Occupational HEALTH

SOUTHERN AFRICA

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

In this issue:

The cost of alcohol abuse at a Free State mine

The management of chemical burns

Professional qualifications in Occupational Hygiene, BEBOH modules and examinations: Part 1

The use and application of computerised information technology in an Occupational Health clinic

Computerise, or not?

Occupational Hygiene, Safety and Environmental Health Resources on the Internet

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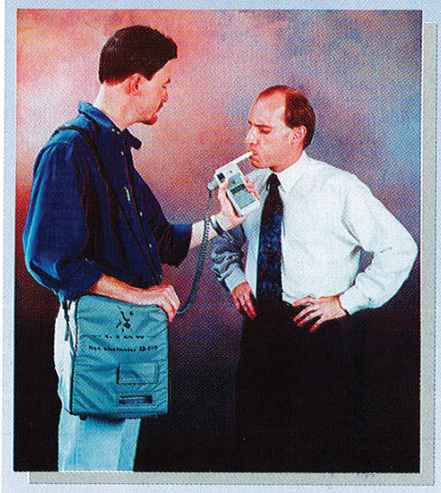
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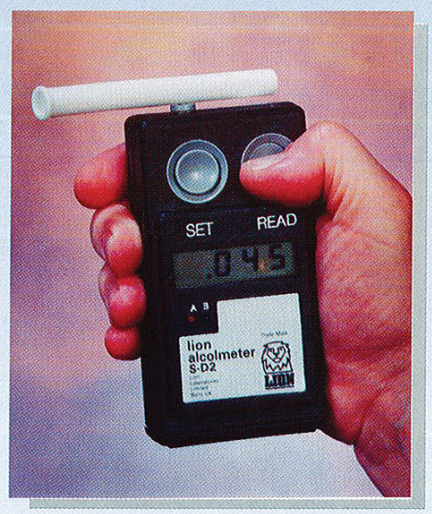
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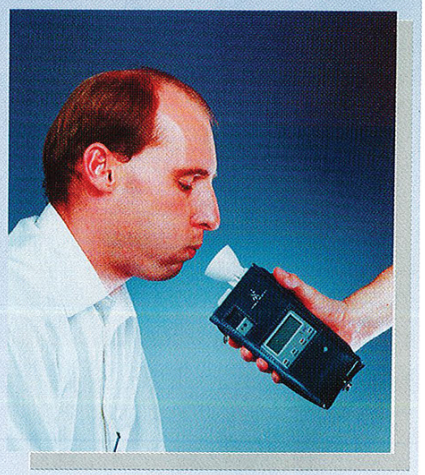


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Standards



On a recent trip to the United Kingdom and Holland, I was reminded of the good manners and determined commitment by everybody to protect and maintain their high driving standards on the roads. This was particularly evident with **safe** driving habits, and a strict awareness of responsibility towards fellow citizens. Included in this is the very strict adherence to driving without the influence of any alcohol, and the regulations pertaining to the discipline of policing and screening drivers is well known. How different and disturbing was my home-coming with the aggression, lack of consideration and almost oblivious attitude towards safety by the South African drivers. It was frankly frightening to behold on the first day of my return.

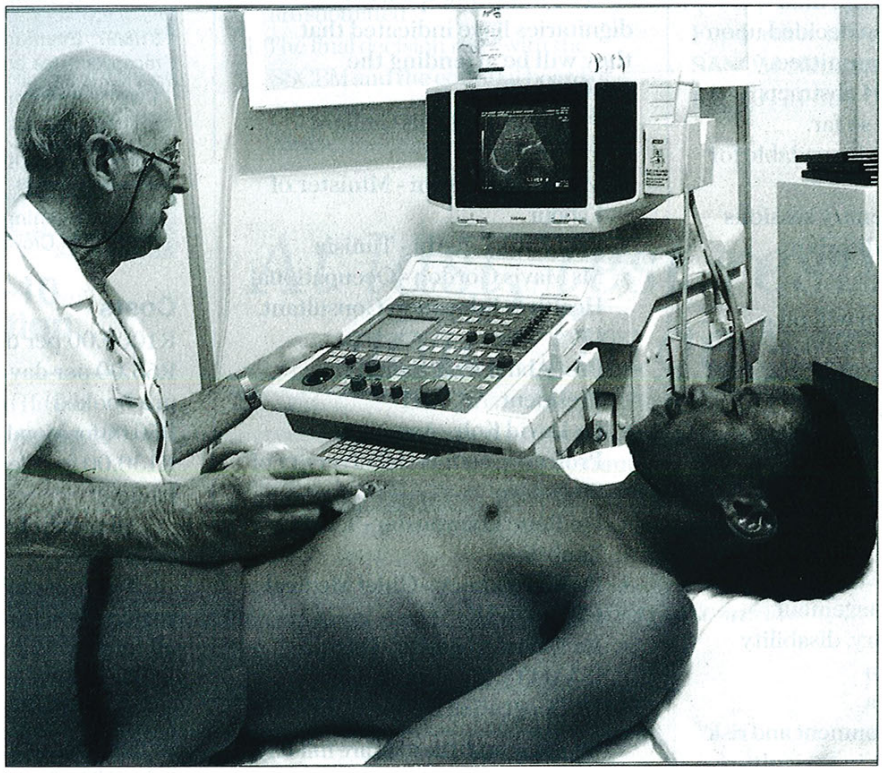
If we go the road towards measuring health at the workplace, it is imperative that such monitoring procedures must include alcohol and drug screening, and this should be strongly supported by all workers including management. This will require a change of attitude and significant responsibility towards appreciating that health is, in effect, not merely the absence of disease, but in the Occupational sense, a serious commitment towards maintaining high standards. In this edition, this has been strongly identified by Van der Linde, who reports on the alcohol abuse in the mining industry and gives an indication of the serious consequences of such abuse and the cost to our economy.

Two very significant features on the professional qualifications required in Occupational Hygiene are included. The British Examining Board in Occupational Hygiene (BEBOH) has identified modules and examinations which are available in South Africa and these will be critical to the development of the high standards that we would like to see. Readers are reminded of the significant role that Occupational Hygienists play in the field of Occupational Medicine, and in particular health monitoring in industry. This development is again welcomed as the establishment of the Institute of Occupational Hygienists (Ferrie and Truter in the January/February edition) will go to further the credibility that such initiatives deserve. Stanton and Joubert have made major inroads into the development of these examinations and standards, and we strongly endorse the sentiments of OHASA for Dr Stanton's outstanding achievement in 1996.

Occupational Health is developing into a strongly defined discipline in Southern Africa, and the progress made over the past two years since the Journal was initiated is clearly evident. What is particularly pleasing for the Editorial Board are the contributions made by authors outside of the Medical Profession. This enhances the objectives of the Journal and stimulates awareness.

Chris van Selm
Editor

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PACOH '97
PAN AFRICAN CONFERENCE ON OCCUPATIONAL HEALTH

Occupational Health challenges for Africa programme progress report

The structure of the final programme has been decided upon by the Scientific Committee.

Approximately 54 abstracts have been received so far.

Exhibition space is available for 30 exhibitors.

There will be plenary sessions only in the main auditorium.

Registration

Early registration will take place from 14:00 to 17:00 on Sunday, August 31 1997, at the Holiday Inn Crowne Plaza. Registration will also take place on Monday, September 1 1997, from 08:00 to 10:00.

Topics for sessions

1. Occupational disease: diagnosis, surveillance, management
2. Ergonomics, injury, disability and compensation
3. Research in Africa
4. Occupation environment and risk
5. Health and safety in agriculture
6. The vulnerable worker
7. Occupational Health and Primary Health Care
8. Lung diseases

Each session will be opened by an invited keynote speaker.

The following speakers/ dignitaries have indicated that they will be attending the conference:

- Prof Jean-François Caillard - President, ICOH
- Mr Tito Mboweni - Minister of Labour
- Prof Rafik Gharbi - Tunisia
- Ms Mavis Gordon - Occupational Health & Education Consultant, UK
- Prof Abdel Aziz Kamal - President, ARAOH
- Dr David Koh - Associate Professor, National University of Singapore
- Dr Rene Loewenson - TARSC, Zimbabwe
- Dr MI Mikheev - Chief Medical Officer, WHO
- Mr Jackson Nkurlu - ILO (SAMAT), Zimbabwe
- Dr Deogratius Sekimpi - Uganda

Monday and Tuesday are full-day sessions ending with a poster session. Factory visits will be arranged for Wednesday afternoon and the programme will end with lunch on Thursday at 13:00 (except for those delegates who will be attending the ARAOH AGM)

Social programme

31/8/97 Evening - Welcome drinks reception - Ice breaker

1/9/97 Evening - Informal get-together, Durban Turf Club (pre-booked)

2/9/97 Evening - SASOM and SASOHN AGMs

3/9/97 Evening - Formal banquet at Holiday Inn Crowne Plaza (pre-booked)

Costs

R1000.00 per delegate
R65.00 per day for lunch (to be pre-booked)
R50.00 for Monday evening function
R130.00 for Wednesday evening banquet

All alcohol to be paid for on a cash basis.

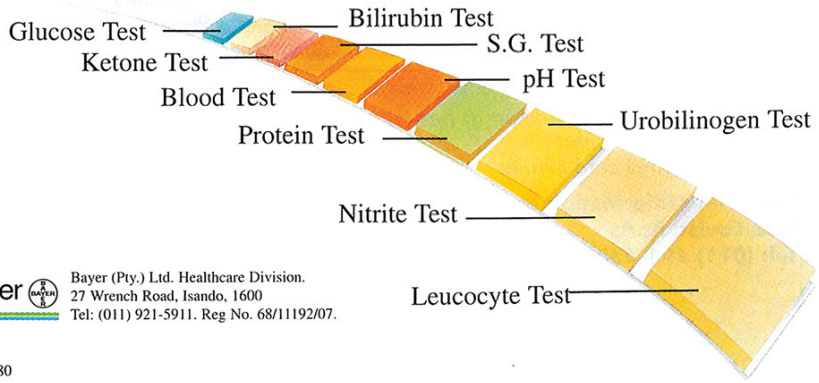
The programme and registration form will be posted to all interested persons.

Delegates are to book their accommodation directly with the hotels.

Enquiries

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Prize for articles on biological monitoring

The SASOM Scientific Committee for Biological Monitoring (SSCBM) is again pleased to announce R1000 (2 x R500) prizes for the best two articles published in the journal.

The SSCBM criteria are as follows:

1. An original article on Biological Monitoring from South Africa
2. Data not older than 3 years
3. The SSCBM may withdraw the prize if insufficient quality publications are submitted
4. The final decision rests with the SSCBM and the editorial board of "Occupational Health Southern Africa"
5. One cash prize will be announced and presented at the SASOM AGM in September 1997 and the other in January 1998
6. Articles published during the period January to December 1997 will be entered for the competition

For further information contact the SASOM National office at tel: (012) 664-0460.

New ICD-10 classification

In 1992, the World Health Organisation (WHO) published the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10). Following advice from SA experts, the Central Statistical Services (CSS) has decided to adopt the ICD-10 and to base the codes on 3 characters. A manual has now been compiled and distributed.

The chief purpose of the manual is to assist medical practitioners and nurses to describe the cause of death as accurately as possible for death certificates. However the code is useful for morbidity statistics as well.

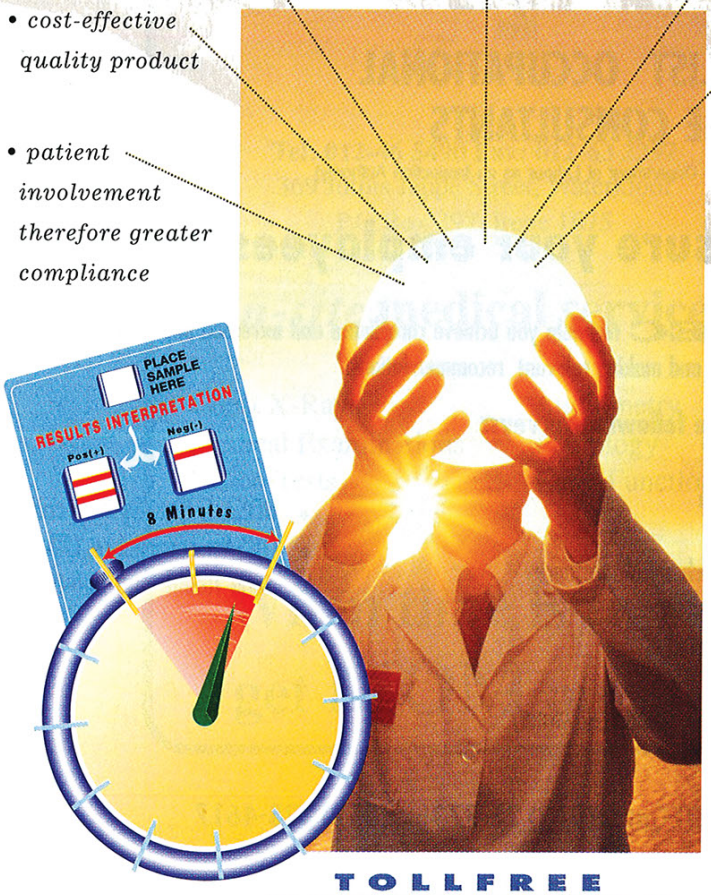
The manual is issued free of charge and anyone requiring a copy should contact:

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WHO/SA Technical Cooperation Programme: Occupational Health

WHO sponsored training

Dr RS Bridger, head of the Ergonomics Group at the University of Cape Town and author of the book "Introduction to Ergonomics" will present a one week introductory course on ergonomics at the National Centre for Occupational Health (NCOH), Johannesburg 4 - 8 August 1997. Mr Chris Moore from the Canadian Centre for Occupational Health and Safety (CCOHS) will present a two day course on 'Accessing the internet for Occupational Health and Safety information' at the NCOH 5-6 November and the University of Natal 10 - 11 November 1997. Anyone interested in attending the above courses should contact Dr David W Stanton at the NCOH Tel: (011) 725-1116 (direct line), fax: (011) 720-6608, e-mail: davidw@ncoh.pwv.gov.za

Three one day occupational dermatoses workshops will be held in Port Elizabeth, East London and Umtata in July 1997. Contact person Lea Roodt cell: 082 576 1412.

The Legionella Action Group will be presenting a one day seminar/workshop on Legionella on the 17 September 1997 at the Volkswagen Conference Centre, Midrand. Depending on demand a one day seminar/workshop on Legionella will also be held in Cape Town during September 1997. Contact person Audi Snyman at tel (016) 703-3059 fax: (016) 703-2925

Using the Internet to access health and safety resources

The Canadian Centre for Occupational Health and Safety (CCOHS) has just published a revised edition of its printed publication, "Using the Internet to Access Health and Safety Resources". This publication shows readers how to join health and safety mailing lists and newsgroups; search for and download documents, software and multimedia resources; connect to online library catalogues; and access health and safety resources on thousands of World Wide Web sites.

If you would like more details, please feel free to read about it on CCOHS' web site at http://www.ccohs.ca/products/publications/intpub.html or contact CCOHS' customer services at:

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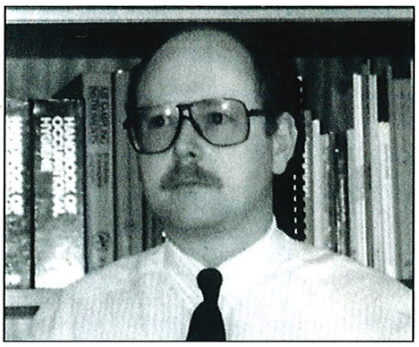
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Dr David W Stanton awarded OHASA Certificate of Outstanding Achievement for 1996

Dr David W Stanton, Head: Occupational Hygiene and Toxicology Division at the National Centre for Occupational Health (NCOH) is the recent recipient of the OHASA certificate for 'Outstanding Achievement in 1996' for his contribution to the occupational health discipline in Southern Africa. Dr Stanton has been responsible for a number of recent initiatives to develop occupational health in Southern Africa, but received this award in recognition of his work to develop and manage the WHO/South Africa Technical Cooperation Programme 1996 - 2003: Occupational Health and Safety (with Particular Emphasis on Workers' Health).

This programme was authorised by the WHO and the Department of Health in the third quarter of 1996 to strengthen the capacity of the Government to develop and implement occupational health programmes at all levels. While the budget for this programme is modest (US$1 676 400 for 1996 - 1999) it is one of the most important and ambitious occupational health programmes ever initiated in this country. It consists of key national workshops on policy and strategy, research, education and training, primary health care, bridge building between the inspectorates and trade unions, and key provincial workshops to enhance occupational health and safety activities in the provinces. A national surveillance scheme for occupational diseases has been established starting with respiratory diseases (SORDSA) which will be expanded in future years for other occupational diseases. Under the occupational health and safety training programme, a wide variety of courses are being funded including



specialised training for National Government and Provincial staff. A directory of occupational health and safety courses in the country will be published. The most extensive occupational health library in the country, the AJ Orenstein Library at the NCOH is being computerised. Its holdings, in particular its electronic information, is being updated and expanded to aid technical information dissemination. A series of articles on useful contact details is being presented in the journal *Occupational Health Southern Africa*. The first article featured NGOs and Occupational Health Clinics, the second article is on some 15 societies and associations involved in occupational health and safety and the third article being developed is on OH & S courses available by province in the country. Further articles will feature for example useful contact details for relevant national government and provincial offices.

