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From the Editor . . .

Gill Nelson,
Editor-in-Chief

We find ourselves at a very exciting time in the history of occupational safety and health (OSH) on the African continent. Several efforts have been made in the past to promote the discipline on the continent. Some have been successful, but the official launch of OSHAfrica in 2018 has created new energy. Currently, OSHAfrica has representation in 38 countries and is growing.

In this issue, the President of OSHAfrica presents some thoughts on the recent OSHAfrica 2019 Conference that was held in South Africa in September. Under the ever-watchful eye of Dr Thuthula Balfour and the OSHAfrica Conference Planning Committee, everything came together 'seamlessly'. One cannot dispute that this, the first pan-African OSH Conference, was a huge success, attracting more than 1 000 delegates from 31 African countries and many other parts of the world. The Conference created an environment for both OSH academics and practitioners to present their work. In addition, many colleagues who had met online on the OSHAfrica WhatsApp group met, in person, for the first time.

Zodwa Ndlovu had the opportunity to work behind the scenes, as Chief Rapporteur, with a team, making notes on the key points of each presentation. Cross-cutting issues that emerged during the Conference were used to draw up a set of recommendations which were presented at the closing plenary. We hope to share these with you once the Conference report has been finalised. It is hoped that all OSH practitioners will work towards turning the recommendations into reality, and present updates at the OSHAfrica 2022 Conference in Kenya.

We are glad to report that *Occupational Health Southern Africa* had a presence at the Conference. Our stand was manned by Kevin Beaumont, the Journal's publisher, and Anne van Vliet, who deals with sales. The team introduced the Journal to OSH professionals from all over the world. Copies of the Journal were also added to the delegates' goodie bags, and leaflets promoting the Journal were distributed throughout the Conference venues. We look forward to growing the Journal's footprint in Africa as OSHAfrica develops.

You will notice that we have a new 'partner' in this issue – we welcome the flagship International Occupational Hygiene Association (IOHA) *Global Exposure Manager* newsletter. Forthcoming issues of the Journal will feature IOHA news items, or IOHA articles on topics of international interest. Prof. Tom Fuller, President Elect of IOHA and Education Committee Chair, board member of the Occupational Hygiene Training Association, member of Workplace Health Without Borders (WHWB), and the American Industrial Hygiene Association (AIHA) Chair of the Emerging Economy Microgrant Subcommittee of the International Affairs Committee, was instrumental in this initiative, and we welcome his future involvement in *Occupational Health Southern Africa*, as a member of the Editorial Advisory Panel.

I have just returned from a six-month productive sabbatical in London where occupational health research is high on the UK Government's agenda. A report, entitled *The Value of Occupational Health Research*, was launched in August in the House of Lords. It seems that developed countries experience similar problems to our own. The report emphasises the importance of research to identify causes of ill health. It also highlights the issues of workers being 'forgotten' once they leave the workforce, and the failure to help injured or ill employees return to work through rehabilitation. The latter is a topic that has been addressed in several research papers in *Occupational Health Southern Africa*. Less than 50% of workers have access to occupational health services, and there is a lack of investment in training of occupational health practitioners, and research. I was shocked to read that "most of the research centres which have studied work-related diseases and ill-health have closed over the past 40 years and there are fewer academics trained in this field". For more details, see https://recruitingtimes.org/recruitment-and-hr-legal-updates/26912/the-value-of-occupational-health-research-launched-at-the-house-of-lords/.

We urge you to access the Journal website for details about upcoming events, the abstracts from the recent SASOM-MEDICHEM Conference, and other occupational health news and updates.

Salesperson, Ms Anne van Vliet, staffing the *Occupational Health Southern Africa* stand at OSHAfrica
Photograph: Kevin Beaumont

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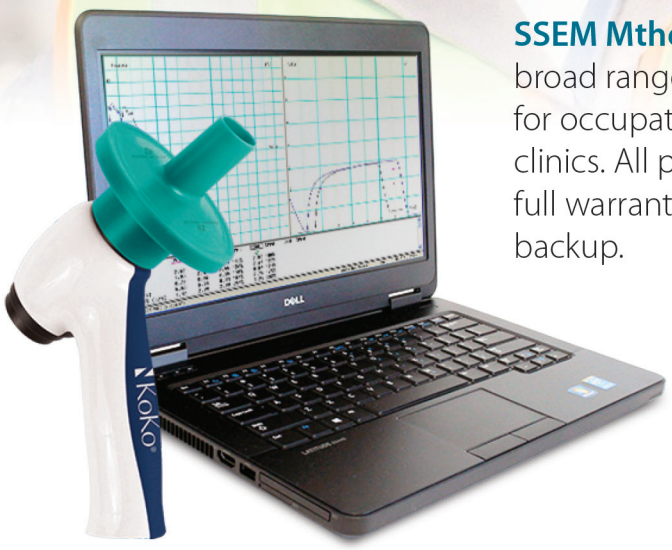

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In memoriam – Dr Gerald Baise

A tribute from the KwaZulu-Natal (KZN) Chapter of
The South African Society of Occupational Medicine (SASOM)

Dr Gerald Baise was an occupational medicine practitioner (OMP) and active member of SASOM for many years; he very rarely missed our regular SASOM meetings. He worked as an OMP in many industries over the years, for companies such as Defy, Plascon, Nampak, Dow Chemical Company, and Corobrick, to name a few. He served on the SASOM KZN Chapter Executive Committee from the early 1990s and as Chair of the Chapter.

Despite developing a chronic illness, and the subsequent deterioration of his health, Dr Baise continued to work until May this year when he handed over his occupational health post to one of our SASOM colleagues. He soon developed an acute complication of his illness and, sadly, passed away in hospital on 18 June 2019.

The following three short tributes, from his sister Sheila, and two nurses who worked with Gerald, provide insight into his character and dedication to his profession.

TRIBUTE FROM SHEILA, SISTER OF GERALD BAISE

"Gerald's parents, Rachel and Nathan, were born in Zhaager in Lithuania. Being Jewish, they faced much discrimination and were both denied an education; with only a trade open to them to pursue as careers, they trained as tailors. They immigrated to South Africa in the first decade of the 20th century, married and settled in Port Elizabeth where they raised five children – four sons and one daughter; Gerald was the third son.

Gerald attended Grey High School and was a high-achieving student, excelling in both academics and sport. He was the first Jewish prefect and the first Jewish boy to win the Alec Brooke Scholarship to study Medicine at the University of the Witwatersrand. He was a brilliant cricketer and was chosen to play for Eastern Province Nuffield. He was also a rugby referee at senior school level for many years, and his passion for rugby continued until his death.

He became a passionate doctor, always improving his knowledge and keeping up to date with new developments. Because his parents were uneducated, through no fault of their own, he was acutely aware of the importance of education, and helped many people improve their lives through learning. Having experienced discrimination first hand, he was also very aware of the importance of equal rights.

He had huge artistic talent, and adored and had an impressive knowledge of classical music. He was a talented sculptor and exhibited his art at several exhibitions; his family members are very proud of his beautiful pieces. He was very well travelled and always returned home full of enthusiasm about everything he had seen and learned.

Gerald is survived by two sons, Seth and Adrian, six grandchildren, two brothers and one sister. His larger-than-life personality, vibrancy and wonderful sense of humour will be dearly missed."

Dr Gerald Baise
Photograph: Seth Baise

TRIBUTE FROM SR LYNNE KISCH, NURSING PRACTITIONER

"I first met Gerald when I worked for the Nampak Group in the 1980s. To say that I was terrified was an understatement, as he 'came with a reputation'. After three months of visits to the factory, Gerald said to me 'you can talk to me and call me Gerald…'. That was the beginning of a beautiful doctor-nurse-friend relationship. He was an amazing mentor and teacher; what I have learnt in industry is directly attributed to Gerald's teachings. Over the years, we became friends, and he was someone I could turn to for advice. He was astonishingly generous with his time, his knowledge and his garden. The only topic that we did not discuss was the current state of rugby in South Africa; I am not a rugby fan and he just rolled his eyes and shook his head. There are many stories to be told, but I want to say 'thank you Gerald' for being a part of my life and, mostly, for making me the nurse that I became. I miss you so much – your laughter, your funny jokes and your friendship."

TRIBUTE FROM SR BEVERLEY VAN DER BERG, NURSING PRACTITIONER

"I started working with Gerald in the late 1980s and maintained contact with him as a colleague and friend. As already stated by Sr Lynne Kisch, he was an excellent teacher and enjoyed sharing his expertise. He had a phenomenal wealth of knowledge in many aspects of life, and a wicked sense of humour. As the saying goes, 'laughter is good for the soul', and this is often needed in occupational health! He was also a very generous person. I have many stories which I will hold dear; a character of note – you will be sorely missed, GB!"

From all of us at the SASOM KZN Chapter, we will miss Dr Gerald Baise dearly as a great friend and colleague. We extend our sincere and deepest condolences to his family, friends and colleagues. May his soul rest in peace.

By Dr Sean Cheevers
Member: SASOM KZN Chapter
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  - Wellness and Disease Management System

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An occupational health service intervention to improve TB infection prevention and control among South African health workers

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ABSTRACT

Background: South Africa has adopted strategies to prevent workplace transmission of diseases, including tuberculosis (TB). Occupational health and safety (OHS), and infection prevention and control (IPC), are essential in combatting human immunodeficiency virus (HIV) and TB in the workplace. We evaluated the effect of a multi-faceted policy, practice and education intervention on OHS and TB IPC at a provincial teaching hospital in South Africa.

Methods: A quasi-experimental study was conducted in 2014-2017 in an 800-bed hospital in Tshwane, South Africa, as part of a larger research collaboration. A multi-faceted intervention (including elements focused on primary, secondary and tertiary prevention) to improve OHS and TB IPC in the hospital was implemented. Observational walkthrough surveys were conducted and an infection control practices assessment tool was completed pre- and post-intervention to evaluate the impact of the intervention. Total TB IPC scores were calculated and differences in scores between pre- and post-intervention were compared, using t-tests.

Results: While there was substantial strengthening in the hospital's OHS systems, including HIV and TB services, resources and infrastructure, little improvement in IPC occurred and administrative controls did not improve at all, despite the interventions and support provided. The total TB IC score decreased from 12.5/37 to 11.0/37 (p = 0.0363).

Conclusion: Strengthened workplace programmes for health workers in low- and middle-income countries, including those targeting HIV and TB, are possible with political will and involvement of management and workers. However, a monitoring and evaluation system, supported by top management, is essential to ensure implementation by frontline health workers, and to guard against complacency.

Keywords: occupational health and safety, HIV and TB workplace programme, infection prevention and control, health workers

INTRODUCTION

South Africa is a middle-income country with one of the highest tuberculosis (TB) incidence rates in the world, at 567 per 100 000 population.[1,2] This is four times the global TB incidence rate, two and half times the African TB incidence rate, and more than double the World Health Organization (WHO) crisis level.[2]

Tuberculosis has been recognised as an occupational hazard for health workers (HWs) since the 1950s[3] and, in South Africa, pulmonary TB has been listed as an occupational disease for HWs since 1993.[4-6] South African HWs have a 2-3 times higher incidence rate of active TB disease than the general population,[7,8] and an estimated incidence rate of multidrug-resistant (MDR) TB hospitalisations of 64.8 per 100 000 for HWs, compared to 11.9 per 100 000 for non-HWs.[9]

Tuberculosis in South Africa threatens the health system and associated reforms towards the realisation of universal health coverage (UHC),[10] as adopted by the United Nations,[11] with a global estimated needs-based shortage of 17.4 million HWs[12] and at least 60 000 doctors in South Africa.[13] The high TB patient load and TB cross-infection between patients and HWs pose a serious threat to UHC.

The global community, including South Africa, has adopted strategies to control and manage diseases, including TB, in the general population and the workplace.[14-17] International Labour Organization (ILO) Conventions 155, 161 and 187 also guide occupational health and safety (OHS).[18-21] South Africa has ratified convention 155 which has proven useful in

guiding OHS legislation. Infection prevention and control (IPC) and OHS, in theory, drive HIV and TB workplace programmes, supported by the WHO's TB IPC guidelines[21] and the global plan of action (GPA) on workers' health.[22]

The GPA specifically calls for establishing OHS programmes for HWs, while the WHO TB IPC policy provides guidelines for implementing measures for TB IPC, which have been shown to prevent TB cross-infection in healthcare settings.[23-25] However, there is a dearth of literature on how well OHS TB prevention programmes are functioning in practice. The aim of this study was to evaluate the effect of a multi-faceted policy, practice and education intervention on TB infection control and OHS at a provincial teaching hospital in Tshwane, South Africa.

METHODS

The quasi-experimental study was conducted in a 800-bed provincial teaching hospital of the Gauteng Provincial Department of Health, which has 1 960 employees. The intervention comprised three components implemented continuously throughout the study period (2014-2017), with the advisory support of the researchers.

Primary prevention consisted of assisting hospital management, trade unions and HWs to prioritise and establish an OHS service, as prescribed by South African legislation, by: a) training management and HWs on their OHS responsibilities and rights, as well as the roles of health and safety representatives (HSRs) and committees (HSCs); b) conducting a hazard identification and risk assessment (HIRA); and, c) applying these measures in the protection and control of occupational TB among HWs.

Secondary prevention focused on strengthening the hospital's risk-based medical surveillance programme (RMSP) for occupational TB, through training, developing policies and procedures, and identifying necessary resources.

