

OCCUPATIONALhealth

SOUTHERN AFRICA

Volume 30, Issue 1, 2024

ISSN 2226-6097



OFFICIAL JOURNAL



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South African Society
of Occupational Medicine
FOUNDED IN 1948

South African Society of
Occupational Medicine (SASOM)



SAIOH

Southern African Institute for
Occupational Hygiene (SAIOH)



Mine Medical Professionals
Association (MMPA)

An accredited peer-reviewed journal of the Department of Higher Education and Training (DHET)

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South African Society of Occupational Medicine

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OCCUPATIONALhealth

SOUTHERN AFRICA

Volume 30, Issue 1, 2024

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Audit Bureau of
Circulations of
South Africa
2019

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Tuberculosis (TB)

INDUSTRY PERFORMANCE AGAINST TARGETS (2020-2022)

ACTIVITY	MILESTONE	2020	2021	2022
TB Screening	Annual TB screening (100%)	68%	75%	84%
TB Incidence	Below the National TB incidence rate 5% year-on-year reduction for the TB incidence rate	195/100 000 population	221/100 000 population	241/100 000 population

TB CONTACT TRACING

TB contact tracing was implemented to stop the spread of TB in the mining industry and in the community. It involves finding the people that an infected person has been in contact with, so, they can get counselling, testing and, if needed, be put on treatment.

The Health and Wellness Task Team (previously known as TB Contact Tracing Task Team) helps identify TB index cases from member companies and trace identified contacts in households and communities.

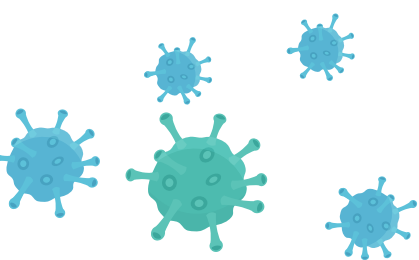
World Tuberculosis (TB) Day, 24 March 2024, continues with the theme "Yes! We can end TB". TB is still one of the world's deadliest diseases and recent years have seen a worrying increase in drug-resistant TB.



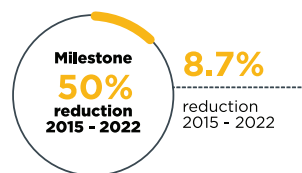
ACCORDING TO WORLD HEALTH ORGANIZATION (WHO)

In 2023, 192 countries and areas with more than 99% of the world's population and TB cases reported data

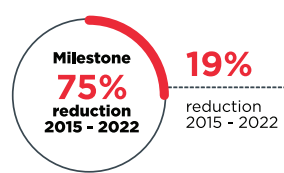
WHO END TB STRATEGY: 2025 MILESTONES.



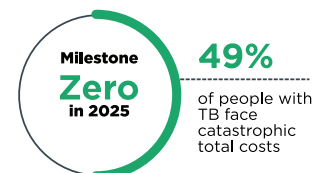
TB INCIDENCE RATE



NUMBER OF TB DEATHS



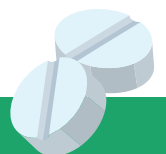
PERCENTAGE OF PEOPLE WITH TB FACING CATASTROPHIC TOTAL COSTS*



A total of 1.3 million people died from TB in 2022 (including 167 000 people with HIV). Worldwide, TB is the second leading infectious killer after COVID-19 (above HIV and AIDS).

Multidrug-resistant TB (MDR-TB) remains a public health crisis and a health security threat. Only about 2 in 5 people with drug resistant TB accessed treatment in 2022.

TB is present in all countries and age groups. TB is curable and preventable.



US\$ 13 billion is needed annually for TB prevention, diagnosis, treatment and care to achieve the global target agreed at the 2018 UN high level-meeting on TB.

Ending the TB epidemic by 2030 is among the health targets of the United Nations Sustainable Development Goals (SDGs).

WHO published a Global tuberculosis report 2023 with more insights



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From the Guest Editor . . .



Dr Vusumuzi Nhlapho, Guest Editor

The nation is gearing up for national and provincial elections scheduled for 29 May, and campaign efforts have intensified for what will be an election with a more uncertain outcome than any since the establishment of our democracy in 1994. It is imperative for South Africans to fulfil their responsibility by participating in the process to choose a political party and leaders who will steer South Africa towards economic improvement.

While the economy is at the forefront of the minds of many, we need to keep health high on the agenda. One of the diseases that persists in South Africa and other countries is tuberculosis (TB), the second leading cause of death from a single infectious agent after SARS-CoV-2. In 2022, 1.3 million people died from TB globally, as reported by the World Health Organization (WHO);¹ 424 000 of whom were from the African region.² Currently, TB is mentioned in the manifestos of only three political parties – the Economic Freedom Fighters (EFF), African Transformation Movement (ATM), and African National Congress (ANC).³ We can only hope that other parties will also see the importance of adding TB to their agendas before the upcoming elections.

The South African mining industry continues to address the high prevalence of TB. In partnership with the International Labour Organization (ILO) and the Mine Health and Safety Council (MHSC), the Minerals Council South Africa hosted a session on ‘Sustainable responses to HIV, AIDS and TB in the world of work’ at the 11th South African AIDS Conference in Durban in June 2023. In August last year, the Health Policy Committee established the Gold TB Working Group, which comprises all gold-mining companies. The Masoyise Health Programme⁴ has led in coordinating activities of the mining sector over the last decade, and continues to work on issues related to HIV, TB, and non-communicable diseases. Efforts to prevent and treat TB in the African region continue, under the auspices of the African Union Development Agency (AUDA-NEPAD) and funded by the Global Fund,⁵ as reported by Norman Khoza and colleagues over the last few years in this and previous issues of *Occupational Health Southern Africa*.

World TB Day is held on 24 March every year and this year WHO Regional Director for Africa, Dr Matshidiso Moeti, while highlighting the plight of paediatric TB, called it an ‘ancient disease’.² It is relevant that one of the papers in this issue of *Occupational Health Southern Africa*, from the 7th International Conference on the History of Occupational and Environmental Health (organised by the International Commission on Occupational Health (ICOH) Scientific Committee on the History of Prevention of Occupational

and Environmental Diseases) that was held in Durban in November last year, is about silicotuberculosis – the combination of silicosis and tuberculosis – which still occurs in the mining industry. Rodney Ehrlich takes us on the historical journey of the two diseases in the gold mines – from the belief that they were linked, to the denial of the association, and back to the current evidence-based knowledge about the strong relationship between them.

David Rees and Gill Nelson take up the historical silicosis thread in their description of the belief that aluminium oxide powder could prevent pneumoconiosis in gold miners; another paper presented at the ICOH conference in Durban. Interestingly, South Africa never bought into the idea, saving many miners from aluminium-induced neurological injury. Arthur Mclvor draws our attention to important similarities in the fight against TB and silicosis in South Africa and Britain, looking at the contributions to the occupational health narrative that trade unions made over a period of more than 100 years.

While significant progress has been made in the management of both TB and silicosis in the mining industry, concerted efforts and programmes are required to ensure that they soon become part of South Africa’s (and the world’s) history.

The 34th triennial ICOH congress (ICOH2024) will take place from 28 April to 3 May this year in Marrakesh, Morocco. Africa is well represented in the scientific programme of the congress, with presentations by participants from South African and other African countries in both the oral and poster sessions. We have been looking forward to meeting up with occupational health colleagues from around the world after the hiatus caused by the COVID-19 pandemic, which prevented many of us from travelling to Melbourne, Australia in 2021 to attend the 33rd ICOH congress, which was ultimately postponed to February 2022 in a fully virtual format. Look out for the report on the ICOH2024 Congress in our next issue.