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(Personal Communication, data on file, Dr M. McCann, Dr Kotzenberg; Drs Bouwer & Partners, Durban 1994.)

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(Usefulness of CDT in monitoring Alcohol Withdrawal. H. Decrey, Society of General Internal Medicine, 1994 A.G.M.)

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The cost of alcohol abuse at a Free State mine

JA van der Linde

Abstract

Alcohol is a popular drug in the mining industry and contributes to employee illness and injury, increases in health services utilisation, reduced productivity and increased costs.
An Australian study developed aetiological fractions to estimate what portions of various illnesses could be attributed to alcohol. These tables were utilised to estimate the related medical costs of alcohol abuse at a Free State Gold Mine.
The results indicated that alcohol related treatment costs amounted to R 593 592 and the cost of lost shifts amounted to R 3 392 499. The total cost was R 3 986 million which represents an average cost of R 284.84 per employee per annum. Extrapolated to every 100 000 workers in the mining industry, the costs amount to R28 484 million per annum.
The recommendations emphasize the need for accurate, locally developed simplifying assumptions to enable the industry to monitor and manage alcohol costs more effectively.

Introduction

The mining industry has been experiencing increasing pressure to survive due to a stable gold price and continuously increasing costs. Several shafts have been failing to make profits and have been forced to close down resulting in the retrenchment of many workers. Ever more emphasis is being placed on cost containment, which also affects health services. Health services should make every effort to contain their costs on the one hand, but should also comment on factors affecting the utilisation of health services and productivity.

Alcohol is far and away the favourite drug in the mining industry, and with little doubt also a very significant contributor to employee illness and injury. This increases health service utilisation and leads to lost productivity and increased costs. This investigation attempts to assess the possible cost of alcohol abuse to the mining industry by utilising existing sources of information.

Problems associated with alcohol abuse

The objectively measurable alcohol problems in a company are described under the headings of health; sickness absence and absenteeism; accidents; disciplinary offences; and productivity.

Health

Health conditions, which are commonly and usually present as short-term absence due to sickness and indicative of alcohol abuse trends, are the following:

- Blood pressure: Alcohol abuse is a common cause of raised blood pressure - raised blood pressure is three times more common in heavy drinkers than in the general population.
- Gastric problems: The majority of unidentified, recurring and short-term gastrointestinal problems are attributed to alcohol abuse.
- Musculoskeletal problems: There is a higher incidence of low back pain and general musculoskeletal problems among long-standing heavy drinkers.
- Respiratory problems: There is a higher incidence of pulmonary tuberculosis and recurring chronic chest infections resulting from excessive alcohol intake depressing the immune system.
- Nervous system: Morning dizzy spells, fits and blackouts are often associated with alcohol abuse and mood disorders like depression are much more prevalent in heavy drinkers.[1]

Sickness absence and absenteeism

Medical records are unreliable in identifying the extent of alcohol problems being the cause of sickness absence.

JA van der Linde
Freegold Health Services, Welkom, OFS

Occupational Health SA 1997; Vol 3, No 3: 9 - 14

Patients seldom admit that their illness is due to excessive alcohol use, and doctors hide the fact that alcohol is the underlying cause of illness on sick certificates, mostly to protect their patients.

The different categories of absenteeism are certified or uncertified sickness, absence with permission or absence without permission (AWOP), and part-of-shift absence such as late arrival, extended lunch breaks or early departure. Studies have indicated that alcohol abusers are late for work 3 - 14 times more often, are absent from work 5 - 7 times more and use three times more sick leave than other employees.[1,2]

Accidents

Several studies have indicated that a significant portion of on-the-job accident victims had alcohol in their blood at the time of the accident. A study at a South African pulp mill indicated that 18% of injuries on duty were positive for the presence of alcohol in their blood, and that 38% had abnormal gamma glutamyl transferase results, suggesting alcohol problems.[1]

Disciplinary offences

Disciplinary offences are often followed by formal disciplinary hearings which involve the offender, the supervisor who laid the charge, the senior of the supervisor who chairs the hearing, a personnel official, a union representative and possible one or more witnesses. The process is formal requiring accurate minutes and is time consuming. Hearing are held during working hours and many production hours are lost in the process. Albertyn and McCann[1] quote an example of one employee who had managed to earn 14 final warnings, mostly for intoxication at work, by manipulating the wash out period for final warnings very effectively.

Productivity

The effect of alcohol abuse on productivity is often difficult to measure. All the above mentioned problems associated with alcohol abuse have a direct impact on productivity. Studies have indicated[2] that employees who abuse alcohol are prone to many more job mistakes, have lower work output (work shrinkage), have 3-4 times more job accidents, cause an increase in crime at the work place like pilferage and also an increase in the costs of security and quality control as more personnel are required to protect company property and to control product quality.

The costs associated with alcohol abuse can be divided into two categories[3] which are: direct costs such as the treatment costs of alcohol and alcohol-related diseases - and indirect costs such as the value of lost productivity from alcohol abuse, morbidity and loss of personal income as a result of the disability from alcohol abuse, and mortality which is premature death from alcohol abuse and the associated lost productivity. Estimating the actual costs of alcohol abuse to companies and society is complex, and must rely on a number of simplifying assumptions.

Alcohol and illness costs

In an Australian study, Holman and Armstrong[4] developed tables of aetiological fractions to estimate what portions of various illnesses could be attributed to alcohol. Table I lists the various conditions and the associated fractions attributable to alcohol.

A study of Telcom Australia employees[5] utilised the fractions developed by Holman and Armstrong to estimate the direct cost to industry of absenteeism attributable to drinking alcohol and smoking. Telcom Australia had approximately 80 000 employees and their results indicated that the annual costs of alcohol to the company amounted to $5 500 000. The costs related to smoking were $16 500 000 and illness attributable to alcohol or smoking accounted for 25% of sick leave for the year. Extrapolated to the entire Australian work force the costs amounted to $2 000 000 000 per year.

Estimated costs of alcohol-related illness and absence at a Free State gold mine

The above mentioned assumptions were utilised to estimate the costs of illness and absences attributable to alcohol at a gold mine employing approximately 14 000 employees of which 90% were unskilled labourers. A survey done during annual medical examinations revealed that 60% of all employees responded in the affirmative to the question, "Do you drink alcohol?" It is suspected that the consumption of alcohol among the mine employees is higher than the average for the general population. A survey utilising the CAGE questionnaire, which consists of the following four questions:

Harness Stress

SA people are the 'most stressed'

COCAINE DEALING

INCREASES IN

GAUTENG

ECSTACY SCANDAL AT SCHOOLS

ALCOHOL COSTING MILLION

on is a illness

Bestu

stres



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Enjoy yourself -
don't kill yourself!

Depression is a treatable illness

Stress

1. Have you ever tried to cut down on your drinking?
2. Have you ever been annoyed by criticism of your drinking?
3. Have you ever felt guilty about your drinking?
4. Have you ever taken alcohol as an eye-opener first thing in the morning?

was done at two hostels of a neighbouring mine and the results indicated that 32% of participants experienced psycho-social problems related to alcohol, suggesting alcohol dependence. This figure is higher than average as the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)[6] reports the life time prevalence for alcohol dependence as 14%. It is suspected that the aetiological fractions mentioned earlier, which were developed in Australia, would probably result in an under-estimation of the causative role of alcohol in illness in this mining population.

Medical services to the largest portion of workers are rendered from workplace clinics, called Medical Stations. An employee reporting ill to a medical station often does not go to work on that day although he receives paid sick leave for the lost shift. Treatment is given by nurses and doctors and serious conditions are referred to a mine hospital. Medical records are kept on medical cards and although the entire record is not computerised, certain information from consultations are categorized and computerised.

The computer records were scrutinized for the period 1 April 1995 to 31 March 1996. The average employee strength for the mine for the period was 13 995. The reasons for attending medical stations or going to hospital were categorised as follows: Disease, Mine Accident, Motor Vehicle Accident (MVA), Other Accident, Assault and Occupational Disease.

The aetiological fractions developed by Holman and Armstrong (Table I) were applied to the above categories as follows:

Disease - This is a general category containing illnesses with varying aetiological contributions from alcohol. This category is often referred to as the "malingering" category as reasons for reporting ill include headache, gastritis and other complaints which are often alcohol related. It is argued that a conservative fraction of 0.10 should be used for this category, but it is suspected that it would be an under-estimation of the causative contribution of alcohol.

Mine Accident - The machine accident item from Table I compares with the mine accident category and the fraction of 0.13 was accepted for this category.

MVA - An MVA compares with Road Injuries from Table I and the value of 0.30 was utilised for this category.

Other Accident - Slip-and-fall accidents occur regularly in this category and the fraction of 0.38 associated with Fall Injuries from Table I, was accepted for this category.

Assault - Short term examinations at this mine have indicated that approximately 80% of assault victims are significantly intoxicated with alcohol, and it was decided to utilise the local indicator of 0.80 for this category rather than the 0.51 as suggested by Table I.

Occupational Disease - No comparable item could be found from Table I for the occupational disease category. As pulmonary tuberculosis predominates in this category, and as the detrimental role of alcohol on the immune system is known, a conservative arbitrary fraction of 0.10 was accepted for this category.

Table I: Aetiological fractions of conditions caused by alcohol[5]

Description	Fraction	Description	Fraction
Lip Cancer	0.18	Heart Failure	-0.27
Oral Cancer	0.55	Heart Disease	-0.27
Pharyngeal Cancer	0.65	Stroke	0.15
Oesophageal Cancer	0.50	Oesophageal Varices	0.51
Colon Cancer	0.15	Oesophageal Haemorrhage	0.47
Rectal Cancer	0.05	Gastritis & Duodenitis	0.10
Hepatic Cancer	0.35	Acute Gastritis	0.10
Pancreatic Cancer	0.17	Stomach Disorder	0.10
Laryngeal Cancer	0.56	Alcoholic Cirrhosis	1.00
Breast Cancer	0.21	Cirrhosis of Liver	0.51
Pellagra	0.83	Cholelithiasis	-0.33
Gout	0.10	Acute Pancreatitis	0.36
Alcoholic Psychosis	1.00	Chronic Pancreatitis	0.69
Neurotic Depression	0.10	Headache	0.10
Neurosis	0.10	Tachycardia	-0.27
Suicide	0.23	Fire Injuries	0.15
Alcohol Dependence	1.00	Ethanol Toxicity	1.00
Alcohol Abuse	1.00	Methanol Toxicity	1.00
Anxiety	0.10	Beverage Poisoning	1.00
Other Acute Stress	0.10	Aspiration	1.00
Depression	0.10	Child Abuse	0.15
Alcoholic Polyneuropathy	1.00	Drowning	0.26
Hypertension	0.21	Road Injuries	0.30
Myocardial Infarction	-0.27	Other Falls	0.30
Angina	-0.27	Fall Injuries	0.38
Cardiomyopathy	0.31	Machine Injuries	0.13
Cardiac Dysrhythmias	-0.27	Assault	0.51

Table II: Medical Station attendances for the period 01/04/95 - 31/03/96

Reason	Attendances
Disease	162 535
Mine Accident	24 007
MVA	1 560
Assault	5 625
Other Accident	7 340
Occupational Disease	850
Total	**201 917**

Table III: Shifts lost for Medical Station attendances and hospital stays plus sick leave (SL) for the period 01/04/95 - 31/03/96

Reason	Med.Station	Hospital & SL	Total
Disease	14 660	29 123	43 783
Mine Accident	1 135	16 720	17 855
MVA	76	2 030	2 106
Assault	478	5 167	5 645
Other Accident	573	4 061	4 634
Occupational Disease	107	336	443
Total	**17 029**	**57 437**	**74 466**

Table IV: The cost of Medical Station attendances attributable to alcohol

Description	Attendances	Aetiological Fraction	Alcohol Cost
Disease	162 535	0.10	354 488
Mine Accident	24 007	0.13	68 067
MVA	1 560	0.30	10 207
Assault	5 625	0.80	98 145
Other Accident	7 340	0.38	60 832
Occup. Disease	850	0.10	1 853

Total Medical Station attendances cost attributable to alcohol: R 593 592

Table V: The cost of shifts lost attributable to alcohol

Description	Shifts Lost	Aetiological Fraction	Alcohol Cost
Disease	43 783	0.10	1 087 963
Mine Accident	17 855	0.13	576 782
MVA	2 106	0.30	156 995
Assault	5 645	0.80	1 122 180
Other Accident	4 634	0.38	437 571
Occup. Disease	443	0.10	11 008
Total cost of lost shifts attributable to alcohol:			R3 392 499

Table II reflects the Medical Station attendances for the period according to the above categories.

The total of 202 917 attendances represents an average of 14 attendances per employee per annum. The cost of one attendance is calculated by dividing the total budget for medical stations at the mine by the number of attendances, which amounts to R21.81 per attendance.

The number of shifts lost during the period as a result of the above attendances as well as for hospital visits or hospital stays, are reported in Table III. More than 74 000 shifts were lost during the year for medical reasons which represents an average of approximately five shifts lost per employee per annum. The value of revenue lost due to lost shifts is calculated by determining the value of gold produced per employee per month divided by 24, which is the average number of shifts worked per employee per month. The average revenue loss for one lost shift during the above period was R248.49.

To estimate the portion of costs attributable to alcohol, the aetiological fractions mentioned earlier were applied to the various categories for attendances and lost shifts, and multiplied by the associated cost factor as reflected by Table IV and V. The cost for medical station attendances attributable to alcohol amounts to R593 592. This amount does not include the cost of mine hospital attendances as hospital records were not categorised in the same way. The amount is thus an under-estimation of the total attendance costs. The total cost of shifts lost for medical reasons attributable to alcohol was R3 392 499. This amount does not reflect the cost of shifts lost for non-medical reasons such as absence without leave, which is often attributable to alcohol abuse. The total cost for alcohol attributable medical attendances and lost shifts was R3 986 091. This represents an average cost per employee per annum of R284.84.

Discussion

Estimating the cost of alcohol abuse to industry is complex and relies on simplifying assumptions, such as the aetiological fractions to determine which part of costs are attributable to alcohol. The results of this investigation has limitations due to the following factors:

- The aetiological fractions utilised were developed under Australian conditions and do not necessarily apply to South

African mining conditions. A conservative approach was thus followed towards rather under-estimating costs than over-estimating them.

- The medical records were already categorised and computerised which made it impossible to apply the fractions to specific diagnoses and thus obtain more precise information. The approach adopted was conservative in an attempt to avoid over-estimating costs.
- The investigation only attends to the direct medical-related costs of alcohol and does not estimate indirect costs such as work pilferage, absenteeism, accident costs, disciplinary costs, reduced productivity, tardiness, increased health insurance costs, crime and the increased cost of security, the costs associated with lawsuits, legal fees and negative publicity, the increase in Workmen's Compensation Act claims or the cost to the local community and the social lives and circumstances of employees.



In spite of the above limitations the results would suggest that significant costs incurred for medical reasons in the mining industry, are directly attributable to alcohol abuse. Extrapolated to every 100 000 workers in the mining industry, a conservative estimate of the annual medical costs attributable to alcohol would be R28 484 million.

Recommendations

This investigation emphasises the need for accurate, locally developed simplifying assumptions to enable the industry to plan record keeping according to these assumptions, and to monitor and manage the costs associated with alcohol more effectively. Reliable, valid and especially credible information about alcohol-related costs and effects could serve as an impetus for management and unions to negotiate workplace alcohol policies and to develop workplace alcohol programmes which could include:

- Screening for alcohol at the workplace
- Training supervisors to deal appropriately with problem drinkers, and
- Addressing alcohol-enabling factors in company culture.

Programmes such as the above[7] would not only improve the profitability of companies, but would likely benefit individuals working there, their families and the economy of the country in general.

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The management of chemical burns

AB Kotzé

Abstract

Chemical burns are a big concern to the health care provider, affected individuals and industry as a whole. This is due to the fact that they cause severe pain, incapacity and also have the potential to cause total and permanent disability. The skin and eyes are most often affected, but inhalation and ingestion damage also occurs.

In general the aim of emergency treatment is to decontaminate the burn area with copious amounts of water, before standard thermal burn regimens are followed. Some chemicals however pose unique challenges because of the potential threat of systemic toxicity from percutaneous absorption. It is essential that factories and industry have emergency procedures in place to deal with chemical burns. Local facilities should include emergency shower and eye wash equipment. Arrangements with local hospitals / clinics should include the provision of relevant material safety data sheets (MSDS's) and toxicological data.

Chemical burns of the skin

Chemical burns may be considered as a special form of irritant contact dermatitis in which substantial skin necrosis and inflammation result from a one-time, usually brief, exposure to a chemical substance.

Chemical burns most frequently result from accidental exposure to a diverse number of organic and inorganic acids and alkalies. Acids generally damage tissue by coagulating protein through oxidation, reduction, desiccation, or salt formation mechanisms. Alkalies not only coagulate tissue protein by desiccation or salt formation, but they also saponify fats and cause liquefaction necrosis.[1]

Chemical burns may be divided into first-, second- or third-degree chemical burns, depending on the degree of tissue destruction, and are analogous to thermal burns.

Classification of burns

- First degree burns consist of damage to the epidermis only with vasodilation, oedema and pain as in the case of severe sunburn.
- Second degree burns usually have blister formation and there are signs of vital perspiration and hair follicles. The dermis is mainly intact and pain is still sensed.
- Third degree burns include all the skin layers with subcutaneous extension. The skin is pale white or charred with a stiff leathery appearance (eschar formation). The skin is dry, swollen, insensitive to pain and often cracked.

