possible demonstrating as well as media exposure to the public. The focus on the moves undertaken is perceived as a serious threat against the dispensing of essential drugs at these industrial clinics.

It has been shown quite conclusively before that Industry makes significant contributions to Primary Health Care at the work place, and as such is not only efficient, but of major value to patient and employer as well as all Occupational Health workers. These clinics are usually well run, very efficiently controlled and strictly adherent to cost effectiveness, as well as supporting appropriate treatment programmes where indicated.

Aids continues to be focused on in this Journal, and Slawski has identified the spread of this global epidemic. Bedhesi and Webster also identify the impact on Southern Africa and the working model created in Namibia offers a stimulating challenge to other workers with their education programme. This is both inclusive of Health Care Workers, Employer Representatives, and prominent Community Support. It makes interesting reading.

Stanton and Swakamisa have outlined the exciting challenge of the technical co-operation programme developed from 1996 to 2003 in conjunction with the World Health Organisation, and this has led to a major impact on the initiatives undertaken for workshops and other developmental programmes as outlined in their article.

Diabetes in industry is a major disease profile in Southern Africa, and a particularly disturbing feature of the disease is that it is growing in numbers, while at the same time, the management and diagnostic programmes in place are supposedly improving. It is interesting to note the encouragement given by the authors that diabetes can be well managed and that Industry should play a significant role through its representative health care workers to control the epidemic at the work place, as well as maintaining employment.

Finally, it is again our pleasure in identifying the developments that have taken place with the structured improvements of our Journal as the second year has completed its programme within the stated objectives. We wish all our readers a happy festive season, and look forward to the new year with hope that the value of the journal to those Occupational Health workers who have shown such interest will be substantiated with the reminder that without its readers, the Journal itself would not exist!

Chris van Selm  
Editor




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### Are you fit to drive?

"The carnage on South African roads has reached frightening proportions." This is the opening remark of Dr Bernard Mandell in his foreword to the medical aspects of fitness to drive, (*in a guide for medical practitioners*, published by MASA with the South African Association for Accident and Traffic Medicine and the National Road Safety Council). The Pretoria News (12 June 1996) highlighted 27899 traffic accidents in 1995, that is one every 20 minutes. Recently the issue was highlighted again in a Financial Mail survey (10 May 1996) "Fleet Management - is he fit to drive?"

Aviators, radiation workers, pest control operators and workers from various other occupations undergo rigorous medical examinations on

entry and at periodical intervals thereafter.

Why drivers of vehicles?

- Carnage on the roads
- Health and well-being of drivers
- Cost of vehicles and products
- Training costs

Who then should be covered?

- Drivers of all vehicles
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- Goods vehicles
- Hazardous goods vehicles

Who is to do these tests?

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Do we need medical requirements or is this "Heading for a witch hunt? where unnecessarily harsh rules have been implemented to bring matters under so-called control." (Transport Management June 1995).

What constitutes a healthy and fit driver? - Currently legislation allows for medical examinations for

passenger (Public) and hazardous goods (Hazchem) permits. There are however no legal specific requirements or standards other than the completion of a standard medical form and an eye test.

The South African Society of Occupational Medicine (SASOM) guideline, large associations and company in-house guidelines do exist, but vary greatly from visual acuity testing (orthorator to Snellen) to drug tests (cannabis to alcohol), to syphilis and AIDS testing. It is with great anticipation of change that SASOM has noted the National Road Traffic Bill and SABS requirements.

A working group within the Department of Transport to investigate medical requirements for fitness has been established - for further comments or information, **contact the Department of Transport, SASOM or MASA.**

### Short course in Occupational Health 1997

The Department of Community Health, Faculty of Medicine, University of Natal will be offering a short course in Occupational Health in 1997 to Occupational Health and Hygiene Practitioners, as well as Medical Practitioners who wish to update their knowledge in this field.

A modular approach will be adopted with lectures supplemented by visits to industries. In addition an indication of where candidates can source theoretical information will be provided.

The aim of the course is to equip the attendees with the basic knowledge, skills and competencies to enable them to advise their employers on how to meet the legal requirements contained in the Occupational Health and Safety Act of 1993.

If you are interested in attending one or a number of the modules, or in receiving additional information, please write to:

Dr F Robinson, Department of Community Health, Faculty of Medicine, Natal Medical School, PO Box 17039, Congella 4013 or fax (031) 260-4211

Queries may be addressed to Ms Patricia Lock on tel (031) 260-4507

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## SORDSA - Surveillance of Occupational Respiratory Diseases in South Africa

This is an invitation to all Occupational Health personnel to participate in the nation-wide surveillance of work-related and occupational respiratory diseases in South Africa (SORDSA) started in October 1996.

SORDSA is a three year collaborative project of the National Centre for Occupational Health, the South African Society of Occupational Medicine (SASOM), the South African Pulmonology Society (SAPS) and the Department of Labour, and is managed by a Board of Directors representing these organisations.

The main goals of SORDSA are:

1. To monitor the extent and distribution of work-related respiratory disease;
2. To identify hazardous industries, occupations and agents for the purpose of prevention;
3. To create awareness among medical doctors of work-related respiratory diseases;
4. To develop a model surveillance scheme for occupational diseases;
5. To link SORDSA with intervention programmes.

After a year of preparation SORDSA is well set to begin in October 1996, with funding from WHO and a dedicated person in Denise Bradfield, who will be responsible for regular contact with the reporting doctors and for the upkeep of the registry.

Members of SASOM will play a major role in the SORDSA reporting structure as SORDSA is based mainly on voluntary reporting by pulmonologists and medical doctors, who are members of SASOM or SAPS. The reporting structure also includes provincial SORDSA representatives who will be able to give advice and report cases referred to them by other medical

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practitioners. Within the next few weeks all members of SASOM and SAPS will receive a SORDSA reporting booklet which includes monthly reporting forms with self addressed envelopes and guidelines for reporting. For SORDSA to succeed we need your participation. We are thus inviting you to become part of the SORDSA team. We hope that SORDSA will become an interactive process which will generate information and lead to an exchange of new ideas.

Surveillance of work-related respiratory diseases has been shown to be successful in disease prevention in the United Kingdom, United States and other European countries. You can help us to make it succeed in South Africa where work-related lung diseases, especially chronic obstructive lung disease, occupational asthma and pneumoconiosis have substantial public health importance because of our large population of underground miners, agricultural workers and an increasing population of industrial workers.

For further information contact SORDSA personnel: **Dr David Rees, Dr Eva Hnizdo, Naeem Sader, Denise Bradfield.**  
**SORDSA Tel/Fax (011) 725-5978**  
**e-mail: sordsa@nsoh.pwv.gov**  
**NCOH: Tel: (011) 720-5734**

## Dispensing medicines and permit system

Following the threat by the Department of Health to disallow the dispensing of medicines by occupational health nurses for Primary Health Care (PHC), both SASOM and SASOHN have formulated a comprehensive plan of action which was put into operation in October. Members of the societies should contact their local chapter or branches for details.

It appears the Department is opposing the delivery of PHC on the factory floor as it feels employers who commit financial resources to PHC (in direct competition to the state service for PHC) might make the introduction of a compulsory National Health Insurance System (NHIS) more difficult and that companies may request a rebate on such contributions to the NHIS if they provide in-house PHC services.

Members will be kept updated on progress in this area.

**Dr Mike Baker**

### 25th International Congress on Occupational Health

Venue: Stockholm, Sweden  
Date: 15 - 20 September 1996

Thirty-seven South Africans attended the 25th International Congress in Sweden. The congress which was of an exceptionally high standard covered a wide scope of relevant occupational health topics. Areas of focus included health and shift workers, musculo-skeletal disorders and working conditions and cardiovascular disease. With regards to the last, interest has increased and research is being initiated. Occupational Health Practitioners in the European countries have witnessed an increase in cardiovascular disease amongst semi-skilled workers and are now studying the impact of the work environment on this condition.

Highlights of the congress included the inaugural ceremony and addresses by keynote speakers. His

majesty, King Carl XVI Gustaf of Sweden, patron of the congress and Occupational Health in Sweden, opened the congress.

Each day commenced with keynote speakers addressing the audience. The speakers who were all renowned experts in their specialist fields delivered knowledgeable and challenging presentations.

The presentations that I will briefly touch on are those from Andres Johansson, Director General of the Swedish National Institute of Working Life and Joan Acker from the United States. Andres Johansson's paper "Occupational Health, a global perspective" addressed the issue of the free trade and free trade agreements resulting in a trend towards globalisation of the economy. Main concerns expressed were the possible exploitation of cheap labour and the



*Penny Mead at the SASOM and SASOHN poster presentation*

general impact of free trade agreements on Occupational Health. Johansson emphasized the importance of ensuring uniformity of standards between the parent company in an industrialised country and an operating company in a developing country. He further stated that free trade could be beneficial as it could act as a catalyst by assisting

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# WHO/South Africa technical cooperation programme 1996 - 2003

## Occupational Health and Safety

(with particular emphasis on workers' health)

*Principal Authors: Dr David W Stanton & Dr Kenneth Swakamisa, Department of Health.  
Responsible WHO Officers: Dr Welile Shasha & Dr Vincent Agu, WHO Country Office  
Funding 1996 -1999: \$1,676,400*

### Terms of Reference:

The history and record of South Africa in the area of occupational health has been severely criticised in the 1976 Erasmus Report of "The Commission of Enquiry on Occupational Health", two decades later in "The Reconstruction and Development Programme" (RDP) of the African National Congress (ANC), and in the findings of the 1995 Leon Report of "The Commission of Inquiry into Safety and Health in the Mining Industry". The RDP states that South Africa's apartheid policies, combined with the under-regulated activities of local and transnational corporations, placed workers' lives at severe risk as a result of inadequate monitoring of dangerous practices and substances. The RDP goes on to state that: the democratic government must work towards safe and healthy living and working environments; occupational health services must be greatly expanded; and legislation

to protect the health of workers must be enforced. Laws must conform to International Labour Organization standards and other international standards, and unions, as well as state agencies, must be empowered to monitor and enforce safety and health standards. The ANC National Health Plan and the Government support the need to plan, implement and greatly expand occupational health services.

A Cabinet decision has been taken to restructure occupational health and safety competencies, and to establish a National Occupational Health and Safety Council.

The WHO recognises the substantial occupational health and safety problems in South Africa, and has responded with technical and financial support to strengthen the capacity of the Government to develop and implement occupational health programmes at all levels.

Part 1 of a series of articles on the WHO/SA Technical Cooperation Programme. In the next issue Part 2 will cover the occupational

health and safety training activities. Further issues will focus on occupational health activities in each of the nine provinces.