As the heat wave appears to be retreating and winter steadily approaches, on behalf of the Editorial Board, I wish you a productive and research-full year.

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Amtronix and **Stanyer Electroserve** now offer a comprehensive range of Bacterial/Viral filters for Pulmonary Function and Spirometry from **CHP**

CHP filters use a high-quality electrostatic filtration medium with filtration efficiency exceeding 99%, capable of trapping bacteria, viruses and other micro-organisms.

Designed for inspiratory and expiratory manoeuvres, single-use bacterial/viral filters provide an efficient hygiene solution, and protection that virtually eliminates cross-contamination, which keeps both the patient and operator safe without compromising system performance.

The **CHP** range is available to fit most leading makes of Spirometers and PFT systems and do not have to be approved for use. The filters are independently tested and validated to meet the requirements of local and international standards (ATS/ERS/SATS).

Features:

- The **CHP** range includes both round and oval filters
- Colour-coded port sizes are tailored to fit a wide selection of equipment
- Unique filter design provides an airtight connection with equipment for accurate results
- Minimal dead space as needed for lung volume and DLCO testing
- Excellent filtration efficiency of bacteria, viruses and micro-organisms
- Low resistance to airflow for accurate Spirometry and lung function results
- Exceeds ATS/ERS guidelines for all criteria

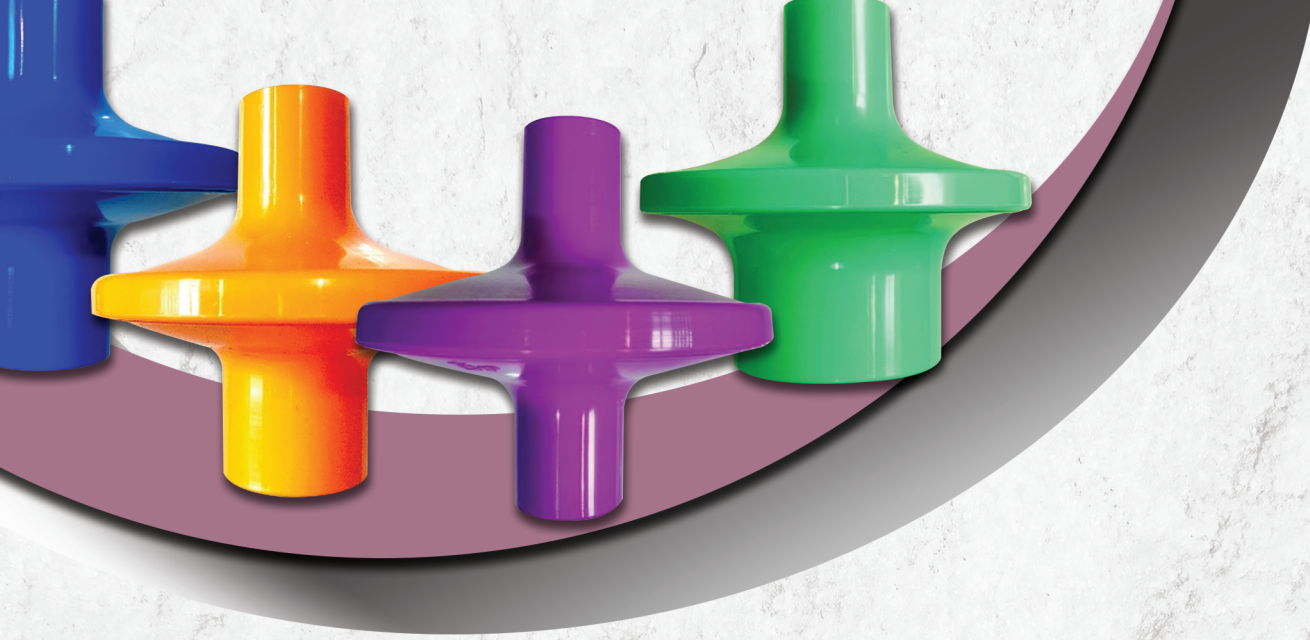
Specifications:

Filtration efficiency: > 99%

Differential pressure: < 1.5cm/H₂O/L/sec

Minimal deadspace: < 42 ml

*Specifications are filter dependant. For detailed specifications please contact us.



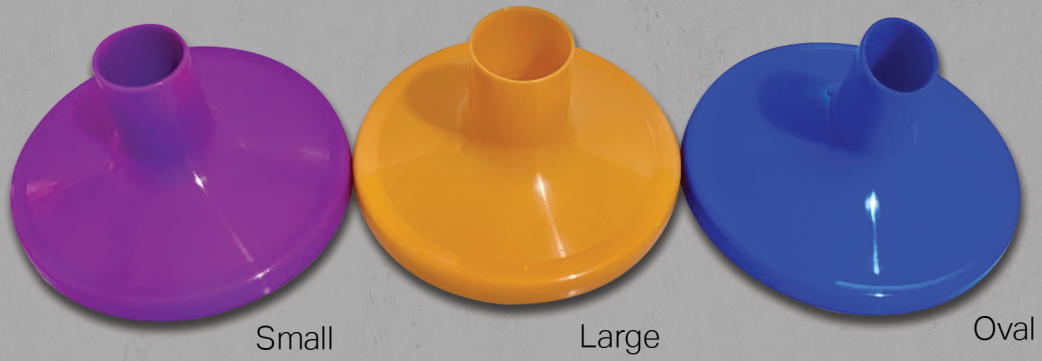
Product Code	Spirometer	Model
PFT-2025 (Standard) PFT-2225 (Oval)	ndd Medical Technologies	EasyOne Air Easy on-PC EasyOne Pro EasyOne Pro LAB
	Schiller	SpiroScout SPIROVIT SP-1 G2

Product Code	Spirometer	Model
PFT-2033 (Small) PFT-2533 (Standard) PFT-2233 (Oval)	Schiller	SP260 Flowscreen Pro
	Jaeger	MasterScope MasterScreen
		Flowmate Spiro Pro
	Vyaire	Vyntus SPIRO PC Vyntus ONE
		AME
	IQ TeQ	Short Adaptor
	ORCAwave	Short Adaptor
	MSG	Short Adaptor
	Thor/Spirosonic	All models

Product Code	Spirometer	Model	
PFT-2030 (Small) PFT-2530 (Standard) PFT-2230 (Oval)	MIR	All models	
	Vitalograph	ALPHA Touch ALPHA 6000 In2itive	
		Micro Medical	All models
		Schiller	SP-260
	MH	LA303	
	COSMED	microQuark Quark Spiro	
		Pony FX	
	CONTEC	All models	

Product Code	Spirometer	Model
PFT-2044 (Small) PFT-2544 (Standard) PFT-2244 (Oval)	nSpire	Digidoser
		KoKo
		HDcpet 6000
		Sx 1000
		NHD4500

Three
mouthpiece
options*



Reviewers of manuscripts in 2023

We are grateful to all our reviewers for their guidance and evaluation of manuscripts submitted to *Occupational Health Southern Africa*.

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MINERALS COUNCIL SOUTH AFRICA **MASO@ISE Health Programme**

STI Awareness

Key facts

- According to WIONEWS, SOUTH AFRICA HAS THE HIGHEST STD RATE (AUGUST 2023) - 37 272.5 PER 100K PEOPLE
- According to the World Health Organisation (WHO)- July 2023:
 - Human papillomavirus (HPV) infection is associated with over 311 000 cervical cancer deaths each year (2).
 - STIs have a direct impact on sexual and reproductive health through stigmatization, infertility, cancers and pregnancy complications and can increase the risk of HIV.
 - Drug resistance is a major threat to reducing the burden of STIs worldwide.