Chemical burns treatment

The aims of emergency treatment are to :

- Decontaminate the affected tissue - skin or eye
- Cool the burn
- Replace fluid losses

Decontamination / cooling

Cooling of all burn wounds by drenching with water is essential for the decontamination of tissue and dissipation of the heat transferred to the tissues. There is evidence that this limits the ultimate depth of the wound, hopefully to that of partial thickness only. It is worth decontaminating the wounds for 20 minutes, or until pain is relieved, if the patient presents within two hours of exposure.

Intravenous (IV) fluid replacement

Intravenous fluid resuscitation is indicated where the burned area exceeds 15% of the body surface area in an adult (Fig 1). If the patient has to wait for more than half an hour from the time of burning to admission to hospital, IV fluids should be started immediately. International preference is for crystalloids only in the first 24 hours. Ringers Lactate or Plasmalyte B are the fluids of choice. Second best would be normal saline.

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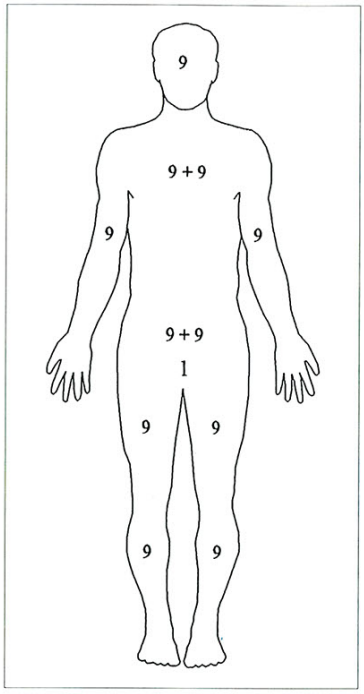


Figure 1: "Rule of nines" Not accurate in a child

Dressings

The aims when dressing a burn wound are firstly to prevent drying out of the wound (which causes the depth of the burn to increase) and secondly, to prevent contamination of the injured tissues. A dressing consisting of tulle gras covered with burn antiseptics such as silver-sulphadiazine (Flamazine) or povidone-iodine (Betadine).

Analgesia should be generous but safe and therefore caution is required until the patient is haemodynamically stable. Intramuscular injection should be avoided due to poor mobilisation during the shocked and oedematous state. Omnopon 20mg (or equivalent) in 20 ml saline given intravenously and titrated to the pain is ideal. A few milligrams are given slowly over some minutes and repeated as necessary. 'Entonox' by demand valve is useful during evacuation and dressings.

Respiratory injury

Most respiratory injuries in burn patients result from the inhalation of toxic products in smoke. Aldehydes and strong acids such as sulphuric acid can be carried in smoke; burning plastic is particularly dangerous. The lungs' response is the development of the "respiratory distress syndrome". It can be rapidly fatal, but may be reversed by intensive care measures, such as positive pressure ventilation, physiotherapy and bronchial washing.[2]

Treatment

Administer oxygen by mask and transfer the patient when cardiovascularly stable to a centre with Intensive Care facilities.

Special management regimens for specific chemical burns

Due to the potential threat of systemic toxicity from percutaneous absorption the following chemicals warrant special management.

Hydrofluoric (HF) acid burns

Cutaneous exposure to weak solutions of HF (below 20%) usually does not result in long-term morbidity, but may cause considerable pain. The typical incident is that of a patient who appears with severe pain, erythema and oedema of a finger or hand. In some cases, blisters may form. Subungual exposure may produce a grey, black or bluish discoloration. Pain may be delayed for 2 to 24 hours after exposure to solutions below 50% concentration.

Higher concentrations (above 50%) rapidly induce pain (immediate or within 1 hour) and may be associated with blister formation and initial erythema, which may later turn white. Liquefaction necrosis and eschar formation with sloughing of tissue may be seen. Tenosynovitis and osteolysis may result from deep penetration of the fluoride ion. There may be some overlap in the clinical presentations of dilute and concentrated exposures depending upon such factors as the duration of exposure, the immediacy and adequacy of first aid measures and whether or not the exposure occurred within the confines of a glove. Gloves may act as occlusive dressings when HF enters through a pinhole, exacerbating the severity of the injury.

Treatment

Cutaneous exposures require immediate removal of all contaminated clothing, thorough water lavage and the expeditious application of a topical treatment. Topical fluoride neutralizing agents such as calcium gluconate should be readily available in the workplace where HF is used.

Medical treatment regimen :

- Wash exposed areas with copious amounts of water.
- Wet dressings with 10 % calcium gluconate gel. Some authors have described the use of a surgical glove as an occlusive dressing over the topical treatment with calcium gluconate.
- If pain persists 10 % calcium gluconate (as found on every emergency trolley) is injected immediately into the lesions and up to one centimetre from them to neutralise the fluoride ion. If pain recurs this is repeated. Use with caution due to cardiac effects.
- Debridement of severe burns may be necessary to prevent ongoing tissue destruction.

Systemic effects

Systemic effects of hydrofluoric acid exposure can be related to a variety of electrolyte abnormalities. These may include hypocalcaemia and hypomagnesaemia due to complexing of these cations by fluoride; hyperkalemia due to extracellular efflux of potassium; hypercalcaemia due to calcium injections and systemic fluorosis. Furthermore alterations of pulmonary or renal cell

function may contribute to hypoxia or acidosis. As a result of these ionic imbalances, cardiac rhythm and hepatic and renal functions may be disturbed. Deaths have been reported associated with profound hypocalcaemia and hypomagnesaemia and hyperkalemia. Management of the systemic effects of hydrofluoric acid exposure is primarily supportive, with treatment of the underlying abnormality. If systemic absorption of significant amounts of fluoride is anticipated, one should add calcium gluconate to intravenous fluids even before calcium levels have been measured. Circumstances that may result in a significant hypocalcaemic risk include:
1. A dermal exposure to 50 % or greater HF concentration to 1% of body surface area (eg. one complete hand)
2. Any dermal exposure of more than 5 % body surface area
3. An inhalation of vapours from 60 % or greater concentration of HF acid solution or
4. Ingestion of HF solutions. Calcium should be infused slowly to avoid inducing cardiac arrhythmias. Twenty millilitres of 10% calcium gluconate should be added to the first litre of fluids, pending reports of calcium levels. Before calcium administration, serum should be drawn. Subsequently, calcium levels should be monitored at frequent intervals (e.g. hourly) to ensure the maintenance of normocalcaemia.[3]

Phenol

Phenol is highly corrosive to the skin and is absorbed rapidly into the body. Systemic toxicity associated with phenolic burns has included cardiac arrhythmias, cardiopulmonary arrest, convulsion, and coma. Lavage with water is not particularly effective in removing residual phenol from the skin surface and polyethylene glycol (PEG) 300 or 400 in 2:1 mixtures of PEG and alcohol have been recommended for skin decontamination.[4]

Phosphorus

Phosphorus ignites upon contact with air and may cause thermal burns when it comes into contact with the skin. Phosphorous burns should be treated as quickly as possible. The recommended treatment consists of washing with 5 percent sodium bicarbonate and 1 percent copper sulfate prior to the removal of any embedded phosphorus particles. Any patient with a significant phosphorus burn should have serum electrolytes, phosphorus and calcium measurements as well as electrocardiographic monitoring.[5]

Alkyl mercury compounds

Alkyl mercury compounds are strong skin irritants and may cause second- or third-degree chemical burns. They are extremely toxic to the central nervous system and fatal neurotoxicity may develop from continued absorption present in blister fluid or necrotic tissue. Blisters and necrotic tissue should therefore be debrided as soon as possible.[6]

Chromic acid

Chromic acid is a strong tissue-oxidizing agent and may produce small, usually painless ulcers of the fingers and hands. Inhalation of its vapours can produce ulceration and perforation of the nasal septum.

Chemical burns of the eye

Chemical burns of the eye represent the most common cause of serious toxic eye injury. The factors determining the extent of ocular injury are numerous. They include the substance's concentration, the final pH of the solution, the duration of exposure, the state of the ocular defence mechanisms (tearing, blinking), and the specific characteristics of the chemical (the anion and cation) itself.

Alkali burns

Contact with an alkali solution of pH greater than 11.5 results in the immediate destruction of corneal epithelial cell membranes. Further penetration allows the alkali to enter the anterior chamber and directly damage the iris, lens, ciliary body, and trabecular meshwork.[7] A rapid increase in intraocular pressure follows. The initial increase in intraocular pressure abates within one hour. The most severely injured eyes may then go on to become hypotonic because of damage of the aqueous-forming structures. To all injured eyes there follows a characteristic anterior-chamber or panocular inflammatory response. This leads to a more profound and prolonged rise in intraocular pressure - a secondary glaucoma.

The ability of the eye to scavenge free radicals is impaired and these destructive agents, along with the collagenases, are thought to be the cause of the ongoing destruction that manifests itself as recurrent epithelial breakdown and ulceration. This tendency towards ulceration is often quite prolonged and, unfortunately, may lead to ulceration, perforation, and loss of the eye months or even years after the injury.

Clinically, immediate pain is caused by the direct alkali stimulation of the corneal unmyelinated nerve endings and the rapid initial rise in intraocular pressure. However, these nerves are destroyed by the alkali, and the cornea rapidly becomes anaesthetised. In

appearance, the cornea becomes translucent or opaque due to corneal oedema, the conjunctiva begins to swell and, depending on the nature, concentration and extent of contact with the alkali, the perilimbal blood vessels may blanch or segment. Because of the ongoing alkali damage, the immediate appearance of the burned eye is an uncertain indicator of the eventual outcome. The appearance of the eye after 24 hours has been found to be useful for prognostic estimation.[8]

Acid burns

Acids generally tend to form insoluble complexes with the ocular surface structures they contact, limiting penetration and deeper ocular injury. Thus, although acid burns may cause ocular disability because of scarring of the lids, conjunctiva, and lacrimal apparatus, they are only rarely associated with the deeper, more prolonged changes seen with alkali burns. Exceptions to this pattern are the injuries caused by concentrated sulfuric acid and hydrofluoric acid. [9]

Ocular exposure to Hydrofluoric (HF) acid

After ocular exposure to HF, immediate lavage with water should be performed in the workplace for at least 15 minutes. Once the patient is brought to medical attention, adequate lavage should be ensured by irrigation with at least 2 litres of water or normal saline. Instillation of a topical anaesthetic may facilitate lavage of the eye. Several drops of 10 % sterile calcium gluconate solution may be advisable after irrigation as a benign method to neutralize any residual fluoride remaining in the eye. Corticosteroid ophthalmic drops may also be useful to minimize inflammation. An ophthalmologist should always be consulted.[10]

Summary

1. Treatment of chemical burns to the skin

All chemical burns need to be washed down with copious amounts of water for 20 minutes. Thereafter dressings and fluid therapy are the same as for burns in general. Phenol, Hydrofluoric acid and Phosphorous burns have their own specific management requirements.

2. Treatment of chemical burns to the eye

- Immediately wash out the eye for 20 minutes with water or a normal saline drip.
- Determine the specific chemical involved.
- Examine for corneal ulceration.
- Treat with corticosteroid eye drops for the first 24 hours when all patients are to be reviewed by an ophthalmologist.

3. It is essential that factories and industry have emergency procedures in place to deal with chemical burns. Local facilities should include emergency shower and eye wash equipment.

4. Arrangements with local hospitals / clinics should include the provision of relevant material safety data sheets (MSDS) and toxicological data.

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HOW MUCH IS HEALTHY?

Healthy eating was once associated with Swiss clinics and coarse muesli. Today it is part of the policy of most governments and international agencies. It is high on the list of consumer concerns and is used as a marketing tool for many food products. This drive toward healthy eating is not without its problems, some real, some potential[1].

The public's perception of the role of sugar in the diet continues to be at odds with scientific fact. In recent years several expert committees have considered the question. ***"Is current sugar consumption within a safe range of intake?"***[2]

A likely explanation for the frequent statement that sugar consumption is excessive is the persistence of the view that disappearance data equates with actual consumption data. Consumption figures are often reported on a per capita basis, calculated from disappearance data, with no allowance made for losses or wastage in food manufacturing or in other aspects of usage. When actual sugar consumption is measured, intake figures are much lower than those calculated when disappearance is measured[2].

What is an acceptable level of sugar intake with regard to nutrient adequacy?
Those at the extremes of sugar intake, like those at the extremes of ANY dietary habit, appear to be less likely to have a balanced diet[3].

Sugar is a concentrated source of energy and in a diet deficient of energy, sugar would make an important contribution to energy intake[4].

NUMBER OF BOYS AND GIRLS WHO HAD MICRONUTRIENT INTAKES OVER OR UNDER THE RDA ACCORDING TO ADDED SUGAR INTAKE (g/MJ)
Rugg-Gunn et al (1991) Empty Calories? *J Human Nutr & Diet* 4:101-111.

Nutrients	Over/ Under RDA	Boys Low Sugar Intake	Boys High Sugar Intake	Girls Low Sugar Intake	Girls High Sugar Intake
Calcium	Over	26	23	23	21
	Under	4	7	7	9
Thiamin	Over	25	25	28	28
	Under	5	5	2	8
Riboflavin	Over	21	21	10	11
	Under	9	9	20	19

*However, in general, it appears that diets containing the highest concentrations of micro- nutrients were achieved by those consuming average amounts of sugars. The available estimates suggest that this corresponds to approximately **14 to 18%** of dietary energy from added sugars*[3].

The image of sugar is changing. From early times when it was highly valued as a spice and a medicine, to the 1970's and 1980's when it was scorned for its alleged contribution to a multitude of health problems. Today, scientific evidence supports the conclusion that **sugar in moderation is not a health risk.** While negative attitudes and folklore about sugar persist, the way is paved towards a more balanced perspective on sugar's role in a healthy diet[6].

Without question, excessively high intakes of sugar, as with other nutrients, whether fat, iron, or even fat-soluble vitamins, are undesirable. Admittedly, reducing sugar intakes in the diets of western populations would not result in ill-health, assuming that there was no subsequent increase in fat consumption. However, to restrict sugar in the diets of poor Third World populations would make for an unwanted fall in energy intake, particularly among the young. No sugar antagonist has addressed the consequence of this advice![5,7]



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Published in the interests of on-going nutrition education by the South African Sugar Association, P.O. Box 374, Durban 4000.

Extract from the seventh national HIV survey of women attending antenatal clinics of the public health services in South Africa October/November 1996

Department of Health

Background

During October/November 1996, the Department of Health conducted the seventh national annual survey in a series of unlinked anonymous surveys in women attending antenatal clinics of the public health services. These surveys were made possible by the good cooperation and support of the provincial coordinators and a number of laboratories, of which the participants of this years' survey are listed in the acknowledgements. A specified number of routine antanatal blood specimens consecutively received during October/November were serologically screened for HIV antibodies after completion of routine tests. A summary of the results of the seventh national HIV survey are hereby presented.

Results

Based on a sample of 15 044 specimens screened, it is estimated that 14.07% of the women attending antenatal clinics of the public health services nationally were infected with HIV by the end of 1996. In 1995, the prevalence level of HIV infection in this group was 10.44%.

Prevalence rates (%) and 95% confidence intervals (CI) based on the seventh national HIV survey (1996) and comparative figures of the sixth national survey conducted in 1995

	1996			1995		
	Est (HIV+)	95%CI		Est (HIV+)	95% CI	
		Lower limit	Upper limit		Lower limit	Upper limit
South Africa	14.07	13.35	14.79	10.44	9.86	11.02
Provinces						
Western Cape	1.65	1.06	2.24	1.66	0.94	2.38
Eastern Cape	8.10	6.92	9.28	6.00	4.89	7.11
Northern Cape	6.47	5.05	7.89	5.34	4.10	6.58
Free State	17.49	15.57	19.41	11.03	9.44	12.62
KwaZulu-Natal	19.90	17.68	22.12	18.23	16.31	20.15
Mpumalanga	15.77	14.34	17.20	16.18	14.40	17.96
Northern Province	7.96	6.24	9.68	4.89	4.00	5.78
Gauteng	15.49	13.58	17.40	12.03	10.36	13.70
North West	25.13	22.31	27.95	8.30	6.67	9.92
Age group						
<20	12.78	11.33	14.23	9.50	8.15	10.85
20 - 24	17.52	16.28	18.76	13.12	11.97	14.27
25 - 29	15.21	13.93	16.49	11.03	9.81	12.25
30 - 34	12.13	10.67	13.59	8.05	6.79	9.31
35 - 39	9.67	7.85	11.49	7.37	5.47	9.28
40 - 44	9.94	5.76	14.12	4.36	1.96	6.76
45 - 49	5.83	2.25	9.41	7.45	0.00	19.36

THIS SECTION HAS BEEN SPONSORED BY: BOEHRINGER MANNHEIM

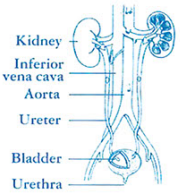
YOU and Urinalysis

Introductory Anatomy and Physiology of the Renal System

THE RENAL SYSTEM

The renal system consists of:

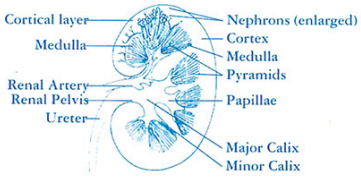
- Two kidneys
- Two ureters
- Bladder
- Urethra



The Kidneys

- Bean-shaped
- Size: ± 12 cm x 6 cm
- Located: under the lower ribs on either side of vertebrae

A cross section of the kidney, showing:



- OUTER CORTEX
  - contains glomeruli
- INNER MEDULLA
  - 8 – 18 'pyramids'
  - composed of tubules
- RENAL PELVIS
  - collecting ducts empty urine into pelvis and from here it passes to ureters.