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## Activities 1996-1997

### Workshops

- Workshops to develop national policy and strategy for occupational health and safety (Department of Labour 1997).
- Nine 2-day workshops (one for each province) to identify needs and coordinate skills in the delivery of occupational health services in each province (Provinces 1996-97).
- Three-day national workshop to facilitate cooperation between occupational health and safety inspectors and trade unions (Department of Mineral and Energy Affairs and Trade Unions 1997).
- Two-day workshop to develop a national plan for occupational health research (NCOH 25 -26 July, 1996).
- Two-day workshop to develop a national plan for occupational hygiene education and training (Occupational Hygiene Association of Southern Africa [OHASA] and The Institute of Occupational Hygienists of Southern Africa [IOHSA] 1996).
- Two-day workshop to develop a national plan for occupational medicine education and training (SASOM and SASOHN 1997).
- Two-day national workshop on occupational health and primary health care at the workplace (SASOM and SASOHN 1996).
- Two 3-day national workshops with trade unions to assess the needs for HIV/AIDS work-related programmes and to develop related interventions (1997).

### Programmes to:

- Develop and implement an education and training programme for occupational health and safety practitioners (1996 - ).
- Develop and implement occupational health service delivery programmes in two regions in 1996 (one in Eastern Cape and the other in North West province). Implementation of occupational health delivery programmes in at least one region in each province in 1997.
- Develop training materials for district primary level practitioners (1997).
- Develop and implement a national surveillance scheme for occupational diseases (initially starting with the Surveillance of Work-Related and Occupational Respiratory Diseases in South Africa [SORDSA] programme 1996- ).
- Develop and computerise a National Occupational Health and Safety Information Dissemination Service, and provide a dial-up capability for sharing resources and services with government departments and the provinces. Acquire key occupational health and safety microfiche sets and information on CD-ROM. Provide a set of important publications on occupational health and safety to each province (NCOH 1996-97).
- Develop a database of persons involved in occupational health (SASOM 1996-97).
- Support the journal "Occupational Health Southern Africa" to promote relevant conferences, workshops, seminars, services etc. by NGOs, societies, trade unions, government departments, and others (1996-97).

For further details or assistance from this important programme contact:

Dr David W Stanton, Programme Manager, NCOH, PO Box 4788, Johannesburg, 2000

Tel: (011) 725-1116 (Direct Line)  
Fax: (011) 720-6608

Tel: (011) 720-5734 (Via Operator)  
Internet: davidw@ncoh.pwv.gov.za

# Some aspects of AIDS in the workplace (part 1)

Janina Krystyna Sławski

## Abstract

**AIDS is and will become a significant feature of employment in South Africa over the coming decade. The expected high levels of HIV prevalence in South Africa will mean that employer will have increasing numbers of employees leaving employment for AIDS related reasons. The challenge that employers face is to find sensitive and constructive ways to ensure that these employees can continue to add value in employment for as long as is possible.**

## Introduction

AIDS has become a very real tragedy for many people across the world, including South Africa. It will affect every facet of South African society. In particular, AIDS will have a significant impact on employers. Although much of this impact is still to come, it can be predicted and managed, so that its potentially tragic effects can be ameliorated. The consequences of AIDS should be shared and managed equitably and with compassion by society as a whole. Making appropriate decisions in advance of the full impact of AIDS will help to limit its terrible consequences.

Miss Janina  
Krystyna  
Sławski

Actuary  
Risk Management  
Consultancy  
Southern Life  
Association

*Occupational Health SA*  
1996, Vol 2, No 6 12-14

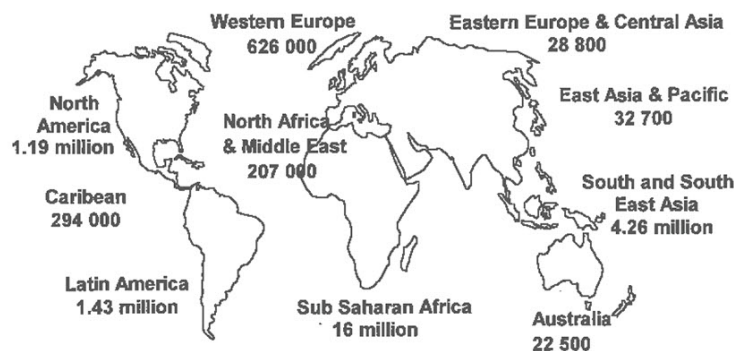


Figure 1: The WHO's estimates of cumulative global HIV infections.

## The spread of the AIDS epidemic globally

Two types of AIDS epidemic are generally described on a global basis. They are identified by the most common method of transmission of the AIDS virus. The first is termed a "Pattern I" epidemic, characterised by mainly homosexual or intravenous drug related infections. HIV prevalence figures currently are of the order of 0,1% to 0,5% of the adult population infected. The second is called a "Pattern II" epidemic, characterised mainly by heterosexual transmission of HIV, where prevalence is expected to reach between 10% and 25% of the adult population. Countries that are usually described as having Pattern I type epidemics include the United Kingdom, the United States, and Australia. The pattern of spread of the epidemic in these countries is significantly different from that which is emerging in the Pattern II countries, such as those in South America, Sub Saharan Africa and South and South East Asia. While the epidemic appears to be levelling off in many Pattern I countries, the peak of the epidemic in most Pattern II type countries is still many years away, with extensive spread into the general population expected. Reporting standards in Pattern I countries are high with up to 90% of AIDS cases being reported. Only about 10% of AIDS cases are reported in Pattern II countries.

The World Health Organisation (WHO) collects statistics on global reported AIDS cases. The total number of cases reported to the WHO to the end of 1995 was 1,3 million. Allowing for underreporting, the WHO estimated that 6 million AIDS cases had actually occurred since the start of the epidemic. About 70% of the AIDS cases were reported from Africa, with 9% coming from the United States. WHO estimates that about twenty-four million people had been infected with HIV to the end of 1995 (Figure 1).

## The spread of the AIDS epidemic in Africa

The spread of HIV and AIDS through Sub Saharan Africa can be described by using the analogy of a pebble dropped into a pond with ripples moving away from where the pebble entered the water. The "pebble" starting the AIDS epidemic in Africa entered the Uganda and Rwanda region in the early 1980s. Thereafter, the "ripples"



Figure 2: HIV and AIDS in Africa

have moved away from this region each year, as the epidemic has spread. Thus, the experience in Uganda in 1986 was repeated in Malawi two years later, in Zambia in 1990, and so on to South Africa in 1996 (Figure 2). Looking at the experience of these other countries over the last few years has given us a good idea of what the future holds for South Africa.

## HIV and AIDS in South Africa

Although the AIDS epidemic has been spreading for many years in South Africa, most people who have been infected are still perfectly healthy. In the next few years, however, more and more of these people will start to become sick and the effects of AIDS will become more apparent. One of the most closely watched HIV prevalence figures in South Africa is the Department of Health survey of women attending antenatal clinics, conducted annually in October and November. The results for 1990 through to 1995 are illustrated in Figure 3.

At the end of 1995 for the country as a whole 10,44% of women attending antenatal clinics were HIV positive. This represented an increase of nearly 40% from 7,6% at the end of 1994.

KwaZulu-Natal appears to be the province most affected by AIDS, with a prevalence of 18,2% in the 1995 antenatal clinic survey. In reality, however, the epidemic in KwaZulu-Natal is simply more advanced than that in the rest of the country in the same way that the epidemic in the Uganda and Rwanda region is more advanced than that in the rest of Africa. Figure 4 illustrates that other provinces are not that far behind KwaZulu-Natal.

It is expected that the prevalence will reach about 25% of the total adult population by the year 2010 as is illustrated in Figure 5. It is expected that the incidence among females will be about forty per cent higher than among males. Reasons for this disparity include the fact that women are more physically susceptible to transmission of the virus during sexual intercourse, and that they are often not in a position to insist on the use of condoms.

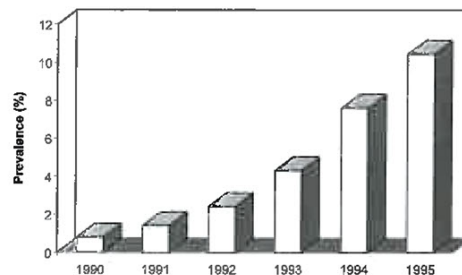


Figure 3: National Antenatal HIV Surveys 1990 to 1995

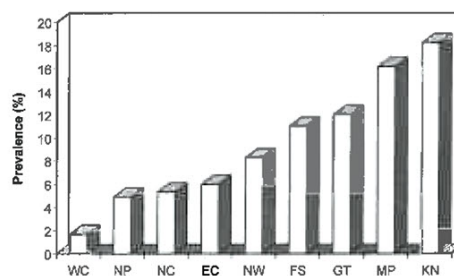


Figure 4: National antenatal HIV survey 1995: Provincial figures

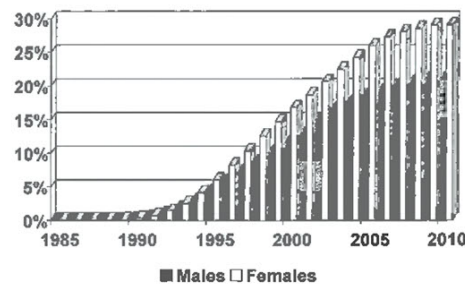


Figure 5: Projected HIV prevalence

## Implications for South African employers

Most employers in South Africa will not yet have seen significant signs of HIV and AIDS in their workforce. Over the next few years, however, companies will have increasing numbers of HIV positive people in their workforce, and there will be more employees leaving work due to AIDS associated illness, or dying of AIDS while still in service. The impact of AIDS related deaths and disabilities could be dramatic because they will occur in the younger age ranges where in the past the incidence of death and disability has been low. The majority of new HIV infections will occur in the most sexually active years between ages 20 and 35, with most deaths occurring an average of ten years later, between ages 30 and 45.

HIV and AIDS could have a complex and wide ranging impact in the workplace. Companies will face issues such as the legality of pre-employment HIV testing

particularly in view of the promulgation of the Labour Relations Act, 1995. There will be increases in the time and costs associated with recruitment and training. Average productivity will reduce, not only because employees are sick and unable to work at full capacity but also because employees may need to take time out of work to care for sick family members or to attend funerals. AIDS education and counselling facilities may need to be provided for employees. The confidentiality of employee HIV results will have to be strictly maintained. Consideration will have to be given to whether there are any instances in which there is a risk of HIV transmission in the workplace, with appropriate preventative measures being introduced.

It may be useful for employers to draw up an AIDS policy, highlighting all of the issues that have been considered. Several suggested guidelines for HIV and AIDS in the workplace have been drawn up by such diverse organisations as the AIDS Law Project and Business South Africa. At a meeting of Southern African Development Community (SADC) representatives in January 1996 a draft code on HIV and AIDS in employment was drawn up. When finalised, such a code could become the accepted guideline for companies in South Africa.

## Impact on employee Benefits

The overall impact of AIDS on Employee Benefit Schemes can be summarised as follows. More employees will die, leaving dependents who will require financial support. More employees and their dependents will be sick and in need of health care. More employees will retire due to ill health, requiring financial support in their illness and for their dependants after their death. While there will be some offset in costs because fewer members will reach normal retirement age, in the absence of corrective action, there will be significant increases in the cost of providing employee benefits. Group Life and Disability premiums and Medical Aid contributions could increase to up to five times their pre-AIDS level.