Tertiary prevention included advocating for, and recommending reasonable accommodation of HWs at risk of TB or those with TB, and encouraging reporting and submissions of claims as per the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993.[26]

The pre-post analysis reported in this paper constitutes one component of a larger study designed to evaluate the strengthening of the hospital's OHS programme; results from the HW survey component of this evaluation have been reported elsewhere.[27,28] The assessment reported here focuses on system changes over the duration of the intervention (including components related to leadership, budgets, personnel, resources, and OHS technical tools), juxtaposed with comparative results of observational walkthrough surveys pre- and post-intervention. The survey was conducted in the following areas: emergency department (ED), theatre, intensive care unit (ICU), neonatal ICU, medical ward, paediatric ward, surgical ward, TB focal point (patient's registration, notification and referral area), stores department (SD), family medicine outpatient department, laboratory, and dietician's clinic. The assessment tool used in this study was a modified infection control practices tool previously developed and used elsewhere,[29] and based on the Occupational Health and Safety Act No. 85 of 1993 (OHSA).[30] It comprises 64 items, appraising environmental controls, administrative controls, respiratory protection, and miscellaneous controls (such as availability of TB screening for HWs).

An 8-item mini-OHS evaluation tool for the overall hospital was completed by the hospital OHS coordinator. Pre- and post-intervention data were collected by a multidisciplinary team in October 2014 and March 2017, respectively. Changes in the OHS programme were described and a total TB IPC score was calculated for each surveyed area. The numbers of reported and compensated HWs for TB each year were extracted from hospital OHS programme records.

Statistical analysis

The total possible score was 37; all items were weighted equally. Scores were summed under four categories (administrative controls, maximum score 15; environmental controls, maximum 5; personal protective equipment controls, maximum 10; and miscellaneous controls, maximum 7). The scores were summarised as means and standard deviations for those that were normally distributed and as medians and interquartile ranges (IQRs) for those that were not normally distributed. Pre- and post-intervention scores were compared using the Student's t-test for mean scores and the Wilcoxon signed-rank test for median scores.

Ethics approval was obtained from University of Pretoria's Faculty of Health Sciences Research Ethics Committee (#136/2013); and University of British Columbia's Research Ethics Board (H13-01260).

RESULTS

All hospital units invited to participate in the TB workplace assessment agreed to participate.

Table 1 shows that, by 2017, the hospital had improved with regard to the number and categories of OHS personnel, infrastructure and equipment, and availability of OHS technical tools. However, it did not have an OHS policy and/or an operational OHS budget. The hospital had changed chief executive officers (CEOs), infection control nurses and OHS coordinators at least three times over a three-year period. Occupational health and safety continued to be the responsibility of the OHS coordinator who reported to the quality assurance manager, except for a brief period in 2015 when reporting was elevated to the office of the CEO. During that period, the OHS programme gained an OHS building (two consulting rooms, two offices, a combined waiting area and reception, a staff kitchen, and two toilets); and three nurses, a social worker, an administrative clerk, two environmental health practitioners (EHPs), and an occupational medical practitioner (OMP) were hired or deployed from other

Table 1. Pre- and post-intervention occupational health and safety resources at the provincial teaching hospital

Category	Item	Pre-intervention	Post-intervention	Commentary
Leadership	Chief executive	Yes	Yes	Changed more than three times
Budget	Dedicated OHS budget	No	No	
OHS professionals	Occupational health nurse	Yes	Yes	Changed more than three times
	Occupational medical practitioner	No	Yes	Changed more than three times
	Environmental health practitioner	No	Yes	
	Infection prevention and control coordinator	Yes	Yes	Changed more than three times
	Social worker	No	Yes	
	Other nurses	No	Yes	
	Administrative clerk	No	Yes	
Infrastructure and equipment	Designated office space	No	Yes	An unprecedented vote of confidence by the hospital management for OHS
	OHS equipment	No	Yes	
OHS technical tools	OHS policy	No	No	
	Updated health risk assessment	No	Yes	This update occurs every two years in line with the law
	Risk-based medical surveillance plan	No	Yes	In line with occupational exposure risk profiles
	Functioning health and safety representative and committees	No	Yes	With representation from management and trade unions
	Active OHS training programme	No	Yes	Covering management and workers

departments. By 2017, the hospital had up-to-date HIRA and RMSP processes, with HSRs appointed, a functioning HSC, and improved engagement by organised labour. In addition, the hospital had an OHS training programme for managers, organised labour and workers.

Table 2 illustrates the TB IC scores in the different units ranged from 7-19, and from 1-17 in 2014 and 2017, respectively. The mean TB IC score decreased significantly, from 12.5/37-11.0/37, pre- and post-intervention ($p = 0.0363$). The administrative TB IPC scores ranged from 0-7 in 2014 and from 0-7 in 2017 (out of a possible score of 15). Personal protective equipment (PPE) TB IPC scores ranged from 2-8 in 2014, and from 0-7 in 2017, out of a score of 10. The differences in the administrative control and PPE TB IPC scores, pre- and post-intervention, were not statistically significant. However, the difference between the mean miscellaneous scores (4.0/7 and 2.5/7 in 2014 and 2017, respectively) was statistically significant ($p = 0.0063$).

Some improvements in administrative controls were seen from 2014 to 2017. The number of units that conducted screening for coughing patients immediately upon arrival increased from two (17%) to three (25%); and the number of units with a designated staff member screening for coughing patients increased from zero to two (17%). However, there were more 'failures' than improvements. The number of units with written evidence of a TB IPC plan, policy and/or standard operating procedure decreased from 11 (92%) in 2014 to none in 2017 (none of the units could provide evidence of the documents post-intervention); the number that had a separate, well-ventilated waiting area for coughing patients or patients with suspected TB decreased from one to zero, as did the number with a designated well-ventilated area away from other patients and staff, where patients could produce sputum specimens; and the number that were fast-tracking coughing patients for consultation decreased from three (25%) to zero.

While there was an improvement in the number of trained staff members on TB IPC from two (17%) in 2014 to five (42%) in 2017, there was, unfortunately, a loss of the only 2014-designated TB isolation area by 2017. There was also little to no improvement in environmental controls. While no units had adequate natural ventilation in 2014, three (25%) had this in 2017; and the number with fans in good working condition increased from zero to one (8%). However, no units had negative pressure in isolation areas in either years; the number of units with mechanical ventilation decreased from two (17%) to zero; and none of the units had maintenance schedules or maintained the fans in either year.

With regard to PPE, six units (50%) had adequate N95 respirator supplies in 2014, but this decreased to five (42%) in 2017. None of the units had N95 respirator-fit testing for HWs in either year. The number with HWs using N95 respirators decreased from one (8%) to zero.

Improvement in miscellaneous controls after the intervention was also disappointing. The number of units that referred HWs to the OHS clinic for screening decreased from eight (67%) in 2014 to one in 2017; although the number with appropriately-labelled and colour-coded containers/bags for biohazardous waste increased from nine (75%) to 10 (83%).

Table 2. Pre- and post-intervention TB infection control workplace assessment scores in the different hospital units

	Administration control score (/15)		Environmental measures score* (/5)		PPE measures score (/10)		Miscellaneous controls score (/7)		Total TB IC score (/37)	
Unit	Pre-intervention	Post-intervention	Pre-intervention	Post-intervention	Pre-intervention	Post-intervention	Pre-intervention	Post-intervention	Pre-intervention	Post-intervention
Polyclinic	2	2	1	1	2	7	5	2	10	12
Emergency department	4	1	0	0	4	4	4	2	12	7
TB focal point	6	3	0	0	6	6	4	2	16	11
Diet clinic	3	0	0	0	4	4	2	2	9	6
Ward 6	7	7	0	1	7	5	5	4	19	17
Ward 7	7	5	0	1	7	4	4	4	18	15
Ward 22	2	5	0	1	5	5	4	4	11	15
Laboratory	1	1	0	0	6	5	6	4	13	10
Theatre	2	3	0	0	8	7	4	1	14	11
ICU	3	5	1	0	5	5	4	3	13	13
Neonatal ICU	0	1	0	0	6	4	3	4	9	9
Stores	1	0	0	0	3	0	3	1	7	1
Mean/ median	3.1	2.75	-	-	5.5	5.0	4.0	2.5	12.5	11.0
Mean difference	0.41		-		-		1.25		2.08	
Median difference	-		-		5.25†		-		-	
P value	0.4899		-		0.1094		0.0063		0.0363	

* insufficient number of observations to calculate central measures of tendency; † Wilcoxon signed-rank test used to test for statistical significance

Table 3 illustrates the findings for one unit (the emergency department) in a dashboard format.

Results with respect to TB cases among staff are reported elsewhere.[28] From January 2014 to December 2017, there were 14 TB cases (one multidrug-resistant [MDR] and five extra pulmonary TB cases) among HWs, of which 50% (n = 7) were diagnosed in 2016.

DISCUSSION

Universal health coverage (UHC), as envisioned by the National Health Insurance (policy) for South Africa, depends – at least in part – on the availability of the appropriate quantity, quality and mix of skilled HWs. Ensuring access to OHS programmes, including HIV and TB workplace programmes for HWs, is a key strategic pillar in preventing shortages of HWs and would dramatically improve the working lives of HWs.

The suite of interventions we undertook to promote primary, secondary and tertiary prevention initiatives, through lobbying the CEO and organised labour to implement these measures, led to improved governance, with the OHS coordinator reporting directly to the CEO, and continued collaboration between management and organised labour. The importance of labour and management working together to promote health and safety in the workplace is well documented.[31] We credit the labour-management cooperation for the marked improvement in human resources for OHS, with the employment and redeployment of an additional occupational health nurse, a registered nurse, an OMP, two EHPs, a social worker and an administrator. The intervention and concomitant labour-management cooperation also stimulated improvements in infrastructure (office and clinic), which contributed towards a conducive and enabling environment for OHS. Based on the available resources in 2017, the hospital had moved from stage I to stage II of internationally-recommended basic occupational health services (BOHS).[32] This indicated some progress in strengthening the OHS service, and subsequently the HIV and TB workplace programme for the HWs.

The overall TB IPC score, however, remained disappointingly low, especially when compared to similar studies without an intervention programme.[8,27] While budgetary constraints were cited as the cause for failure to implement TB IPC, our observations pointed to lack of sustained leadership and political will, staff complacency, and lack of acknowledgement of the risk posed by TB, as reasons for failing to sustain TB IPC. It is alarming that, despite all the system-strengthening interventions and support that the hospital received from the

Table 3. Example of dashboard format of TB workplace assessment results: Emergency department

	Pre-intervention (2014)	Post-intervention (2017)
ADMINISTRATIVE CONTROLS		
Facility has a specific written infection control policy available (staff have access to the infection control policy)	✓	■
The infection control policy (plan) is implemented and monitored	■	■
All patients are screened for a cough immediately after they arrive at the facility	✓	■
There are designated staff members to screen patients	■	■
Respiratory hygiene posters are available for patients	■	■
Coughing patients are offered a surgical mask to wear	✓	■
There is a separate, well-ventilated waiting area for coughing patients or patients with suspected TB	■	■
There is a designated well-ventilated area, away from other patients and staff, where patients can produce sputum specimens	■	■
When visitors come to see patients who have suspected or confirmed TB, the visits are conducted in well-ventilated areas, and the patients are given surgical masks to wear	NA	NA
Outpatients who are coughing are fast-tracked for consultation	■	■
A TB suspect/confirmed case register is kept in the facility	■	■
In-patients with suspected TB are admitted in a designated isolation area or side room or single room	■	■
Signage is available and is clearly posted outside rooms when isolation is necessary	■	✓
Instructions for PPE are clearly posted on the walls	■	■
Staff have been trained on TB infection control procedures	✓	■
ENVIRONMENTAL MEASURES		
Natural ventilation is adequate (windows are kept open and a staff member is assigned to open windows regularly)	■	■
Negative pressure is available in isolation areas	■	■
Fans are used to increase air mixing (and are in good working condition)	■	■
Mechanical ventilation (e.g. extractor fan or whirly bird in the ceiling) is available	■	■
Fans are regularly maintained	■	■
PERSONAL PROTECTIVE MEASURES		
Adequate supplies of non-sterile gloves (in a variety of sizes)	■	■
Adequate supplies of sterile gloves (in a variety of sizes)	■	■
Adequate supplies of N95 respirators	✓	■
Staff have had N95 respirator-fit testing	■	■
Staff are using N95 respirators (observed)	■	■
Staff are using N95 respirators when inducing sputum	NA	NA
There is a sufficient number of wash basins with running water	✓	✓
Wash basins are clean and well maintained	✓	✓
Liquid hand soap is available	■	✓
Alcohol hand rub is available for use in between patient care	✓	✓
MISCELLANEOUS CONTROLS		
Health workers who are coughing are referred to the OHS clinic for TB screening	■	■
A written biohazardous waste policy is present	✓	■
Written regular waste disposal SOPs are present	■	■
Containers/bags for biohazardous waste are colour-coded and appropriately labelled	✓	✓
Intermediate waste storage area and main waste storage facility are clean and maintained	✓	✓
Body fluids, faeces, etc. are disposed of in a bedpan cleaner, using a method that prevents splashes	✓	■
Spill disposal kits are available and/or instructions and training are provided on how to clean a spill safely	■	■

✓ available/done; ■ unavailable/not done; NA not applicable in Emergency dept.

researchers, TB IPC worsened. We do not believe that this deterioration was attributable to our interventions but, rather, to the high leadership turnover, HW rotational systems between departments, and shifts, which undermined the work we had done. In addition, an insufficiently-addressed poor culture of TB IPC, exacerbated by the lack of publicised hospital TB surveillance reports, may have contributed to the significant decline in TB IPC. In retrospect, we could have stressed the importance of TB surveillance to management, organised labour and the HWs during our engagements with them.