FUNCTIONS:

- Filtration
  - toxic and waste products eg urea.
  - substances exceeding a threshold value, eg glucose.
- Regulation
  - fluid
  - electrolytes
  - acid base balance
  - red blood cell development
- Production
  - Hormones
  - Prostaglandins



The Ureters

- Length 24 – 34 cm.
- From renal pelvis to bladder.
- Consists of a hollow muscular tube.
- Function:
  - Transportation of urine to the bladder by peristaltic activity of the muscles.

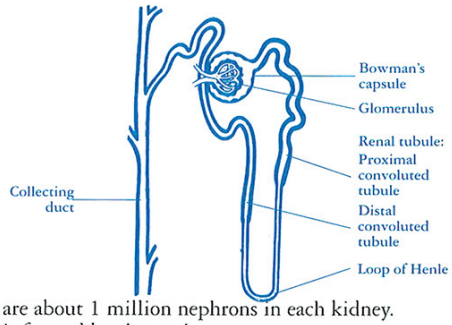
The Bladder

- Located in the pelvic cavity.
- Elastic, muscular, hollow organ.
- Ureters and urethra are connected to the bladder.
- Function:
  - Collection and storage of urine until micturition reflex occurs (urine volume greater than 150 ml).
  - Discharge of urine.

The Urethra

- Length in female – 4 cm and male – 24 cm.
- Urine is finally excreted via urethra.
- Function:
  - Discharge of urine from the bladder.

Functional Unit of the Kidney is the Nephron

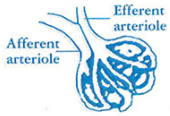


- There are about 1 million nephrons in each kidney.
- Urine is formed by the nephrons.

The renal TUBULE consists of a long tortuous tube.

The NEPHRON consists of a GLOMERULUS and a TUBULE.

The GLOMERULUS:



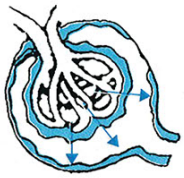
The afferent arteriole forms numerous loops which together make a 'tuft' of small blood vessels.

The efferent arteriole is much narrower in diameter than the afferent, and transports blood away from the glomerulus.

Formation of Urine

GLOMERULUS

- The diameter of the afferent arteriole is greater than the diameter of the efferent arteriole.
- This raises the pressure in glomerulus.
- The pressure forces plasma (without protein, cells) to filter in the Bowman's Capsule.



BOWMANS CAPSULE

The BOWMANS CAPSULE surrounds the Glomerulus closely.

The filtrate (primary urine) contains all blood constituents except blood cells and proteins.

Necessary substances are reabsorbed into the body in the tubules while waste products and toxins are excreted.

PROXIMAL CONVOLUTED TUBULE

- Active reabsorption of Glucose, Amino Acids, Uric Acid and Some electrolytes.
- Secretion of hydrogen ions

LOOP OF HENLE

- Reabsorption of water and sodium chloride

DISTAL CONVOLUTED TUBULE

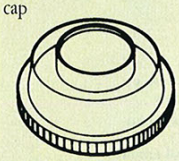
- Reabsorption of water
- Secretion of ammonia and hydrogen ions

COLLECTING DUCT

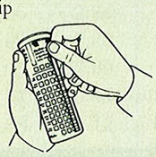
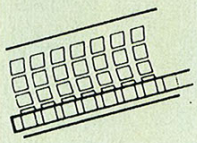
- Reabsorption of sodium, water, urea

The urine, which is now formed passes from the collecting duct to the pelvis of the kidney and from there to the bladder to be excreted.

Introducing the Boehringer Mannheim Urinalysis Strip

FEATURE	ACTION	BENEFIT
Strip handle is on top of strip as strip is being compared to colour chart 	• Prevents soiling of hands while reading colour chart	• Provides reagent strip handling convenience
Pop-top cap on vial 	• Pops open with one hand motion	• Provides convenient opening
Desiccant is secured in vial cap 	• Prevents desiccant from being misplaced • Gets to humidity before humidity gets down to strips	• Assures strip stability and accurate test results
Aluminium vial 	• Unbreakable • Protects strips from light	• Provides convenience • Assures strip stability and accurate test results

Boehringer Mannheim Urinalysis Test Strips – *Confidence without Compromise*

FEATURE	ACTION	BENEFIT
In addition … Stable reagent formulation; COMBUR strips are stable in the original capped vial until the listed expiry date. Stable for up to 24 months after opening.	• Eliminates marking the opening date on vial • Longer strip life eliminates out of date strips • Stable chemistry provides accurate results	• Convenience • Saves time and money • Provides accurate results and better quality care
60 second reading time 	"For convenience all values on the strip may be read at 60 sec. after immersion into the urine." COMBUR strips are stable for up to 2 minutes after immersion into the urine.	Maximum reading convenience Accurate results
COMBUR strips are stable for up to 2 minutes after immersion into the urine. COMBUR strips have improved stability of colour drift		Provides maximum reading convenience and accurate results for better quality patient care
Colour chart on vial runs vertically from the top down and parallel to test strip 	Allows tester to compare test strip to colour chart without having to rotate vial to view each parameter	Provides convenient reagent strip handling
Colour blocks on colour chart are spaced the same distance apart as they are on the test strip 	Allows tester to compare test strip to colour chart without moving the strip up and down the colour chart	Provides convenient reading and saves time.

PARAMETER	FEATURE	ACTION	BENEFIT
leucocytes	• superior reagent formulation • opened expiration date is same as unopened date • longer shelf life	• detects lysed leucocytes • no glucose interference • no specific gravity interference • customer doesn't have to mark opening date on vial • eliminates out of date strips	• eliminates missed WBC's that have lysed and can't be seen under microscope. • Provides more accurate results and better quality care • provides convenience • saves money and time
nitrite	• greater sensitivity	• provides for detection of significant bacteria at lower levels • no specific gravity interference	• more accurate results and better quality care
pH	• no runover from protein pad	• eliminates false lowering of results	• provides more accurate results and better quality care
protein	• clearer colours • greater sensitivity	• easier to read • no interference from highly alkaline or highly buffered urines • provides for detection of significant protein at lower levels	• assures reading convenience • provides more accurate results and better quality care
glucose	• superior reagent formulation • greater sensitivity	• no ketone interference • no ascorbic acid interference • detects lower levels of glucose of clinical significance • no specific gravity interference • no interference due to temperature variations	• accurate results and better quality patient care • better quality patient care • more accurate results and better quality patient care
ketones	• specific for acetone as well as acetoacetic acid	• no missed ketones, detects acetone where urine is retained in bladder or is left standing and acetoacetic acid turns into acetone	• more accurate results and better quality patient care • early detection of ketoacidosis
urobilinogen	• Kutter et al. test method	• tests for urobilinogen with less false negatives and positives than Erlich's aldehyde reaction	• less false negatives and false positives • more accurate results and better quality patient care
bilirubin	• greater sensitivity	• detects lower levels of bilirubin	• more accurate results and better quality patient care
blood	• iodate scavenger pad • superior reagent formulation • greater sensitivity	• no ascorbic acid interference • no specific gravity interference • no elevated protein interference • detects blood at lower levels	• differentiates between Hb and RBC • eliminates missed haematuria due to lysed RBC which cannot be seen under a microscope

The UNIQUE construction of the COMBUR strip

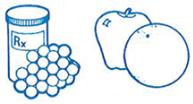
- A firm plastic strip holds the reagent patches
  - this plastic will not interfere with readings
  - urine will not be absorbed onto this carrier foil

absorbent pads underline reagent pads



- An absorbent pad underlies each reagent pad
  - this prevents chemical runover from one reagent pad to another
  - excess urine, which could affect results, is absorbed

blood-iodate scavenger patch on blood pad



- The reagent pad
  - each reagent pad is highly sensitive to pathological substances in urine
  - each pad has a high specificity
- A 'scavenger pad' overlies the reagent pad where necessary
  - this removes substances from the sample which could interfere with the test
- A fine nylon mesh covers the pads and is laminated to the foil
  - protects the pads from abrasion
  - contamination is minimised
  - glue is not used (could interfere with absorbency)
  - ensures rapid penetration of urine onto the test pad
  - increases diffusion of urine on test pad

nylon-mesh layer



- Test patches are spaced sufficiently to prevent overspill

Every urine pathology test you do, no matter how routine, has the potential to yield vital clues to an individual's state of health.

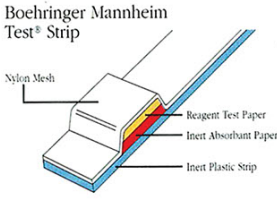
Performing and interpreting urine tests requires an investment in time and money.

To get the best return from this investment, it is imperative that the reagents used for urine testing are the

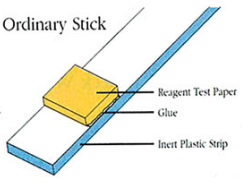
- most sensitive,
- most specific and
- most stable available.

If such a test is also the easiest to use, and does not cost extra, why use anything but Boehringer Mannheim urine test strips?

Boehringer Mannheim Test® Strip



Ordinary Stick



Did you know?

All urine strips are not the same!

Choose Quality

Choose COMBUR

Diagnosis, Screening and Cost Saving

There is a wealth of information in every urine test:

▲ *AID TO DIAGNOSIS*

- ▲ the presence/absence of substances can be a valuable aid to diagnosis.
- ▲ on the spot diagnosis is possible and treatment can be initiated immediately

●● *SCREENING*

- ●● detection of substances in the urine may alert the health care worker to investigate further for disease.
- ●● early complications can be detected and treated timeously.

SS *COST SAVINGS*

- SS the use of easy to use, inexpensive but reliable urine strips will allow early diagnosis.
- SS this eradicates the high cost of treating established or advanced disease.
- SS complications and the high costs involved are minimised.
- SS the need for costly laboratory tests are reduced.

THE TEST STRIP AS AN AID TO DIAGNOSIS AND AS A SCREENING TOOL

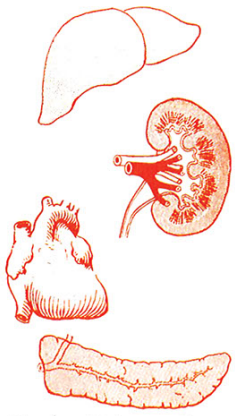
Routine urine tests utilising the **Boehringer Mannheim Combur 10 Strip** will highlight possible disease states.

HEPATIC DISEASES

RENAL DISEASES

CARDIAC DISEASES

METABOLIC DISEASES



If a patch on the Boehringer Mannheim Combur Strip records an abnormal result, further investigation may be necessary.

SG	≺ Always report
pH	≺ Always report
Leu	≺ Send urine for MC&S (Microscopy, culture and sensitivity). Check nitrite; blood; protein
Nit	≺ Send urine for MC&S (Microscopy, culture and sensitivity). Check WBC; blood; protein
Prot	≺ Check WBC; nitrite; blood. Highlight to medical team
Gluc	≺ Check blood glucose level. Check ketone patch. Report to medical team
Ket	≺ Check urine and blood for glucose level Report to medical team
Urob	≺ Highlight for medical team's attention
Bil	≺ Highlight for medical team's attention
Blood	≺ Send urine for MC&S (Microscopy, culture and sensitivity). Check for protein; WBC; nitrite.

NB: ALL ABNORMAL FINDINGS *MUST* BE RECORDED AND REPORTED TO MEDICAL TEAM.

PHYSICAL EXAMINATION OF URINE GIVES YOU ADDITIONAL INFORMATION ABOUT HEALTH AND DISEASE

URINE COLOUR

Urine is normally yellow but may change due to various substances:

1. **PALE, COLOURLESS**
   - Increased fluid consumption
   - diabetes insipidus
   - diabetes mellitus
2. **DARK YELLOW, AMBER**
   - decreased fluid consumption
   - dehydration
   - presence
     - ★ bilirubin
     - ★ acriflavine
     - ★ vit A
     - ★ certain medicines
3. **YELLOW-GREEN/BROWN**
   - Bilirubin
   - rhubarb
4. **BLUEISH GREEN/GREEN**
   - infections
   - certain medications
5. **PINK-RED**
   - blood (exclude external contaminations)
   - porphyrins
   - beets
   - certain medications
6. **BROWN-BLACK**
   - blood
   - melanin
   - certain medications

URINE TRANSPARENCY

Urine is usually clear. However, the following may cause cloudiness, especially if the urine is left to stand for some time.

- ★ blood cells
- ★ yeast
- ★ bacteria
- ★ sperm/ prostatic fluid
- ★ kidney stones



URINE VOLUME

Although about 180 litres of fluid passes through the kidneys in 24 hours, only 1 – $1^1/_2$ litres is excreted in the urine. NORMAL VOLUME: 1 – $1^1/_2$ litres in 24 hours.

ABNORMAL VOLUMES:

1. POLYURIA

Consistent excretion of large quantities of urine ie. more than 2 litres/24 hours.

POSSIBLE CAUSES:

- excess fluid intake
- diabetes insipidus
- diabetes mellitus
- some renal diseases



2. OLIGURIA

Consistent excretion of small amounts of urine, ie. less than 400 ml/24 hours.

POSSIBLE CAUSES:

- poor blood supply (eg. dehydration/shock)
- acute kidney disease
- end stage kidney disease
- urinary tract obstruction



3. ANURIA

Complete absence of urine excretion.

POSSIBLE CAUSES:

- Acute renal failure
- Acute glomerulonephitis
- Urinary tract obstruction
- Haemolytic transfusion reaction



URINE ODOUR

Urine odour is usually caused by the ammonia content. Abnormal odour may be caused by:

- Ageing of urine
- Disease
- Diet



STRONG AMMONIA ODOUR:

May indicate bacterial activity:

- Stale urine
- Urinary tract infection



SWEET FRUITY ODOUR:

May indicate the presence of ketones

- Diabetes mellitus
- Vomiting/Diarrhoea
- Starvation
- Strenuous exercise



OTHER ODOURS:

May be associated with ingested food:

eg. asparagus



Test Parameters

SPECIFIC GRAVITY

Specific Gravity tells us about the ability of the kidney to concentrate or dilute the urine. It may also indicate compliance in prevention of urolithiasis

NORMAL RANGE: 1.020 – 1.030 g/ml

MEASURING RANGE: 1.000 – 1.030 g/ml

ABNORMAL VALUES:

◆ **REDUCED SG:**

The urine is very dilute and light in colour. This may be found in:

- diabetes insipidus
- hyperaldosteronism
- renal diseases where the kidney cannot concentrate the urine sufficiently (eg. glomerulonephritis)
- some medications
- excess fluid intake
- diabetes mellitus

◆ **RAISED SG:**

The urine is very concentrated and dark in colour.

- dehydration
- diabetes mellitus
- fluid deprivation
- diarrhoea and vomiting
- burns
- haemorrhage
- nephrosis
- fever
- adrenal insufficiency
- liver disease
- congestive cardiac failure

◆ CONSTANT SG:

The urine remains at a constant SG which equals that of plasma.

- chronic renal disorder.

NB: Combur-SG patches are NOT affected by glucose, urea, protein or creatinine.

ACTION TO TAKE IF ABNORMAL VALUES ARE FOUND

1. RECORD finding in contrasting colour or highlight to draw attention.
2. REPORT to the medical team.
3. CHECK pH and protein.

LEUCOCYTES

The presence of white blood cells (leucocytes) in the urine is a cardinal symptom of urinary tract infection.

NORMAL RANGE: <10 leu/µl

MEASURING RANGE: 0 – 500 leu/µl

ABNORMAL VALUES:

■ normal range	<10	leu/µl
■ borderline concentration	10 – 20	leu/µl
■ pathological concentration	>20	leu/µl

(leucocytes are more reliably detected than bacteria in urine).

◆ **LEUCOCYTURIA**

The presence of white blood cells in the urine indicates a renal infection:

- pyelonephritis
- cystitis
- urethritis
- renal abscess
- prostatitis
- renal tuberculosis (may give abacterial leucocyturia)
- trichomonas
- bilharzia
- calculi
- also analgesic nephropathy

It is essential to exclude contamination from the genital area.

Leucocytes may be destroyed:

- if specimen is left to stand for more than 4 hours
- if pH is >8
- if SG is very low <1.010
- if antibacterial therapy has been initiated

NB: Combur Leucocyte patches are able to detect lysed (destroyed) as well as intact white cells. (Lysed cells will not be seen on microscopic examination).

ACTION TO TAKE IF ABNORMAL VALUES ARE FOUND

1. RECORD finding in *contrasting colour* to draw attention.
2. REPORT to the medical team.
3. CHECK pH, protein and blood.
4. Send urine specimen for microscopy, culture and sensitivity.

NITRITE

All urine contains nitrate. Nitrate will be changed to nitrite if certain bacteria are present. This suggests an infection.

NORMAL RANGE: 0 (zero)
MEASURING RANGE: negative to positive (±>7µmol/l)

ABNORMAL VALUES:

Any discoloration of the test patch indicates a positive reaction.