*Part two of this article will appear in Occupational Health Southern Africa Vol 3 No1 January/February 1997 issue*



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# STD/HIV/AIDS education: Its impact on new HIV infections amongst employees

C Bedhesi, Dr CH Webster,

## Summary

In order to achieve a reduction in HIV infection, a holistic approach should be in place. It is essential that a well-structured STD/HIV/AIDS programme is integrated with a comprehensive company developed and owned preventive and occupational health programme. Education must also be balanced with accessible confidential counselling services.

## Introduction

The Oranjemund Health Education Project (OHEP), was developed by the Medical and Dental department of the Namdeb Diamond Corporation, to deal pro-actively with the impending HIV/AIDS pandemic. Initially an AIDS Committee managed the programme but it soon became apparent that the link to STDs had to be made and that integration into a preventive health programme was essential. This led to the formation of a health committee managed by a non-medical person, in our case a person with psycho-social training, supported by two nursing sisters. The committee included employee and employer representatives, as well as prominent community representatives (school, church, business, etc.).

## Objectives

The objective of OHEP is to encourage employees to take responsibility for their own health through empowerment. Employees become empowered by receiving ongoing education on important preventive health issues relevant to our employees and their families. These issues are presented under the following headings:- Risk factors, causes, symptoms, prevention and treatment of preventable diseases.

## Intervention strategy

This strategy was the result of studying other apparently successful programmes in Southern Africa, particularly the Copperbelt Health Education Project (CHEP) in Zambia, and the immediate needs of the Namdeb employees and the Oranjemund community. These include the following:

### Company policy on HIV/AIDS

This policy is in keeping with National and International Guidelines on HIV/AIDS Policies in the workplace. It is non-discriminatory and ensures that all employees will remain employed as long as they are productive. It allows for employees to receive STD/HIV/AIDS prevention education and ongoing HIV/AIDS counselling should they become HIV+ve whilst in employment.

### In-house training

One day participatory workshops are run for all employees in their language of preference i.e. English, Afrikaans and Oshiwambo. All training programmes for these workshops are developed by the Co-ordinator of OHEP and her staff. The OHEP personnel present the workshops themselves.

### Peer education

Regular three day Peer Education Workshops for Shop Stewards of the Mineworkers Union of Namibia (MUN) have been developed by the OHEP Co-ordinator. These peer educators are an integral part of the OHEP programme and their performance is monitored regularly. These workshops have been extended to Commercial Sex Workers.

### STD treatment and counselling

STDs are treated according to the SAIMR Syndromic approach<sup>1,2</sup> All STD patients diagnosed in the medical department are referred to OHEP for treatment and counselling according to set protocols. HIV/AIDS counselling is part of the process.

C Bedhesi,  
Aids Education Co-ordinator

Dr CH Webster,  
Chief Medical Officer, Namdeb Diamond Corporation, Oranjemund, Namibia

Occupational Health SA  
1996, Vol 2, No 6 16-18



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*From page 17*

document for reference.

f) In-house training programmes relevant to the context of the workers. The programme is part of the employees' development in company time.

g) Emphasis on the psycho-social needs of employees when ill.

h) Ongoing evaluation and auditing with independent expert input.

### **Conclusion**

Despite the apparent success of the programme it must be carefully monitored to prove that the downward trend in new HIV infection is permanent. We firmly believe that introducing company employees to a "package programme" by outsiders will not be effective unless the thrust of their effort is to train an influential core group of company employees to provide a comprehensive company and employee owned programme.

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## Continuing Education in PRIMARY HEALTH CARE

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### Hazards of medical glove powder

Powder has been used as an aid to the donning of natural rubber medical gloves since the beginning of the century. Quite simply the powder prevents the surfaces of the rubber gloves from sticking together.

Early materials used such as talc or lycopodium, were found to cause foreign body reactions and in the case of surgical gloves these materials were implicated in granuloma and adhesion formation in the peritoneum. Post-operative complications affecting many other organs were also reported.

Consequently, by 1950, the use of talc was discontinued and largely replaced by epichlorhydrin, crosslinked cornstarch. This material was believed to have the advantage of being degraded and absorbed by the body and was not therefore



Figure 1: Airborne glove powder

considered to have the same undesirable side effects as talc.

However, the introduction of gamma irradiation as an alternative to autoclaving as the preferred method of sterilisation,



Figure 2: There can be this much powder on an ordinary powdered surgical glove

reduced the absorbability of cornstarch particles. Over the ensuing years many publications have linked glove starch to a number of clinical problems in the surgical and medical environment.

#### Post-operative complications

If starch powder is inadequately removed from powdered surgical gloves before use, it can be introduced unwittingly into the surgical field. The immune system then reacts in attempt to destroy the invader by surrounding the powder particles, forming starch granulomas. This can lead to tissue adhesions, especially in the presence of ischaemic tissue, and in some cases significant post-operative complications.

A detailed review of the tissues relating to problems of starch peritonitis, granulomas and adhesions was written by

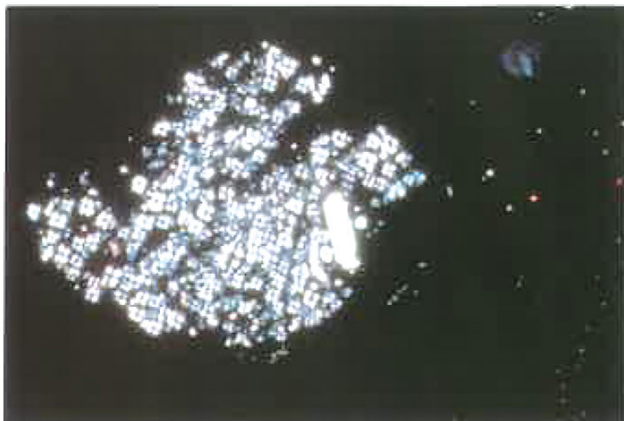


Figure 3: Granulomas can cause starch peritonitis

Ellis. His paper traces the history of the problem from the first cases reported in 1955 through to the recognition of the condition of starch peritonitis and the possibility of misdiagnosis of symptomatic miliary nodules on the peritoneal surface as malignant tumour seedlings.

In addition to the reports of peritoneal granulomas and adhesions, there have been many case studies and research papers published, detailing powder-induced complications in most parts of the body.

#### Gynaecological surgery

Adhesions interfere with egg collection by fallopian tubes, causing infertility.

#### Ophthalmic surgery

Corneal inflammation, granulomas and starch endophthalmitis have been reported.

#### ENT surgery

Cases of starch granulomas in the middle ear have been reported.

#### Neurosurgery

CSF contamination during myelography may occur.

#### Urological surgery

Starch granulomas of the scrotum and bladder have been found.

#### Cardiac surgery

Occurrences of post-cardiotomy syndrome, starch granulomas of endocardium and granulomatous myocarditis have been reported.

#### Thoracic surgery

Cases of starch pleuritis (post-thoractomy syndrome) have been found.

#### Orthopaedic surgery

Starch granulomatous synovitis and possible reduction in the bond strength of orthopaedic cement have been identified.

In addition to complications caused by adhesions and granulomas, there have been reports of other powder-related post-operative problems.

For instance, abrasive damage to synovial joints has been reported when prosthetic implants, ligament replacements and sutures, contaminated with powder residue, have been used during surgery.

Powder can contaminate dialysis units during patient treatment and reprocessing, leading to the clogging of renal capillaries and kidney failure.

Powder contamination has also been implicated as a possible cause of death during cardiac catheterisation and auto-transfusion. Critical vessels have become blocked as a result of devices and materials being prepared by individuals wearing powdered gloves.

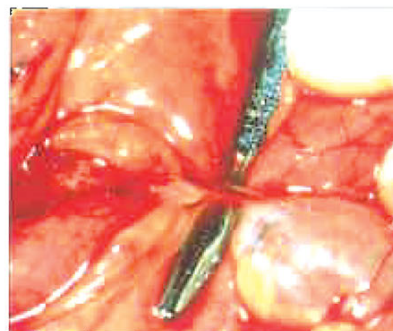


Figure 4: Granulomas can cause adhesions

#### Delayed wound healing

The presence of starch powder in a surgical wound can affect the rate of healing and tissue strength, as well as contribute to scar formation.

Chegini *et al* have demonstrated the inhibition of cytokine production by glove starch, and the implied effects on wound healing. Corless *et al.* found that the addition of starch to wounds in a rat model decreased the resilience, ultimate strength and toughness of wounds. This prolongs healing times which may increase the risk of infection and the probability of wound

dehiscence. The adverse effect of glove powder on wound healing may require a longer hospital stay, which will inevitably involve unnecessary patient distress and increased treatment costs. Hunt *et al* showed that starch was present in surgical wounds even in an environment where powdered gloves had been worn but not come into direct contact with the patient. The same study demonstrated that starch powder also contributes to scar formation.

Glove chemicals such as residual accelerators, have a cytotoxic effect. They may be an avoidable cause of failure in endothelial cell seeding of vascular prostheses and could also adversely affect the wound healing.

### Increased risk of infection

Starch powder is routinely used in bacteriology departments to enrich culture media. Its effect on wound infection can therefore be predicted.

The presence of starch powder reduces the bacterial load required to establish an infection. Using an animal model, Jaffray & Nade demonstrated a tenfold decrease in the inoculum of bacteria required for abscess formation when glove starch was present.

Powder may also carry bacteria and viruses to or from patients either by direct transfer or via the air, during various procedures such as phlebotomy, X-ray, patient bathing, bladder catheterisation and patient transport. Powder can also be transferred into the peritoneal cavity by endoscopes and may ingress into the epidural space during anaesthetic procedures.

The greater risk of infection which results from powder contamination may increase the likelihood of a longer hospital stay and supplementary antibiotic therapy. Unnecessary patient distress and increased treatment costs may be the result, which could end in legal claims.

### Misdiagnosis

Powder contamination can cause misdiagnosis in several areas, perhaps the most serious of which is misdiagnosis of cancer. The potential for starch-induced miliary nodules to be misdiagnosed as tuberculosis or carcinomatosis was first reported in 1970.

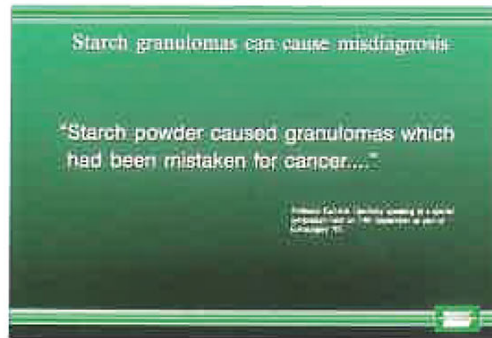
More recently, Gieroksky *et al* report multiple glove powder granulomas masquerading as disseminated malignant disease. Over four years the authors routinely biopsied peritoneal

nodules which had been identified as metastatic carcinoma. Pathological investigations were used to confirm the diagnosis and identify the presence of starch in the specimen.