We were particularly disappointed that the administrative controls did not improve, despite the minimal costs (other than time) that would be needed to invest in reorganising spaces and implementing policies. Administrative controls, viz. strengthening coordination; developing a facility plan; TB surveillance among HWs; advocacy, communication and social mobilisation; triaging, separating infectious patients, and fast-tracking coughing patients; and HIV prevention, antiretroviral therapy and isoniazid for HIV-positive HWs,[20] are outcomes that could have been achieved using available hospital resources.

The incidence of self-reported TB and/or TB diagnosed through the RMSP in the hospital was much lower than the reported incidence of TB disease for HWs in South Africa,[7,8] despite an upsurge of cases in 2016. Active case finding would likely have identified more cases. While the OHS service and the HIV and TB workplace programme had increased their human resources and improved the infrastructure by 2017, the BOHS systems were clearly not fully functional. These ineffective/incomplete aspects required of BOHS systems included absence of surveillance; inadequate information, education and communication; lack of sustained leadership and governance; unclear human resources management; and lack of sustained stakeholder engagement.

The active role of the lead researcher in service delivery during intervention had a major impact on persuading management to allocate resources. However, the missed opportunity for HIV and TB active case finding was lamentable, as was the lack of implementation of a robust surveillance system. The high staff (CEO and OHS coordinator) turnover frustrated the implementation of interventions, and the researchers should have disseminated their findings more quickly and widely, to sustain positive impact.

CONCLUSION

Although OHS, including implementing HIV and TB workplace programmes for HWs, is widely acknowledged to be essential for health systems in low- and middle-income countries, especially those with high HIV and TB co-epidemics, our research suggests that, even with targeted interventions, it is crucial that established systems are supported by ongoing top-level leadership, labour-management cooperation and, especially, monitoring and surveillance systems. Based on our findings, we recommend that OHS systems, including HIV and TB services, report directly to the CEO or equivalent officer; that HIV and TB control programmes be integrated into the OHS programme; and that investment be directed to establish robust ongoing systems, rather than isolated activities.

LESSONS LEARNED

- Leadership by management and organised labour is a key driver for implementing occupational health and safety (OHS) programmes.
- A high staff turnover is detrimental to OHS services.
- Conducting long-term interventional research on OHS services, without integrating the research findings as they become available, is an opportunity lost.

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DECLARATION

The authors declare that this is their own work; all the sources used in this paper have been duly acknowledged and there are no conflicts of interest.

AUTHOR CONTRIBUTIONS

Conception and design of the paper: MZ, AY, LO'H, MM, SK
Data acquisition: MM, MZ
Data analysis: MZ, MM, AY, LO'H
Interpretation of data: MZ, MM, AY, LO'H, NM, EB
Drafting of the paper: MZ, AY, EB, SK, MM, NM, LO'H
Critical revision of the paper: MZ, AY, EB, SK, MM, NM, LO'H

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Is one man's garbage another's toxic treasure?

A brief look into the informal recycling of waste on landfills and associated health challenges in South Africa

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INTRODUCTION

As South African consumerism has risen, the waste being generated has increased. Poor accessibility to recycling infrastructures in communities has resulted in a high influx of reusable waste at landfills.[1] Waste disposal through landfills is the primary form of disposal worldwide. According to the World Bank (2018), South Africans produce 0.50-0.99 kg of waste per capita per day.[2] In 2017, the Department of Environment, Forestry and Fisheries (DEFF), formerly the Department of Environmental Affairs, reported that 75% of this waste is disposed of in landfills across the country.[3] This has, to some degree, created a 'gold rush' to landfills as underprivileged and unemployed men and women in urban communities turn to waste recycling as a form of income generation.

It is estimated that 15 million people work as informal recyclers in developing countries.[4] In 2016, the DEFF estimated that there were 60 000 to 90 000 informal waste workers on the streets and landfills in South Africa,[3,5] but this might be a conservative estimate. In a 2013 review by Lizner and Lange, it was estimated that informal waste workers comprised approximately 0.6% of the total global population.[6] In the South African context, this is equivalent to 350 000 waste reclaimers, in relation to the current total population of 58 million.[7] Landfill waste disposal and its recycling activities contributed 0.62% to the South African gross domestic product in 2012.[3] The DEFF aims to increase this figure to 1-1.5% through acceleration of the waste recycling economy.[3]

Longevity of landfills is a major challenge as designated land in urban areas becomes scarce.[8,9] This is further compounded by the growing global concern about greenhouse gas emissions from landfills.[8] With increasing urbanisation and population growth, alternative forms of disposal, such as waste recycling, are becoming more important. As the informal recycling sector continues to grow, one needs to ask if there are any associated significant health risks. This paper aims to look at informal waste recycling in South Africa and the associated health risks.

Informal recycling in South Africa

Informal recycling is effective in reducing the amount of waste disposed at landfills in developing countries, thus prolonging use of the sites.[8] Reclaimed secondary materials from landfills reduce manufacturing costs.[9] South Africa has an unemployment rate of 29% and low labour absorption rates in the 20-30 and 60-64 years age groups of the population.[10] This has resulted in an upward trend in the proportion of the South African population that earns a living from informal collection of recyclable waste.[11,12]

Informal recyclers are a common sight in most cities and municipal landfill sites worldwide. The informal recycling chain begins with rummaging through waste in the streets and landfill sites.[11,12] Informal recyclers (also known as waste pickers) are paid per kilogram of waste sold to buy-back centres, although the rates of payment vary by the type of items recovered, and are at the buyer's discretion (Figure 1).[5,11-13] In a 2011 study by Mamphita, informal recyclers in Pretoria were reported to be earning ZAR 792 to ZAR 6 600 per month.[14] This was higher than the estimated global daily income of ZAR 11-176 of waste reclaimers at the time (2012).[6] Viljoen and colleagues later reported, from a 2017 national study, that street waste pickers earned on average ZAR 72 (ZAR 2-500) on a usual day across cities in South Africa. They also found that level of education and having a trolley were associated with income.[15]

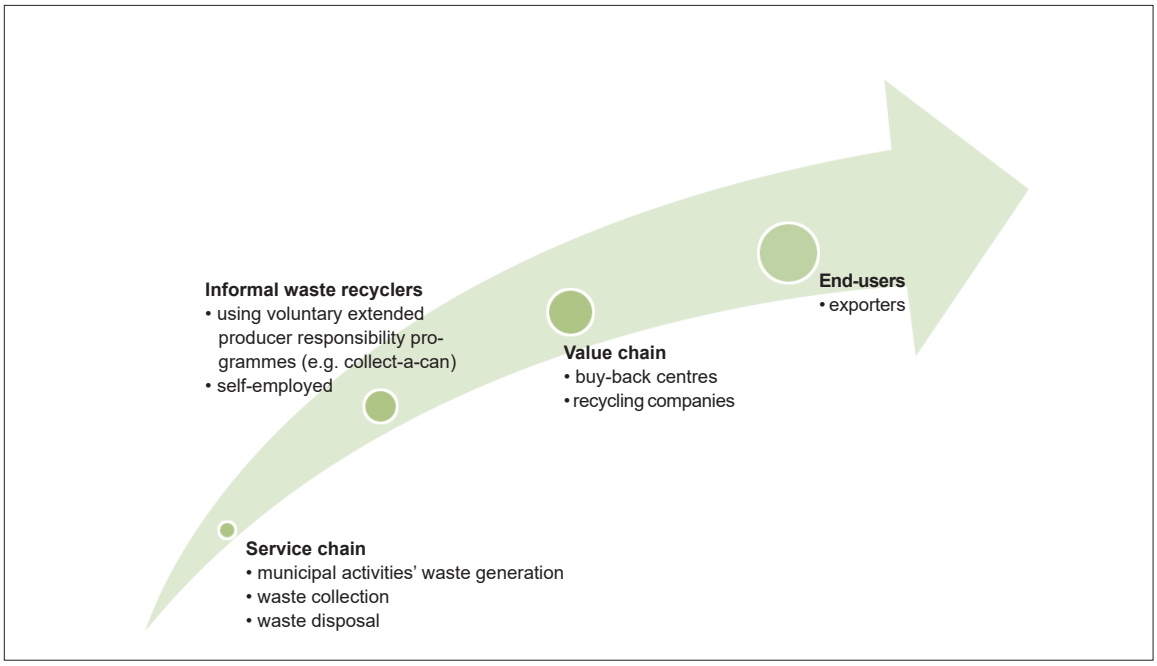

Figure 1. The role of informal waste recyclers in bridging the service and value chains in South Africa [adapted from Godfrey and Oelofse, 2017[5]]

The International Labour Organization (ILO) describes progressive steps in moving out of informal work as 'giving priority to reducing decent work deficits in the informal economy in the immediate term, by ensuring those found in it are recognised by law, have rights, legal and social protection and representation'.[16] This statement outlines focus areas that can be adopted by national governing structures to formalise informal waste recycling. Several attempts have been made in South Africa to achieve this.[17-20] The waste disposal by landfill policy of the DEFF does not encourage waste reclamation at landfills. Nevertheless, access control measures were left to the discretion of the relevant local municipalities, on condition that the landfill did not accept hazardous waste.[17] Some local municipalities create synergies between informal recyclers and their work processes on landfill sites, by granting landfill access to informal waste recyclers. According to the Council for Scientific and Industrial Research's (CSIR) guide for municipal waste management, health and safety concerns are addressed by both the informal waste recyclers and landfill managers at an elementary level (wearing gloves and avoiding vehicle accidents, etc.).[18]

The DEFF has aimed to streamline the practice of informal recycling by including it in the strategic goals for national waste management systems (Table 1).[16] Goal 3 of the DEFF National Waste Management Strategy is to grow the contribution of the waste sector to the green economy by promoting decent work through the formalisation of the practice of informal recycling, and expanding the roles of small and medium enterprises (SMEs) in waste management.[19] Goal 3 is reiterated in the Department's draft document on 'Recognising the Informal Waste Sector in Advanced

Table 1. Summary of the 2016 DEFF National Waste Management Strategy goals[19]

Goal 1: Promote waste minimisation, reuse, recycling and recovery of waste
Goal 2: Ensure the effective and efficient delivery of waste services
Goal 3: Grow the contribution of the waste sector to the green economy
Goal 4: Ensure that people are aware of the impact of waste on their health, well-being and the environment
Goal 5: Achieve integrated waste management planning
Goal 6: Ensure sound budgeting and financial management for waste services
Goal 7: Provide measures to remediate contaminated land
Goal 8: Establish effective compliance with and enforcement of the Waste Act

Table 2. Health and safety risks perceived by informal waste recyclers, by activity and waste type [12,13,22-24]

Activity	Solid waste type	Hazards
Offloading of waste from trucks	Domestic	Vehicle accidents
		Vehicle exhaust emissions
Searching construction rubble and cleaning collected bricks	Construction/building	Cement and brick dust
		Repetitive movements
		Asbestos exposure from asbestos-containing building material
Searching through offloaded waste from trucks	Biological	Biological exposures from faecal matter in nappies and discarded human foetuses
		Rodent infestation
	Hazardous chemicals (illegal waste)	Chemical vapours
	Glass	Cuts
	Electronic	Mercury exposure from broken light bulbs
Burning plastic cables	Electronic	Chemical fumes
Smashing computer and television screens	Electronic	Cuts
Sorting waste	Paper; cardboard and plastic	Repetitive motion

Waste Treatment'.[20] In the draft document, the Department acknowledges the need for expert advice on health and safety, as well as training, for informal recyclers. However, accountable stakeholders are not clearly indicated.[20] Formal infrastructures for informal waste recycling have been observed in Gauteng and the Western Cape provinces in the last five years.[9,21] While these enclosed facilities show improved working conditions (e.g. sheltered, and with waste conveyor belt systems), it is important to acknowledge hazards that may arise in an indoor setting. This was observed in Brazil when poor ventilation was highlighted in enclosed waste sorting facilities that were established to improve the infrastructure for waste recycling.[22]

Health risks associated with informal waste recycling

Reclamation has come under scrutiny in South Africa as a health risk to recyclers.[12,13,23] As outlined in Table 2, informal waste recyclers recognise various health hazards relating to the type of waste received on municipal landfill and associated activities.[13,21-24] While correct waste disposal procedures and diverting hazardous waste from municipal landfills may reduce health hazards, training informal waste recyclers on risk management is essential. Waste reclaiming activities on landfills may put individuals at risk of exposure to mercury from light bulbs, lead, endocrine-disrupting chemicals from electronics devices, and asbestos fibres from unregulated disposed of building waste.[13,18,21,24] Increasing outdoor air pollution in urban areas, due to fossil fuel emissions, further compounds the cocktail of harmful exposures experienced by informal recyclers.[8]

There is considerable epidemiological evidence for adverse health effects associated with landfill exposures. A Google Scholar search, using the keywords 'municipal landfills', 'waste workers', 'waste pickers', 'informal waste workers and health effects', identified various studies that have highlighted challenges in the waste management sector.[12,13,15,18-38] Some studies have also investigated an association between proximity to municipal landfills and adverse health effects in surrounding communities.[26-28] In a case-control study that examined hospital hypertensive discharge rates from 1993 to 2000, Huang and colleagues (2006) found that the prevalence of hypertension in people residing near waste sites in New York was associated with exposure to persistent organic pollutants from the waste sites.[28]

Cross-sectional studies on municipal waste workers in developed countries have reported respiratory symptoms

(e.g. coughing, sneezing, wheezing, and phlegm production) and skin diseases (e.g. rashes, eczema and itchy skin).[29-32] Hazards of concern reported in the literature in the last 10 years are mainly those associated with exposure to respirable and total inhalable particulates from landfills, and biological agents.[27,31,32,36-38]

Research on waste workers in South Africa is limited. Ncube et al.'s 2017 systematic review of studies with epidemiological evidence on public health concerns of municipal waste handling did not include any studies from South Africa.[33] There is also a scarcity of studies in South Africa that focus on quantifying waste handling exposures. To our knowledge, only two studies have used quantitative exposure monitoring techniques to assess occupational exposures in the waste handling sector in South Africa.[37,38]

Some studies in developing countries have focused on informal recyclers' exposures, and landfill exposures. For example, lead exposure levels in waste-recyclers have been studied in Ghana and Senegal.[29,35] High lead levels were observed in personal respirable dust samples of recyclers of electronic waste and urine of children residing in close proximity to landfills. In both countries, soil lead levels on the landfills were higher than on the reference sites. In the Senegal study, lead levels (known to produce progressive tubule-interstitial nephropathy that may cause kidney failure) found in children's urine, were traceable to lead in the soil on the landfill.[29] The high lead levels may have stemmed from the high influx of electronic waste into developing countries, in general.