◆ **NITRITE IN URINE**

Indicates an infection of the urinary tract.

- cystitis
- urethritis
- pyelonephritis
- prostatitis

The following organisms are Nitrite forming:

E Coli	Aerobacter	Enterococci
Proteus	Citrobacter	Staphylococci
Klebsiella	Salmonella	Pseudomonas

It is essential to exclude contamination from the genital area.

A false negative result may be caused by:

- starvation (low intake of nitrate containing food)
- urine retention time in bladder too short
- antibiotic treatment.

NB: Combur nitrite patches are NOT affected by ascorbic acid.

ACTION TO TAKE IF ABNORMAL VALUES ARE FOUND

1. RECORD finding in contrasting colour to draw attention.
2. REPORT to the medical team.
3. CHECK urine for pH, protein leucocytes and blood.
4. Send urine specimen for microscopy, culture and sensitivity.

PROTEIN

Protein is not a normal constituent of urine. Proteinuria (protein in urine) is a frequent but non-specific indicator of renal disease.

NORMAL RANGE: 0 – .15 g/l (0 – 150 mg/dl)
MEASURING RANGE: neg: 0.3 – 5 g/l (30 – 500 mg/dl)

ABNORMAL VALUES:

◆ **BENIGN PROTEINURIA (NO disease)**

(First morning urine clear; protein appears during the day).
Benign proteinuria may be caused by:

- posture
- exercise
- emotional stress
- sudden pain or shock
- temperature extremes
- steroids
- pregnancy
- certain drugs

◆ **PATHOLOGICAL PROTEINURIA**

■ ***EXTRA-RENAL PROTEINURIA***

(Disappears when the disease is treated)

- cardiac insufficiency
- myocardial infarct
- febrile states
- pre-eclampsia
- nephrotoxic drugs
- colic
- hypertension
- bilharzia
- hypokalaemia
- gout

■ ***RENAL PROTEINURIA***

(Persists day and night)

- glomerulonephritis
- pyelonephritis
- glomerulosclerosis
- nephrotic syndrome
- renal tuberculosis
- gouty kidney
- bilharzia
- cystic kidneys
- nephrotoxic drugs

■ ***POSTRENAL PROTEINURIA***

- cystitis
- bleeding of urinary tract
- urethritis

It is essential to exclude contamination from the genital area.

ACTION TO TAKE IF ABNORMAL VALUES ARE FOUND

1. RECORD finding in contrasting colour to draw attention.
2. REPORT to the medical team.
3. CHECK pH, leucocytes, nitrites and blood.
4. Send urine specimen for microscopy, culture and sensitivity.

pH

This test determines the acidity or alkalinity of the urine.

NORMAL RANGE: 5 – 6 (up to 8)
MEASURING RANGE: 5 – 9

ABNORMAL VALUES:

◆ **PERSISTENTLY ALKALINE URINE**

pH > 6 : 7 – 8

Caution: This may be caused by a vegetarian diet and is NOT pathological. Causes include:

- urinary tract infection
- renal failure
- pyloric stenosis
- vomiting
- alkalosis (metabolic or respiratory)
- anorexia nervosa
- bulimia
- alkalizing drugs

◆ **PERSISTENTLY ACID URINE**

pH < 6 : 5 – 6

Caution: This may be caused by a high protein diet and is NOT pathological. Causes include:

- diarrhoea
- malabsorption syndromes
- metabolic or respiratory acidosis
- diabetic ketoacidosis
- cardiac failure
- dehydration
- fever
- phenacetin intake
- starvation
- acidifying drugs

GLUCOSE

When the blood glucose level exceeds the renal threshold, (±10 mmol/l) glucose is excreted in the urine.

NORMAL RANGE: 0 – 0.8 mmol/l (0 – 15 mg/dl)
MEASURING RANGE: normal, 2.8 – 55 mmol/l (5 – 1 000 mg/dl)

ABNORMAL VALUES:

High levels of sugar in the urine are usually caused by diabetes mellitus. However, other causes must be considered.

◆ **DIABETOGENIC**

(glycosuria related to diabetes mellitus)

- diagnosis of diabetes mellitus
- poor stabilisation of diabetes mellitus
- diabetes mellitus out of control
- inappropriate treatment of diabetes mellitus

◆ **RENAL GLYCOSURIA**

(the kidney tubule does not reabsorb sufficient glucose from the filtrate)

- pregnancy
- reduced renal functioning
- acute renal failure
- poisoning, causing reduced tubular reabsorption
- low renal threshold (eg. old age; idiopathic)

◆ **ALIMENTARY CAUSES**

(excessive intake of carbohydrate)

- Glucose Tolerance Test
- Carbohydrate rich diet

◆ **HORMONAL/METABOLIC DISEASES**

- haemachromatosis
- hyperthyroidism
- phaeochromocytomas
- Cushings syndrome

◆ **ENVIRONMENTAL**

- sudden shock or pain
- sudden extreme changes in temperature
- cortisone treatment
- infusion

NB: Ascorbic acid and ketones do NOT interfere with the results on Combur Strips.

ACTION TO TAKE IF ABNORMAL VALUES ARE FOUND

1. RECORD finding in contrasting colour to draw attention.
2. REPORT to the medical team.
3. CHECK urine for ketones (if both glucose and ketones are detected, immediate action is required).
4. CHECK blood glucose using Accutrend meter or Reflolux meter.

KETONES

When fat, rather than glucose, is utilised in the body for energy, ketone bodies are formed. They are rapidly excreted in the urine.

NORMAL RANGE: nil

MEASURING RANGE: neg, 0 – 3 mmol/l (0, +, ++, +++)

ABNORMAL VALUES:

◆ **DIABETES RELATED:**

- diabetic ketoacidosis (insufficient insulin)

◆ **GASTRO-INTESTINAL:**

- vomiting/diarrhoea
- Acetonemic emesis in babies
- weight reducing diets
- Hyperemesis gravidarum
- Anorexia/Bulimia
- starvation

◆ **OTHER**

- severe stress
- fever due to infection
- eclampsia
- excessive exercise

NB: This is a very sensitive patch which reacts to BOTH acetone and acetoacetic acid in urine.

ACTION TO TAKE IF ABNORMAL VALUES ARE FOUND

1. RECORD finding in contrasting colour to draw attention.
2. REPORT to the medical team.
3. CHECK urine for glucose.

   (If both glucose and ketones are detected, immediate action is required).

UROBILINOGEN

Urobilinogen is formed in the intestines from bilirubin. It is absorbed into the blood and passes to the liver, where it is degraded.

NORMAL RANGE: <17µmol/l (<1mg/dl)

MEASURING RANGE: normal, 17 – 200µmol/l (1 – 12mg/100ml)

ABNORMAL VALUES:

RAISED VALUES:

◆ *OVERBURDENING OF LIVER*

- haemolytic anaemia
- pernicious anaemia
- intravascular haemolysis
- increased putrefaction
- excess Haemoglobin breakdown
- reabsorption of large haematomas
- increased production of urobilinogen in the intestines
- ileus
- constipation
- enterocolitis
- sickle cell anaemia

◆ *RESTRICTED HEPATIC FUNCTION*

- viral hepatitis
- hepatic congestion or alcohol
- Carbon Monoxide poisoning
- liver damage from drugs, poisons
- chronic hepatitis
- liver cirrhosis
- carcinoma of liver

◆ *CHOLANGITIS*

- increased urobilinogen production in the biliary tract.

LOWER VALUES

- Failure of bile production
- Biliary obstruction
- Inhibition of intestinal flora

ACTION TO TAKE IF ABNORMAL VALUES ARE FOUND

1. RECORD finding in contrasting colour to draw attention.
2. REPORT to the medical team.
3. INVESTIGATE further for cause.

BILIRUBIN

Haemoglobin is broken down in the liver and reticulo-endothelial system to bilirubin. In the liver bilirubin is conjugated (joined) to Glucuronic acid to form conjugated bilirubin.

Unconjugated bilirubin – is not soluble in water and is therefore not excreted in urine.

Conjugated bilirubin – is soluble in water and is excreted in the urine.

NORMAL RANGE: up to 3 µmol/l (up to .2 mg/dl)

MEASURING RANGE: neg: 9 – 35 µmol/l (0.5 – 2 mg/100 ml)
0, +, ++, +++

ABNORMAL VALUES:

Jaundice may develop because of problems before the bilirubin reaches the liver, problems in the liver, or after it has left the liver.

◆ **PREHAPTIC**

Because it has not yet reached the liver, there is an excess of unconjugated bilirubin and none appears in the urine.

- over production of bilirubin
  - haemolytic anaemia
  - intravascular haemolysis
  - pernicious anaemia
- retention of bilirubin
- Crigter Najjar syndrome
- icterus neonatorum
- Dubin Johnson syndrome

◆ **HEPATIC JAUNDICE**

This is caused by an intrahepatic biliary obstruction or hepatocellular damage

- acute/chronic hepatitis
- tumours
- cirrhosis
- trauma

◆ **POST HEPATIC**

This will be caused by a biliary tree obstruction

- gallstones
- tumours
- trauma
- infections

ACTION TO TAKE IF ABNORMAL VALUES ARE FOUND

1. RECORD finding in contrasting colour to draw attention.
2. REPORT to the medical team.
3. INVESTIGATE further for cause.

BLOOD

The detection of red blood cells or haemoglobin in the urine is always of pathological significance.

NORMAL RANGE: <3 ery/µl

MEASURING RANGE: Ery: neg, ca 5-10 to 250 Ery/µl
Hb: neg, ca 10 to 250 Ery/µl

ABNORMAL VALUES:

The Combur test is sensitive to the presence of intact red cells, haemoglobin or myoglobin.

◆ **HAEMATURIA** (blood in urine)

RENAL:

- Kidney stones
- Kidney or renal tract tumours
- Kidney or renal tract infections
  - glomerulonephritis
  - pyelonephritis
  - cystitis
  - urethritis
- Glomerulosclerosis
- Renal tuberculosis
- Polycystic kidneys
- Renal infarction
- Severe Renal or Urinary Tract Trauma

BLOOD:

- sickle cell anaemia
- haemophilia

OTHER:

- Malaria
- Bilharzia

◆ **HAEMOGLOBINURIA (Hb in urine)**

- intravascular haemolysis
- breakdown of red cells
- haemolytic diseases
- incompatible blood transfusions
- severe vitamin deficiency (Vit C or Vit K)
- severe poisoning
- burns
- excess exercise
- drugs

◆ **MYOGLOBINURIA (myoglobin in urine)**

- muscular
  - physical exertion
  - muscle damage
  - myopathics
  - burns
- cardiac
  - myocardial infarct

NB: Combur blood patches are NOT affected by ascorbic acid.

ACTION TO TAKE IF ABNORMAL VALUES ARE FOUND

1. RECORD finding in contrasting colour to draw attention.
2. REPORT to the medical team.
3. INVESTIGATE further and obtain medical history.

Visual Urinalysis Technique

Boehringer Mannheim Test® Strips are easy to use and designed to give accurate results – test after test.

To gain the full benefit from the advantages of using Boehringer Mannheim Test® Strips, the importance of good technique cannot be stressed too much.



Urine samples should be as fresh as possible and well mixed.

1



Open vial by pressing upwards with thumb and remove strip

2



Replace cap on vial.

3



Briefly (no longer than 1 second) dip the test strip into the urine to wet all test zones.

4



Withdraw strip and wipe the edge along the rim of the container to remove excess urine.

5



Compare the test zones with the colour scale on the label at 60 seconds for semi-quantitative results. The colours are stable for a further minute at least, thus giving ample reading tie.

6

Automated Urinalysis Urilux®

URINALYSIS YESTERDAY

Urinalysis is essential in any medical setting, whether emergecy, acute, medium term or chronic care.

Urine has been evaluated since the dawn of medicine, and the ancients noted the urine colour, volume and odour as a diagnostic tool and to evaluate treatments. They also noted the attraction of urine for insects such as bees and ants to establish the presence of glycosuria.

Gradually, more sophisticated methods of urinalysis were developed, culminating in the highly sophisticated Combur® range of urine test strips.

URINALYSIS TODAY

The Combur® range of urine strips eradicated many of the user problems with urinalysis, such as irregular timing of individual patches, leaking and flooding of patches, and individual colour interpretations.

However, any test which uses strip technology and which relies on a visual interpretation of the results is wholly dependent on the accuracy of the user.

In keeping with our philosophy to remain in the forefront of technology, a cost effective alternative to visual evaluation of urinalysis has been developed.

URINALYSIS 2000

The Urilux® is *easy* to operate and gives *reliable* results.

The cost-effective alternative to visual evaluation.

Urilux® is the smallest member of Boehringer Mannheim's urinalysis system family.

Urilux® improves standardisation of urinalysis measurement

Fast and easy handling.

Timing of the test, measurement, calculation of results and the printout *are all automatic.*



THE FUTURE IS NOW

Abnormal results at a glance.

Urilux® flags all abnormal results. You can see them immediately on the LED display, or on the printout.

Results can be printed in *conventional, arbitrary or SI units.*

Reliable performance

You should use your Urilux® with Boehringer Mannheim's superior quality Combur 10 Test M® reagent strips.

SECURITY

Safety measures.

Calibrate your Urilux® with Control-Test M strips to ensure that your results are consistent and to eradicate errors.

In-built check functions will detect and indicate errors in handling or instrument failure.

Minimal maintenance.

All parts are fully removable and are easy to clean.

Professional qualifications in Occupational Hygiene, BEBOH modules and examinations: Part 1

DW Stanton

The British Examining Board in Occupational Hygiene (BEBOH) modules and examinations are now available in South Africa and will play a very important part to raise the standards of occupational hygiene certification and practice. Part 1 of this paper gives some background information on professional qualifications in occupational hygiene and looks in particular at the American Board of Industrial Hygiene (ABIH), BEBOH and The Institute of Occupational Hygienists of Southern Africa (IOHSA) requirements. Part 2 of this paper, in the next edition of Occupational Health Southern Africa, will cover the different BEBOH modules, the courses and examinations available.

The American Board of Industrial Hygiene (ABIH)

Organizations to improve the practice and educational standards of professionals in occupational hygiene have existed for many years. The American Board of Industrial Hygiene (ABIH) has its origins in 1956 when the Board of Directors of the American Industrial Hygiene Association (AIHA) appointed an *ad hoc* Committee on Certification in the field of Industrial Hygiene[1]. In 1958 the American Conference of Governmental Industrial Hygienists (ACGIH) was invited to join the AIHA in initiating a certification programme. The ABIH was formed in 1960 and the first certification examinations were held in Cincinnati, Ohio in 1963. Individuals passing the Certified Industrial Hygienist (CIH) examination become members of the American Academy of Industrial Hygiene (AAIH).

The British Examining Board in Occupational Hygiene (BEBOH)

In 1967 the British Occupational Hygiene Society (BOHS) Council approved the establishment of the British Examining Board in Occupational Hygiene. The aims of the Board were stated to be the establishment of recognised standards of competency in the practice of occupational hygiene and to certify the attainment of these standards by individuals. At an early stage the Board saw the need for at least two levels of attainment [2]. The senior grade was envisaged to be that of a graduate or equivalent who could be expected by an employer to be capable of practising comprehensive occupational hygiene at a professional level, and without the need for other professional supervision. It was considered that a practitioner would require five years' responsible experience to attain this level of competence. A more junior grade was also foreseen, aimed at those who had attained a scientific education of a General Certificate of Education (GCE) A-level standard and who were engaged in carrying out occupational hygiene measurements - normally under the direction of a hygienist qualified at the senior level. A period of three years' practical experience would be required for this level of attainment. It was anticipated that people in this group would often wish to attain professional status in due course, and hence develop skills in determining remedial actions. The two awards proposed were the Diploma of Professional Competence in Comprehensive Occupational Hygiene, and the Certificate of Operational Competence in Comprehensive Occupational Hygiene.

By 1975 it became apparent to the Board that there was a need for a lower level of qualification, as there were by now a considerable number of persons of junior status who were carrying out some occupational hygiene activities, but did not have the educational attainments to qualify them for admission in the Certificate

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Examination. These technicians were often engaged in a limited field of activity and could not, in any case, be classified as being in comprehensive practice. A scheme was therefore introduced whereby approved courses could be offered by colleges, covering an instruction period of sixty hours, and at the end of which the Board's Preliminary Certificate Examination could be attempted. Syllabuses were prepared eventually for thirteen sections of the comprehensive practice syllabus including toxic metals; harmful dusts, liquids, vapours, gases and mists; asbestos sampling and analysis; general principles of workplace control; noise and vibration; thermal environment, etc.

This scheme proved outstandingly successful and was subsequently amended to provide an incentive to practitioners to widen their field of knowledge by enabling the holders of six appropriately grouped Preliminary Certificates (P.Certs) to be exempted from the written Certificate Core Examination.

The need for the hygienist to keep up to date with current developments in a formal way has promoted the need for Continuous Professional Development (CPD). It is a continuous process to keep abreast of the changes in this rapidly developing Occupational Health and Safety (OH&S) field. The OH&S profession has long reached a stage where basic or initial qualifications are no longer sufficient for a long term occupation. Maintaining competence, or closing the competence gap, must now be regarded as a crucial fact of professional life. The ABIH introduced their Certification Maintenance Programme in 1979 and in recent years has made the requirements for Continuing Education Units (CEUs) and re-certification more stringent. BEBOH currently has a voluntary scheme in place which will be mandatory from 1999. A summary of occupational hygiene developments leading to professional qualifications in the USA, UK and RSA is given in Table I.