A total of ten patients was found to have glove powder granulomas as identified by pathology. All patients had previously undergone between one and five abdominal surgeries (nine patients for cancer). Each patient had at least one of the surgeries performed at a hospital that used powdered gloves.

Powder has also been reported to affect laboratory results. Powder can be responsible for physical interference with or absorption of reagents, test samples and controls, which may lead to inaccuracies in laboratory studies, e.g. toxicity studies, blood chemistries and medication levels. These interferences have led to false negatives in HIV diagnostic laboratories and when utilising polymerase chain reaction (PCR) amplification techniques.

Misdiagnosis may result in patients undergoing inappropriate medical treatment or surgery. Length of hospital stay may increase in these circumstances, causing unnecessary patient distress, lower quality of life and increased costs. In some cases there could be legal claims.



## Summary

On the outer packaging of powdered surgical gloves there is a printed warning notice which typically reads:-

### WARNING

*Surface powder should be removed prior to undertaking operative procedures in order to avoid the risk of adverse tissue reaction.*



Figure 5: Washing powdered gloves is time consuming and expensive

Washing can remove 99% of the powder from gloves, but only by extensive, costly, washing procedures. Failure to effectively remove the powder will cause agglomeration of powder particles which can be even more likely to cause granulomas. Starch powder was found within abdominal adhesions in 18% of 600 patients admitted for re-operation in a pan-European study. The annual cost of hospitalisation due to abdominal adhesions in the US has been estimated at \$1.17 billion. The potential link between these two statistics indicates an enormous potential for savings.



Figure 6: Inhalent hazards, glove powder binding latex proteins

Patient outcomes may be adversely affected by the need for re-operation and extended hospital stay. As a result, patients may suffer unnecessary distress and discomfort and treatment costs will rise.

In the case of non-sterile gloves, powder related allergies are the greatest concern. The powder has a drying action on the skin and combined with abrasive action from outer agents as in frequent handwashing procedures, which are imperative even if gloves are used, can lead to irritant contact dermatitis. The use of powder free gloves can frequently alleviate this condition.

Although glove powder itself does not normally trigger allergic reactions, allergens, such as extractable latex proteins, has been shown to bind to glove powder.

When glove packs are opened or gloves donned the protein-laden powder becomes aerosolised. When airborne these powders may be inhaled by patients or hospital personnel, triggering wheezing, allergic

rhinitis, conjunctivitis, bronchospasms or asthma in sensitised individuals.

Both patients and healthcare workers can become sensitised over a long period of time from exposure to high levels of latex proteins.

Once sensitised, the condition is irreversible. Therefore the removal of glove powder as an environmental contaminant, is the safest alternative.

*Clinical references available on request, contact Maggie Smock, Tel: (011) 314 3102*



Figure 7: Respiratory effects



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# Diabetes in industry

Larry A. Distiller, Brian D. Kramer

## Abstract

Employers are often not keen to employ people with diabetes. The reasons for this include concern that too much time will be taken off as sick-leave, patients may become unwell or develop hypoglycaemic episodes on the job, and a perceived notion that diabetic patients may need early ill-health retirement. These issues are placed in perspective. Evidence suggests that well-controlled and educated diabetic patients can be expected to perform as well as non-diabetic patients, should not require excessive sick-leave and should, in general, enjoy a full working life. Suggestions are made regarding the employment of diabetic patients on insulin in hazardous occupations. The role of the Occupational Health Nurse in caring for diabetic persons in the work place is briefly reviewed.

## Introduction

Traditionally, patients with diabetes mellitus have been discriminated against in the workplace to a greater or lesser degree. The reasons for this are fairly obvious. In the first instance, employers are not keen to employ people with a chronic illness and diabetes particularly, has unpleasant connotations. This may or may not be justified, depending upon the applicant's job description, the type of diabetes and treatment being received, the presence or absence of significant diabetic complications and the patient's ability to understand and control his diabetes. From the employer's point of view, the major concerns are a perception that the diabetic patient may require an excessive amount of sick leave and may warrant early ill-health retirement. The latter, in turn, may jeopardise the Company's Pension Fund and for this reason many large institutions are

unwilling or unable to employ diabetic patients. Depending upon the kind of work required to be done, employers may be concerned about hypoglycaemic reactions on the job which could damage the diabetic patient himself or other workmen and this, in turn, has repercussions regarding employer liability.

There are, unfortunately, no set guidelines in the literature with regard to the kinds of work a diabetic should not be allowed to do or the risks involved in employing diabetic patients and therefore decisions as to whether to employ, retrench or allow ill-health retirement to a diabetic patient are often arbitrary, depending upon the person's experience and understanding of the Company Medical Officer or the Human Resources Personnel.

## Absenteeism from work

The perception that diabetic patients, in general, tend to take more time off work for ill-health than the general population needs to be challenged. As a group, insulin-dependent diabetics lose slightly more time than average off work through sickness, but tend to compensate for this by their generally better than average performance records.<sup>1</sup> In general, the overall impression gained from studies of work experience is that most diabetics take the same sick-leave as their fellow employees without diabetes.<sup>2</sup> In 1966, studies were carried out at the Du Pont Company and the Ford Motor Company<sup>3,4</sup> and these studies show that over 70% of the diabetic employees had completely satisfactory records of absenteeism due to sickness.<sup>5</sup> However, the remainder of the diabetic patients had a less favourable outcome and as a result the entire group of employed diabetics in both companies showed a slightly increased absenteeism rate for sickness than in matched control groups. The National Centre for Health Statistics have tended to confirm this finding<sup>6</sup>, reporting that in

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1996, Vol 2, No 6 24-28

1975 some 30% of diabetics accounted for about 63% of all the sick days associated with diabetes. What is clear, is that diabetes itself does not result in increased time off work. Rather it is poorly controlled diabetes with subsequent diabetic complications that results in illness and work-days lost. Diabetic ketoacidosis can be avoided with proper patient understanding of their condition and its occurrence should be considered a failure of adequate patient education.<sup>7</sup> The occurrence of severe hypoglycaemic episodes should also be largely avoidable. The major cause of time off work, however, is for treatment and recuperation from the major chronic complications of diabetes such as retinopathy, nephropathy, myocardial infarction, amputation and stroke. The evidence that good glycaemic control in insulin-dependent diabetes will significantly delay or prevent the onset of microvascular complications is now accepted.<sup>8</sup> There is also mounting evidence that glycaemic control may be an important factor in reducing the incidence of macrovascular disease such as myocardial infarction.<sup>8</sup> In this regard, control of other risk factors such as smoking, hyperlipidaemia, hypertension and obesity are also essential to promoting longevity and good health. Therefore, adequate patient treatment and life-style changes allied with adequate patient education and support should considerably improve the work capacity of diabetic patients and significantly reduce time taken off for ill-health. It is important, therefore, for the medical profession and, more particularly, the Diabetes Care Team to ensure that employers judge diabetic people by their individual qualities rather than their disease and to deal with misconceptions where necessary.

### Diabetes and disability retirement

Diabetes itself is virtually never an indication for premature ill-health retirement. On the other hand, some people with diabetes do warrant early retirement due to the development of diabetic complications. Most commonly, these may consist of myocardial infarction, severe ischaemic heart disease or stroke. More specifically, however, there may be the development of a severe diabetic

retinopathy with visual impairment, severe peripheral neuropathy or end-stage diabetic nephropathy and in these circumstances, depending upon the particular person's job-description, boarding for ill-health may become a necessity. Not surprisingly, studies do suggest that the number of ill-health retirements due to diabetes in a population group is greater than expected.<sup>9</sup> Once again, however, the results appear to be skewed in that a small number of diabetics, usually badly controlled and with extensive complications, are responsible for the ill-health retirement with the majority of diabetic patients having a full and fruitful work career. With the advent of better diabetic care, a better understanding of diabetes management, and improved glycaemic control, the number of patients who will require early retirement due to the development of diabetic complications will reduce progressively over the coming years.

In our experience the commonest reason for patients requesting ill-health retirement is poor work performance (unrelated to their diabetes) with the threat of retrenchment or premature retirement and it is often the employers who suggest to them that they should seek boarding for ill-health as they will then get a better retirement package. In these instances, it is often very difficult to refuse their request on medical grounds as these patients will specifically go out of their way to take time off ill due to poor diabetes control in order to strengthen their case. Sometimes, however, a request for ill-health retirement is, indeed, due to poorly controlled diabetes with excessive time off ill so that the employers no longer find it feasible to keep the diabetic employed. The commonest symptom in these patients, in our experience, appears to be severe painful diabetic neuropathy. Although it is known that improved glycaemic control will reduce the number of sick days and improve painful neuropathy which is, in any event, self-limiting, it can be extremely difficult to prove that the pain has, indeed, abated in patients who are bent on being retired from work prematurely. Therefore, when assessing a patient's request for ill-health retirement, the following needs to be taken into account:

- The true motivation for the request and whether it emanates from the patient or his employers.
- The duration of diabetes, type and treatment and adequacy of diabetic control.

- The presence or absence of any complications in relation to the patient's job description.

Frequently it is found that with proper diabetic management and improved glycaemic control, patients who were thought either by themselves or their employers to be unfit for further work, can be rehabilitated and returned to their full employability.

### Job discrimination

There are no ready guidelines available for deciding which jobs diabetics cannot do. From the employers' point of view, their major problem in employing diabetic patients is the risk of impaired performance or injury to themselves, the work force or expensive machinery due to hypoglycaemia. This is notwithstanding the fact that most employers do not understand hypoglycaemia, what it is or how it can and should be avoided. Accordingly, diabetic patients who are treated on diet alone, or on diet and oral agents, tend to have few problems with employment. On the otherhand, insulin-treated diabetic patients may not find employment quite so easily. It therefore bears stating that Insulin-treated patients with good general health should be able to be gainfully employed in most occupations<sup>10,11</sup> and few restrictions should be placed. Employment standards for persons with diabetes were first recommended by the American Diabetes Association in 1972<sup>12</sup>. These guidelines were subsequently up-dated and later, in 1982<sup>13</sup>, the American Diabetes Association decided to abandon specific employment standards and instead stated: "Any diabetic, whether insulin-dependent or non Insulin-dependent, should be able to accept any employment for which he or she is individually qualified". The problem still arises that there are some job-descriptions which could be perceived as dangerous for which patients with diabetes on Insulin might be considered to be unsuitable. The two obvious situations are aviation (which will be dealt with later) and the driving of commercial vehicles. This latter aspect has been dealt with by ourselves in some detail recently<sup>14</sup> and will not be reviewed here.

In many high risk employment situations, the employer may employ a person with insulin-dependent diabetes mellitus if they are "well controlled".