There are more than 20 types of STIs, including:

Chlamydia	HPV
Genital herpes	Pubic lice
Gonorrhoea	Syphilis
HIV	Trichomoniasis

What causes sexually transmitted infections (STIs)?
STIs can be caused by bacteria, viruses, and parasites.

Who is affected by sexually transmitted infections (STIs)?
Most STIs affect both men and women, but in many cases the health problems they cause can be more severe for women. If an STI is passed to a baby, it can cause serious health problems.

Do you as a parent discuss this with your children?

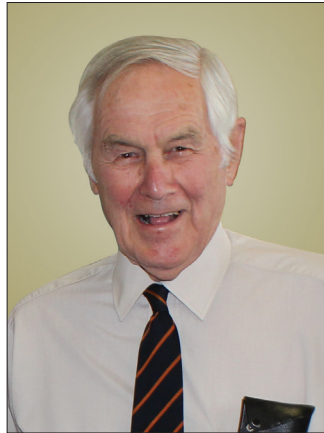
Prof. Tony (JCA) Davies: 28 August 1931–3 March 2024

Worker advocate, mentor, and an inspiration to many

Gill Nelson: University of the Witwatersrand, South Africa; MMPA honorary life member

It is with sadness that we share the news of the passing of Professor Emeritus Tony Davies after a short illness. Born in Scotland, schooled at St John's College in Johannesburg, and trained in medicine at Guy's Hospital in London, he moved to Zimbabwe (then Rhodesia) in 1958. There, he worked at Mpilo Hospital in Bulawayo, and later was stationed at Shangani from where he ran the public hospital and satellite rural clinics. In 1962, he moved to Gweru where he was appointed as the Provincial Medical Officer of Health (MOH) for Midlands Province. During this time, he developed a nationwide TB register, which enabled the discharge of inpatients back into their communities (he emptied the sanatoriums), and follow up and supply of treatment at local clinics. He was the first TB officer in Zimbabwe, and his interest in TB – both preventive and curative – continued throughout and beyond his career in occupational medicine. In 1974, he moved to Harare to take up the MOH position for Harare City.

Nine years later, in 1983, Tony moved to Johannesburg and was appointed as the Professor of Occupational Health at Wits (in a joint post with the Department of Health), and as the Director of the



Professor Emeritus Tony Davies

National Centre for Occupational Health (NCOH), now the National Institute for Occupational Health (NIOH) – a position he held until 1996, although he continued in an honorary position for a further 19 years until his retirement to Kenton-on-Sea in the Eastern Cape, with his wife, Deirdre, in 2015.

Tony's experience in mine occupational health led him to being selected as one of four members of the Commission of Inquiry into Safety and Health in the Mining Industry, headed by Judge Leon in the 1990s. Throughout his career, he supported many researchers to undertake research of neglected but pressing occupational health issues. He was an active player in investigations into several cases of worker exposure to hazardous substances, including the mercury contamination at Thor Chemicals in the 1990s. His work with asbestos miners contributed to the establishment of two trusts to compensate asbestos workers with disease and their dependants. Several of his many papers were published in the *Adler Museum Bulletin*, where he was the co-editor from 2005 to 2014.

Tony is survived by his wife, Deirdre, and their six children. 

Johann Beukes: 6 October 1941–11 March 2022

Deon Jansen van Vuuren: SAIOH General Manager

Almost two years have passed since Johann's death. In acknowledging the huge contribution that he made to the occupational hygiene profession in southern Africa, I was not sure if I should call this a tribute or an obituary. The words, 'gratitude' and 'admiration' came to mind, as did 'announcement of his death' and 'a short biography'. But let me not waste any more time on this – it is a mix of a tribute and an obituary.

Johann (JDR) Beukes was a giant of a man, not just in physical size, but also in his work and family – a true gentleman. In 2022, we notified you of his death by e-mail notification and in our newsletters. But I feel the need to acknowledge him and share something of this gentle giant or, rather, gentleman. His family summed it up accurately as a "life celebration".

Johann Beukes was our much-loved and admired friend and colleague, who sadly passed away on 11 March 2022. His knowledge of the industry and his many roles within the Southern African Institute for Occupational Hygiene (SAIOH) and its Professional Certification Committee (PCC) are well known. His positive attitude and desire to be of service to others, even during his darkest hours, touched



Johann Beukes

Photograph: courtesy of Juanita Meyer (Johann's daughter)

us all. On a personal level, we enjoyed his sense of humour, love of life and, above all, his deep love for his family and God.

I am not going to bore you with details of Johann's life, e.g. date and place of birth, where he grew up, schooling, etc. Let us rather celebrate the time we had with him.

Johann was not always the retired, elderly person we knew. He was extremely proud of being an occupational hygienist, and championed the profession in the mining industry and wherever else he worked.

Johann started his career in the old South African Railways and Harbours, after which he moved to the coal mines, specialising in ventilation. He was an active and proud member of the mines' proto rescue teams for almost 20 years, which entailed working in dangerous environments, and being exposed to serious life-threatening situations. Names like Grootvlei, Springfield, and Arnot came up in our conversations. At Arnot, he was the Mine Manager until he joined the Department of Mineral Resources and Energy (DMRE), and then Multimesh. Eventually, he started his own occupational hygiene consultancy: Health and Occupational Hygiene Laboratories (HOHL).



Johann Beukes receiving the SAIOH Fellow award and medallion from Celia Keet (SAIOH President 2020/2021)

Photograph: courtesy of Deon Jansen van Vuuren

I met Johann before 1994, when he was the Deputy Director: Dept. of Minerals and Energy (Directorate: Mine Environmental Control). From the first day, I knew him to be a fair, honest, and extremely knowledgeable person. When I did the BEBOH (now BOHS) Certificate of Practical Competence in Occupational Hygiene, he also attended the theory classes and sat the exams (two three-hour written assessments and an oral assessment). He did not pass them the first time, but said, *"I will read and upskill my occupational hygiene competency"*. He was, by then, the owner and managing director of HOHL, which was also a Department of Employment and Labour Approved Inspection Authority (DoEL AIA).

Johann was one of the main motivators and a passionate spokesman for occupational hygiene in the mining industry. At all times, he carried the occupational hygiene flag, and served on several objective-setting DMRE committees. His contributions included actively participating in the setting of qualification standards in the mining industry, acting as an office bearer for the Mine Ventilation Society of South Africa (MVSSA) (where he was also a Fellow), and giving presentations at mining conferences.

Johann's company, HOHL, was an Approved Training Provider (ATP) for the internationally recognised Occupational Hygiene Training Association (OHTA). Johann was also a certified technical occupational hygiene auditor for the South African National Accreditation System (SANAS).

Johann joined SAIOH in 1994, where he was an extremely active member. In 1999, he became a SAIOH Fellow – the 6th person to receive this honour at the time. He was a member of the PCC from 2004 to 2022, and PCC Chair from 2008 to 2010. He was elected to the SAIOH Council in 2003, served as the SAIOH Vice President from August 2009 to July 2011, and was the SAIOH President from August 2011 to August 2013. He was on the Council for many years, until

2018, either as an elected or a co-opted member, representing the Institute at mining industry events.