Table I Background to developments in professional qualifications in occupational hygiene

USA	
1918	Harvard University Education/Research Program Leading to an Advanced Degree in Industrial Hygiene
1938	Formation of the NCGIH (National Conference of Governmental Industrial Hygienists) - name changed in 1946 to the ACGIH
1939	AIHA formed
1960	ABIH (Formed by the AIHA and the ACGIH to certify industrial hygienists)
1963	ABIH First Certification Examination
1977	National Institute for Occupational Safety and Health (NIOSH) establishes Educational Resource Center (ERC) program for federally supported graduate education in OH&S
1979	ABIH Certification Maintenance Program
UK	
1953	BOHS formed
1967	BEBOH (Formed under the BOHS)
1975	IOH formed (Institute of Occupational Hygienists)
1978	BERBOH (Examination and Registration - BOHS and IOH representatives on the Board)
1991	BEBOH becomes the Examination Arm of IOH (Award holders only on the Board)
1995	BEBOH pilot voluntary Continuous Professional Development (CPD) scheme
1999	BEBOH CPD to become compulsory (Certification Maintenance)
RSA	
1975	Inclusion of occupational hygiene subjects in the National Diploma: Public Health
1983	OHASA formed (Occupational Hygiene Association of South Africa - name changed in 1996 to the Occupational Hygiene Association of Southern Africa)
1993	IOHSA formed (The Institute of Occupational Hygienists of Southern Africa)
1995	OHSAP formed (The Board of Registration for Occupational Hygiene, Safety and Associated Professionals)
1996	BEBOH modules, and examinations introduced by Technikon Pretoria
	Interim IOHSA Entrance Examinations held by the IOHSA Examination Board
1997	IOHSA introduce Certification Maintenance

Qualifications required for the designation of Professional Occupational Hygienist

The ACGIH, AIHA, and the AAIH definition of an Industrial Hygienist is "A person having a college or university degree or degrees in Engineering, Chemistry, Physics, Medicine, or related physical and biological sciences, who, by virtue of special studies and training, has acquired competence in industrial hygiene." At the landmark 1986 international conference in Luxembourg on Training and Education in Occupational Hygiene, it was recommended that minimum standards of education, training and experience should be established internationally in order to facilitate the mobility of occupational hygienists between different countries. At a further major international meeting on "The Development of the Profession" in Geneva in 1991 it was recommended that the most suitable training for the occupational hygienist is continuous study at degree level (preferably Master's level) in a University or similar higher education institution, to ensure a depth of knowledge not otherwise obtainable.[3]

A survey of existing certification schemes for occupational hygienists throughout the world was published by the International Occupational Hygiene Association (IOHA) in 1995. Their report reviewed the schemes in Australia, Canada, Italy, Japan, The Netherlands, United Kingdom and the United States of America[4]. Table II lists the common qualifications for the designation of professional occupational hygienist in the seven countries. More details on the ABIH and BEBOH requirements are given in Table III. This table also includes the criteria set by The Institute of Occupational Hygienists of Southern Africa (IOHSA) to attain their Professional Occupational Hygienist status.

The requirements set by IOHSA should be seen as an initial vetting process to start the process of certification and it is planned that the standards will be significantly raised in the coming years. The author has proposed to IOHSA that an achievable target would be to raise the standard of their Professional Occupational Hygienist requirements over the next decade to the level of that required by BEBOH for the Diploma of Professional Competence and the ABIH for CIH status.

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2. *BOHS. The First Forty Years: An account of the formation and development of The British Occupational Hygiene Society 1953-1993. BOHS, Derby 1993; 81-90.*
3. *WHO. Occupational Hygiene in Europe: Development of the Profession (Proceedings of the WHO, CEC, IOHA Workshop in Geneva 1991). WHO Regional Office For Europe, Copenhagen 1992; 38.*
4. *IOHA. Certification of Occupational Hygienists: A Survey of Existing Schemes Throughout the World. IOHA, Derby 1995.*

Table II : Common qualifications for the designation of Professional Occupational Hygienist in certification schemes around the world

Criteria	Qualifications
Education	College or university degree in natural sciences (chemistry, physics, biology), engineering or medicine **Plus Alternatives**: • Special studies or training in occupational hygiene • Postgraduate training at Master's level in occupational hygiene or closely related field • An academic degree in occupational hygiene
Experience	Five or more years' experience in the comprehensive practice of occupational hygiene (>50% work time dedicated to occupational hygiene at a professional level)
Examination	Pass a written and/or oral comprehensive examination that assesses knowledge and skills of the candidate

Table III: Qualifications required for the ABIH, BEBOH and IOHSA designation of Professional Occupational Hygienist

American Board of Industrial Hygiene (ABIH) Certified Industrial Hygienist (CIH)

Graduation from an approved college or university with a bachelor's degree in industrial hygiene, chemistry, physics, chemical, mechanical, or sanitary engineering, or biology

Plus

Successful completion of one day Core Examination (about 250 multiple choice questions) on the theoretical aspects of industrial hygiene and the sciences upon which the profession rely

Plus

Demonstration of five years of professional experience in industrial hygiene under the supervision of a Certified Industrial Hygienist (CIH)

Plus

Successful completion of the Comprehensive Practice or Aspect Examinations (each consisting of about 250 multiple choice questions).

BEBOH Certificate of Operational Competence in Comprehensive Occupational Hygiene (Cert.Occ.Hyg.)

Pass the Certificate Core Examination (Two three hour papers).

or

Pass all six core modules each of which require a 90 minute written examination comprising of 60 multiple choice questions plus a 30 minute essay question examination

Plus

Three or more years' practical experience in the comprehensive field of occupational hygiene

Plus

Pass an oral examination.

BEBOH Diploma of Professional Competence in Comprehensive Occupational Hygiene (Dip.Occ.Hyg.)

Honours degree in science or engineering, or a degree in medicine (for direct examination route)

Plus

Pass the Certificate Examinations

Plus

Pass the Diploma Core Examination (two three hour papers with more searching questions)

or

Successful completion of twelve modules in occupational hygiene (six core and six specialised/ advanced modules)

Plus

Five or more years' professional experience in the field of occupational hygiene

Plus

Pass an oral examination.

IOHSA Interim Requirements for Professional Occupational Hygienist status

Graduation from a technikon or university requiring five years' appropriate study (two years' relevant experience can be substituted for each year of formal educational qualification)

Plus

Two years of occupational hygiene experience

Plus

Successful completion of 15 - 20 minute written examination with typically eight multiple choice questions and two short definition questions

Plus

Pass an oral examination.

Occupational Hygiene, Safety and Environmental Health Resources on the Internet

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Since the advent of the computer, vast data wares of knowledge and information are available. Government agencies, universities, technikons, NGOs and private concerns as well as the man in the street have opened up access to unlimited information from neurosurgery and space exploration to owning and breeding llamas. The occupational hygiene, safety and environmental information, software and discussion costs a local call once your computer is connected via a modem to an Internet service provider and on to the world wide web (Internet).

As we delve deeper into the Internet we begin to see how each web site gives access to more and more related sites, with information and knowledge so large we sometimes forget what we started looking for.

This is a brief review of some of the available web sites specifically related to Occupational Hygiene, Safety and Environmental Health, where the Occupational Hygienist, Safety Professional and even the Shop Floor Worker can access information at the touch of a button. Some sites are specifically commercial in nature and use the web as an advertising tool, but governmental, NGOs and educational institutions usually provide free access to information.

1. Duke Occupational and Environmental Medicine home page (http://www.gilligan.mc.duke.edu/ocm)

A very well designed web site with animated inserts, and is the home page of the occ-env-med mailing list, where a free subscription enables discussion via e-mail on topical occupational hygiene, environmental and medical subjects. It also includes access to related sites, both European (see http://www.es.wku.edu/-russellg/ih/ih.html) and American.

2. Industrial Hygiene on the WWW (http://www.cs.wku.edu/~russellg/ih/ih.html)

This is a very useful interactive site to assist Industrial Hygiene professionals with calculations using online interactive forms that give immediate results e.g. convert mg/m3 to ppm or visa versa, as well as providing online safety and health programme assessment sheets. Maximum and minimum sampling times can also be calculated, and % dose readouts can be converted to 8hr TWA results, as well as sound pressure levels being converted to reference durations of exposure.

3. Department of Energy's Environmental, Safety and Health technical info services (http://www.tis.hq.eh.doe.gov)

The technical information services is a collection of information that provides the safety and health professional with reliable, accurate and current information to assist them in performing their jobs. It includes information on relevant documents, publications, databases, resources and other interesting Internet resources and web sites.

4. Material safety data sheets (http://www.pdc.cornell. edu/issearch/MSDSsrch.htm)

This is a site that offers access to a database of over 325 000 material safety data sheets.

5. US Dept. of Labor Occupational Safety and Health Administration (OSHA) (http://www.osha.gov)

This site provides information about OSHA, media releases, publications, programmes and services, as well as on software, frequently asked questions, statistics and data related to occupational health and safety. Technical information, US government and safety and health Internet sites.

6. US Environmental Protection Agency
(http://www.epa.gov)

This online resource gives information on the environment, news, programmes and initiatives, publications, data systems and software. It is also a great resource for students, teachers, researchers, business, industry and even kids.

7. American Association of Occupational Health Nurses
(http://www.aaohn.org)

This nursing site is a very good resource for links to other Internet nursing resources, as well as information on publications, news, American employment opportunities, information services and discussion forums.

8. American Industrial Hygiene Association (AIHA)
(http://www.aiha.org)

This Association's web site gives more information on its objectives, members etc, as well as conferences and continuing education courses, and products and publications, and as always provides hot links to other Industrial Hygiene and safety professional web sites.

9. Canadian Centre for Occupational Health and Safety
(http://www.ccohs.ca/resources/hshome.htm)

The CCOHS promotes a safe and healthy work environment by providing information and advice about Occupational Health and Safety products and publications, and has a huge list of over 1000 safety Internet resources. It also has information and details of the HS-Canada mailing list.

10. Ergoweb
(http://www.ergoweb.com)

This is an excellent resource for those interested in ergonomics, with access to workplace evaluation and design software, an extensive database of ergonomic products and services, standards and guidelines, instructional material etc. Another two useful features are the ergonomics search facility, and case studies.

11. MSDS on line
(gopher://atlas.chem.utah.edu:70/11/msds)

A database of material safety data sheets listed alphabetically.

12. MSU Radiation, Chemical and Biological Safety
(http://www.orcbs.msu.edu)

Provides links to various home pages, MSDS links, as well as a photo archive, info seek option and safety links.

13. National Institute for Occupational Safety and Health (NIOSH)
(http://www.cdc.gov/niosh/homepage.html)

This site gives access to the NIOSH database information, research agendas, symposia and conferences, as well as respirator information and occupational and environmental questionnaires.

14. Rocky Mountain Centre for Occupational and Environmental Health
(http://rocky.utah.edu)

This site offers a broad spectrum of information on all relevant areas of occupational health, medicine, nursing and safety. It has sections on: Industrial Hygiene, Occupational Health Nursing, Occupational/Environmental Medicine, Ergonomics and Safety. Other available resources are safety and health links and technical papers.

15. University of Virginia EPA chemical substances fact sheets
(gopher://ecosys.drdr.virginia.edu/11/library/gen/toxics)

This site offers a very comprehensive alphabetical list of chemical fact sheets that contain comprehensive information.

16. World Health Organisation
(http://www.who.org)

Offers a key word search facility on WHO information, as well as details of its activities, departments and related organisations and services.

17. International Occupational Safety and Health Information Centre
(http://www.turva.ml.tut.fi/cis)

This site gives access to and information on products and services, an international directory of occupational safety and health institutions, databases and CD-ROMS on OH&S. A glossary of related OH&S words is given, as well as comprehensive section on chemical safety (with databases) and safety training modules.

18. American Conference of Governmental Industrial Hygienists (ACGIH)
(http://www.acgih.org)

This site is interesting in that it provides all the resources that the others have but it

also has free downloadable Threshold Limit Values demo software, as well as a demo version of the occupational health and safety CD-ROM CC-INFO, and a windows based Industrial Hygiene calculator.

19. American College of Occupational and Environmental Medicine (http://www.acoem.org)

This is the site of the largest organisation of occupational and environmental physicians, dedicated to promoting and protecting the health of workers through preventive services, clinical care, research and educational programmes. It offers information on various services and activities, and links to other related sites.

20. British Occupational Hygiene Society (http://www.ed.ac.uk/~rma/bohs.html)

This site provides information on the society, its members and objectives, activities etc. It also has gateways to special interest groups including health services, and chemical hazard and risk groups. It has useful links to members of the societies' web pages and a useful facility for searching the index of the Annals of Occupational Hygiene Journal.

21. International Occupational Hygiene Association (http://www.ed.ac.uk/~robin/ioha.html)

This is an association body of 20 member organisations, that represent over 20 000 occupational hygienists worldwide. The site gives information on its goals, objectives and primary activities as well as some useful links to member organisations in the USA, Australia, Britain and Canada.

22. Medical, Clinical and Occupational Toxicology Resource Home Page (http://www.pitt.edu/~martint/welcome.htm)

This is a resource for practitioners, educators and researchers in medical, clinical and occupational toxicology. It has a toxicology Internet resources section with numerous links to toxicology sites.

23. Safety related Internet resources (http://www.mrg.ab.ca/christie/safelist.htm)

This web site has a large number of web links, to other sites, over 2278 entries in alphabetical order. It also has info on e-mail addresses, electronic publications, mailing lists and news groups of relevance.

24. International Labour Organisation (ILO) (http://www.ilo.org)

This organisation's site has an overview of the ILO, labour standards and human rights, press releases, current topics, publications, vacancies, as well as access to departmental home pages. A useful facility is the access to ILO databases, including bibliographic, full text and statistical.

25. University of Edinburgh: Environmental Health (http://www.ed.ac.uk/~rma)

This university site provides information on courses offered, as well as useful resource links on research, teaching in occupational and environmental health, and an index of in-house on-line teaching resources. It also has links to over 250 related websites worldwide.

Mailing lists

Other resources of interest are the mailing lists that operate via e-mail and allow groups of people with a shared interest to send messages to each other via a mail server which is a computer that posts e-mail to all the subscribers of the list.

Every mailing list has two mail addresses, firstly the list address where your message is sent and then forwarded to all the subscribers, which can number in the thousands depending on the popularity of the discussion topic. The second address is the administrator's address where a message you send is read only by the list manager or owner, or the mail server computer. This address is used for messages about subscribing and unsubscribing to the list.

To subscribe to a mailing list, all we need is its administrative address, and e-mail facilities - no subscription fees are asked. Certain rules do however apply, to ensure the smooth running of the list. These may include the banning of certain types of messages, e.g. advertising, "junk mail", criticism of an individual or organisation, and defamatory statements. It should also be remembered that administrative requests should only be sent to the administrative address, and not to the list itself. Replies or comments to a particular person should be sent to that person's personal address if the subject is private, not to the list address, or every list member will receive a copy.

It is often a good idea for beginners to observe the messages, comments and the general operation of the list for a few weeks

before posting your own comments to obtain a "feel" of the list and its operation.

Two lists of interest to the Occupational Health and Safety Professional are:

The Health and Safety Canada mailing list

This list is a means of distributing messages to a group of individuals with interest in Occupational Health and Safety. It is primarily meant for Canadians, but anyone interested in Occupational Health and Safety is welcome to join. Messages may relate to any Occupational, Environmental Health or Safety topic.

To subscribe send an e-mail message to (majordomo@ccohs.ca), with no subject heading, and the words "subscribe hs-Canada" in the body of the message. No other comments, signatures or salutations should be included as the message is processed by a computer and will be bounced back if the computer does not understand it.

The global occupational hygiene list

This list is intended to improve communication between industrial/ occupational hygiene professionals and institutions globally, and facilitate the global promotion of the profession. It is the official list of the American Industrial Hygiene Association (AIHA), as well as serving Industrial Health practitioners in multi-national practice, and those working to develop occupational hygiene educational resources and enhance professional recognition globally.