Unfortunately, the definition of well-controlled is never clear and the paradox is that the better controlled a diabetic patient on insulin is, the more likely is that person to suffer hypoglycaemic episodes.<sup>15</sup> Therefore, in a dangerous job situation, one must either opt for an "uncontrolled" diabetic who has persistently high blood glucose levels and risk the long-term sequelae of poor control, or achieve adequate diabetic control which will better ensure a long and effective work life but have an increased risk of hypoglycaemia. Under these circumstances, the patient needs to be educated into the correct principles of self-care and to be able to perform regular home blood glucose monitoring. It must be borne in mind that blood glucose concentrations below 3 mmol/l may result in the occurrence of early physiological and cognitive changes prior to the classic symptoms of hypoglycaemia. This might well interfere with the patient's ability to concentrate or make rational decisions. Once again, this problem can be averted by adequate patient awareness and regular self blood glucose monitoring. On the other hand, the best predictor of the likelihood of day-time hypoglycaemic coma occurring, is a history of a previous day-time hypoglycaemic coma. It is therefore apparent that when assessing the suitability of a patient with diabetes mellitus on insulin therapy for a work position which might be considered hazardous, many factors need to be taken into account. A blanket ban on all insulin requiring diabetic patients from such positions, which will inevitably result in many perfectly capable persons being unable to pursue their chosen trade or profession and make a living, is unacceptable. No definite guidelines exist in this regard and we would like to suggest the following approach:

#### 1. Non-hazardous employment

No restrictions be placed on any diabetic patients in general. Effective diabetes education and support in the work place should be provided where possible. Patients should be encouraged to inform their colleagues and superiors of their diabetes. Insulin-requiring diabetics should be encouraged to perform regular home blood glucose monitoring, preferably with a reflectance meter. Twice-yearly general check-ups and an annual visit to an ophthalmologist should be encouraged.

### Hazardous employment

In this context hazardous employment can be defined as a job description where a severe hypoglycaemic episode can endanger the life of the patient, others in the work place, or result in damage to expensive equipment. Persons who are already trained and employed in a hazardous occupation when they develop diabetes requiring insulin should be allowed to continue in this employment, provided they meet the following criteria:

- Absence of recurrent hypoglycaemia resulting in loss of consciousness
- Ability to recognise early signs of hypoglycaemia
- Regular twice-yearly check-ups and annual ophthalmological examinations. Should there be evidence of developing diabetic retinopathy or diabetic eye disease, or coronary artery disease, these people should be placed in less hazardous employment if possible. In certain job situations the presence of a peripheral neuropathy or peripheral vascular disease may also warrant a change in job description

- The development of hypoglycaemic unawareness should be an immediate indication to cease employment in a hazardous situation.

Diabetic patients already on insulin therapy before embarking on a hazardous occupation should be discouraged from doing so.

Notwithstanding the recent trends to delay or prevent chronic complications by tighter glycaemic control, moderation of control may be necessary in individuals in whom the risks of hypoglycaemia outweigh the risks from moderate hyperglycaemia. In other words, more liberal glycaemic control may be warranted in persons in hazardous job situations and it should be borne in mind that the degree of glycaemic control aimed for needs to be tailored to the individual requirements of each patient.

### The aviation industry

It has long been an international rule that diabetics requiring any medication for control, oral or otherwise are disqualified for a pilot's licence.<sup>15</sup> Recently, these guidelines have been reviewed<sup>16</sup> by the Federal Aviation Administration of the U.S.A. and it has been suggested that waivers be

granted to carefully monitored pilots using oral hypoglycaemic agents. Currently, diabetic associations world-wide are lobbying for both commercial and private pilot's licences to be granted to patients with diabetes controlled on oral agents, although a blanket ban on any pilot's licence for patients on insulin therapy remains in force.

The health requirements concerning cabin attendants are dependent upon individual airlines. As a general rule, when on insulin therapy, cabin attendants are relieved of their position. Until recently, many airlines would also not allow cabin attendants on oral agents to fly but more recently, this rejection has been relaxed and many airline companies are now permitting cabin attendants on oral agents, provided they are adequately controlled, to maintain their jobs.

### The role of the Occupational Health Nurse

From the above, it must be evident that the Occupational Health Nurse (OHN) has a vital role to play in maintaining a healthy productive work force amongst the diabetic population.

The exact incidence of diabetes in this country is unknown but has been estimated as being in excess of 8% of the adult population. World-wide the incidence of diabetes is increasing at an alarming rate,<sup>17</sup> and this appears to be true for South Africa.

Furthermore it is estimated that more than half the people with diabetes are undiagnosed. Any large industry, therefore, will have a significant number of known and undiagnosed diabetics on their payroll. OHNs should be equipped and taught to screen employees for diabetes as a routine, and be able to counsel and help control newly diagnosed cases and established diabetics alike.

OHNs should have specific training in diabetic education, the principles of care of the diabetic patient and the importance of good glycaemic control.

Self blood glucose monitoring should be understood by the OHNs who should have a knowledge of the available techniques and reflectance meters on the market so that they can advise, encourage and promote the use of regular self-monitoring. Most importantly, they should be encouraged to be in contact with the patient's own doctor to discuss any problems that might arise. The cost of such a training programme is absolutely minimal when measured against the potential losses

incurred by poorly controlled diabetes, including days off work ill and premature retirement due to ill-health. In the U.S.A. many large companies are now introducing diabetes management programmes into the work place<sup>18</sup> and whilst this may cost money, these employers are realising that if they don't offer good quality care it will affect the work environment and the output of work, and waste education and training they have given to employees.

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# Solvent induced encephalopathy - the Norwegian experience

Hakon Lasse Leira

## Introduction

Over the last 20 years solvent induced brain diseases and diseases due to asbestos exposure have been central issues of occupational medicine in Scandinavia. Our findings regarding the asbestos induced diseases are comparable to what has been found elsewhere, but when it comes to the solvent induced diseases the picture is different. Hundreds of cases of encephalopathy have been diagnosed and compensated in all the Scandinavian countries (Finland, Sweden, Denmark and Norway) whereas such cases are not recognized at all in most other countries. Solvent induced encephalopathy has even been called "the Scandinavian disease". During the last decade reports of such cases have been published from some countries outside Scandinavia, but there is still no clear cut explanation why solvent induced encephalopathy is not recognized in most countries.

Chronic cerebral damage after high, acute exposures to solvent vapour has been recognized for decades. The first report was published as early as 1856<sup>1</sup>. The more recent discovery was that exposure to solvent vapours at relatively low concentrations could pose a threat to cerebral health, provided that the period of exposure was prolonged. In Sweden and Finland this was recognized in the middle of the 1970s,<sup>2,3</sup> in Denmark some years later<sup>4</sup>, but not until the 1980s in Norway. In the other Scandinavian countries solvent exposure is now said to be under control. In Norway I think we still need a few more years to be sure of this.

In the Norwegian workforce of some two million persons, 13% of males and 9% of females are exposed to solvents on a daily basis, according to recent survey figures<sup>5</sup>. In the latter half of the 1980s, between 150 and 170 cases of solvent induced encephalopathy were notified annually to the Directorate of

Labour Inspection. There are reasons to believe that a substantial proportion of cases were not notified. More recently the numbers have decreased, reaching 68 in 1995. (The Directorate of Labour Inspection, personal communication).

## Exposure

Most organic solvents seem to have brain damaging properties. The more water soluble ones like alcohols, ketones, and esters may be less harmful than the lipid soluble ones (the chlorinated as well as the common aliphatic and aromatic solvents), but as a rule of thumb all organic solvents should be regarded as potentially toxic to the central nervous system. At ordinary exposure levels the peripheral nervous system on the other hand, seems to be vulnerable only to a minority of solvents, namely n-hexane, carbondisulphide, methyl-n-butylketone and 1,1,1-trichloroethylene.

In Norway patients with solvent induced encephalopathies are mainly males in their 40s or 50s who have been occupationally exposed to solvent vapour for 15 to 30 years.<sup>6</sup> The exposures have in almost all cases been high enough to lead to acute symptoms like headache, dizziness, and excessive fatigue. At present the risk seems to be greatest among spraypainters and in the printing trades, particularly concerning off-set, rotogravure, and screen printing. Workers doing metal degreasing and work with glass fibre reinforced polyester plastics are also at risk.

Ordinary painters working with brush and rolls were heavily represented among the patients 10 to 15 years ago. A change in the composition of paint, to more water based products has reduced the risk of brain damage in this trade quite considerably. Solvents are, however, still used extensively in a wide range of industries, so that occasional patients from many different trades are seen.

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## Diagnosis

The clinical picture is unspecific. The main complaints concern short term memory and concentration that have deteriorated to such a degree that it has interfered with the working ability of the patients. Irritability, excessive fatigue, depression, alcohol intolerance, reduced libido, and headache are also common symptoms. The problems have increased gradually over many years and the patients are unable to tell exactly which year the problems started. Patients will often understate their symptoms. An interview with the wife or another family member is therefore often of value.

The diagnosis is based on the work history, the disease history, the presence of typical symptoms and typical findings on neuropsychological (psychometric) tests, as well as on the exclusion of other possible causes (Table I). Necessary differential diagnostic investigations include a clinical neurological examination, an EEG, a cerebral CT scan and blood tests to exclude anaemia and diseases of the kidneys, liver and thyroid (Table II). The neuropsychological examination should reveal defects on tests measuring psychomotor functions, perceptual speed, and short term memory, defects compatible with a diagnosis of diffuse encephalopathy. If no other cause has been found and if the occupational exposure to organic solvents is considered sufficient, a diagnosis of solvent induced encephalopathy is made. The exposure is considered to be sufficient if the worker has been exposed for more than ten years to concentrations that frequently have given rise to symptoms like headache, dizziness and fatigue. Once the exposure to neurotoxins has ceased, the disease will stabilize.

Table I: Diagnostic criteria for solvent induced encephalopathy

<b>Exposure</b>	More than 10 years of daily (>4h/day) exposure to concentrations that at least once in a while have lead to acute symptoms like headache, dizziness, nausea and fatigue.
<b>Symptoms</b>	Reduced short-term memory, concentration and libido, irritability, chronic fatigue and reduced tolerance to all forms of stress.
<b>Signs</b>	Neuropsychological tests showing reduced psychomotor function, reduced perceptual speed and reduced short-term memory.
<b>Differential diagnosis</b>	Exclusion of other possible causes like trauma, anaemia, drug abuse or diseases of the liver, the kidneys or the thyroid.

Table II: Investigations

Clinical neurological examination
EEG
Cerebral CT-scan
Blood test to exclude anaemia and diseases of the liver, the kidneys and the thyroid
Neuropsychological tests of verbal comprehension, cognitive nonverbal function, psychomotor function, perceptual speed, and short-term memory

## Treatment

As there is no treatment for this condition, the goal is to prevent further damage to the central nervous system. Patients should be advised to avoid further exposure to organic solvents and to cut down on alcohol consumption. At the time of diagnosis most patients are experiencing problems at work and the majority of them will be unable to continue. They can only rarely take another job, so most end up with a disability pension and a compensation for occupational disease. In economic terms they will not be too badly off in the present Norwegian system.

### What was done?

In the period 1984-89 the Labour Inspection focused heavily on the problem of the health risk posed by organic solvent exposure. The 150 inspectors were trained to recognize harmful exposure, to check for relevant symptoms and how to improve working conditions. Practically all workplaces using organic solvent were inspected in 1986 and 1987. Both the trade unions and the Confederation of Norwegian Employers supported this work and many shop-stewards and management staff were also trained in these matters. In the same period health professionals were informed about relevant symptoms and signs and a system for referral of suspected patients was established.