I had the honour and privilege to sit with Johann on many PCC oral assessments. His quiet authority and knowledge amazed me. I visited him at his home frequently, and had many conversations about occupational hygiene, SAIOH, and life. He enjoyed *"braaivleis, and boerewors en pap"*.

Hundreds of messages of condolence were sent after Johann passed away – a testament of how much he was loved and admired. Some are shared below.

"I am saddened to hear of the great loss!"

"Please convey my deepest condolences to Johan's family, we often met at the SANAS STC meeting in Pretoria and his wisdom and knowledge and experience in occupational hygiene, will be greatly missed."

"Such an epic loss. My heart goes out to his family."

"This is truly devastating news. Johann was a giant of a man who had my deepest respect as a professional and human being. May his soul rest in peace. My sincerest condolences to his family, they have suffered a huge loss."

"Please extend my deepest condolences to the family who have lost a giant of a human being."

"That's really a great loss."

"I received the sad news of the departure of Johann with a heavy heart and sadness. I have known Johann for many years, and I have always been touched by his humility, experience and great knowledge of the occupational health and hygiene industry. Indeed, Johann has contributed immensely and in numerous ways to the field. When I was doing my doctoral studies, I turned to Johann for insights and contribution. He selflessly shared his leadership and entrepreneurial knowledge and experience without any reservation. His insights contributed immensely to the development of my research and achievement of my doctoral qualification. I pray that his family find comfort in the knowledge that Johann has run his race and is now resting. May his family be consoled in the good memories and times that they shared with Johann. May his soul rest in peace and rise in glory."

"Very sad and a huge loss for occupational hygiene."

"Johann was such a kind, gentle soul and I will always remember him as a true gentleman whose love for his wife Clara, and his family was a true inspiration. I cannot imagine how much we will miss Johann, who always saw the best in everyone because of his generous heart." 🇿🇦



Trade unions and occupational health and safety in comparative historical perspective: a comment on South Africa and Britain

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Keywords

trade unions, mining, health and safety, South Africa, Britain

How to cite this paper

Mclvor A. Trade unions and occupational health and safety in comparative historical perspective: a comment on South Africa and Britain. *Occup Health Southern Afr.* 2024; 30(1):5-13. <https://doi.org/10.62380/ohsa.2024.30.1.1>

ABSTRACT

In this paper, prepared for a keynote lecture to the International Commission on Occupational Health (ICOH) conference held in November 2023 in Durban, I explore the historical relationship between trade unions and occupational health and safety, comparing developments in South Africa and the United Kingdom (UK). The focus is on mining and I address the following questions: What impact did trade unions have, what was their relationship to occupational health and safety, and how did this change over time? I first argue the case for the central importance of trade unions and the progressive role they played, historically, in occupational health in the UK as 'guardians' of workers' bodies, critically examining the so-called 'trade union effect'. I then discuss the distinctive racialised nature of trade unionism in mining in South Africa and the role of the unions in occupational health. The powerful role that the whites-only Transvaal Miners' Union and the Mine Workers' Union played in occupational health is examined, and how the labour movement colluded in the tragedy of the silicosis and tuberculosis disaster amongst black miners in the twentieth century. I end the paper with a comment on how the emerging black trade union movement contributed to addressing the occupational health experience of black miners in the 1980s and 1990s.

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Silicotuberculosis in South Africa: forgotten in history, neglected in science

A brief overview

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Keywords: silicosis, tuberculosis, gold mining, history

How to cite this paper

Ehrlich R. Silicotuberculosis in South Africa: forgotten in history, neglected in science. A brief overview. *Occup Health Southern Afr*. 2024; 30(1):14-17. <https://doi.org/10.62380/ohsa.2024.30.1.3>

INTRODUCTION

Silicosis and pulmonary tuberculosis (TB) are distinct diseases but frequently co-occur in settings in which workers inhale silica dust. There have been different conceptions of combined disease, associated with differences in terminology, as explained below. However, silicotuberculosis is defined here as the combination of silicosis and tuberculosis, whether the tuberculous component is active disease requiring treatment, or post-TB lung disease ('old TB'). Relative to silicosis alone, silicotuberculosis is associated with increased lung function impairment, poorer outcomes in treatment, and increased mortality.¹⁻³

In this overview, I argue that silicotuberculosis has received insufficient scientific and medical attention over the past half century or so. The context is the South African gold-mining industry, but the argument extends to the English-language literature, globally. My perspective is influenced by Rosental's analysis of the International Labour Office (ILO) Silicosis Conference held in Johannesburg in 1930.⁴ In Rosental's view, the international medical definition of silicosis was shaped by the needs of the South African mining industry, particularly in developing a manageable system for medical exclusion and compensation. One consequence for science and practice was a narrowing of the field of vision and scope of research on the effects of silica dust.

Lethal miners' phthisis – dust or TB?

By 1900, there was a lethal epidemic of miners' phthisis in the new South African gold-mining industry.⁵ There had already been a century of medical argument about the causes of lung disease in such dusty industries. After Koch's discovery of the tubercle bacillus in 1882, the view took hold that TB was a necessary factor in miners' phthisis.⁶ It was believed that dust played a role, but that TB was responsible for the serious effects, including premature mortality.⁶ This view presumably underlies the listing of both silicosis (in 1912) and TB (in 1917) as compensatable diseases in miners under South African law. However, only at the 1930 Silicosis Conference was a consensus expressed that silica dust on its own could cause serious disease.^{4,6}

Silicosis and silica as contributing causes of TB

The literature up to the 1960s is striking in the almost unanimously expressed belief that silica dust and silicosis predisposed to TB. However, from at least the 1930s, Orenstein, medical advisor to Rand Mines Ltd., denied the aetiological association between silica, silicosis, and TB.⁷ Almost 50 years later in 1978, Martiny, the medical advisor to the industry recruiting agency, the Witwatersrand Native Labour Association (WNLA), stated that "TB is not a mining disease" in an unpublished memorandum to the South African Parliament to have TB removed from statute as a compensatable disease in miners (*"Comments on Revision of the Plural Affairs code – pneumoconiosis and tuberculosis; 1978"*). At about the same time, Cowie, a specialist physician at Anglo American's Ernest Oppenheimer Hospital in Welkom, expressed the opinion that given the replacement of accelerated silicosis by the slowly progressive chronic form of silicosis, and the availability of short-course TB treatment, the aetiological association between silicosis and TB had lost much of its practical importance.^{8,9}

However, within the next decade Cowie published evidence of an almost trebling of the TB risk in miners with silicosis.¹⁰ There is little in the public domain on how this finding was managed internally within the gold-mining industry but, from my observation at the time, it appears that the association was accepted and the question shifted to that of whether TB could be attributed to silica exposure in the absence of silicosis. This was a more difficult question to answer, as it required studies able to measure dust exposure and in which silicosis could be controlled for in the analysis. To further complicate the question, "absence of silicosis" should have been "absence of radiological silicosis". This follows from a study by Hnzido and Sluis-Cremer, based in the Epidemiology Research Unit attached to the Medical Bureau for Occupational Diseases, which showed that two thirds of the silicosis cases identified at autopsy were not visible as such on the chest X-ray (CXR).¹¹ This finding seems to have had little influence on conceptions of the influence of silica and silicosis on TB and other diseases, both in South Africa and in the global literature more generally.¹²

The 2000s brought a surge in publications on human immunodeficiency virus (HIV) and TB in gold miners. The singular association between silicosis and TB was replicated in a number of studies.¹³⁻¹⁵

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Silicosis was shown also greatly to aggravate the association between HIV and TB. In HIV-infected miners, the unadjusted relative risk of TB was reported in 2000 to be 4.5.¹⁵ In miners with both HIV infection and silicosis, the relative risk for TB was more than three times higher, at 14.6.