There is a dearth of studies focusing on exposures and health outcomes in the domestic waste management sector in South Africa. Ncube et al. (2017) reported total dust concentrations in municipal waste workers (waste bin loaders) that exceeded 10 mg/m^3. However, a complementary study by Dalasile and Reddy (2017) reported personal respirable dust exposures in waste pickers on a Durban landfill that were below current South African occupational exposure limits.[38] Using general household survey data from 2005-2015, Omotoso found that those who collected recyclable waste for a living were 3% more likely to experience ill-health than those who did not.[13] Further, more specific research on contributing factors to ill-health in waste recyclers would be beneficial.

CONCLUSION AND RECOMMENDATIONS

Informal waste recyclers are exposed to hazards that may increase the risk of adverse health outcomes. In the Government's efforts to accelerate economic growth and promote decent work in the recycling sector, support is needed from environmental and occupational health and safety professionals in controlling hazardous exposures to mitigate risks of adverse health effects. While there is commitment to promote decent work for informal recyclers at the national government level, implementation strategies to address health and safety challenges need to be cascaded to the informal sector through engagement between government stakeholders and informal recycling consortiums, such as Women in Informal Employment: Globalizing and Organizing (WIEGO).[39]

DECLARATION

The authors declare that this is their own work; all the sources used in this paper have been duly acknowledged and there are no conflicts of interest.

AUTHOR CONTRIBUTIONS

Conception and design of the paper: TM
Data acquisition: TM, JW
Data analysis: TM, JW
Interpretation of data: all authors
Drafting of the paper: TM, JM
Critical revision of the paper: all authors

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Statistical analysis methods used to assess data below the limit of detection in the South African literature, 2010-2017

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ABSTRACT

Background: **The statistical methods used to analyse data below the limit of detection (LOD), otherwise known as non-detect (ND) data, may result in under- or over-estimation of exposure, leading to inaccurate decision making in occupational health risk assessment.**

Objective: **The objective of this study was to describe the statistical methods commonly used to analyse ND data in the South African scientific literature.**

Methods: **Studies that used statistical methods for the analysis of ND data, published in South African journals from 2010 to 2017, were identified through an electronic search of the South African Bibliographic and Information Network (Sabinet) database, and snowballing. The selected manuscripts were reviewed and the methods used for dealing with ND data were described.**

Results: **Fifteen manuscripts that statistically analysed ND data were identified. Most used substitution (60.0%) and exclusion (20.0%) methods. Robust methods, including multiple imputation, regression on order statistics and β-substitution, were used in only 20.0% of the studies.**

Conclusion: **Robust approaches for analysing ND data in occupational health are seldom used in South Africa. Occupational hygienists should consider using the Bayesian toolkit, Expostats, which is freely available software for the analysis of ND data.**

Keywords: **non-detects, non-detect data, limit of quantitation, substitution, imputation, regression on order statistics, maximum likelihood estimation, Bayesian statistics**

INTRODUCTION

Laboratory measurements are used to measure occupational, environmental and biomedical exposures. However, laboratory instruments detect a certain range of measurements and exclude those that are 'too low' or 'too high'. The limit of detection (LOD) is the lowest concentration that an analytical procedure can measure reliably. Concentrations of the analyte (substance) with values between zero and the LOD of the procedure or instrument are known as non-detects or non-detect (ND) data. These unmeasurable values can cause bias due to over- or under-estimation of mean values, leading to erroneous conclusions that could adversely affect decision making on exposure control and prevention.

The LOD is the lowest concentration that is clearly distinguishable from that of the 'blank'. The blank contains all the reagents required in an analytical procedure without the analyte of interest, and is used to calibrate the instrument. The LOD is often set at the mean plus 2-4 times the standard deviation (SD) of the blank value.[1,2] Uncertainty increases as the measurement approaches the LOD. The point at which the analyte is unmeasurable is known as the censoring limit, and depends on the methods and instruments used in the analyses.[3]

Statistical analysis of non-detect data

It is important to analyse ND data appropriately. There are several statistical methods that can be used, depending on the proportion of ND data and the sample size. Some of the commonly used statistical analysis methods for ND data are summarised in Table 1.

Exclusion methods

A common method involves the exclusion or deletion of ND data. However, this approach is not recommended as it results in

Table 1. Summary of commonly used statistical methods to deal with ND data

Statistical method	Description	Strengths	Limitations
Exclusion or deletion	Exclusion of ND data in analyses	Avoids uncertainty	Over-estimates or under-estimates the mean
Substitution	Substitution of ND data by LOD, LOD/√2	The calculation is simple The β-substitution method is suitable for small samples	Over-estimates or under-estimates the mean
Multiple imputation	Replaces missing data with values based on measured values	The estimates are not biased if the appropriate imputation model is used It accounts for uncertainty from missing values	Source of variability resulting from detected data are not accounted for during imputation
Maximum likelihood estimation (MLE)	Assumes the data are normally distributed and uses values above the LOD to compute those below the LOD	Estimates unbiased means and standard deviations	Cannot be used when the dataset contains more than 50% ND data
Regression on order statistics (ROS)	Uses linear regression modelling to calculate ND data	Is suitable for all sample sizes and high proportion of ND data	Transformation of the data can introduce bias in the true mean value when the assumption of normal distribution is not met
Bayesian statistics	ND data observations are considered as missing values; a posterior distribution is obtained for these values given the detected values	Computer applications are freely available to assess ND data The level and variability of previous information are considered when generating values for the ND data Is suitable for small sample sizes	At 70% ND data, the BE procedures do not provide robust estimates

over-estimation of the mean.[4] All ND data should be included in analyses because they are not missing values but, rather, values that are not detected because they are too small due to the limitations of the measuring instrument.[5]

Substitution methods

Substitution methods replace ND data values with zero or a constant value, e.g. the LOD value, LOD/√2 or LOD/2.[6-8] There is no sound theoretical basis for the use of these substitution values, and the choice is arbitrary. Substitution with LOD-based values can result in over- or under-estimation of mean values.[5-7] This method has also been shown to produce poor results in simulation studies.[3] Furthermore, since the distribution pattern of the substituted values is different to that of the original data, statistical tests using data containing substituted values can produce parameters (e.g. means, standard deviations, correlation coefficients and regression slopes) and test results that are inaccurate and, therefore, misleading.[3,4,6,7] Despite these shortcomings, substitution methods have been recommended in the literature,[9] probably because they are considered better than exclusion methods.

The traditional methods of substituting ND data values with LOD/2 or LOD/√2 have been revised with the β-substitution method, using β-factor X LOD.[10] The β-factor varies, depending on whether the arithmetic mean (AM), geometric mean (GM), or 95th percentile is estimated. The method involves random generation of observation values below the LOD, using the detected (measured) values, followed by the analysis of the data using complete sample techniques (as if all the values were included in the analysis). The β-substitution process is repeated several times, after which the results are combined or averaged. The β-substitution method assumes a lognormal distribution of the data and may therefore result in bias if the data actually follow other patterns of distribution.[10]

Multiple imputation

Multiple imputation involves creating values for missing data from observed data, based on the assumption that the data are normally distributed, using the known available parameter estimates. However, to avoid uncertainty, these parameters are obtained through bootstrap dataset resampling. This involves replacement of data with an average value of a sample of the original data. This creates multiple data points with greater accuracy, in terms of bias and uncertainty.[11] When the proportion of data below the LOD is small, multiple imputation results in unbiased estimates.[12,13]

Regression on order statistics

Regression on order statistics (ROS) is a semi-parametric approach that is used when the ND data are assumed to be normally distributed, but the distribution of the detected values is not.[4,5,14] Linear regression modelling is used to calculate values for ND data. This allows descriptive statistics to be computed, based on both the detected and predicted observations from the regression model. The direct use of detected data to estimate ND data without the assumption of the normal distribution improves the robustness of the ROS method.[4] The ROS method can be applied to any sample size with high numbers of ND data and skewed data.[3] Similar to the MLE method (discussed below), transformation of data that might be required when using parametric methods can result in a biased mean. Nevertheless, both the MLE and ROS

methods have been shown to be similar with regard to bias and the degree of precision.[15]

Maximum likelihood estimation

Unlike the other methods described, the maximum likelihood estimation (MLE) does not generate ND data values but estimates means and variances from observed values.[5,12] The MLE is a parametric method that assumes that the data follow a certain known distribution (including the normal distribution) so that the measurements represent random values whose distributions are unknown. Using values above the LOD, the proportion of data below the LOD, and assumptions based on the distribution of the data, the MLE method computes parametric values (means and variances) with the maximum likelihood of describing the data.[5] In other words, the assumed shape and information contained in the data are used to estimate parameters that are then used to make inferences about the population of interest.[3]

Two variants of the MLE method are reported in the literature. The Hald MLE method is laborious, requires extensive calculations, and cannot be used if more than 50% of the values are not detectable.[10] The Cohen MLE is more versatile and is appropriate for analysing datasets with more than 50% of ND data.[10] Both approaches result in the estimation of unbiased means and standard deviations under a variety of conditions. However, caution is needed when applying the MLE approach, because the results can be affected by outliers and by mismatch between the actual distribution of the data and the assumed underlying distribution.

Bayesian statistics

Bayesian estimation (BE) statistics utilise previously known (prior) information to adjust and update current data (e.g. ND data). The adjusted data (also known as posterior data) can then be used to calculate useful statistics or parameters. Unlike the traditional MLE techniques, the BE procedures allow the use of known information to calculate estimates such as means, standard deviation and 95th percentiles etc.[16,17] Advantages of using BE statistics are that they take into account the values and variability of previous information, and the methods are suitable for small sample sizes. A number of online applications that can be used to compute ND data using Bayesian models are freely available from www.expostats.ca.[18,19]

It is difficult to recommend a single, robust statistical method to assess ND data. The choice of the method depends on the proportion of the ND data in the dataset and the validity of the assumptions with regard to the data.[3] Nevertheless, many international and national agencies have developed guidelines for ND data analysis. For example, the United States Environmental Protection Agency (USEPA) recommends substitution when the percentage of ND data is less than 15%, and the Cohen MLE method for datasets with 15-50% of ND data.[20] The World Health Organization (WHO) recommends the use of substitution methods as well as MLE and graphical methods, depending on the proportion of ND data in the dataset.[16]

The methods described above can be applied in occupational settings to account for exposure measurements that are below the LOD. However, the effects of bias, variability and uncertainty should be considered when selecting statistical methods for the analysis of ND data, as the methods will affect the results and, consequently, decisions to control hazardous exposures.

Table 2. South African journals in which manuscripts describing the analysis of ND data were published

Journals	Number of manuscripts
African Journal of Aquatic Sciences	1
African Journal of Science, Technology, Innovation and Development	1
African Zoology	2
Occupational Health Southern Africa	2
Onderstepoort Journal of Veterinary Research	1
South African Journal of Science	1
South African Medical Journal	1
The Clean Air Journal	2
Transactions of the Royal Society of South Africa	1
Water SA	3

In our experience, the assessment of ND data appears to be a relatively novel concept that is seldom used in the South African context. The aim of this study was to describe the statistical approaches used to analyse ND data in manuscripts published in South African journals from 2010 to 2017.

METHODS

Scientific manuscripts, published in South African journals from 2010 to 2017, were identified through an electronic search of the South African Bibliographic and Information Network (Sabinet database). Sabinet is an online central library of journals from, or relating to, Africa, and facilitates resource sharing among South African institutions. We searched the database for manuscripts published in South Africa, using the search terms 'censored data', 'limit of detection', 'LOD', 'below the limit of detection', 'non-detects', 'statistical methods for LOD', and 'censored data analysis'. The Sabinet search was complemented by snowballing which involved identifying articles from the reference lists of selected manuscripts.[21] We described the statistical methods used to manage ND data, as explained in the selected manuscripts.

RESULTS

A total of 150 South African manuscripts were retrieved: 136 from the Sabinet database and 14 from snowballing. Of these, 135 (90.0%) were excluded because they did not describe any statistical methods for analysis of ND data. The remaining 15 studies were published in 10 journals (Table 2).