Until 1989 the number of notified cases dropped nicely each year. As no further decrease was seen over the next four years, a new campaign was launched in 1995. This focused on advertisements in journals for healthworkers and in magazines for the most relevant trades as well as written information that was spread to some

5000 workplaces considered most at risk. Training courses were also offered. This campaign was supported by the Confederation of Norwegian Trade Unions and sponsored by the Working Environment Fund of the Confederation of Norwegian Employers, the Association of Insurance Companies and the Ministry in charge of the working environment.

### A Scandinavian disease?

The reasons why solvent induced encephalopathy is not recognized in most other countries are not clear, but some suggestions can be made. In Scandinavia most traditional, i.e. chemically related, work diseases are well controlled so professional interest could turn to "softer" diseases. Scandinavian occupational

epidemiologists have provided convincing evidence for the magnitude of the problem<sup>2,7,8,9</sup> and there is now ready access to the rather sophisticated procedures that are necessary to diagnose cases of solvent induced encephalopathy. Both interest and capability is thus at hand.

The exposure to solvents may be higher in the cold Scandinavian countries where natural ventilation will be less efficient than in countries with a mild climate. In some countries the exposure may never be large enough, like in Singapore, where practically all kinds of manual labour are performed by migrant labourers from neighbouring countries. These workers are admitted to Singapore on two-year work permits that may be renewed once. Thus these workers will never be exposed for a sufficiently long period to develop chronic brain disease.

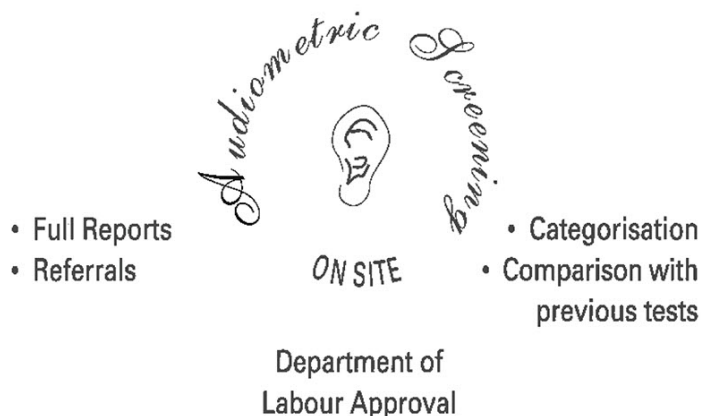
### Conclusion

Solvent induced encephalopathy is a chronic disease affecting workers with a long history of exposure. Exposed workers who never experience acute symptoms like headache and dizziness seem to be at low risk of permanent brain damage. The symptoms are nonspecific. Clinical signs are often not apparent and the diagnosis relies heavily upon the history and upon neuropsychological findings concerning short-term memory, concentration and psychomotor speed. Most organic solvents can induce encephalopathy. Some may be more effective and have other harmful effects as well and should therefore be avoided, namely benzene, n-hexane, carbondisulphide, methyl-n-butylketone as well as the all the chlorinated solvents.

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# Visual status and eye protection in chemical industrial workers

Aboobaker Bulbulia

## Abstract

Presently approximately 1.2 million workers are employed within chemical industries throughout South Africa. Very little data exists regarding the visual status and prevalence of occupationally related eye injuries of these workers. A questionnaire was administered and a visual examination carried out on 78 workers in a chemical factory. Visual symptoms in exposed workers were significantly over-represented compared to non-exposed workers. More than half (52.5%) of the workforce demonstrated visual disorders in at least one of the five areas examined (26.9% of workers were habitually corrected for refractive errors while 25.6% of workers failed to meet the necessary visual requirements). The prevalence of occupationally related eye injuries was 5.1% and unilateral loss of vision was found in two workers. With regard to safety spectacles, only 52.4% of workers wore them when required. The reluctance to wear these spectacles is attributed to poor spectacle design. Protection protocols at work need to be revised and improved education of personnel is needed. The optometrist is in a position to provide essential eye care, education and information to industry.

## Introduction

Industry poses a potentially hazardous work environment since workers are constantly faced with environmental and visual challenges. Although not all workers require high degrees of visual efficiency for various work-assignments, it is common sense that good sight means increased efficiency and a safer working environment. Health and Safety regulations have sought to encourage

those engaged in jobs which present potential dangers to the eyes to wear suitable protective visors or spectacles, but chances are still taken particularly when it comes to chemical hazards.<sup>1</sup> Various chemicals have a direct effect on pre-existing ocular abnormalities and may indirectly cause ocular problems.<sup>2</sup> In addition, in relation to health and safety concerns, workers who have visual problems may not be able to differentiate between colours, or determine the absence or presence of an object, or discriminate the direction of movement of an object.

The Durban New-Germany complex is highly industrialized. Its diversity and the degree of industrialization are paralleled by increasing variety and complexity of occupational injuries and hazards<sup>3</sup>. At present approximately 1.2 million workers are employed within chemical industries throughout South Africa. Of these workers, about 32 000 are employed in the production of industrial chemicals and approximately 70 000 are employed in the production of non-industrial chemicals (Central Statistics Services, Department of Manpower, 1996).

Given the scarcity of literature and optometric research on worker-based studies, particularly within the chemical industry, the main objective of this study was to determine the visual status of workers in a chemical factory. In addition, current eye safety practices used by workers and their opinions regarding ocular protective devices were established. Finally, the prevalence of industrial eye accidents within the factory were determined. Apart from providing basic data, this study may provide information for future management of vision care needs of workers in industry.

## Method

Authorisation was obtained from the management of the chemical factory in Kwa Zulu-Natal, South Africa, that was involved in this study. Permission for visual

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examination of workers was obtained via the resident occupational health nurse, and informed consent for the testing of each worker was obtained. The sample size consisted of 78 workers. A visual examination was administered (in a conference room on site) to each worker. To determine the visual status of workers, different tests were used to assess visual acuity, binocular status, refractive status, perceptual status and organic problems (intra-ocular pathology). A description of the various test procedures used has previously been described in detail.<sup>4</sup>

A structured questionnaire was completed for each worker, including demographic data, chemical exposure, visual symptoms, family history, and past medical and ocular history (including a section on ocular disability related to employment). Workers were also asked about the use of any eye protective devices with specific questions about the comfort, clarity, and effectiveness of such devices. After all procedures were administered, workers were informed of their findings and were advised to have a comprehensive visual examination if necessary.

Data was analysed on computer using the EPI-INFO programme and EPI-INFO STATCALC<sup>5</sup>.

## Results

The sample consisted of all 78 workers (73 males and 5 females). The average age of males was 41.18 years (SD 8.59), ranging from 26 to 64 years, while that of females was 42 years (SD 9.03) and varied from 31 to 54 years. The distribution of workers within the factory can be seen in Table I.

Thirty eight workers (49%) were occupationally exposed to chemicals used in the manufacture of paints, plastics and synthesis of chemical intermediates. These workers subjectively identified formaldehyde, acrylonitrile and acrylonitrile as the chemicals to which they were most exposed. The remaining 40 workers (51%) were not occupationally exposed to any chemicals. Nearly three-

Table I. Worker distribution in factory

Factory area	Percentage workers
Office (administration)	31.0
Production	19.0
Warehouse	22.0
Workshop	12.0
Safety and Health	8.0
Laboratory	8.0
<b>Total (78 workers)</b>	<b>100.0</b>

Table II. Visual symptoms reported by workers

Symptom	Exposed workers	Non-exposed workers
Blurred distance vision	42%	39%
Blurred near vision	41%	54%
Asthenopia (eyestrain)	41%	36%
Headaches around eyes	40%	26%
Burning or itchy eyes	50%	28%
Epiphora (watery eyes)	51%	23%
Red eyes	50%	21%
Eye discharge	9%	0%
Photophobia	15%	8%

quarters (74%) of exposed workers (29 of 38) reported experiencing visual symptoms while working compared to 48% of non-exposed workers (19 of 40). Visual symptoms were consistently overrepresented in exposed workers compared to non-exposed workers, and this difference was statistically significant ( $p = 0.017$ ). Table II gives a breakdown of the various types of visual symptoms reported in these two groups.

Table III. Prevalence of visual disorders detected

Visual disorder	Prevalence %
<b>Visual acuity: Distance/Near</b>	<b>58.6</b>
Distance VA	16.9
Near VA	39.7
<b>Eye co-ordination</b>	<b>41.3</b>
Receded Near Point of Convergence	21.8
Distance lateral phoria	2.6
Distance vertical phoria	1.3
Near lateral phoria	11.7
Near vertical phoria	1.3
Distance strabismus	0.0
Near strabismus	1.3
<b>Refractive status</b>	<b>62.6</b>
Myopia	5.3
Hyperopia	2.6
Astigmatism	1.3
Presbyopia	42.6
Myopic astigmatism	16.0
Hyperopic astigmatism	32.0
Anisometropia	0.0
<b>Perceptual status</b>	<b>30.6</b>
Colour vision anomaly	5.1
Stereopsis (depth perception)	23.1
<b>Organic problems</b>	<b>17.3</b>
Crystalline lens opacities	1.3
Optic disc anomalies	6.5
Disc cupping (>0.4)	14.3
Vascular anomalies	10.4
Raised intra-ocular pressure (> 19mmHg)	11.7
<b>Total visual disorders</b>	<b>52.5</b>

The prevalence of visual disorders detected in workers was 52.5%. The prevalence of specific types of visual disorders can be seen in Table III (these results do not necessarily add up to a 100% since a worker may have had more than one type of visual disorder).

No statistically significant differences were found between exposed and non-exposed workers with respect to the prevalence of visual disorders.

### Worker's opinions and eye safety

The percentage of workers that received information on eye safety and their opinions on safety spectacles are shown in Figure 1.

### Eye injuries

The prevalence of work-related eye injuries was 5.12%. Visual loss as a result of these injuries were found in two workers who had sustained mechanical injuries. No visual loss was recorded in the other workers. The different types of eye injuries are shown in Table IV.

Table IV. Eye injuries

Cause of eye injury at work	Prevalence
Caustic burn	1
Foreign body penetration	1
Mechanical injury	2
<b>Total</b>	<b>4</b>

## Discussion

### Visual disorders

There are a number of occupations for which a minimum standard of vision has been stipulated<sup>6,7</sup>. Clerical and administrative workers (31% in this factory) and mobile equipment operators and machine operators (69% in this factory) are required to have binocular distance and near acuities of 6/7.5<sup>6</sup>. Acceptable binocular distance and near acuities of 6/7.5 or greater were demonstrated in 83.1% and 60.3% of workers respectively. The prevalence of acuity disorders greater than or equal to 6/12 found in this study (10.4%) is similar to that reported in other industrial workers (15.0%)<sup>8</sup>.