In 2018, six large gold-mining companies settled a class action suit for silicosis and TB contracted by their employees.¹⁶ Each disease is assessed separately under the Trust Deed of the Tshiamiso Trust, the civil trust formed in the wake of the settlement, and respiratory impairment and compensation grade are determined from the results of spirometric testing.^{16,17} This formulation is in contrast to that in the Occupational Diseases in Mines and Works Act (ODMWA) under which TB combined with any other disease (commonly silicotuberculosis) is automatically classified as second degree (equivalent to “> 40% impairment”). This certification carries a substantially greater payout than does first degree.¹⁸

Occupational health management of miners with silicosis and tuberculosis

By the 1970s and 1980s, resistance had developed within the gold-mining industry to the longstanding statutory requirement that miners diagnosed with silicosis or TB (active or with evidence of old TB) be excluded from risk work. This resistance arose from a change in labour regimen towards retention of skilled and returning migrant workers,^{19,20} and was influenced by medical research within the industry, which showed that short-course TB treatment was curative and not impaired by co-existing silicosis.²¹ Changes in mining company practice,⁹ followed by statute,¹⁸ resulted in the dropping of automatic exclusion of individuals with silicosis or TB from risk work. This did not apply to combined disease, which continues to require exclusion from risk work. Follow-up studies were few. An exception was Cowie’s demonstration that miners with silicosis had a 50% greater TB treatment relapse rate than those without silicosis.²²

Linkage of silicosis to TB programmes

By the 2010s, international interest had turned to combatting TB in southern Africa²³ – by the World Health Organization, the World Bank, and the Global Fund to Fight AIDS, Tuberculosis and Malaria. One outcome of this international interest was the Global Fund-financed programme, Tuberculosis in the Mining Industry in Southern Africa (TIMS), from 2017 to 2018.²⁴ This programme provided the resources for an eight-country programme, excluding South Africa, to screen and treat TB in miners, ex-miners, and community members in countries neighbouring South Africa. Included was a protocol for submission of the claims of migrant workers from the South African mining industry for compensation under the ODMWA. Based on quarterly reports, more than 200 000 people were examined from July 2016 to September 2018 (of which the majority can be assumed to have been miners or

ex-miners).²⁴ However, the opportunity to expand our knowledge of the epidemiology and clinical characteristics of the two diseases in this large ex-miner population was taken up by only one centre, based in Lesotho.^{25,26}

Looking back

In returning to the literature on combined disease in the first two thirds of the 20th century, prolific publication on all aspects of combined disease is evident from South Africa, the United Kingdom, and the United States (from English-language sources). The multidisciplinary coverage included pathology, physiology, radiology, and clinical science.²⁷⁻³² By the 1970s, this literature appears to have been largely forgotten and seldom referred to. Tony Davies, at the National Centre for Occupational Health,³³ and Cowie⁹ were exceptions, and it took professional historians to bring this work to wider attention. This included the work of Rosental mentioned above, McCulloch²⁰ and, more recently, McCulloch and Miller.³⁴

An interesting mid-century example is the 1964 paper by Gerrit Schepers.³⁵ The 18-page article lacks references, but is an unusually comprehensive source of experimental and clinical observation and accompanying theory of interaction. Schepers had worked at the Miners’ Phthisis Medical Bureau in Johannesburg from 1944 to 1954, before emigrating to the United States, where he spent the first three years at Saranac Laboratory, a centre of research into TB and mineral dust disease.²⁰ His paper provides a systemic classification of the pathogenesis and clinical presentation of different disease phenotypes due to silica exposure and TB infection, depending on the temporal sequence. These are briefly summarised in Table 1.

While the body of work referred to above predates the era of modern short-course treatment of TB and reflects higher silica dust exposures, the late 20th century/early 21st century epidemic of silicotuberculosis in South Africa calls for a reconsideration of everything learned about combined disease.

Somewhat later, in the 1980s, Solomon published two papers based on his long experience as an occupational radiologist, which reflected close observation of the radiological appearances of silicosis and TB in miners.^{36,37} In these articles, he identified a nodular presentation of TB (other than that of miliary TB) that may complicate silicosis, including an ‘indolent’ form in which the sputum was frequently negative for TB.

Looking ahead

There is a need for an active research programme in the pathophysiology, pathology, radiology, and clinical science of silico-tuberculosis (as defined in the Introduction) as a specific phenotype resulting from exposure to silica and *Mycobacterium tuberculosis*. Table 2 suggests a number of lines of research for revival or initiation.

Table 1. Schepers’ classification of phenotypes of combined silica exposure and TB infection³⁵

Phenotype	Temporal pattern	Clinical outcome
Tuberculosilicosis	Silica exposure follows TB infection (‘reactivation’)	Reactivation of TB disease, with tendency to indolent chronic disease
Silicotuberculosis	TB infection contemporaneous with silica exposure (‘simultaneous phase’)	Rapidly developing tissue destruction and fibrotic disease, with fatalities
Silicosis with tuberculosis	Active TB superimposed on silicosis (‘predisposition phase’)	Rapidly disabling disease with high fatality rate, irrespective of whether TB occurs during or after silica exposure

Table 2. Needed lines of inquiry into silicotuberculosis

Topic	Line of inquiry
Pathogenesis	How silica particles and <i>Mycobacterium tuberculosis</i> , and the disease processes of silicosis and TB, modify each other. This should include consideration of the influence of the temporal sequence of exposure, infection, and disease, in addition to dose and duration
Epidemiology	Long-term cohort study of miners to determine the natural history of silicotuberculosis, including mortality. In southern Africa, these include living cohorts who worked on the South African mines and new cohorts, such as informal and small-scale miners in South Africa and other countries such as Zimbabwe ³⁸
Radiological differential diagnosis	Role of computed tomography in distinguishing between silicosis, TB, and silicotuberculosis
Impairment	Role of diffusing capacity for carbon monoxide (DLco) in silicotuberculosis, thus expanding the measurement of pathophysiology beyond spirometric lung volumes
Diagnosis of active TB	Influence of silicosis on the performance of CXR and of microbiological tests in detection of active TB
Treatment of TB	Effectiveness of different drug regimens for TB, including short-course regimens, in individuals with silicosis
TB preventive treatment	<ul style="list-style-type: none"> Effectiveness of TB preventive treatment, including that of short regimens, in silica-exposed individuals Operational studies on how to improve uptake and adherence
Silica exposure cessation for preventive purposes	<ul style="list-style-type: none"> Determination of silica exposure threshold that prevents excess risk of TB or recurrent TB Risk of TB (or recurrent TB) associated with continuing silica exposure relative to ceasing exposure

CONCLUSION

The combined disease of silicotuberculosis has historically been subject to shifting interest and understanding – driven by burden of disease, concerns about compensation, medical exclusion, and loss of livelihood, and assignment of responsibility for treatment and prevention. The argument in this article is that one of the effects of the separation of silicosis and TB as individual diseases, to be considered and managed apart, has been the neglect of scientific exploration of their relationship and interaction in the late 20th and early 21st centuries.

Interest in phenotypes of combined disease waned in high-income countries with the decline in silicosis severity and incidence, and the introduction of effective treatment for TB – a stage prematurely believed to have been reached in South Africa. Failure to recognise subradiological silicosis in the classification of silicosis at the 1930 TB conference further contributed to the invisibility of combined disease, as did the South African migrant labour system, with the experience of miners leaving employment with silica-laden lungs or radiological silicosis lost to observation.