Table 3 describes the analytes measured in the selected studies. With the exception of two manuscripts on occupational exposure assessment, all reported environmental exposure assessments of bioaccumulation of chemicals in organisms, and concentrations of chemicals in water, air and soil, and particulates. The two occupational exposure manuscripts reported on exposure

Table 3. Summary of the selected studies that analysed ND data

Author	Year	Analyte measured
Swanepoel and Rees [22]	2011	Silica in air
Du Plessis et al.[23]	2013	Cobalt and nickel in workers
Oosthuizen et al.[24]	2015	Metals and particulate matter in air
Posthumus and Woollatt [25]	2014	PCDDs and PCDFs in air
Sallau et al.[26]	2017	Trace elements in soil
Naidoo et al.[27]	2013	Metal bioaccumulation
Newman and Watling [28]	2007	Arsenic, cadmium and mercury in water
Zhao and Zhao [29]	2014	Lead and zinc in water
Kampire et al.[30]	2015	PCBs in sediments
Baker et al.[31]	2017	Metal accumulation
Erba et al.[32]	2015	Viral load
Gooneratne et al.[33]	2008	Sodium monofluoroacetate bioaccumulation in sheep
Akinsanya et al.[34]	2015	Bioaccumulation of pesticides in foodwebs
Griffin et al.[35]	2017	Phosphate
Monyai et al.[36]	2016	Various water quality parameters

PCDDs: polychlorinated dibenzodioxins; PCDFs: polychlorinated dibenzofurans; PCBs: polychlorinated biphenyl

assessment of silica in South African farms[22] and dermal exposure to cobalt and nickel among base metal refinery workers.[23]

A summary of the methods used to analyse ND data in the 15 manuscripts is presented in Table 4. Substitution methods were used in nine (60.0%) of the manuscripts, while exclusion methods were used in three (20.0%). The ROS, multiple imputation, and β-substitution were utilised in each of three (20.0%) additional manuscripts.

Table 4. Statistical methods used to analyse ND data in South African published scientific manuscripts (2010-2017)

Statistical methods	Number of manuscripts	References
Exclusion	3	Exclude or delete ND data[28,33,36]
Substitution	9	Substitution with zero[25,26] Substitution with LOD[24,27,29,34] LOD/2[30,31] Substitution with 1.6 log10 HIV-RNA[32]
β-substitution	1	β-substitution method[23]
ROS	1	ROS[35]
Multiple imputation	1	Multiple imputation[22]

DISCUSSION

We aimed to assess statistical approaches used to analyse ND data in recent studies published in South African journals. Although 150 manuscripts mentioned LOD or ND data, statistical methods to deal with these were described in only 15 manuscripts. The studies covered a wide spectrum of exposures: organic and inorganic chemicals; in soil, water, air, mine tailings or organisms. Only two focused on occupational exposures, yet ND data can lead to over- or under-estimation of exposures which can have adverse consequences for workers.

In most of the studies, the statistical methods used for ND data were not reported. In those where the methods were reported, most used substitution or exclusion methods. More robust multiple imputation and ROS methods were used in only three studies. The use of more robust and accurate methods should be encouraged in order to reduce bias.

In only two of the manuscripts in which ND data were analysed were the studies conducted in occupational settings. This might point to a high use of exclusion methods where authors may be disinclined to report the presence of ND data in their studies. Under-reporting of ND data has been cited as being a principal challenge when calculating valid estimations of average occupational exposures in the USA.[37]

The methods selected for analysing ND data have particular implications for occupational health research. For example, exclusion of ND data would have caused over-estimation of formaldehyde exposure in the United States Integrated Management Information System (IMIS) time-weighted average (TWA) results by 20%, and under-estimation of the French database (COLCHIC) short-term data by 30%.[37] Underestimation of exposures resulting from exclusion of ND data in France could have given a false sense of safety to workers and safety managers, and thereby placed the lives of millions of workers at risk, while the over-estimation of exposures in the USA would have resulted in unnecessary interventions and anxiety among workers.

Limitations

This study was limited in that it was based on manuscripts in the Sabinet database. Not all studies conducted in South Africa are published in South African journals. The selection of manuscripts was therefore biased. It is very possible that manuscripts in which ND data analyses are used and described are published in the international literature. The study should thus be repeated, using a broader range of journals. Nevertheless, this study raises awareness of the need for improved statistical approaches to the analysis of ND data, in South African-based studies.

CONCLUSION

Although exclusion and substitution methods were the most commonly used approaches for dealing with ND data, the results from such studies should be interpreted with caution due to the bias associated with these methods. The use of freely available web application tools such as Expostats to analyse ND data is encouraged in both occupational and environmental exposure assessment studies.

DECLARATION

The authors declare that this is their own work; all the sources used in this paper have been duly acknowledged and there are no conflicts of interest.

AUTHOR CONTRIBUTIONS

Conception and design of the study: FM, WU
Data acquisition: WU
Data analysis: FM
Interpretation of the data: FM
Drafting of the paper: WU
Critical revision of the paper: FM, WU

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10 steps to checking your spirometry result

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The 10-step process, outlined in Figure 1, ensures that best practices for data validation, interpretation and record keeping are adhered to in the assessment of every spirometry test. This 10-part series briefly outlines each step, one-by-one.

STEP 6: CHOOSING THE BEST TEST OR BEST CURVE FOR INTERPRETATION

In a spirometry test, the measured forced vital capacity (FVC) and forced expiratory volume (FEV_1) are interpreted from a series of at least three acceptable forced expiratory curves. The data can be interpreted as either the best test or the best curve.

The (new) best test is created by the software, and uses the highest FVC and FEV_1 values from the three best blows, not necessarily from the same 'blow' attempt. The FEV_1/FVC ratio is calculated and other variables are derived, if required, for diagnostic or interpretive purposes, e.g. the peak expiratory flow (PEF) or forced expiratory flow (FEF25-75%).

Alternatively, the best curve can be selected for interpretation. This is the blow from an acceptable curve with the largest sum of FVC and FEV_1 of the three best blows. This best curve is then used to derive other variables e.g. PEF or FEF25-75%.

Although all spirometry software should create a best test, using the highest FVC and FEV_1 from different curves, many spirometers have defaults set to something different. Users are encouraged to review the settings to ensure that the best test method is used for interpretation.

These points are illustrated in Table 1. The best blow is Trial 4 – the blow with the highest sum of FVC and FEV_1. The best test, however, is the 'new' test created by the software, and comprises the highest FVC of the three best blows (4.04 L from Trial 4), and the highest FEV_1 from the three best blows (3.04 L from Trial 2). This creates a new FEV_1/FVC ratio (75.3%). These are the values that are measured against the predicted values and are expressed as a percentage of predicted (or absolute %, in the case of the FEV_1/FVC), and Z-scores for interpretation.

10 STEPS TO CHECKING YOUR SPIROMETRY RESULT

Step 1	Calibration and patient data
Step 2	Reference values and ethnicity
Step 3	Acceptability and usability
Step 4	Repeatability
Step 5	Lower limits of normal/Z-scores
Step 6	Best test/best curve
Step 7	Interpretation
Step 8	Grading
Step 9	Recording and reporting
Step 10	Trends and record keeping

Figure 1. The recommended 10-step process to ensure your spirometry result derives from best practices for data validation, interpretation and record keeping

Table 1. Spirogram illustrating the best curve (Trial 4) and best test (Best)

Parameter	Pred	LLN	Best	Trial 4	Trial 2	Trial 3	% Pred	Z
FVC [L]	3.69	2.92	4.04	4.04	3.89	3.90	110	0.75
FEV_1 [L]	3.16	2.48	3.04	3.03	3.04	3.04	96	-0.28
FEV_1/FVC [%]	84.40	74.00	75.30	75.10	78.20	78.20	89	-1.43
PEF [L/s]	8.25	6.07	7.67	6.51	7.67	7.67	93	0.44
FEF25-75 [L/s]	3.76	2.29	2.41	2.41	2.70	2.70	64.00	1.52

LLN: Lower limit of normal

OSHAfrica 2019 inaugural Conference and General Assembly

The OSHAfrica 2019 Conference and General Assembly, held at Emperors Palace Conference Centre, Gauteng, South Africa, from 18-20 September 2019, has come and gone, leaving everyone with pleasant memories.

The choice of South Africa as the host country began with a quiet nomination by Debbie Myer when we requested nomination submissions; other nominated countries were Sudan, Zimbabwe and Tunisia. South Africa emerging as the selected host was a blessing to OSHAfrica because most of the speakers and delegates were interested in coming to South Africa. Conference planning began immediately, with Dr Thuthula Balfour showing positive leadership in assembling and chairing the Conference Planning Committee, which she co-chaired with Dr Claire Deacon.

Day One of the Conference was amazing. I walked into a hall packed with people who came with so many expectations. The proceedings opened with an energising performance by a talented dance troupe, who provided a clear message on workplace health and safety.

There were sound keynote addresses from several stakeholder groups, followed by interesting and stimulating plenary and technical papers presented in parallel sessions. We were all amazed at the depth of knowledge that the Zambian Minister for Mines, the Honorable Mr Richard Musukwa, presented in his keynote paper. The presentation was rich in thoughts and a true representation of the current health and safety situation, not only in mining, but across all workplaces in Africa.

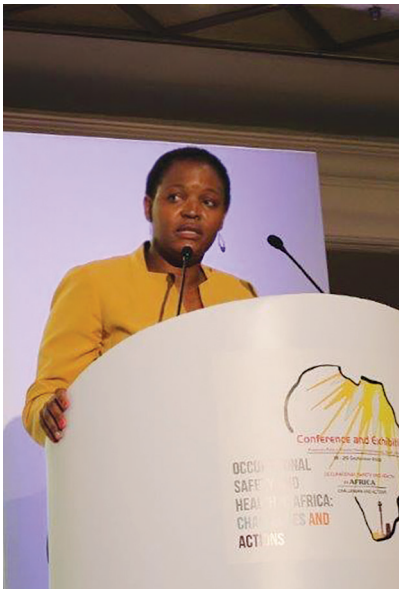
One of the key highlights of the Conference was the turnout – the number of speakers and non-speakers who flew into South Africa to be a part of this Conference. One young woman flew all the way from Canada; other delegates came from Thailand, the USA, Russia, the UK, Turkey, Ukraine, and Australia. A community of German OH professionals came to Africa for their first ever visit. Africans also represented their countries across the subregion.

It was indeed a very successful Conference, with more than 1 200 delegates from 31 countries, 54 international speakers and 40 South African speakers. There were two serving government ministers, and the presence of the International Labour Organization (ILO), the World Health Organization (WHO), and the African Union (AU). Everything was on point, from planning to implementation.

One of the primary aims of OSHAfrica is to bring African occupational safety and health (OSH) professionals together for collaborative work and sharing of data. This was further strengthened during the course of the Conference, as most of the delegates from across Africa were meeting each other for the first time and sharing networking and bonding opportunities. We also saw professionals from Africa and beyond the continent sharing the stage and co-chairing, further strengthening the OSHAfrica dream. A workshop that focused on teaching delegates how to write abstracts and research papers reinforced another overarching aim of OSHAfrica, namely to address the lack of OSH data in Africa.

Because this was our maiden Conference, we envisaged problems in getting professionals from across the continent, and the world, to gather in South Africa. We needed to demonstrate the right attitude, and show that we could be trusted. Therefore,

Dr Ivan Ivanov from the World Health Organization (WHO) *Photograph: Dr Thuthula Balfour*



Ms Chimwemwe Chamdimba from the African Union Development Agency *Photograph: Dr Thuthula Balfour*

The Hon. Mr Richard Masukwa, Minister of Mines and Minerals, Zambia *Photograph: Dr Thuthula Balfour*

Welcome Ceremony (L-R) – Mrs Namakau Kaingu, Mr Peter-John 'Jakes' Jacobs, Mr Sanjay Gandhi, Dr Thuthula Balfour, The Hon. Mr Richard Musukwa, Ms Chimwemwe Chamdimba, Mr Ehi Iden, Dr Ivan Ivanov, Dr Claire Deacon, and Mr Franklin Muchiri *Photograph: Ehi Iden*

Kenya will host the 2022 OSHAfrica Conference
Photograph: Dr Thuthula Balfour

we started our engagement along these lines, and many of our members who had contacts with renowned occupational safety and health professionals volunteered their time and resources to bring these individuals to Africa. The African Union Development Agency contributed immensely by funding some of the speakers from the continent.

We call on OSH professionals across Africa and the rest of the world (we also have non-African members) to align with the OSHAfrica plan for the next three years. A report on the Conference was presented by the Hon. Dr Zweli Mkhize, Minister of Health of South Africa, and the recommendations in the report will be implemented. We have a number of projects that have been developed by the three scientific committees; these are geared towards improving the capacity and capabilities of African OSH practitioners, and translating these gains into occupational safety and health improvements in workplaces across Africa.

The OSHAfrica 2019 Conference set a high standard that I hope will continue in future Conferences. A successful pitch was made by our colleagues from Kenya to host the OSHAfrica 2022 Conference. The OSHAfrica Committee is full of ideas and we anticipate that every Conference in the future will be better and more innovative than those in the preceding years.

Within the Conference, we also held a very successful General Assembly, which will be held at every future Conference. At the General Assembly, the existing interim Board was dissolved to make room for a democratically elected Board of Trustees, supported by members to lead OSHAfrica for the next three years.

We currently have more than 500 members from more than 37 African countries, and we have new members joining daily. Please join OSHAfrica if you are not already a member, and help us to make workplaces safer and healthier across Africa. Visit our website www.oshafrica.africa for more information.