The majority of the workers (59.7%) demonstrated no eye co-ordination disorders, but of the 41.3% who had eye co-ordination disorders, only 9.0% were symptomatic. The diagnosis of lateral and vertical phoria disorders as part of an eye co-ordination disorder was made using the criteria stipulated in previous studies<sup>6,7</sup>. Only those phorias which exceeded the maximum permissible phorias were recorded as disorders and since the actual binocular reserves of workers were not measured, these phoria disorders may account for only a small proportion of the workers being symptomatic. Poor binocularity can result in discomfort, and the associated symptoms of eyestrain, headaches and asthenopia are of concern not only for humanitarian reasons but also because the symptoms also result in a less productive worker<sup>9</sup>.

The high prevalence of presbyopia can be attributed to the fact that the average age of workers was 41.23 years. The inset of presbyopia at approximately this

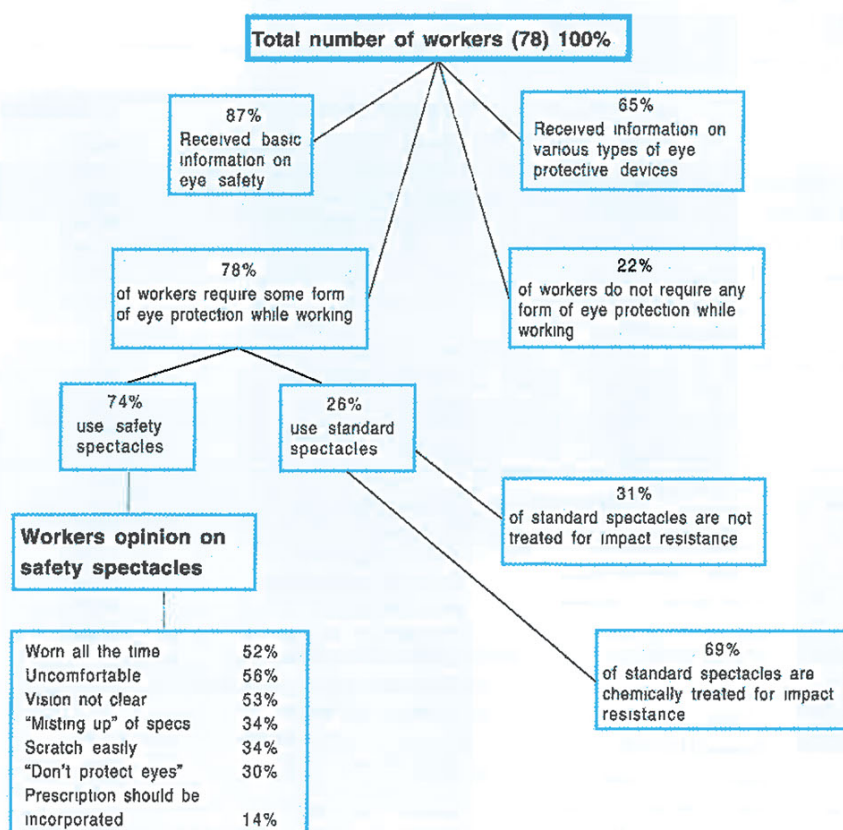


Figure 1. Information on eye safety and workers opinion on safety spectacles

age is well documented<sup>10,11</sup>. For the typical industrial worker, vision problems begin with the onset of presbyopia<sup>12</sup>. This is supported in our study, since 75% of those workers who required a spectacle correction were 40 years or older.

One of the possible reasons for greater prevalence of hyperopic astigmatism (32%) as compared to myopic astigmatism (16%) could be that only 31% of workers in the factory (See Table I) had jobs involving close working distances for prolonged periods. Statistics taken from a survey of South African industrial workers in 1971 indicated that 25.2% of employees were considered incapable of doing their job efficiently through lack of visual ability<sup>13</sup>. In this study we found that without any optical correction 52.5% of the workers failed to meet the requirements necessary to be visually efficient at their particular visual demand. However, with their habitual correction 26.9% of these workers met the requirements. The remaining 25.6% of workers required a spectacle correction to meet the visual requirements. The prevalence of specific refractive disorders for habitually corrected and uncorrected workers can be seen in Figure 2.

Chemical substances absorbed systematically may cause disturbances of colour vision<sup>2</sup>. Defective colour vision was reported in 5.1% of workers, which is consistent with that found in other industrial workers (5.0%)<sup>12</sup>. Colour discrimination is especially important in industry (including this particular chemical factory) since many utilise colour coding systems to ensure safety and efficient production.

Impaired depth perception was noted in 23.1% of the workers which is not consistent with that reported (5.0%)<sup>8</sup> in another study. A possible explanation for the higher prevalence of reduced stereo-acuity could be due to the use of different test instruments and fail criteria. Alternatively, this high prevalence may be related to the high prevalence of eye co-ordination disorders (41.3%) since good binocular vision is required for the development of stereopsis<sup>6</sup>. The ideal situation would be that every worker has binocular vision with well developed stereopsis. In some job classifications, for example, operators of moving equipment and structural steel workers it is an absolute requirement. In others, possession of these attributes is not critical<sup>6</sup>. In our study, the presence of stereo-acuity disorders was higher amongst workers who were mainly clerical and administrative personnel rather than machine operators.

The prevalence of organic problems amongst workers in this factory was 17.3%, while those found in Nigerian industrial workers was 10.7%<sup>14</sup>. A direct comparison cannot, however, truly be made as a result of differences in selection of disorder criteria and large sample size differences.

**Safety spectacles**

The prevention of eye injuries by physical or chemical agents is vital for any work situation<sup>15</sup>. In South Africa, it is mandatory for the employer to provide appropriate and complete eye protection for employees<sup>16</sup>.

A variety of safety spectacles, goggles, eye screens and face screens was available for workers. Our results showed that workers were well informed with respect to eye safety, and had also been shown the different types of eye safety devices available. Workers who were required to wear some form of eye protective device, wore either standard spectacles or safety spectacles. The majority of the workers wearing safety spectacles complained that these were uncomfortable, scratched easily, and "misted up". Similar reasons are given by workers in the metal industry in Britain<sup>17</sup>. Many workers complained that these safety spectacles did not conform to their facial contours, hence causing discomfort. Clarity of vision was affected because the polycarbonate material of the lenses is more susceptible to scratching than conventional lens material<sup>18</sup>. Results from another study<sup>19</sup> confirm that misting of lenses, coupled with peripheral vision limitation by side frames and disturbed binocular vision due to the nose bridge

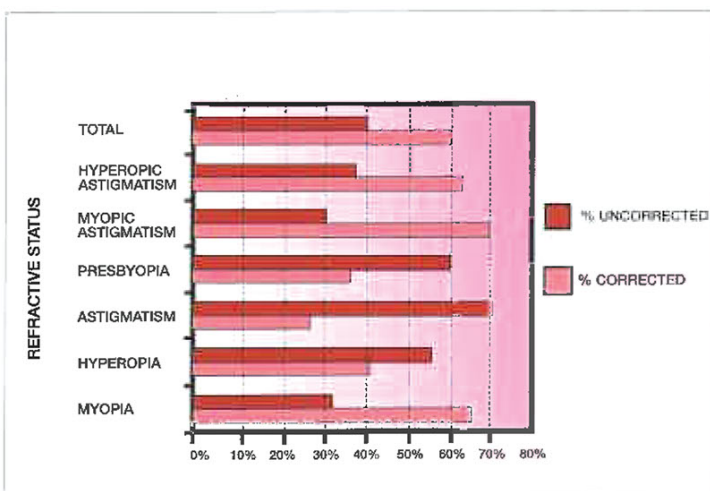


Figure 2. Refractive disorders for which workers were optically corrected and uncorrected

increases the unpopularity of eye protective devices in the workplace. Almost one third (29.5%) of the workers in this study felt that the safety spectacles did not protect the eyes, and some felt that the prescription should be incorporated into the safety spectacles. Due to the above reasons, only 52.4% of the workforce required to wear safety spectacles actually wore them. Ametropes who were required to wear some form of eye protection wore standard spectacles (68.7% had chemically hardened lenses). Although these lenses achieve the required impact resistance<sup>9</sup>, their combination with standard cosmetic frame shapes and materials do not provide adequate protection against chemical vapours, splashes and sprays). This problem for the ametropes may partially be overcome by eye-cup or goggle-type spectacles in which the prescription lens is moulded in polycarbonate with resistant coatings applied to the finished lens.

### Eye injuries

Occupational causes account for over 80.0% of all injuries involving the eyes, and at least 95.0% of these can be avoided if adequate precautions are taken<sup>1</sup>. Statistics taken from 'The Office of Compensation Commissioner (South Africa) in 1988 show that more than half (53.8%) of the total number of occupational related injuries to the body, involve the eye and orbit<sup>20</sup>.

The prevalence of occupational eye injuries in this study was 5.12% which is similar to another (8.4%)<sup>21</sup> study investigating eye injuries in chemical industrial workers. Half of these workers who sustained injuries to the eyes had not been wearing eye protection while working. This result is significantly more than that found in workers in the metal industry (39.6%) under similar circumstances<sup>17</sup>. The difference may be due to the greater need for protection against foreign bodies and projectiles within the metal industry. However, a finding that is consistent with the abovementioned study is the need for improved education of workers and the provision of individually measured eye protectors<sup>17</sup>. Other eye injuries occurred whilst eye protection was worn. This finding is also significant as it shows that some protectors may have been wrongly recommended for a particular task or had failed to perform adequately. (A similar finding was found in another study<sup>21</sup> as well). Eye protection of workers should form part of the overall workplace safety program<sup>22</sup>. No communications had previously occurred between any

optometrists and the management (of the factory involved in this study) as regards the development of such a program. The strategy for controlling ocular hazards associated with the workplace should be a product of interaction between industry and optometry. This strategy should not only include the provision of individual eye protective devices for workers, but also ergonomic considerations and design of work practices to reduce or eliminate any potential ocular hazards. Such a program will increase productivity and improve safety of the workplace by eliminating worker dissatisfaction and reducing the risk of eye injuries amongst workers.

### Conclusion

In a visual examination of 78 workers in a chemical factory, 52.5% of workers had visual disorders (26.9% of workers were habitually corrected for refractive errors while 25.6% of workers failed to meet the necessary visual requirements). With regard to safety spectacles, only 52.4% of workers wore them when required. The reluctance to wear these spectacles is attributed to poor spectacle design. Industrial accidents had resulted in unilateral loss of vision of two workers. These results emphasize the need for optometric intervention, improved worker education, and revision of protection protocols at work.