This overview has focused on the South African gold-mining industry, which is exceptional in some respects – such as a century-long management of a migrant labour system, the great depth of mining operations, and the size of local TB and HIV epidemics. However, the questions raised about silicotuberculosis apply also to other countries with large silica-exposed populations and high TB burdens, notably China and India, and to growing informal and small-scale mining in Africa.³⁸ A programme of research is needed in the relevant disciplines to pursue the unanswered questions, with funding sufficient to sustain research groups able to build the body of knowledge required for policy, clinical practice, and social justice.

DECLARATION

The author has prepared expert reports for plaintiff attorneys in silicosis legislation, including the relationship of silicosis to tuberculosis.

ACKNOWLEDGEMENTS


This article benefited from work by the author on the subject of silicotuberculosis in collaboration with Prof. David Rees and Prof. Jill Murray.

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The non-use of aluminum oxide for silicosis prophylaxis in South African mines

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Keywords: McIntyre Powder, silicosis therapy, McIntyre Research Foundation, silicosis prevention

How to cite this paper

Rees D, Nelson G. The non-use of aluminum oxide for silicosis prophylaxis in South African mines. *Occup Health Southern Afr.* 2024; 30(1):18-21. <https://doi.org/10.62380/ohsa.2024.30.1.2>

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The Ergonomics Regulations: the role of the health professions

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Keywords

competent person, systems ergonomics approach, health professionals, fitness to work, ergonomic risk assessment

How to cite this paper

Kocks DJ, Swart L, Tafaune G, Lapere J, Vlok G. The Ergonomics Regulations: the role of the health professions. *Occup Health Southern Afr.* 2024; 30(1):22-26.

<https://doi.org/10.62380/ohsa.2024.30.1.4>

ABSTRACT

Ergonomics is the scientific discipline concerned with customising workplace conditions and job demands to fit the capabilities, limitations, and needs of the workforce. It is a multidisciplinary field, synthesising principles from diverse areas such as human factors engineering, industrial engineering, physiology, psychology, industrial design, biomechanics, kinesiology, occupational safety, and occupational health. The Ergonomics Regulations compel employers to undertake ergonomic risk assessments, implement control measures, provide training, and conduct medical surveillance to protect employees from ergonomic-related disorders. The Regulations mandate that ergonomic risk assessments be performed by a 'competent person', yet stop short of defining explicit criteria for competence. This has led to some confusion regarding the involvement of health professionals in ergonomic risk assessment and raises the question, 'Do health professionals comply with the legal definition of competence for this task?' This paper uses a systems ergonomics approach to highlight the diverse and complex risk factors that human workers bring to the workplace. The authors argue that qualified health professionals are best positioned to identify and manage high-risk motor, sensory, psychosocial, cognitive, and behavioural human factors, and are therefore indispensable in the ergonomic risk assessment process.

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Ergonomics Regulations 2019, promulgated under the Occupational Health and Safety Act No. 85 of 1993, as amended

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On 6 December 2019, the Ergonomics Regulations were published in the Government Gazette,¹ and are applicable to all workplaces as per the definition in the Occupational Health and Safety Act No. 85 of 1993, as amended.² The intention of the Regulations is an ergonomics programme approach, which should be integrated into existing occupational health and safety programmes. Ergonomics is not a stand-alone hazard, but rather part of the broader approach to ensure a workplace that is safe and without risk to the health of employees, as well as productive.² An ergonomics programme is a systematic process for anticipating, identifying, analysing and controlling ergonomic risks, and should include, at least, an ergonomics hazards identification and risk assessment, risk controls (through the implementation of the hierarchy of controls), information and training, monitoring and evaluation, and medical surveillance.

The aim of the Ergonomics Regulations is to balance worker wellbeing and productivity through interactions of the human and the work-system, focusing on a human-centred approach. The practical benefits of ergonomics include:

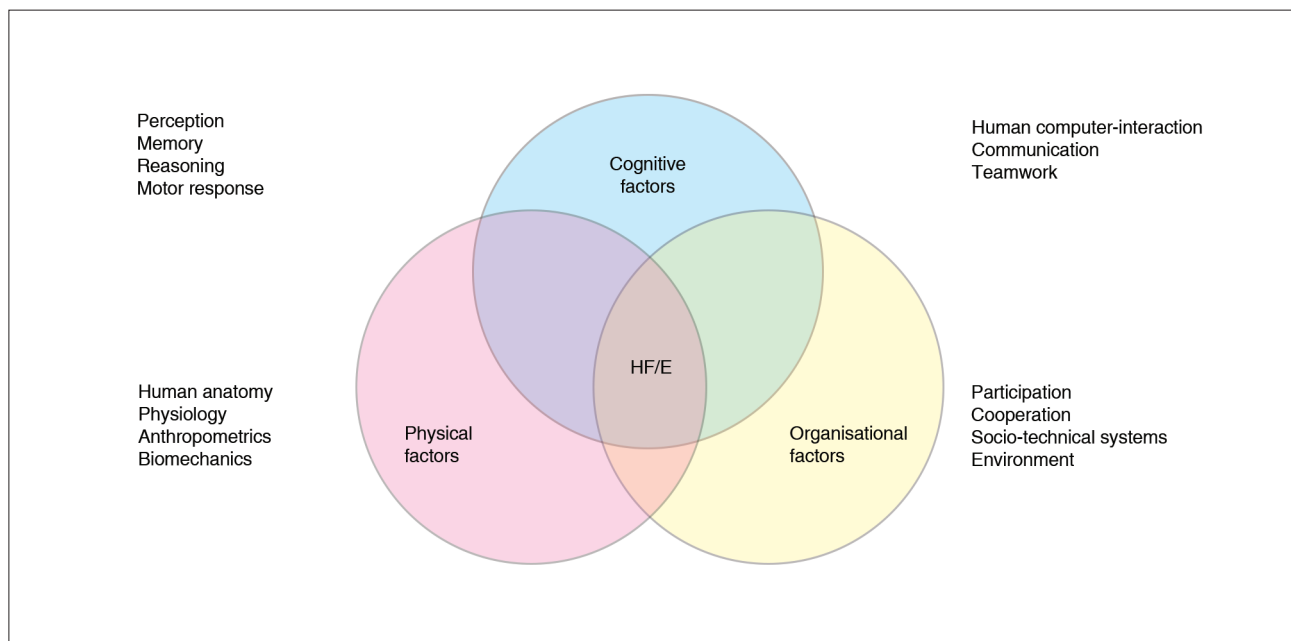
- For the employee – improved health, wellbeing and safety at the workplace
- For the employer – improved productivity, efficiency, and prevention of occupational incidents and adverse health effects
- For Government – a workplace that is safe and without risk to the health of employees²

The Regulations also incorporate the three factors of ergonomics, previously known as domains, viz. physical, cognitive, and organisational, which are interrelated¹ as illustrated in Figure 1.