Report by:
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OSHAfrica President
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The SATBHSS Project, Occupational Health and Safety, mid-term review, key achievements and recommendations (29 April-8 May 2019)

AIM OF THE REVIEW

The aim of the Southern Africa Tuberculosis and Health Systems Support (SATBHSS) Project mid-term evaluation was to provide an opportunity for key partners to reflect on implementation progress and fix bottlenecks that might impact negatively on project results.

The African Union Development Agency-New Partnership for Africa's Development (AUDA-NEPAD) undertook a self-assessment to evaluate its contribution, focusing on understanding and documenting progress in the first two years (2017-2018). The overall purpose was to improve implementation efficiency and effectiveness for positive impact in the region. This report provides an overview of the outcomes of the self-assessment, including key recommendations presented by project partners during the mid-term review (MTR) Regional Advisory Committee (RAC) meeting in Maputo, Mozambique.

KEY PROJECT RESULTS

1. On rolling out a standardised package for OH services and mining safety standards across the four countries

To ensure harmonisation, and benefit from the economies of scale, the project adopted a regional approach which resulted in the development of a regional occupational health and safety inspection equipment guideline to be utilised by countries during the procurement of equipment. Through a partnership between AUDA-NEPAD, the International Labour Organization (ILO) and the National Institute for Occupational Health (NIOH), HealthWISE has been rolled out in hospitals in Lesotho as a step towards strengthening occupational health and safety of healthcare workers. HealthWISE lessons learned in Lesotho will be incorporated into the roll-out into the other three project countries. Capacity building has been undertaken in support of screening and treatment interventions of occupational lung diseases.

2. Improving the quality and availability of human resources in the targeted areas

One hundred and twenty-one regional experts have been trained in occupational health and safety (OHS), including medical doctors, occupational health nurses, occupational hygienists, occupational health and safety inspectors, radiologists, environmental health practitioners, and academics. A regional occupational health and safety inspector's training manual, incorporating local, regional and international best practice, has been developed. Practical training on airborne dust measurements, for occupational hygienists who passed the International Occupational Hygiene Association-recognised international exams, is building a cadre of internationally-recognised experts in the region. Contributing partners are listed in Table 1.

3. Strengthening mine health regulation

All countries are reviewing their mine health and safety policies and legal frameworks. The code of practice on mine health regulation and occupational health was established in 2017, and provides a platform for peer learning in these reviews. Regional harmonised guidelines on mine health inspection were adopted in 2018 and have been used to update country guidelines. A

Table 1. Training partners

Partner	Training contribution
National Institute for Occupational Safety and Health (NIOSH) (USA)	ILO chest X-ray classification of pneumoconiosis; B reader training
National Institute for Occupational Health (NIOH)	Fundamentals of occupational health in the workplace
International Labour Organization (ILO)/NIOH	HealthWISE
Workplace Health Without Borders (WHWB) International Occupational Hygiene Association (IOHA) International Commission on Occupational Health (ICOH) WITS University Southern African Institute for Occupational Hygiene (SAIOH)	Training of regional occupational hygiene professionals
Medical Bureau for Occupational Diseases (MBOD)	Occupational health service centres; mapping of miners and ex-mine workers
Occupational Health and Safety Institute (OHSI) (Zambia)	Regional Centre of Excellence on OHS, provision of training facilities, and state-of-the-art B reader equipment

Members of the Regional Advisory Committee (RAC) gather in Maputo, Mozambique
Photograph: Norman Khoza

pool of experts was established in 2019 to support the reviews. In 2018, an agreement was signed with the NIOH for support of the development of a standardised innovative information technology system for compliance monitoring and mine health surveillance data management.

4. Operational research and knowledge sharing

Two regional studies are being conducted on mine health regulation, and occupational health and safety services in southern Africa. The first study comprises: i) a desktop evaluation of the status of OHS regulatory frameworks, and ii) dust exposure measurements in a sample of mines in order to understand worker exposure to crystalline silica and airborne dust levels in different commodities and workforce sizes. Preliminary results showed high silica dust exposure in some of the mines, which triggered interventions to be implemented by the respective ministries. The second study is the 'Opportunities for private sector participation in TB control'. It is being undertaken to understand the level of engagement of the private sector in tuberculosis (TB) control, and to identify opportunities, risks, challenges, and key strategic priorities to expand private sector support for prevention and care.

The results of both studies will support the development, in the four study countries, of targeted policies and regulations that protect mine workers from exposure to harmful dusts that can lead to occupational lung disease, including TB. Conclusions and recommendations from the studies will strengthen legislation in study countries and provide spill-over benefits across the Southern African Development Community (SADC) region.

KEY ACHIEVEMENTS AND RECOMMENDATIONS

The regional project component on OHS is on track: 80% of planned activities in the first half of the project were achieved, with a 70% absorption rate of project funds. Communities of Practice and Centres of Excellence have added value to knowledge sharing and learning. The regional multi-sectoral approach used in project implementation has facilitated learning and has spearheaded a comprehensive response to TB and occupational lung diseases. Training of experts from the government

Present at the RAC mid-term review meeting (L-R) – Dr Ronald Mutasa: Technical Team Leader (World Bank); Mr. Barnaby Mulenga: Permanent Secretary of the Ministry of Labour and Social Security, Zambia; and Her Excellency Dr Nazira Karim Vali Abdula, Honourable Minister of Health, Mozambique
Photograph: Norman Khoza

on OHS is improving the quality and quantity of human resources for OHS. There is a need to focus on country-specific and tailored OHS primary preventions to reduce exposure to airborne dust such as crystalline silica, and coal dust.

Resources for updates on project activities

- Website: http://www.satbhss.org/
- Twitter: https://twitter.com/SATBHSS_Project
- Facebook: https://www.facebook.com/SATBHSS/
- YouTube: https://www.youtube.com/channel/UCpfa6BVEg8WhTDIgYDLwfAg

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IOHA
International Occupational Hygiene Association

Global Exposure Manager

IOHA Newsletter & Technical Updates

The International Occupational Hygiene Association (IOHA) represents the global community of occupational hygienists. The IOHA is an association of occupational hygiene organisations from across the world, all of which are dedicated to the discipline and application of the inherent principles of occupational hygiene. The IOHA mission is to enhance the international network of occupational hygiene associations that promotes, develops and improves occupational hygiene worldwide, providing a safe and healthy working environment for all.

Special international auxiliary session at American Industrial Hygiene conference and exposition (AIHce) – making a difference in global environment, health and safety (EHS)

During the American Industrial Hygiene conference and exposition in Minneapolis, USA, in May this year, several globally-focused groups collaborated to conduct a special auxiliary session on global interests. Speakers included Chris Laszcz-Davis and Nancy McClellan from the Occupational Hygiene Training Association, Peter-John 'Jakes' Jacobs from IOHA, Rich Hirsh from the Developing World Outreach Initiative (DWOI), Garrett Brown from the Maquiladora Health & Safety Support Network, Marianne Levitsky from Workplace Health Without Borders, and Kathy Murphy and Tom Fuller from the American Industrial Hygiene Association (AIHA). During the session, many ongoing outreach and collaborative projects were discussed, in addition to strategic plans for future activities.

IOHA Board member receives American Industrial Hygiene Association Distinguished Service Award at AIHce 2019

The Distinguished Service to AIHA Award recognises distinguished service in the advancement of industrial hygiene and unique technical contributions to the aims and goals of AIHA nationally. During Tom Fuller's time as Chair in 2018, the International Affairs Committee (IAC) received the Soaring Star Award for ongoing excellence by a committee. During that time, the IAC created the Micro-Grant Subcommittee on Emerging Economy Projects Fund that coordinates the distribution of awards for outreach and capacity building. These funds are available to individuals and organisations; the application portal is

MESSAGE FROM THE IOHA PRESIDENT

This edition of our IOHA newsletter, the *Global Exposure Manager*, marks the first edition with Tom Fuller and Gill Nelson at the helm, who no doubt will make a formidable team in putting together good content for you and keeping you informed of the latest happenings within the global occupational/industrial hygiene community. The IOHA is also set to launch its new website soon, and we are excited to bring you fresh content and provide you with a platform where you can become involved in global occupational hygiene initiatives, and actively participate in the global drive for healthy workplaces.

As I write to you, I am sitting in a remote location in an African country, working on an occupational hygiene sampling project. Time away from family and loved ones is never easy and it makes me realise that the work of the occupational hygiene professional can be challenging at times. However, seeing how humans improvise and are able to overcome obstacles in remote settings, away from the creature comforts of city living that we all take for granted, is truly amazing. It makes me once again realise that to have a career that affords us the opportunity to help make a difference in workplaces across the globe is special. We can help save lives!

I would like to remind you of our upcoming IOHA Conference in October 2020 in Daegu, Korea, and look forward to seeing you there.

Peter-John (Jakes) Jacobs
IOHA President 2018/2019
e-mail: pjjacobs@sedulitas.co.za

IOHA Board member receiving Distinguished Service Award 2019 from AIHA President, Cynthia Ostrowski
Photograph: Lydia Renton

currently open until 31 December 2019 at: https://www.aiha.org/get-involved/VolunteerGroups/Pages/AIHA%27s-IAC-Micro-Grants-Subcommittee-on-Emerging-Economy-Projects-Fund-Review-Protocol.aspx.

European Network for Education and Training in Occupational Safety and Health (ENETOSH) representative speaks at two AIHce sessions

At the 11th International Occupational Hygiene Association (IOHA) International Scientific Conference in Washington, D.C. in September 2018, a Memorandum of Understanding was signed between IOHA and ENETOSH. As a result of the collaborative agreement, an ENETOSH representative attended and presented at the AIHce in May 2019. Lester Claravall from the Oklahoma Department of Labor presented a paper on the state's child labour programme in an educational session entitled 'Global Child Labor - A World of Issues and Dilemmas'. He also discussed ENETOSH activities and collaborations in another Conference session on 'Global Occupational Safety and Health Education and Mainstreaming Collaborations'.

IOHA Board meeting at the British Occupational Hygiene Society (BOHS) Conference in Brighton, UK

The most recent IOHA Board meeting was conducted on 31 March 2019 at the BOHS Conference in Brighton, UK. The Conference brought together researchers, practitioners, regulators and IOHA members from around the world to discuss the very latest in issues that affect health at work.

Please refer to the Calendar page on the *Occupational Health Southern Africa* website (www.occhealth.co.za) for details of conferences and other events. IOHA 2020 will be held in Daegu, Korea, 17-22 October 2020. The Conference submission portals for professional development courses, symposiums and special lectures are currently open, and close on 31 January 2020. The submission portal for podium sessions and posters will close on 28 February 2020. The abstract submission portal for the 2020 World Congress on Health and Safety at Work, in Australia, is also now open.

Report by:
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Special international session at AIHce in Minneapolis, USA, in May 2019 *Photograph: Thomas P Fuller*

Some of the IOHA Board members and staff attending the annual BOHS Conference, April 2019 (L to R) – Philip Hibbs, Walter Spieler, Tom Fuller, Jake Jacobs, Dave March, Retha van Niekerk, Andrea Hiddinga, Miilja Koponen, Rene Leblanc
Photograph: Thomas P Fuller

Report on the SASOM-MEDICHEM Joint Congress, 31 July to 3 August 2019

The first Joint Congress of The South African Society of Occupational Medicine (SASOM) and the International Scientific Association for Occupational and Environmental Health in the Production and Use of Chemicals (MEDICHEM) was held at the Protea Hotel by Marriott OR Tambo International Airport, Gauteng, South Africa. SASOM is an affiliate member of the International Commission on Occupational Health (ICOH) and MEDICHEM acts as the ICOH Scientific Committee (SC) on Occupational Health in the Chemical Industry.

The theme of the Congress was *Control of Substances Hazardous to Health: Old and Emerging Issues.* Attendees were accredited with 26 CEUnits for full attendance, including two ethics points by the South African Medical Association (SAMA) or four CEUnits by the South African Council for Natural Scientific Professions (SACNASP).

In a true reflection of global collaboration in occupational health, approximately 110 participants (including invited speakers, delegates and exhibitors) attended the Congress, representing 25 countries: Canada, China, Finland, France, Germany, Greece, Kenya, India, Israel, Italy, Kuwait, Lesotho, Malaysia, Mozambique, Namibia, Nigeria, Portugal, Republic of Korea, Rwanda, Switzerland, Thailand, United Kingdom, United States, Zimbabwe, and South Africa.

The Congress was officially opened by Prof. Daan Kocks (Chair: SASOM) and Dr Murray Coombs (President: MEDICHEM). A special welcome was extended to the office bearers, national secretaries and representatives of the SCs of ICOH. SASOM and MEDICHEM collaborated in this first joint venture to bring together international professional networks to share their expertise. The chemical industry expertise was represented through MEDICHEM and the International Council for Chemical Associations, most notably for their work in sustainable development, green chemistry and responsible care. Opportunities were created for the local professional occupational health societies, viz. SASOM, the South African Society of Occupational Health Nursing Practitioners (SASOHN), and the Southern African Institute for Occupational Hygiene (SAIOH), to interact and network with the international participants. This platform also allowed for excellent opportunities for workplace practitioners and industry representatives to meet with academic and government institutions.

The stimulating and informative scientific programme included alternating MEDICHEM and SASOM sessions, with the following sub-themes: (i) 'Setting the Scene: Chemical Exposure Perspectives – Global, Regional, In-Country'; (ii) 'Chemical Hazards: Occupational Health Ethics and Emerging Issues'; (iii) 'Chemical Hazards: Role of Professional Networks in Occupational Health' and (iv) 'Health and Chemicals: Learnings and Applications'. Six ICOH SCs, which have overlapping work and research interests with those of both MEDICHEM and SASOM, accepted invitations from the Congress organisers to be officially represented in the scientific programme, viz. SC on History of the Prevention of Occupational and Environmental Diseases; SC on Mining Occupational Safety and Health (SC MinOSH); SC on Occupational Health Nursing (SC OHN); SC on Occupational and Environmental Dermatoses (SC OED); SC on Occupational Toxicology (SC OT); and SC on Industrial Hygiene (SC IH).