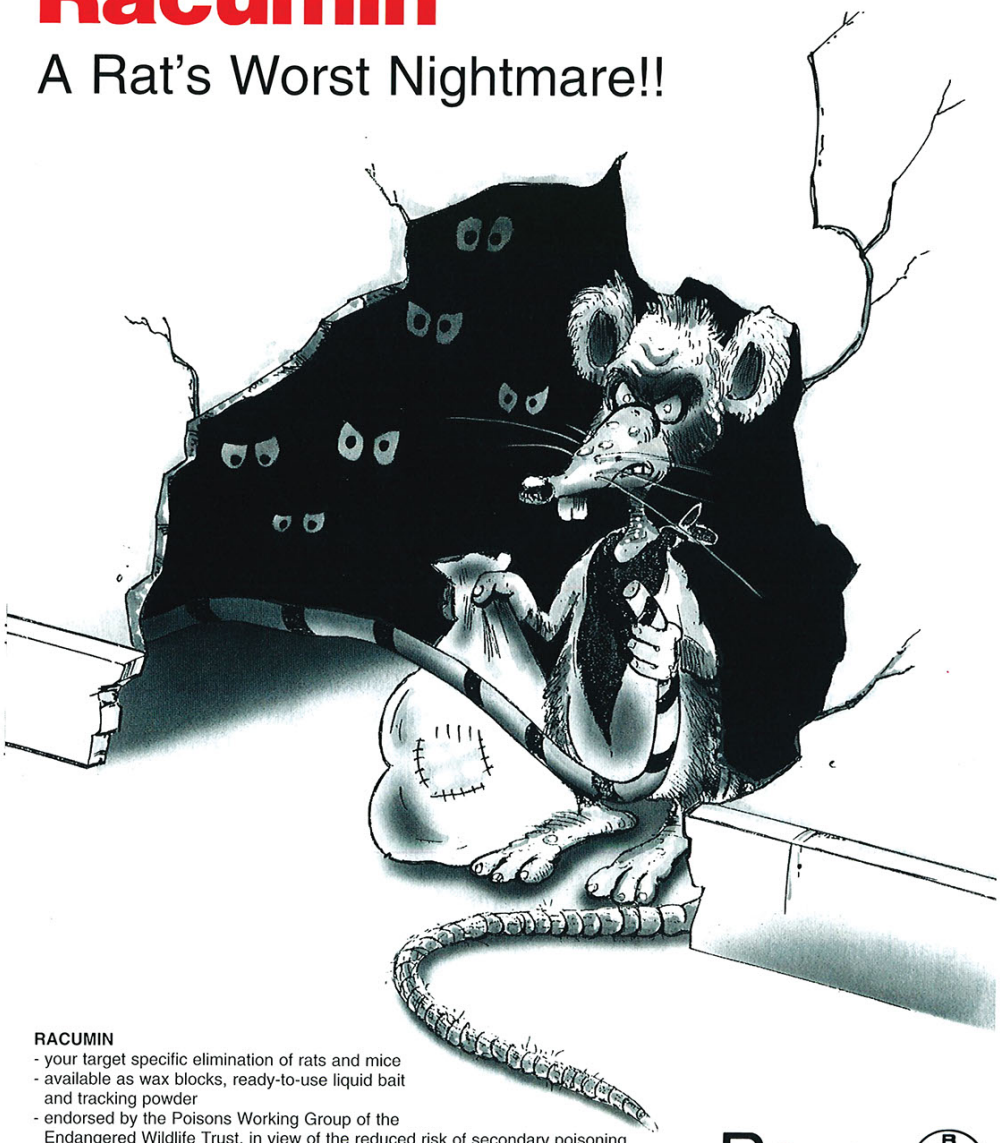
To subscribe send an e-mail message to (listproc@cornell.edu), with no subject heading and the words "subscribe GlobalOccHyg-L < insert first name and surname >. No other comments or signatures should be put into the message.

Once we have subscribed to a mailing list we will receive a welcome message, with all the rules and other relevant information on sending and receiving mail, and an important fact to bear in mind is that our comments and observations go to people around the world, and should be precise, correct and polite.

Surfing the information wave on the web takes time and patience, and a little experience and perseverance, but where else can we get information from asbestos to zirconium exposure within minutes in the comfort of our office or even in our own home. We just have to know where to look!

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The use and application of computerised information technology in an Occupational Health clinic

H van der Merwe

Abstract

It is estimated that 45 percent of the cost of health care today is related to information management. Acquiring the necessary knowledge and skills for this purpose is essential but equally important is selecting the correct tools and equipment for the trade.

Introduction

The two key elements in developing a planned approach for any successful IT programme system require satisfying "user needs" and by "adding value" i.e. why do I want to computerise and what outcome[1] can I expect from using it? Also remember, the IT system must work for you and not vice versa!

Main advantages

The professional medical/nursing official can spend less time on administrative tasks and has more hands-on and quality Occupational Health time with employees or patients.

A non medical/nursing staff member can service certain administrative activities[2] viz. secretarial, budget, stock control, work load, recordkeeping and statistical requirements.

Data (raw statements of fact) i.e. blood pressure, age, job title etc., can be entered and information (decision making statements) can be retrieved i.e. how many employees in a particular job or age group suffer from hypertension.

Improving productivity, evaluating the outcome of the Occupational Health service and help in identifying new needs in respect of resource requirements, further or revised challenges and opportunities on promotion and prevention issues, maintain a more cost effective and quality service.

Confidentiality can be reasonably secured by using passwords etc.

Main disadvantages

Comprehensive and accurate manual recordkeeping is essential, under certain circumstances, for legal purposes and can amount to duplicating certain aspects of the work load if done by a professional medical/nursing official. It is necesary to be selective on what to computerise and for what purpose.

Data may become lost through ill fortune such as computer system failure or theft.

It can create abrupt change, requiring computer literacy and can increase tension and frustration because of poor systems design, operating or technical problems and poor back-up service in remote areas.

Installing a computerised Information Technology system

Any computerised system operates on three basic principles: input, processing and output.

An in-house "need analysis" is essential and a systems analyst/designer/operator or an industrial engineer can assist in determining what data qualifies for "value adding" input, processing and output and on the selection of appropriate hardware (equipment) and software (programme) for appropriate use and application. A systematic phasing-in approach of the various stages ought to be considered.

It is essential to decide between a stand alone system and whether it must be

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Group Medical Officer
Polifin, Sasolburg

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compatible with other systems on the LAN (Local Area Network) or the WAN (Wide Area Network) in larger organisations or institutions.

Also, the system must be integrated if comparison is required of exposure and clinical data.

Developing an in-house computerised IT system is extremely costly, frustrating and a certain source for conflict.

The ideal approach is to shop around for flexible (adaptable) or customised commercial computer IT system products, in liaison with in-house systems guidance and advice.

What is commercially available in South Africa?

More information on the features including price, brochures and demonstrations can be obtained from the suppliers of the following system products, in alphabetical order:

Afrox Occupational Health Care (Primary Health Care and Occupational Health systems)
contact: Dr E Bohnen
tel: (011) 622 2676, fax:(011) 622 2404.

Clinsys (Primary Health Care, Occupational Health incl. audiometry)
contact: Caroline Mathew
tel: (012) 667 2869 or
Dr Greville Wood tel: (031) 266 0456,
fax: (031) 86 4384 or cel:082 882 9284.

DataCare (Primary Health Care, Environmental and Occupational Health systems)
contact: Reg De Kock tel: (011) 266 5460,
fax (011) 266 5579 or cel: 082 553 1110.

Emrisk (Integrated risk/loss control management)
contact: Rita Mostert
tel and fax: (011) 907 9788 or cel: 083 625 4299.

Everest (Primary Health Care, Occupational Health incl. audiometry, lung function and vision)
contact: Roger Mettam tel: (011) 692 3174,
fax: (011) 692 3174 or cel: 083 271 7694.

OHM for Windows (Primary Health Care, Occupational Health and medical screening)
contact: Shona Bettison
tel: (021) 785 3503 and cel: 082 552 7753;
Clive Bradley tel: (031) 465 8268 or
Ian Reid tel: (041) 35 4903.

Ohmega (Primary Health Care, Occupational Health incl. audiometry, lung function and vision)
contact: Francois Nel
tel: (011) 315 1555, fax: (011) 315 7374 or
cel: 082 6510 017.

Ruskal (Primary Health Care, Safety, Occupational Health incl. audiometry)
contact: Craig Holt tel: (011) 453 1650,
fax: (011) 453 1651 or cel: 082 777 0439.

Also of interest, **Data 9000** is an advanced reference tool on electronic Government legislation and computerised publications
contact: Helen Nielson tel: (031) 262 8240,
fax: (031) 262 8168.

Epi info (Epidemiology) is a public domain software database programme on the Internet homepage; http://mkn.co.uk/help/extra/people/Brixton_Books.

Internet, Intranet and Extranet

The **Internet** provides access to the WWW (World Wide Web) by linking your computer with a modem (decoder) through a local service provider (relay station) at a monthly fee and the price of a local telephone call, enabling the user to search information on any known topic, and also, with an e (electronic) - mail facility[3], by facilitating communication amongst users.

The **Intranet** provides internal access for end users only on a LAN or WAN i.e. CD-ROM products and Data 9000 presently and on subscription later on the Internet.

The **Extranet** provides external access for customers and suppliers only through the WAN and is presently under development.

A few useful Internet sites

American College of Occupational and Environmental Medicine (ACOEM) http://www.webcom.com/acoem/ac-home.html

American Association of Occupational Health Nurses (AAOHN)
http://www.aaohn.org/

Disability Evaluation
http://www.ssa.gov/statistics/des.html
http://www.globalnet.co.uk/~pmatthews/DisabilityNet/

Medical Association of South Africa's MASANet
http://www.masa.co.za

Material Safety Data Sheets
http://www.enviro-net.com/technical/msds/
http://turva.me.tut.fi/~oshweb/
http://www.pro-am.com/safelink/msds.htm

Medical Research Council of South Africa
http://www.mrc.ac.za/

Occupational Health and Safety
http://ccohs.ca/
http://turva.me.tut.fi/~oshweb/

Occupational and Environmental Medicine
http://home.earthlink.net/~medtox/smtlinks.html
http://www.eohsi.rutgers.edu/guide.html
http://slackinc.com/matrix/index.html
http://turva.me.tut.fi/~oshweb/

Occupational Hygiene
http://www.cs.wku.edu/~russellg/ih/ih.html
http://www2.wku.edu/www/stuorgs/ihsa/index.html

Pesticides
http://ace.orst.edu/info/extoxnet/
http://www.aginfo.com/

Primary Health Care
http://www.healthworks.co.uk/
http://www.pitt.edu/HOME/GHNET/GHNET.html
http://slackinc.com/matrix/index.html
http://www.HealthAtoZ.com/

Sangonet (a progressive South African Health site)
http://wn.apc.org

Toxicology
http://152.77.200.66/paracelse/presentation.html

Material Safety Data Sheets (MDSD) can be retrieved on the Internet at
http://www.ccohs.ca

Sci.med.nursing (nursing questions and discussions) and sci.med.occupational (job injury issues) are newsgroups respectively.

Also, SASOM and SASOHN has been given a provisional homepage at http://196.26.128.3:80/sasom/ which is presently under construction and is being considered for further development on the MASANet at http://www.masa.co.za facility and readers are similarly encouraged to express their interest and views in this regard to "letters to the Editor" or through Chapter secretaries.

There is also a new Occupational Health Nursing mailing list and those who wish to subscribe can send an e-mail message to listserv@oise.utoronto.ca with a message, subscribe ohn-list.

Please respond in writing to "letters to the Editor" if you know of additional Internet sites worth visiting or on further ideas regarding computerisation in Occupational Health clinics.

References:

1. *Computers in Occupational Medicine http://www.acoem.com/coms/homepage.html*
2. *Internet Technologies for Medical Applications, http://www.pnl.gov/medical/info/internet.htm*
3. *Naidoo Rajen, Electronic Information in Occupational Health, Occupational Health SA, vol 1, no 5, September/October 1995*

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Caroline Mathew Tel:(012) 667-2869

Medical Consultant: Dr. Greville Wood
Tel:(031) 265-1015 Fax: (031) 265-0992

Computerise, or not?

E Kasszas

Elise Kasszas
Health and Safety Officer
National Brands Limited Biscuit & Snacks Division, Rosslyn
Educational Representative, Pretoria Professional Society of Occupational Health Nurses

Occupational Health SA 1997; Vol 3, No 3: 40 - 41

In most Occupational Health and Safety departments, the computer has become an integral part of its organisation. Once the exclusive domain of highly trained personnel in data processing, computer systems have become smaller, more affordable, and more accessible to more people than ever before. In many cases, the personal computer (PC) has more power than the early models. Computer systems and the applicable software are everywhere in the business environment. They have replaced typewriters for correspondence and report writing, and within a health and safety programme, can ease the burden of compliance, maintain better records, analyse more information for decision making helping to prevent work-related deaths, injuries, illnesses and toxic exposure.

Computers are used to:

- Compile, store, analyse and report on occupational injuries and illnesses needed by both the Occupational Health and Safety Act and the Compensation for Occupational Injury and Diseases Act for compliance purposes
- Produce reports
- Assist in accident investigation and analysis to uncover the underlying cause of workplace injuries and identify corrective actions to eliminate them
- Maintain employee health records as they relate to workplace exposure to hazardous substances
- Maintain records needed to document regulatory compliance, such as training
- Store and retrieve complex regulatory information that is often difficult to find in books
- Maintain predictive maintenance, inspection, and repair reports to prevent equipment failure, loss of productivity, or legal violation
- Communicate with other health and safety professionals and share information, documentation and ideas affecting workplace health and safety
- Communicate via LAN/e-mail systems to the various departments in the company, thereby reducing paper flow, as messages and notices can be sent directly to the respective person.

Computers are also tools to help management obtain the information necessary to make better decisions, to help standardize record keeping and reporting functions, assist with legal compliance, protect employees and organisations.

Advantages

Employee health

Monitoring employee health is a key function of a comprehensive occupational health and safety programme. The protection of the employee is after all a major goal of health and safety. This function is used by occupational medicine professionals to manage and store records related to employee health surveillance. As with other systems, individual components can be automated. Hearing conservation programmes and lung function records are frequent candidates. Noise monitoring, audiograms, spirometry results, employees' history, sick absenteeism and other data can be entered and stored. This data can be used to produce monitoring schedules, threshold evaluations, notices to employees and summary reports for programme management and following up of defaulters. Monitoring of stock levels and ensuring that no unnecessary stock is kept or ordered, maintaining detailed records linked to each employee, is made easier with a computerised system.

Analytical capabilities

With most manual systems the compiling and analysis of data from various records consumes professional time that could be better spent. A good automated system performs analytical tasks quickly and formats the results for reports to management. Trends in employee health can become apparent in time to act to prevent injuries and illnesses and even provide statistical data which could

be used for research purposes. Analyses are not practical with manual systems.

Cost saving

Cost saving is hard to document, but automated systems appear to save organisations money beyond the costs of the system development and operation. Increased employee productivity, decreased incident rates and more effective programme management can lead to better overall loss control.

Personal skills

If the occupational health and safety professional is often seen as the nurse hidden away in the clinic, why does she need to know how to use a computer? There are monthly reports, analyses, topics to be written about, memos and correspondence. Professional time is mis-spent on a manual system where reports are hand written, typed by a secretary (when there is time), checked by the professional, then re-typed until they are ready to be submitted. It must be remembered that there is a due date by which monthly reports have to be submitted.

The occupational health and safety professional will initially feel out of place in front of the computer but, given minimum training in basic computer skills, and free access to a computer they are soon able to generate professional reports, which include graphs and related data which management will note with interest and comment on accordingly.

Disadvantages

Occupational health and safety professionals are not computer literate, hence there is a time factor involved, during which they must first learn basic skills. When the health and safety department is to be computerised, the professionals are often overwhelmed by the many available products on the market and, not having any experience, they may purchase the wrong equipment. It is therefore essential that they take time to visit companies that are using different programmes, thereby ensuring the programme they select is going to provide them with the information they need. It is often difficult to customise a programme because of cost factors so, for example if, audiometric screening equipment is already in use, the equipment must be compatible with the software obtained.

Data base installation

This is a time consuming process in which all employee information, department numbers, job description and all medication must be entered. This can be done by a data typist but it would be a good learning process if the health and safety professional entered the information, enabling the professional to understand and learn the programme.

Data input

The size of the occupational health and safety department will determine who will be the person responsible for updating the information on the system; it must be remembered that the system is only as good as the information that has been entered.

The occupational health and safety professional in charge of the department should be the only person who has the level of authority on the computer software to delete, add, and make any changes to the data base once it has been setup.

After sales service

It is most important that a reputable company is used when purchasing software to ensure rapid assistance and follow up.



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- SICK LEAVE
- REPORTS, STATISTICS + GRAPHS

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- HOTLINE TELEPHONIC SUPPORT
- CONTINUAL ENHANCEMENTS TO OHM

For more information on OHM for Windows contact:

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Clive Bradley - Graphic Data Systems (031) 465- 8268
Ian Reid - Medical Solutions (041) 35-4903

Immunisation against influenza in the workplace

Martin and Schoub [1] state that scant data are available in South Africa about costs related to influenza and immunisation against this disease. "Winter-related costs" for 1995 calculated in the ESKOM study (40 000 employees) suggested that immunisation against influenza of young healthy workers would seem to be indicated on economic grounds. Boorman [2] reported results of a study of influenza vaccination in an enterprise with about 700 employees. The sickness absence in days due to URTI, flu and sinusitis of 105 (15 %) vaccinated employees was compared with 90 non immunised controls. Her results suggest that immunisation against influenza may be a worthwhile "pre-winter" exercise but Boorman calls for reconfirmation of the evidence in another industry.

An unpublished study [3] performed in the seventies would serve the purpose. It concerns the worker population (about 5 100) of a motorcar manufacturing plant , which was immunised in 1973, 1975 and 1976 but not in 1974. Instead of comparing sickness absence of immunised persons with that of controls, the incidence rates of sickness absence spells due to "flu", URTI and "common cold" in the total worker population during these two years were studied.

On the first and second of April 1976 a total of 3 444 (65 %) employees had been immunised using an airpressure gun system (Pedijet) to administer the influenza vaccine(A2/ Victoria/3/75 strain).

The percentage cover of "direct" labour was 97%, that of administrative and supporting staff 34%. The direct cost of this was R3 160, to which should be added the indirect cost of working time lost on those two days (144 manhours in total). Incidents of "flu" etc. were recorded by week, month and quarter.