Physical ergonomics focuses on physical activity, cognitive ergonomics on mental processing, and organisational ergonomics on optimising sociotechnical systems. Table 1 provides a few examples of each factor. It is important to keep in mind that employers and competent persons must take all three factors into account when conducting an ergonomics risk assessment, and work with other disciplines when addressing these issues.³

It is important that the Ergonomics Regulations are not read in isolation. As indicated in Table 1, some of the examples of cognitive and organisational ergonomics are governed in other laws administered by the Department of Employment and Labour. Therefore, when conducting an ergonomics risk assessment, employers and the competent person need to consider:

1. The Occupational Health and Safety Act No. 85 of 1993, as amended²
2. Relevant regulations promulgated under Section 43 of the Basic Conditions of Employment Act No. 75 of 1997, as amended⁴
3. The Codes of Practice associated with the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993, as amended⁵
4. The Employment Equity Act No. 55 of 1998, as amended⁶
5. The Code of Practice on the Prevention and Elimination of Harassment in the Workplace⁷



HF/E: human factors/ergonomics

Figure 1. Interaction between the three factors in ergonomics

Source: *International Ergonomics Association*³

Table 1. Examples of physical, cognitive, and organisational ergonomics factors

Ergonomics factor		
Physical	Cognitive	Organisational
<ul style="list-style-type: none"> • Working postures • Materials handling • Repetitive movements • Work-related musculoskeletal disorders • Workplace layout • Physical safety and health 	<ul style="list-style-type: none"> • Mental workload • Decision making • Skilled performance • Human-computer interaction • Human reliability • Work stress • Training 	<ul style="list-style-type: none"> • Communication • Employee resource management • Work design • Design of working times • Teamwork • Participatory design • Virtual organisations • Quality management

Since the promulgation of the Ergonomics Regulations in December 2019, there have been a number of challenges with their implementation. However, the Department of Employment and Labour (DEL) has addressed these and is working on further ways to promote ergonomics in the workplace. The first challenge was the COVID-19 pandemic and its implications for the workplace, with a move to hybrid and remote work. There were also a number of enquiries with regard to the risk assessment and the competent person described in the Regulations. As risk assessment is one of the fundamental regulatory prevention principles in the workplace, the Department gave a 12-month exemption for conducting risk assessments and related medical surveillance, in order for employers to upskill employees or to find skilled external individuals for this task. The Department also drafted and published a guideline on the competent person,⁸ which provides more details on how to select such a person. However, while the Regulations require the appointment of a competent person to perform the risk assessment, the Department has always promoted a team approach when conducting risk assessments, as it is beneficial to draw on knowledge and skills of others in the workplace.

The DEL will also conduct a small, national survey about the implementation of the Regulations, aimed at employers across the country, and using the inspections conducted by the occupational health and safety inspectors. The results of the survey will hopefully provide information about how the regulations are being implemented, the challenges being experienced by industry, and where best practices are being implemented.

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The genesis of ISO 23875 and its impact on heavy mining equipment operator enclosure air quality

Part 1

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ABSTRACT

Mining machines frequently operate in environments with high concentrations of respirable crystalline silica (RCS) dust. Overexposure to RCS poses a substantial health risk to mining machine operators, leading to lung diseases. The International Standards Organisation (ISO) 23875:2021 standard establishes a uniform method and defines the performance metrics necessary to ensure acceptable air quality for mining machine operators. This article series delves into the historical development and transformative influence of the ISO 23875 standard on the air quality within heavy mining equipment (HME) operator enclosures.

INTRODUCTION

Mining machines frequently operate in environments with high concentrations of respirable crystalline silica (RCS) dust. Overexposure to RCS poses a substantial health risk to mining machine operators, leading to lung diseases. Research indicates that existing technologies are highly effective in reducing silica exposures when appropriately applied to heavy equipment cabs.¹⁻⁴

To reduce the risk of overexposure to RCS, the International Standards Organisation (ISO) Technical Committee- (TC-) 82 Mining created ISO 23875:2021 to provide a uniform method, and define performance metrics, to ensure acceptable air quality for mining machine operators. This standard is crucial for implementing consistent and effective measures across the mining industry, to safeguard the health of operators exposed to RCS.

This article, the first in a three-part series, explores the historical development and transformative influence of the ISO 23875 standard on air quality within heavy mining equipment (HME) operator enclosures. We will delve into the roots of ISO 23875 and its inception, and acknowledge the individuals and institutions instrumental in laying the foundational research on which it is built.

Respiratory diseases are inherent in mining. Historically, mineworkers were left to fend for themselves. A recent landmark class action suit in South Africa resulted in a significant settlement for mineworkers with silicosis.⁵ Mining companies are now being held responsible for worker overexposures, which have resulted in lung disease and, in some cases, death.

Litigation pressure underscores the need for standardised best practices in the international mining industry to address operator enclosure air quality. Far more than local and national regulations, effective, industry-adopted international standards heavily influence machine specifications, machine manufacturing, and health and safety practices.

Creating effective international standards is only the first step. To comply with the standard, mining machines require retrofitting or re-engineering to shield operators from respirable dust exposure. Research performed over the past 25+ years, by the US-based Pittsburgh Mining Research Division (PMRD) of the National Institute for Occupational Health and Safety (NIOSH),^a revealed what engineering controls are necessary to control dust ingress into an operator

enclosure, including continuous positive cab pressurisation and high-efficiency filtration on intake, and recirculation airflows within the ventilation system.¹

While research identified the engineering path required, technologies were initially inadequate. However, in 2000, Sy-Klone International patented a powered particle separator, which removed particles larger than 5 µm from heating, ventilation, and air conditioning (HVAC) intake airflows without the use of a mechanical filter, at greater than 90% efficiency. This made the use of high-efficiency filtration over extended service intervals possible in high dust concentration mining environments. Further advancements in filter technology, allowing for increased filter life and durability, came in 2007, when Sy-Klone International applied nano fibres to base filter media, resulting in the first particle-shedding, high-efficiency intake and recirculation filters for mining HVAC intake air systems.² These innovations were evaluated by the PMRD of NIOSH³ and the Queensland Government in Australia, and contributed substantially to the development of compliant air quality in operator enclosures in real-world mining environments.

In 2009, the Queensland Mine Inspectorate performed a groundbreaking real-world evaluation, the RESPA[®] Trial 2009,⁶ which demonstrated the technology's contribution as an engineering control to reduce and maintain RCS dust concentrations below threshold limits.

During this time, research by the PMRD validated additional engineering control technologies, which, as subcomponents to the operator enclosure air quality system, contribute to the continuous delivery of acceptable air quality in real-world mining environments.⁴

In 2012, the International Society of Environmental Enclosure Engineers (ISEEE) was established as a non-profit organisation, filling a need in the industry to focus on real-world testing, certification of air quality performance, and education around operator enclosure air quality. The ISEEE's research emphasised the importance of intake airflows and dilution of operator-generated CO₂, and identified inadequacies in ventilation systems that lacked adequate intake airflow in their HVAC designs.^{7,8}

By 2015, the ISEEE had initiated the Advanced Cab Theory Workshop (ACTW),⁹ which was a culmination of years of proprietary research as well as research performed by NIOSH/ PMRD and others. The workshop is designed to educate all stakeholders responsible for operator enclosure

^a Under NIOSH, the Pittsburgh and Spokane Research 'Centers' were renamed the Pittsburgh Research Laboratory and Spokane Research Laboratory. Both laboratories currently reside under NIOSH's Office of Mine Safety and Health Research.

air quality. During the workshops, a unique cab is utilised – specifically designed to educate about cab theory, multivariable fluid dynamics, engineering controls, and air quality monitoring, and to provide experience on how the cab functions as a complete system to provide acceptable air quality to the operator.

Mining equipment manufacturer, Epiroc (<https://www.epiroc.com/en-za>), sent one of its cab design engineers to participate in the ACTW in 2015, which led to a change in their understanding of cab design. This change caught the attention of the ISO TC-82 Mining representative who, in 2018, asked to use the content of the ACTW in the development of an operator air quality standard for the mining industry. Subsequently, a working group (ISO TC-82 Mining Working Group Nine (WG9)) was formed. The first standard developed by WG9 was ISO 23875:2021.