The Congress presentations covered a wide spectrum of topics, as detailed in the comprehensive report available on the *Occupational Health Southern Africa* website. Also available on the Journal website are the abstracts of all presentations and specific citations from learnings shared in the seven keynote and 35 oral presentations, which are worthy 'take home messages' for all participants.

MEDICHEM Awards

The Joint Congress organisers, scientific committee members and panel of adjudicators take this opportunity to congratulate the following winners of the MEDICHEM Awards:

• Winner: Young Professionals Programme (YPP) Award – Dr Botembetume Maboso (Mafeteng, Lesotho), for his presentation, "Assessing the burden of silicosis, TB and HIV among Basotho formerly employed in South African mines"

• Winner: MEDICHEM Prize – Ms Annelize Jacobs (Port Elizabeth, South Africa), for her presentation, "World class occupational health in an emerging market environment"

• Runner-up: MEDICHEM Prize – Dr Itumeleng Ntatamala (Cape Town, South Africa), for his presentation, "Hard metal lung disease: old and emerging issues".

Associated events and social function

MEDICHEM held a half-day pre-Congress workshop, titled *Chemicals: From Environment to Epidemiology,* with 12 participants and two international facilitators: Dr Tee Guidotti (USA/Canada), a consultant in occupational and environmental health and medicine, in private practice (post-retirement); and Dr Avi Wiener (Israel), an occupational medicine practitioner from the Israel Institute of Technology (Technion) in Haifa and the Institute of Occupational Medicine, Sheba Medical Centre, Ramat-Gan. Topics were: introduction to environmental toxicology; toxico-dynamics; carcinogenesis; application of toxicology and epidemiology in the modern work environment; and case studies.

The ICOH Officers Meeting was attended by the ICOH President Dr Jukka Takala (Finland), the Secretary General Prof. Sergio Iavicoli (Italy), the two Vice Presidents, Prof. Seong-Kyu Kang (Republic of Korea) and Ms Claudina Nogueira (South Africa), and two members of the ICOH Secretariat staff (Italy), Mr Pierluca Dionisi and Mr Antonio Valenti.

The ICOH Regional (African) National Secretaries Meeting was facilitated by Prof. Seong-Kyu Kang (ICOH Vice President for National Secretaries) and attended by the ICOH National Secretaries for Kenya (Dr Kibor Keitany), Nigeria (Dr Uche Enumah), South Africa (Prof. Daan Kocks), and Zimbabwe (Dr Blessing Garamumhango); the ICOH

SASOM – MEDICHEM JOINT CONGRESS 2019

Approximately 110 participants (including invited speakers, delegates and exhibitors) attended the Congress, representing 25 countries

African diaspora representation at the Congress (L-R) Dr Paloma Maripiha – occupational medicine registrar at the University of KwaZulu-Natal (Mozambique); Dr Custódio Muianga – occupational hygienist and environmental health scientist (Mozambique/USA); Mr Peter-John 'Jakes' Jacobs – occupational hygienist, President of the International Occupational Hygiene Association (IOHA) 2018-2019 and Southern African Institute for Occupational Hygiene (SAIOH) Council member (South Africa); Prof. Janvier Gasana – Associate Professor, Department of Environmental and Occupational Health, Kuwait University (Rwanda/Kuwait); Ms Paulina Mutolo and Ms Flávia Saide – inspectors from the Ministry of Labour, Work and Social Security (Mozambique)

Prof. Daan Kocks, SASOM Chair (left), and Dr Murray Coombs, MEDICHEM President (right), opened the Joint Congress and welcomed participants. SASOM and MEDICHEM collaborated in this first joint venture to bring together international professional networks to share their expertise

Mr Jaco Botha, Project Coordinator in the SASOM National Office (far right), shares drumming tips with the members of Drum Sound Circles who provided the entertainment at the Gala Dinner

Prevor, a joint venture with Prism Inter Africa CC (Prismia), was represented by Mr Adrien Braud

The sumptuous banquet consisted of typically South African nosh, completed by very traditional table décor

Photographs: Laria Botha

'Shebeens' - the name given to illegally operated taverns, mostly in black townships, selling home-brewed alcohol. They also functioned as meeting places for activists of the struggle against apartheid

Congress organisers and ICOH Officers (L to R): Dr Marissa Muller – SASOM member (South Africa); Prof. Sergio Iavicoli – ICOH Secretary General (Italy); Dr Murray Coombs – MEDICHEM President (South Africa); Dr Jukka Takala – ICOH President (Finland); Prof. Seong-Kyu Kang – ICOH Vice President (Republic of Korea); Prof. Daan Kocks – SASOM Chair (South Africa); Ms Claudina Nogueira – ICOH Vice President and SASOM ExCo member (South Africa); Dr André Kotzé – SASOM Vice Chair and MEDICHEM National Representative (South Africa); Dr Adriaan Combrinck – SASOM Treasurer and MEDICHEM member (South Africa); Mr Jaco Botha – SASOM Project Coordinator (South Africa) *Photograph: Laria Botha*

National Secretaries for Mali (Dr Birama Diallo) and Togo (Dr Silvere Kevi) attended remotely via Skype.

The official social function was the Gala Dinner. The evening was a traditional 'outdoor-indoor' South African-style 'braai' with a 'shebeen' theme, complete with 'konka' fires, fairy lights and musical entertainment. 'Shebeens' was the name given to illegally operated taverns, mostly in black townships, selling home-brewed alcohol. They also functioned as meeting places for activists in the struggle against apartheid. The sumptuous banquet of typically South African nosh was complemented by an animated and high-energy performance by the drumming outfit, Drum Sound Circles, after which the guests threw caution to the wind, let their hair down and danced the night away. Tunes were provided by a disc jockey who played both local and international music, with many 'blast from the past' renditions.

Closure and acknowledgements

The Congress' main task – 'to promote sustained, inclusive and sustainable growth, full and productive employment and decent work for all' – was accomplished. The outcome of the Congress was well aligned with the recent political declaration at the General Assembly of the United Nations for 'Universal Health Coverage: Moving Together to Build a Healthier World' and with the International Labour Organization (ILO) message, namely *'We recognise that our efforts to achieve our mission must fit into broader societal and global actions to improve working conditions in all parts of the world. Our common efforts can play an important role to convince and support all governments and employers to invest in responsible labour practices, to achieve our mission; we must use and share our combined knowledge and expertise'*, and, more specifically, the ICOH- and ILO-supported call to action – *'to recognise the fundamental rights of safety and health not only to achieve improved health and safety, but also as support to the Sustainable Development Goals, to call on governments and policymakers to address the links between decent work, occupational hazards and diseases, and implement such rights into decisions and commit to implement such actions'.*

The Congress organisers thank the following 16 exhibitor companies who supported the event by displaying their services and products; some companies donated prizes for lucky draws during the Congress: Amtronix (Pty) Ltd, eMoyoDotNetza (Pty) Ltd, Foundation for Professional Development (FDP), H.A.S.S. Industrial (Pty) Ltd, Homemed (Pty) Ltd, iMED Distributors, Kendon Medical Supplies TVL (Pty) Ltd, Medical Solutions, National Institute for Occupational Health (NIOH), Novex Pharmaceuticals CC, Occupational Therapy in Occupational Health (OTOH), Prism Inter Africa CC (Prismia), Rand Mutual Admin Services, Sanofi Pasteur, Sleepfit (Pty) Ltd, SSEM Mthembu Medical (Pty) Ltd.

Last but not least, the success of the Congress relied heavily on the dedication and long hours of hard work by all involved. SASOM and MEDICHEM would like to thank the Congress Organising Committee and other friends and supporters of both entities who worked tirelessly to plan and organise the Congress, finalise a scientific programme of a high standard, liaise with presenters and delegates alike in terms of logistic arrangements, and be present during the Congress week to assist with all the requirements that an international congress entails.

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Illumination hazards in the workplace

Light is defined as the visible part of the electromagnetic radiation spectrum within a range of 380-780 nm. Light acts directly on the retina of the eye to fulfil visual function and non-image-forming tasks. Rods and cones are the photoreceptors in the retina that are responsible for visual function. Rods are responsible for scotopic (low light level) vision. They do not play a role in colour vision and are responsible for low spatial acuity. Cones are responsible for photopic (higher light level) vision. They are sensitive to three different spectra, resulting in trichromatic colour vision, and are responsible for high spatial acuity. Non-image-forming tasks are synchronisation of circadian rhythms to a 24-hour solar cycle; pineal melatonin suppression; and pupil light reflexes.

Illumination is often overlooked as a workplace hazard as it is difficult to differentiate between workplace and non-workplace light exposure.

ILLUMINATION HAZARDS

Illumination hazards in the workplace include: bright light; ultraviolet (UV) rays; blue light; insufficicient light; glare; differences in contrast; differences in light distribution; flicker; incorrect fixture placement based on the luminaire's spacing criteria; stroboscopic effects of lighting on rotating machinery; and dirty luminaires and lamps.

Bright light

Exposure to very bright light, including the sun, can permanently damage the retina, as can chronic exposure to less bright light. This photo-oxidative damage occurs when light reacts with the retina, producing reactive molecules that cause damage to the surrounding molecules. Exposure to blue light increases the risk of age-related macular degeneration (AMD), and has a short wavelength with a range of 460-500 nm. More blue light is emitted by artificial light sources than by natural solar light. Technology has resulted in increasing exposure to artificial illumination (light pollution), which causes changes in the light-dark cycle, and light wavelengths and intensities.

Environmental brightness plays a major role in the synchronisation of human circadian rhythms to solar light-dark cycles. Interference with the light-dark cycle can interfere with the circadian rhythm and affect psychological and physiological mechanisms. Excessive night-time illumination can interrupt normal sleep patterns, decreasing total sleep time and sleep efficiency, with an increase in rapid eye movement (REM) sleep which can cause tiredness during the day.

Intolerance to excess light exposure causes ocular fatigue (eye strain) which is aggravated by blue light, and manifests as eye discomfort and visual impairment. Symptoms include tired, blurry, itchy, or burning eyes, or an increase in teary eyes. Continuous exposure to relatively low ambient luminance of 5-10 lux (the SI unit of illuminance – equal to one lumen per m^2) during sleep significantly increases ocular fatigue in the morning.

Ultraviolet rays

Exposure to ultraviolet (UV) rays from sunlight affects the cornea, causing inflammation of the eyes (photokeratitis) and photoconjunctivitis. Cumulative UV radiation can cause damage to the eyes and eyesight. UV radiation, which is invisible to the human eye, is composed of three main wavelengths: UVA, UVB and UVC. UVB rays are absorbed by the cornea and cannot reach the retina, but UVA radiation passes through the cornea to the lens and retina. Halogen and fluorescent lightbulbs also emit some UV light.

Reflections of the sun on water, snow, concrete or sand, and arc welding, can also cause photokeratitis and can result in permanent visual deficits. The long-term effects of sunlight exposure include cataracts, pterygia, pingueculae, squamous cell cancer of the conjunctiva, skin cancer of the areas surrounding the eyes, and macular degeneration. Cataracts form when the lens of the eye ages, affecting the transparency of the cells, and turning the lens yellow and cloudy. Cataracts can be treated surgically. A pterygium is a soft fleshy overgrowth of the conjunctiva that spreads from the medial corner of the eye near the nose. It is usually painless but can cause visual

impairment if it grows across the cornea. Should visual impairment occur, the pterygium should be surgically removed. A pinguecula is similar to a pterygium but does not grow across the cornea.

Squamous cell cancer appears as a nodule on the front of the eye; there may be visible blood vessels leading to the nodule. This slow-growing tumour can result in loss of sight. Early detection is important for surgical intervention. Skin cancers around the eyes, especially the eyelids, are common in sunny countries with high UV exposure indices. Any spots, moles or other lesions around the eyes should be examined by a dermatologist.

As long-term UVA exposure is responsible for most of the damage to the macula, one should seek medical attention as soon as one experiences blurred vision or no vision at all in the centre vision field of the eye(s). The disease rarely affects peripheral or side vision. As with cataracts, macular degeneration is age related but can be exacerbated by exposure to UV rays. Macular degeneration cannot be reversed but progression can be delayed therapeutically.

When working in the sun or other places where UV ray exposure occurs, employees should wear sunglasses and hats as protection from retinal damage. Lotions with a high sun protection factor (SPF) should be applied to the eyelid areas as this sensitive area is the site of 10% of skin cancers. Indoor light bulbs should be swapped for UV-free bulbs, e.g. incandescent and LED bulbs.

Blue light

Blue light is emitted from the sun, television sets, electronic devices, and fluorescent and light-emitting diode (LED) light bulbs. However, there is a difference between natural and artificial blue light. As light from the sun travels through the atmosphere, the shorter, high energy blue wavelengths collide with air molecules, causing the blue light to scatter and the air to look 'blue'. The body uses this natural form of blue light to regulate sleep and wake cycles (the circadian rhythm). Natural blue light boosts alertness, heightens reaction times, improves memory and cognitive function, and increases the overall feeling of wellbeing.