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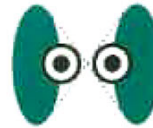
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- Physical and Chemical Stress measurements
- Sampling, analysis and interpretation
- Occupational Health training for all levels
- Isokinetic (stack) sampling

### You get

- Department of Labour
- Approved Inspection Authority
- NOSA Compliance
- OHS Act Compliance
- ISO Accreditation

Contact Jo Bradley Tel (011) 606-3356 or  
Cellular 083-275-8450 Telefax (011) 606-3120

## Occupational Medical Services

### We offer:

- Pre-employment medicals
- Routine medicals
- Audiometric and lungfunction testing
- Foodhandlers medicals
- Radiation workers medicals
- Driver medicals (Heavy Goods Vehicles etc)

Resources and facilities are available at:

**Modderfontein Hospital**  
(Gauteng)

Contact Loretta Hiscock  
Tel (011) 606-3114/6 or  
Telefax (011) 606-3120

**Kynoch Hospital**  
(Umbogintwini, Kwa-Zulu)

Contact Julia Thomas  
Tel (031) 949-2300  
Telefax (031) 949 2024

## Automakers' Environmental Policy strives for relevance and sustainability



*Nissan manufacturing plant*

Automakers, the holding company of Nissan South Africa, adopted their Corporate Environmental Policy in 1992. It has resulted in the company developing and implementing programmes which have challenged the accepted boundaries of corporate environmentalism in South Africa and has won it local and international recognition.

It was awarded the Sankorp Environmental Award in 1995 and was the first recipient of the annual Fleetwatch Green Shield. Its innovative approach to environmental responsibility led to the company being invited to

present a paper at the Global Environmental Management Initiative Conference in Washington DC earlier this year.

The basis of the programme is the recognition that, while support for wildlife conservation is commendable, credible environmental care within the company's own business activities is a more meaningful contribution to environmental protection.

Every department within the company has established an environmental programme with recycling, waste minimisation, chemical management, emergency planning and water and energy

conservation at its heart. The overall effort is coordinated at board level where annual improvement criteria are set.

Although still at an early stage of implementation, this commitment has been extended into the Automakers dealer network, focussing predominantly on waste oil, chemical and effluent management.

The current intense competition in the motor industry has prompted a further development with the realisation that no environmental project can be started which cannot be sustainable through difficult times. Thus Automakers has linked these projects to existing business plans and projects and focussed on efforts which will contribute positively to competitive and market-driven issues.

Waste minimisation or water and energy conservation contribute not only to environmental objectives, but also meet cost saving and process efficiency goals.

Quite simply this means that Automakers' environmental concern extends from the design and manufacture of vehicles through the use of the vehicle to its ultimate recycling or disposal.

For further information please contact Thabiso Magodiello at Tel: (011) 883-7720



Mobile  
Occupational Health Services

The only  
Mobile Audiometry Unit approved by the  
Department of Labour

P.O. Box 145664 Bracken Gardens 1452 Tel: 082 443 7832 Fax: (011) 948-9569

### Drugs of abuse urine screening test



Frontline - the easy, fast and flexible urine screening test for drugs of abuse is now available in South Africa.

Recently launched by Boehringer Mannheim, Frontline now makes it possible to perform rapid, reliable and on-the-spot screening for drugs of abuse - including individual tests for opiates, cannabis and cocaine.

Using the innovative test-strip and a urine sample, the semi-quantitative assay can be completed in just two minutes. It requires no measuring, mixing, pipetting or specimen transfer making it safe and hygienic.

The test result is simple to read and interpret - after the two minute test period is up any colour development in the test pad is compared with the colour chart on the label of the can. If required, the test result can be documented by cutting off the test pad and storing for later referral.

The simple rapid and reliable test method makes Frontline ideal for use in a variety of locations, including hospital emergency wards, clinics and doctors rooms.

For more information please contact the Product Manager at Boehringer Mannheim, tel (011) 886-2400

### Condocan® A registered design

Almost 3 million South Africans are now HIV infected. Preventing the spread of HIV in a workforce is now a major corporate priority. Each case saved will save a company thousands of rands in direct and indirect costs. In addition each case saved prevents another human tragedy.

Condocan is an unique condom dispensing unit. It is simply fixed to a wall or door, and is suitable to be placed in discreet places such as toilets, wash rooms, change rooms, hostels, clinics, clock out points etc. It is made of durable metal, finished in a white plated colour. It does not take any money and condoms are dispensed freely.

Currently condoms are available free from provincial authorities.

The unit can hold approximately 250 condoms with a compartment to house educational leaflets on AIDS prevention.

The dispensers are ideal for companies who want to prevent the spread of HIV/AIDS and other sexually transmitted diseases amongst its employees and want to be seen to be making a major effort to assist employees in keeping themselves free from HIV infection.

The dispensers have been successfully used in many companies in South Africa and are highly recommended as the spread of HIV is now at unprecedented levels.

For more information contact Condocan®, PO Box 92022, Norwood, 2117. Tel/fax (011) 786-6492

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### Fast opens new pharmacy

Fast First Aid has opened its own pharmacy in order to provide a complete service to its customers in the way of now providing complete "one-stop shopping". Knowing how busy the occupational health professionals are, this will assist customers in obtaining all their requirements from one company instead of having to shop around for products. All first aid, OTC and scheduled medicine requirements are now supplied from the premises in Johannesburg.

In addition, cleaning and housekeeping products as well as Fast's own range of quality

disposable linen, examination gowns, drapes etc, are available

Call Brian, Lynne or Leon at Fast on (011) 485-1746, 485-1768 or 640-4335 or fax on (011) 640-4879.

### On-site eye tests

Vision testing on-site, equal to the service available at an optometric practice was pioneered in South Africa by MEF Optometrists cc and today is accepted as an integral part of occupational health practice and service.

Being solely active in vision care, with all tests conducted by qualified optometrists using state

of the art computerised equipment, giving immediate results and advice, all factory personnel can be assessed.

Most important to employers are healthy content employees. The on-site eye tests satisfy many of both parties' objectives. Workers are examined on-site with minimum time away from work stations. Medical aid rates are charged for tests and spectacles. Eye disease found is referred with permission to an ophthalmologist. A large range of spectacle frames are offered on-site and all lenses are safety hardened.

During the past year MEF visited in excess of fifty companies throughout Gauteng.

For further information contact Michelle, tel (011) 440-1167.

# Directory of Occupational Hygienists

## DURBAN



### OCCUPATIONAL HYGIENE, SAFETY AND ENVIRONMENTAL CONSULTANTS

APPROVED INSPECTION AUTHORITY

10 Shelley Place, Umbilo, Durban, 4001.  
Tel: (031) 206-1244. Fax: (031) 25- 2561

## NATIONAL

Approved inspection authority for all chemicals and physical stresses. This includes noise, lead, asbestos and hazardous chemical substances

Member (Coen Buddingh)  
Registered Professional Occupational Hygienist @ IOHSA and Fellow of the Institute of Safety Management

## O.H.S.A.

OCCUPATIONAL HEALTH AND SAFETY ADVISORS CC

PO BOX 645 IFABI 0260  
PHONE/FAX: (012) 371-9277  
CELL PHONE: 082 451-8702

## NATIONAL

Poltech-Ems is dedicated to the science of devising and assisting in the implementation of client-specific solutions in the fields of occupational health and environmental management.



**Gauteng** Tel: (012) 663-7007 Fax: (012) 663-1783  
**Kwazulu-Natal** Tel: (031) 765-5368 Fax: (031) 765-3466  
**Western Cape** Tel: (021) 216500 Fax: (021) 251769

## PARKTOWN



**International Occupational Health Africa (Pty) Ltd.**  
**IOHA - an Approved Inspection Authority.**  
**Approval No. CI 043 OH**

Sixth Floor, Sunnyside Ridge Building,  
Sunnyside Drive, Parktown, 2193  
P.O.Box 1239, Houghton, 2041, South Africa.  
Tel: (011) 643-5849. Fax: (011) 643-6116.

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& Medicine  
Services for a  
complete  
Occupational  
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Package

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### Occupational Hygiene Advisory Services cc.

*Jerry Brown*

#### Focus your Health and Safety Programme

Risk Assessment, Hazard identification, Recommendation of Control Systems,  
Selection of Personal Protective Equipment, Target Training

*More than 15 years experience in Occupational Hygiene*  
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## PRETORIA



**ENVIRONMENTAL SCIENCE SERVICES  
CONSULTANTS (PTY) LTD.**

AIA Reg. No. CI 017 OH

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Occupational Health and Environmental Pollution Management,  
Monitoring, Advisory and Training Services  
has been our business for 12 years,  
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Medical Research Council Building  
1 Soutpansberg Road, Pretoria.  
P.O.Box 55155, Arcadia, 0007.  
Tel: (012) 323-5317/8/9. Fax: (012) 323-4968.  
Cell: 082 5513 484.

## NATIONAL



### AOS HEALTH CARE SERVICES

#### Occupational Hygiene Services

##### We Offer:

- Risk assessments
- Physical & chemical stress measurements
- Sampling, analysis and interpretation
- Occupational Health training for all levels
- Isokinetic (stack) sampling

##### You Get:

- Department of Labour  
Approved Inspection Authority
- NOSA Compliance
- OHS Act compliance
- ISO Accreditation (9002)

Contact: Jo Bradley  
Tel: (011) 606-3356. Fax: (011) 606-3120.  
cell: 083 275 8450

## NATIONAL



### Specialized Help for Industries & People

Striving to establish a healthy, safe and harmonious working environment

#### Our range of services include:

Air quality, Ergonomics, Hygiene, Thermal stress, Illumination,  
Noise, Pollution, Ventilation studies, Environmental impact studies,  
Indoor air pollution, Occupational safety consulting and training

#### For further information contact:

Gilbert Dekenah, Pieter Serfontein or Belinda  
P.O.Box 75969, Lynnwood Ridge, 0040  
Tel: (012) 348-4640. Fax: (012) 348-4289.  
Cell: 082 4509 228

## NATIONAL



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Environmental, Stress and workplace Hygiene Audits  
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illumination, heat stress and ventilation/air quality  
**IOHA - an approved inspection authority**  
Approval number: CI 0480h

Boart Place, 20 Fredman Drive, Sandton, PO Box 61689, Marshalltown 2107  
For further information contact: Vivienne Hartz (011) 322 8018 Deon Olivier (021) 401-9937

## NATIONAL

### Environmental Safety and Health Occupational Hygiene Services



- Heat Stress Management
- Air Quality
- Radiation Protection
- Hearing Conservation
- Ventilation studies
- Assessment of physical work capacity on an individual basis and of industrial work loads
- Shift systems and continuous work schedules
- Risk Assessments
- Approved Inspection Authority

#### Laboratory Facilities Include:

- Exercise laboratory: to measure physiological work performance
- Climatic chamber: to assess heat stress in workers
- Water Laboratory: water analysis and radionuclides in water
- Dust Laboratory: analysis and quantification of dust (DME accredited)
- Breathing simulator: functional performance of breathing apparatus

Further information: Schu Schutte: Environmental Safety and Health  
Tel: (011) 358 0173 Fax: (011) 482 3267 Email: SSSCHUTTE@CSIR.CO.ZA

**How to get your company  
into this directory?**

This directory will appear on the last page of every issue of Occupational Health Southern Africa.  
To have your entry included call Pru Baker at Cannon Medical Media (Pty) Ltd.  
Tel: (011) 455-3498 or (011) 791-2615/6/7.