For 1974 there had been 2 870 such incidents (5 073 employees) and for 1976 only 1991 (5 106 employees). Statistical evaluation (chi squared) confirmed that in 1976 the incidence rates during the two quarters after 1 April (6 winter months) had been significantly lower than those in 1974, especially over May, June and July, when the incidence was only 20 % of that during the same months in 1974. (281 respectively 1 372 cases). Immunity would only be expected to develop about one or two weeks after immunisation. Some sickness absence due to adverse reactions to the immunisation itself may have occurred during April 1976.

Estimated savings regarded as likely to have resulted from this immunisation amounted to R 21 872. This was calculated by considering the potential sickness benefits saved (at that time R8.00 per day !) during May, June and July and deducting the total cost of the campaign. The reader is reminded that in those years wages and the value of the Rand differed markedly from what they are at present.

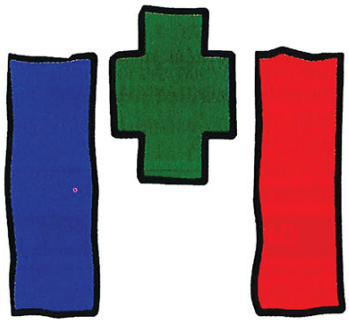
The favourable effects of immunisation against influenza on the relevant type of sickness absence ("flu" etc) during the winter months of 1976, when the incidence rate was significantly lower than in 1974, appear to be confirmed by the finding that for the whole year this was not the case.

It was concluded at the time that immunisation of worker populations against influenza was a cost effective intervention. This is especially so if a satisfactory degree of so called herd immunity (preferably more than 70 %) is achieved . Other enterprises in the area were encouraged to immunise their workforce as well, so as to improve the herd immunity in the population at large, to good effect.

Dr JT Mets, Cape Town

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1. *Martin D J and Schoub B D , Occupational Health SA 1997;3:23-28*
2. *Boorman D , Occupational Health SA 1997;3:29-30*
3. *Mets J T Absenteeism in a motor car manufacturing plant. M.D.Thesis Pretoria 1979*



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Diagnostic test accurately identifies the heavy alcohol consumer

Carbohydrate deficient transferrin (CDT)

A commercial assay for CDT has become firmly established in various countries in Europe, and is now available at many labs in South Africa. The assay is fully reimbursed under the Medical Aid Scheme of Benefits with tariff code 4497. The CDT Test assay is marketed in South Africa by Laboratory Specialities.

The Pharmacia CDTect® assay

CDT consists mainly of one or two isoforms of transferrin that are deficient in their terminal tri-saccharides. Chronic alcohol intake interferes with the metabolism of a number of glycoproteins, including transferrin, which is present in high concentrations in human serum. Regular heavy consumption of alcohol results in the appearance of serum transferrin that is deficient in carbo-hydrate molecules. CDT levels are elevated in a very high percentage of heavy alcohol consumers. The measurement of CDT levels has been found superior in its specificity compared with all other biological markers such as GGT, AST, ALT, MCV, etc.

A cut-off figure of a regular consumption of greater than 80 grams of alcohol per day for diagnosing alcohol abuse is now generally accepted around the world. This corresponds to approximately to 0.75 litre of wine, or 1.5 litres of beer or 200 millilitres of spirits per day.

There are now hundreds of studies and evaluations from around the world over the last decade that document the sensitivity and specificity of CDTect assay in various clinical circumstances and with different populations. At the recommended cut-off level of intake of 60 gm per day of alcohol for a period of 7 to 14 days, the cut-off values for CDT have been established at 20 U/L for males and 26 U/L for females. Sensitivity of the test for males is then 93% and the specificity 98%. For females, sensitivity is 81% and the specificity remains at 98%. However, different studies on different populations and different clinical circumstances give slightly different results. For example, a recent study done in South Africa shows a sensitivity of 95.2% and a specificity of 87.5%. These figures show that the reliability of the CDTect assay, although not 100%, is a tremendous improvement on the currently used diagnostic markers that have been used to identify the heavy alcohol consumer. The best of these alternative markers or tests is a raised level of GGT, which has a sensitivity of approximately 60 to 80% and a specificity of approximately 60%. These other assays are therefore not reliable as indicators of heavy alcohol consumption.

The conclusion is that "When you want to be certain of identifying the heavy alcohol consumer, use the CDTect assay".

It has been established that occasional "binge" drinking does not increase serum CDT levels. Regular heavy drinking over at least 7 to 10 days is required to elevate levels significantly. Since CDT has a half-life of 15 ±7 days, the alcohol abuser must abstain for at least a fortnight before serum levels revert towards normal.

The assay is run on serum taken from a 2 ml blood sample sent by the doctor to the laboratory.

For further information, call Mr Charles Duff at Laboratory Specialities on tel:(011) 792-2190 x 221 or Mr Steve Lee tel: (021) 47-8998

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Substance abuse - bridging the gap between shared responsibility and cost

Sectors of employment have recognised shared responsibility in the health of their employees. Mental health is also recognised as an essential element in the overall health of a person. This is accredited by the inclusion of these health matters in Employee Assistance Programmes (EAPs).

Mental disorders, such as substance dependency, impact adversely on the efficiency and productivity of the employee, in addition to all other social implications.

Shared responsibility and the recognition which mental health deserves are now entrenched in the new Labour Relations Act:

1. Sectors of employment may no longer summarily dismiss employees on the grounds of incapacity arising from ill health even if this results from mental disorders such as substance dependency.
2. Responsibility to investigate and establish causes of the incapacity vests in the employer.
3. The employer is expected to provide the opportunity for appropriate and effective treatment and rehabilitation of the employee.

Another sector illustrating the importance of shared responsibility is the Medical Assurance industry. Creative products are being offered to provide quality treatment at an affordable cost.

Whilst major strides have been made by business, government and labour in recognising shared responsibility and the fact that mental disorders such as substance dependency are treatable illnesses, government subsidies are being radically reduced or withdrawn from effective treatment clinics such as Riverfield Lodge. As a result, the costs and time required for effective treatment and rehabilitation of employees, have escalated. This can also result from inadequate benefits from Medical Aid and other schemes.

Employers and the Human Resources Departments of corporate South Africa may need to re-examine their Medical Aids and other employee benefits. This is necessary to insure that funds and time are at hand to allow the employee to receive the best available for the treatment of mental health problems and specifically substance dependency.

Riverfield Lodge and its associates have been offering treatment for more than eight years. Their successes can be measured by the following:

- The excellent standards and dedication that are maintained by the medical and other support staff
- The years that they have been leaders in this form of treatment
- The recognition afforded to the clinic by leading researchers, physicians, psychiatrists, psychologists, the media, business and government
- The excellent results which have been achieved over the years

The staff complement consists of doctors, clinical psychologists, occupational therapists, social workers, psychiatrically-trained nurses, consulting psychiatrists and a team of supportive administrative staff.

Riverfield Lodge charges Medical Aid tariffs for all treatment.

It is vital to bridge the communication gap among employers, medical assurance companies and treatment clinics.

For further information contact Michael Abelheim at Riverfield Lodge tel: (011) 460-1970 or cel: 082 657 6453



Respirator designed for the smaller-faced person

In an effort to meet the particular needs of female users, 3M has introduced a new respirator which meets the requirements of FFP1 for use against dusts and mists up to five times the threshold limit value (TLV).

As more and more women enter the job market, particularly in areas which were predominantly the male domain, the need for personal protection equipment (PPE) designed for women has grown.

Called the 3M8110, the new respirator is lightweight, maintenance free and designed to provide effective protection from dust, such as asbestos, coal, cotton, cadmium, lead etc, and mist, such as vitreous enamels, chromic acid, etc, with a permissible exposure level



(PEL) of not less than 0.05 mg/m^3.

It features an ergonomically designed, self-supporting polypropylene filter cup which contours to any face shape to ensure a comfortable fit. Its low profile ensures clear vision and the user is assured of easy breathing and communication at normal tones. It requires no cleaning or maintenance and is simply disposed of when it has been used to capacity.

3M has expanded its range of gas and vapour respirators with the 3M 6 100 half-mask respirator. The easy-to-use unit has been designed to meet the need of users with smaller faces.

The economical 3M 6 100 is lightweight and well-balanced to maintain a better fit while the non-allergenic facepiece ensures user comfort at all times. Designed for use with the 3M 6000 and 3M 2000 range of replaceable cartridges and filters, the unit offers a high degree of flexibility with low maintenance requirements.

Filters and cartridges available for the 3M 6 100 include protection against organic and inorganic vapours, ammonia and ammonia derivatives, acid gases, mercury vapour and chlorine gas, and fine particulates.

Enquiries: Chris Werner, Occupational Health & Environmental Safety Division, Toll Free 0800 119711, tel (011) 922-2093, fax (011) 922-2016.

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Alcohol detection technology assists with abuse management

Alco-Safe is a company dedicated to alcohol detection technology and to advising industry and law enforcement agencies in the areas of alcohol abuse management and related accident and loss prevention.

Dave Evans is currently the general manager of the company. An electronic engineer specializing in scientific measurement instrumentation he became involved with alcohol detection in the early seventies and has maintained continuous contact with the international leaders in this field.

He has served on national committees concerned with the alcohol problem and was most recently involved with a working group investigating the effectiveness and validity of breath alcohol testing for legal enforcement purposes.

Many of his articles have been published in major health and safety journals and he has given assistance and made private presentations to a large number of organizations.

He assists organizations in the development of written alcohol policies and control programmes. His efforts also concentrate on reducing alcohol related accidents and deaths and on raising awareness of alcohol's often neglected role in other areas such as productivity, loss control and awareness of alcohol's negative role in the area of health.

Alco-Safe is the major supplier of electronic breath alcohol detectors and accessories in South Africa, with 25 years experience in manufacturing, distribution and support. Only professional grade instrumentation is distributed and knowledge of state of the art technology and of effective measurement policies is maintained through regular communication with the world leaders in these areas. A full repair and calibration service is provided. The practical experience gained in working closely together in areas such as industry, transport, medicine and traffic policing enables Alco-Safe to increasingly provide assistance to small and large organizations in creating and implementing alcohol policies/programmes.

Further details contact
Dave Evans on (012) 46-9251

Chief Directorate Occupational Health Johannesburg

Chief Medical Officer

Commencing Salary: R139 578 pa
In addition to the mentioned salary, the remuneration package includes competitive benefits
Requirements: Registration as medical practitioner with the Interim Medical and Dental Council of South Africa plus appropriate experience.
Duties: The National Centre for Occupational Health requires the services of a Chief Medical Officer to supervise the clinical aspects of a multi-disciplinary team involved in: • an occupational medicine referral clinic • support of provincial occupational health units • designing of protocols and guidelines for occupational health services • technical advisory services • training of occupational health practitioners • health hazard evaluations • research
Note: The successful candidate will have opportunities for in-service training and post-graduate qualifications.
Enquiries: Ms Engela Venter Tel. (011) 720 5734
Reference No: DH/2704/1

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Direct your applications for the attention of Dot Lewis to The Director-General, Department of Health, Private Bag X828, Pretoria 0001.

SIM 0156 **Closing Date: 30 June 1997** simeka

Department of Health

Computerised management system for clinics

Clinsys, a management system for clinics, is a unique Windows-based program, designed specifically for the nurse. It is not a computerised set of notes and does not replace the patient's file, but focuses on making the keeping of a daybook as simple as possible as well as automating the month end routines.

The main components are:

1. Occupational Health Module
This module allows repeatable data that must be analysed for trends to be collected; pre-placement, periodic and exit medicals, audiometry and pulmonary function screening tests
2. Injury/disease on duty medicals
3. Primary Health care module
International coding and the Essential Drug List (EDL) enable visits to be recorded, analysed and a drug register kept. Sick leave is recorded.

ASCII download of human resource files makes setup easier.

Month end routines

Standardised reporting does not occur. Comparisons are therefore difficult. We would like you, the user, to tell us of your requirements for this report. Your contribution could enable the development of an appropriate reporting system that will allow for meaningful comparison of clinics across a wide range of industries.

To participate please contact
Dr GW Wood
Clinsys, PO Box 304, Pavilion, 3611
or fax: (031) 265-0992

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

Kynoch Hospital
(Umbogintwini, Kwa-Zulu)
Contact Julia Thomas
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Mobile Health update

The mobile dental unit of Mobile Health has been providing on-site dental care to industry in the greater Johannesburg area for two years now. Since April this year, Mobile Health has acquired a Mobile Eye Clinic. The type and range of treatment provided within this clinic is extensive, and can be tailored to suit each individual company's needs. Treatment provided includes eye tests (including glaucoma tests and cataract detection tests), contact lenses, safety glasses, spectacles (with a wide range of modern frames from which to choose) and repairs. The optometrists have their own practice and laboratory in Springs and offer an emergency service to all. The Mobile Eye Clinic contains state-of the-art equipment equivalent to conventional stationary practices. Payment for treatment rendered is either at medical aid rates, or at a mutually agreed upon per capita fee.

Employees benefit from the convenience of having Mobile Health's optometrist 'on their doorstep' and employers save on lost man hours and usually see an improvement in worker morale.

Further information tel: (011) 818-5474/5 or cell: 083 252 0870

Medsurge serves medical profession for over 26 years

Medsurge has served the medical profession for over 26 years, meeting the needs of the doctors, hospitals, clinics, occupational health stations and allied emergency services.

The company's success has derived largely from an attitude of personal service and professionalism, backed by a wide range of products which currently number over 5000. Included are amongst others pharmaceuticals, disposables, diagnostic and general equipment, bandages and dressings, surgical instruments, linen, hospital and office furniture.

Medsurg distributes Heine diagnostic sets, 3M tapes and dressings, Johnson & Johnson Healthcare products, Carllklim paper products, Renz surgical instruments, Technogaz resuscitator bags and emergency oxygen cylinders, Petal ambulance, scoop and folding stretchers and a wide range of first aid kits, paramedic bags and emergency equipment.

For further information call tel: (012) 335-2431, fax: (012) 335-2989.

High-tech re-manufactured equipment cuts costs

Cambridge Medical is a small company that addresses very real needs in the medical industry today. The ever increasing cost of purchasing quality capital equipment often forces hospitals, ambulance services, clinics etc. to lower the standard or quality of the equipment to suit their budgets.

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Emphasis is placed on two aspects namely " new technology" (not old, unserviceable and out-dated equipment) and "cost effective" (this includes cost of ownership, not just the purchase price). All units supplied can be serviced.

For further details contact Mark Bates on 082 569 7382.

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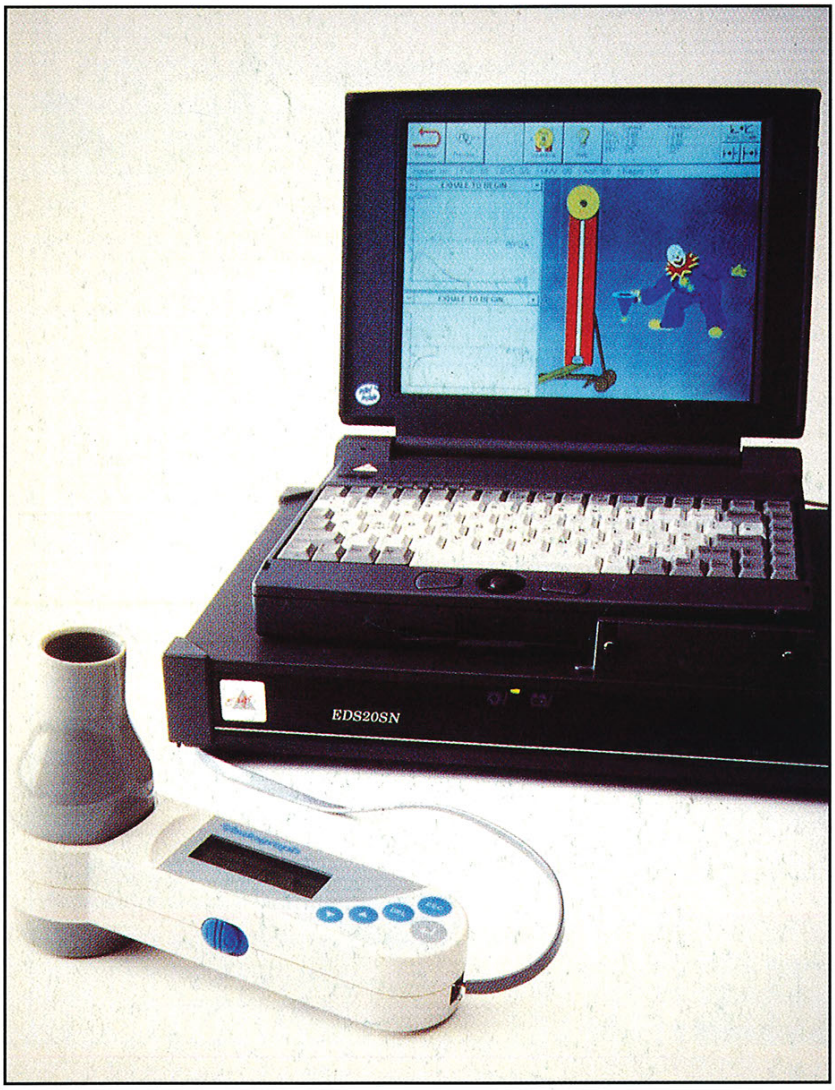
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Further information: Schu Schutte. Environmental Safety and Health
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How to get your company into this directory?

This directory will appear on the last page of every issue of Occupational Health Southern Africa.
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