Blue light is one of the shortest, highest energy wavelengths in the visible light spectrum. The high-energy visible (HEV) wavelengths flicker more easily than longer, weaker wavelengths, creating a glare that reduces visual contrast and affects sharpness and clarity. This results in the eyestrain, headaches, and physical and mental fatigue that are caused by sitting in front of computer screens or other electronic devices for extended periods. Prolonged exposure to blue light may cause retinal damage and macular degeneration, leading to vision loss. The eye does not provide enough protection against blue light, be it natural or artificial. Both natural and artificial blue light can cause permanent eye damage and contribute to age-related macular degeneration.

Insufficient light

Adequate lighting is usually 500-1000 lux when measured at 76 cm above the floor.

Insufficient light may pose a safety hazard but can also affect quality of work, especially precision work. Poor lighting can cause eye strain, leading to discomfort and other health-related complaints such as headaches. When assessing how much light is needed, the following should be taken into consideration:

- demands for speed and accuracy of the task
- light reflection/absorption properties of the surface
- the tasks performed, and the work surface
- the individual's vision acuity.

The Occupational Health and Safety Act (Act No. 85 of 1993) states minimum average values of maintained illuminance in different workplaces, under the Environmental Regulations for Workplaces. A useful resource for information and guidelines on workplace illuminance is *The IESNA Lighting Handbook* (issued by the Illuminating Engineering Society of North America).

Glare

Glare describes the bright light source or reflection that interferes with how a person sees an object. In most cases, the eyes adapt to the brightest light, causing eye strain, and decrease the ability to see as the details in the duller areas become faint. Reflected

glare is caused by light that reflects from shiny or polished surfaces, glass, or digital screens. Direct glare is caused by sunlight, or bright light shining from poorly positioned light fixtures.

Differences in contrast

Contrast is the relationship between the luminance of an object and its background. Problems occur if light levels differ between areas, and if there is contrast between the colours of objects. To reduce this hazard, identify areas with great differences in light levels, objects that are difficult to distinguish from the background, and reading material in which it is difficult to distinguish the print/characters from the background.

Differences in light distribution

When parts of the ceiling and/or general surroundings appear dark and gloomy, light is probably poorly distributed, causing poor visual acuity. Identify dark areas or areas of uneven lighting, and shadows on work surfaces and on stairways. To correct poor light distribution, replace light fixtures with ones that distribute some light upwards, paint the ceiling and walls in light colours that will reflect the light, and clean the ceilings, walls and light fixtures regularly.

APPROVED INSPECTION AUTHORITIES

To ensure a safe working environment without illumination health risks, the employer must measure employees' exposure against prescribed standards. This monitoring must be performed by an approved inspection authority (AIA). Illuminance to be measured comprises luminous flux (measured in lumens) as a measure of the total 'amount' of visible light; and the intensity of illumination on a surface. Day- and nighttime illumination surveys should be conducted, and the efficiency of emergency illumination installations should be tested. The AIA will measure the lighting levels with a lux meter and write a report that includes recommendations.

Emergency evacuation routes should conform to a minimum lux of ≥ 0.3 at floor level and be capable of activation within 15 seconds of electricity failure. Emergency lighting should also last long enough to ensure safe evacuation of all indoor workers.

CONCLUSION

Good lighting increases productivity and is an important factor when assessing health and safety in the workplace. An illumination risk assessment should form part of the health, safety and environmental risk assessment of a company, and objectives and targets should flow from this.

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SAIOH President's message

We are moving into the final quarter of 2019 and my year as your President is ending. We still have a lot of events to look forward to, including our 2019 Conference, with the North West Rustenburg Branch and Mining Forum organising committee planning a varied and exciting programme.

International Occupational Hygiene Association – National Accreditation Recognition Committee (IOHA-NARC) Certification renewal

The SAIOH Council is happy to share the news that our application for the renewal of our certification scheme with the IOHA-NARC is in the final stages, and a positive outcome looks likely. We should be able to confirm this in the next edition of the Journal.

The Southern African Institute for Occupational Hygiene (SAIOH) initially gained IOHA-NARC certification in 2006, with our first renewal in 2012. You may wonder what this certification means to you as a registered member of SAIOH. The IOHA developed the NARC Charter to promote global respect for, and recognition of, occupational hygiene certification programmes that meet or exceed the IOHA Model Certification Programme developed at the 1999 IOHA workshop on certification/registration, approved by the IOHA Board of Directors on 8 July 2000, and revised in 2007 and 2008. This means that registration with SAIOH at registered occupational hygienist (ROH) level is recognised by the sister organisations and societies from other countries that also hold this certification.

The history of the SAIOH logo (acknowledgement to Rob Ferrie and Deon Jansen van Vuuren for their excellent memories)

You may have wondered how and when the current SAIOH logo was chosen to represent our Institute – and maybe even how it was conceived. Council recently had a query in this regard and, after contacting several of our older and retired members, we were able to gather the following information.

SAIOH was formed when the two associations, the Institute of Occupational Hygiene South Africa (IOHSA – 1993), and the Occupational Hygiene Association of South Africa (OHASA – 1983) merged in 2000.

The founding members believed that SAIOH would become an influential institute for our profession, and the need for a robust logo was recognised. The consensus was that a suitable logo needed to:

- Have no more than three colours to keep printing costs down;
- Be able to be photocopied in black and white without losing definition;
- Impart a sense of the academic (learning) achievement required to develop in the occupational hygiene field;
- Evoke the concept of the tripartite system (practitioner, educator, government) – each being linked to the profession;
- Be simple and modern (without words or letters), memorable and easily recognisable and,
- Be unique.

A professional designer was contracted and, with the above brief in mind, he developed several designs which were submitted to Council members for consideration. The clear leader was a somewhat simpler prototype of our current logo. It stylised the three key players around a three-sided table (or 'board'). It also hinted at a 'mortarboard' – the traditional symbol of higher learning, with the purple/burgundy colour suggesting a graduation robe. Several adaptations were submitted to the designer, and the outcome is the current SAIOH logo.

SAIOH Council and member activities

The Vice-President of SAIOH, Norman Khoza, was invited to talk at the Gauteng Provincial Government 2019/20 Institutional Development and Strategic Planning Session. The title of his presentation was: "Work environment office space compliance requirements". He highlighted the occupational hygiene and safety (OHS) challenges faced by the government due to aged infrastructure, population growth, and inadequate office spaces. These challenges counteract many facets of office workstation compliance with minimum OHS standards. Norman also spoke about the role and the importance of SAIOH-registered members in the multi-disciplinary team of OHS experts.

SAIOH was also present at the OSH-Expo Conference held on 16 May 2019 at Gallagher Convention Centre. Norman Khoza represented SAIOH. His presentation was titled: "The role of the occupational hygienist in determining PPE in the workplace".

The presentation covered the occupational hygiene profession, the role of SAIOH as an institute, inclusive of its certification scheme which is well recognised by national and international organisations such as the South African Qualifications Authority (SAQA), the Department of Employment and Labour (DEL) (previously known as the Department of Labour) (DoL), and many other

Participants at the Gauteng Provincial Government 2019/2020 Institutional Development and Strategic Planning Session (L-R): Ms Menyezwa Mandu Menze, Director: Transversal Employee Health & Wellness Programmes; Ms Azeeza Rangunwala, Assistant Director: Research Policy and Capacity Development; Ms Refilwe Tshabalala, Assistant Director: OHS&H; Ms Refiloe Bodibe, Deputy Director: OHS&H; Ms Margaret Mashiane, Deputy Director: Transversal Employee Health & Wellness Programmes; Mr Norman Khoza, SAIOH Vice-President; Mr Malibongwe Mboyi, Chief Director: Transversal and HR; Ms Vuyiswa Stephens; and Ms. Brenda Maitse

Photograph: Norman Khoza

professional bodies. An important message contained within the presentation is that the provision of personal protective equipment (PPE) is considered a last resort but is often an essential component of exposure control programmes. The selection of respiratory protection devices (RPDs) and hearing protection devices (HPDs) should be made by professionals, such as our registered occupational hygienists, who understand the science of exposure control and the need to ensure that the most appropriate units are selected.

Update and modification of the SAIOH website

Many SAIOH members e-mail or phone the SAIOH administration team in search of information, even though much of the requested material is available on the SAIOH website. Discussion with these callers made us realise that it was time to reassess our website. We regularly update information and add items of interest, and this may confuse users.

Tracy Mphaphuli (tracym@saioh.co.za) and Rebecca Dick (rebecca@saioh.co.za), the SAIOH administrative assistants, have been tasked with revamping our website. They are both working extremely hard to modernise and simplify the site. We hope that the changes, which will occur in stages, will take no longer than three months to complete. During this time, you may search for a specific document or click on a link that is no longer available. If this happens, please e-mail or phone the SAIOH office. The staff will be more than willing to assist. By streamlining our website, we hope that users will be able to navigate more easily to information pertaining to SAIOH and its procedures, study material, certification, etc.

Finally – SAIOH Council and award nominations 2019

We requested that members watch their mailboxes and the SAIOH website for the call for nominations for seats on the SAIOH Council, as well as nominations for the various SAIOH awards for excellence which will be presented at the Awards Dinner during the Conference in October. All necessary information and links for the submissions are available on the website. We hoped to see an increase in nominations, especially for the awards. In 2018, two awards were not given as we received no nominations for the categories.

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Mine Medical Professionals Association Annual General Meeting, 31 July 2019

The Mine Medical Professionals Association (MMPA) held its Annual General Meeting (AGM) on 31 July 2019 at the Birchwood Conference Centre in Boksburg. Dr Muofhe Murwamphida was appointed as the new President, having been nominated as such and accepted by all members of the Executive Council in attendance, in accordance with the Constitution of the Association. Dr Dipalesa Mokoboto, from the Department of Mineral Resources (DMR), was elected as the new Vice-President.

The Executive Council members are:

- Dr Luvuyo Dzingwa – Rand Mutual Assurance
- Dr Thuthula Balfour – Minerals Council South Africa
- Dr Khanyile Baloyi – Minerals Council South Africa
- Dr Pravesh Lakha – AngloGold Health Services
- Dr Nothando Moyo-Mubayiwa – Kumba Iron Ore
- Dr Vusumuzi Nhlapho – SA Medical

Co-opted Executive Council members are:

- Dr Jameson Malemela – Sibanye-Stillwater
- Dr Irene Mampa – Implats
- Dr Edward Mudau – Lonmin
- Dr Tumi Legobye – Harmony Gold
- Dr Oliver Ndhlovu – PholaMed Occupational Health and Wellness Services
- Dr John Madonsela – Quantum Leap Occupational Health Services

Before closing, Mr Amos Mphephu, an independent change consultant from Change Metrics Company, delivered a presentation titled 'Embracing digital health-care in South Africa'.

MMPA members (from L to R): Dr Thuthula Balfour, Dr Dipalesa Mokoboto, Dr Luvuyo Dzingwa and Mr Mpilo Booi

Photograph: Mbalenhle Buthelezi, MMPA Secretary

The outgoing President, Dr Nothando Moyo-Mubayiwa (L), and the newly elected President, Dr Muofhe Murwamphida (R)

Photograph: Mbalenhle Buthelezi, MMPA Secretary

Mr Amos Mphephu, change consultant from Change Metrics Company, addresses the meeting

Photograph: Mbalenhle Buthelezi, MMPA Secretary

The MMPA Executive Council believes that membership of the MMPA offers good value to members, especially in such areas as networking, and attending the Annual Congress and other courses that earn members CPD points. Details of these events are regularly e-mailed to members.

Report by:
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Message from the incoming President, Dr Muofhe Murwamphida

I am humbled to accept the position of President of the Mine Medical Professionals Association, with Dr Dipalesa Mokoboto to assist me as Vice-President. I would also like to welcome the members who were co-opted to the Executive Council. I am delighted to serve in the Association as I will be supported by highly capable and experienced professionals who have served in various organisations such as the Minerals Council of South Africa, Rand Mutual Assurance, Sibanye-Stillwater, Implants, Lonmin, AngloGold Ashanti, and the Department of Mineral Resources. I encourage all Council members to attend meetings regularly to ensure continuity of the Association.

I would like to call upon other mine medical professionals to assist in raising the profile of medicine in mining by joining the Association. We plan to strengthen our relationship with stakeholders such as The South African Society of Occupational Medicine (SASOM), the Mine Health and Safety Council (MHSC), and the Southern African Institute for Occupational Hygiene (SAIOH).

I am passionate about reducing the burden of occupational diseases and improving employee wellness in the mining industry. In my lifetime, I would like to see the elimination of occupational diseases and a significant reduction in the prevalence of non-communicable lifestyle disease. The journey to zero harm starts with us. We need to change the way we do things in order to achieve the Mine Occupational Health and Safety Summit milestones. As occupational medical practitioners, we need to adopt best practices in our occupational health clinics. Let us work together with occupational health nurses, mine managers, occupational hygienists and safety practitioners to ensure that we detect early signs of occupational diseases and conduct proper illness investigations. Let us not wait for an occupational disease to be compensable in order to investigate and improve control measures.

There is a significant increase in the number of chronic lifestyle diseases that are being reported. The mining industry is losing money and skills due to sick absenteeism and early medical retirement attributed to complications of hypertension, diabetes, strokes, etc.

I therefore urge mining companies to employ the services of dieticians, to invest in gym infrastructure, and to schedule wellness campaigns and other initiatives that improve the overall health and wellbeing of employees in the mining industry.

Last, as mine medical practitioners, we need to advocate for the overall health of miners. Let us raise our voices to encourage the mining industry to prioritise the health and wellbeing of employees.

occupational health SOUTHERN AFRICA

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