The ISO Working Group comprised 27 subject matter experts from 10 mining countries, including occupational hygienists, academics, mining machine manufacturer HVAC experts, cab design engineers, and filtration specialists.

The standard draft received comments from the Earth Moving Equipment Safety Round Table (EMESRT), the Queensland Mine Inspectorate, the PMRD, the Mine Safety Health Administration, the American Industrial Hygiene Association (AIHA) Mining Working Group, members of Australia's ME18 – Australian mirror committee to ISO TC-82 mining – and the Australian Institute of Occupational Hygiene (AIOH). Every effort was made to be inclusive.

The standard was published in February 2021, after receiving 100% positive votes during multiple ballots. Since publication, the standard has been adopted as a national standard by the European Union (EN/ISO 23875:2022), Sweden (SS/EN/ISO 23875:2022), and Australia (AS/NZ ISO 23875). This widescale adoption of the standard is a victory in our efforts to improve health outcomes for mineworkers.

The second article in this series, 'Technical aspects of ISO 23875', will examine the content of the standard, the structure, and its practical relevance to heavy equipment manufacturers, retrofit engineers, maintenance personnel, machine operators, occupational hygienists, and corporate leadership.

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An insight into RMA's Prevention Programme

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Background

In the September 2022 edition of *Occupational Health Southern Africa*, Rand Mutual Assurance (RMA) published an article on the launch of its Prevention Programme. RMA administers claims for occupational injuries and diseases as required by the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993 (COIDA). RMA has the licence to administer claims for both the mining and metals-related industries.

In April 2022, RMA launched the Prevention Programme, which is a strategic focus area of the business. RMA believes that the prevention of injuries and diseases at work is crucial to contribute to enhanced employee productivity for employers and, more importantly, to improve the health and safety of employees. RMA understands the impact of working conditions and environments that contribute to workplace fatalities, injuries, and diseases. It is for this reason that RMA launched the Prevention Programme to help its members reduce the number of incidents by assisting them with various health and safety initiatives.

Purpose of the Prevention Programme

RMA's Prevention Programme is a pilot project that supports the employers in the metals class. This class consists of various industries, ranging from foundries to automotive plants, light and heavy steel work, and garages. The programme partners with various stakeholders, including employers, employer associations, and unions to reduce occupational incidents by offering a blend of occupational health and safety and financial wellness solutions. The aims of the programme are to improve employee safety, reduce the incidence and severity of injuries and diseases, and reduce the debt burden of employees.



RMA's Prevention Programme is based on the view that safe and healthy workers are more productive workers

Photograph: courtesy of RMA

Insights from 2022

Upon reflection, RMA can share the following insights from the pilot project implemented in 2022.

First, the metals class is varied with regard to the types of businesses that operate and the size of the companies. Companies that have signed up to the Prevention Programme range from family-owned and -run businesses to large international companies. The variance in the types of companies and their size influences how occupational health and safety is viewed and applied in these organisations.

The understanding and application of legislation, the way in which the prevention of incidents is conducted, and the resources provided for safety management are significantly different between these types of organisations.

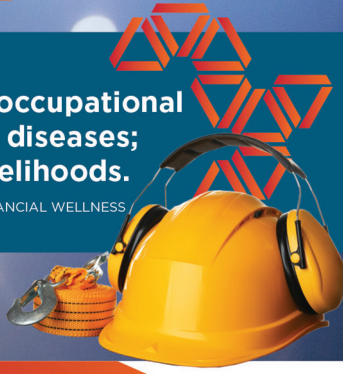
The pilot project started with a small sample of 10 companies that signed up to the programme in 2022. It became evident that prevention (used interchangeably with health, safety, and wellness) is fairly established in the larger organisations and poor, if considered at all, in smaller organisations with 40 and fewer employees. In the smaller organisations, safety is very much either a 'nice-to-have' or is addressed in 'pockets' because of a lack of expertise in these organisations, budget or financial constraints, a lack of understanding (and knowledge) of the legislative requirements and the need for legal compliance, or because the primary focus of small-medium enterprises is survival. Prevention, in its all-encompassing fields, is simply not prioritised. In the event of a major accident that results in a fatality or serious injury, these factors will be of no concern to the various investigating bodies as the Occupational Health and Safety Act and its regulations ought to have been in place, irrespective of the above issues. It is of the utmost importance for employers to be cognisant of the consequences of failing to fulfil their legal health and safety obligations.

Having developed insight into this lack of prevention capacity, as identified in the pilot project companies in 2022, RMA has the reassurance that the Prevention Programme is necessary. By rolling out the programme, we will be able to help companies ensure that, at a minimum, they become legally compliant. No company wants to be known for being unsafe or not caring for its employees. This gives us the confidence that the Prevention Programme is vital, not only to drive lower compensation claims, but also to establish RMA as a social insurer that cares and serves with compassion. The view that safe and healthy workers are more productive workers lies at the heart of RMA's Prevention Programme.

The second insight from the programme in 2022 is related to the larger organisations where health and safety is fairly established, and where one would expect legal compliance. 'Fairly established' can be defined as having some resources dedicated to managing health and safety, such as human resources and finances. However, it was evident from the audits conducted at these organisations that there is much room for improvement to assure best practice. We found that some of the most basic of safety principles are overlooked, or go unattended, or that complacency has set in. With the help of a 'fresh pair of eyes', these unsafe conditions and actions needed to be addressed. Unlike the smaller companies, the larger organisations have invested in

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safety by employing dedicated personnel who are qualified to manage safety; assumingly, they have an allocated budget for this. However, the evidence indicates that budgets are inadequate. Additionally, the safety teams are not always 'heard', are disempowered, and are unable to implement corrective actions (timeously) to ensure that safety is prioritised. In some cases, the teams are demoralised when leadership does not take safety seriously. The findings showed that:


- corrective action was not taken when employees did not wear personal protective equipment (PPE);
- legal appointments were not in place;
- legal liability training was not provided to executive management;
- there was a lack (or poor guarding) of equipment;
- hazardous materials were being used without (or with incorrect) PPE;
- there were issues relating to unsafe equipment;
- there was a lack of safety training; and
- there was poor incident management.

In larger organisations, it is expected that significant business focus is on safety as the consequences of neglecting this can result in financial, reputational, and legal ramifications. It is sadly a reflection that prevention is not a business imperative. RMA believes that further attention, awareness, and education around prevention at a managerial level is warranted. The need for a cost-benefit discussion between RMA and these organisations is evident. Spending R1 million in compensation for occupational injuries and diseases must surely ring alarm bells, especially during the economic hardships facing our country. This financial risk serves as a motivation to join RMA's Prevention Programme; investing in safety is cost effective in the long term.

The third insight from 2022 pertains to the eagerness for collaboration in preventing injuries, loss of life, and occupational diseases in employees, by labour organisations. Stakeholders from both the employer (such as employer associations, e.g. the Steel and Engineering Industries Federation of Southern Africa (SEIFSA)) and employee representatives (such as trade unions, e.g. National Union of Metalworkers of South Africa (NUMSA)) have demonstrated a keen willingness to support RMA's Prevention Programme. It is imperative for safety initiatives to succeed. Safety must be tackled by all participating entities within an organisation. RMA's stakeholders' involvement in the Prevention Programme extends beyond the promotion of the programme; it includes further education, awareness, and training around prevention of injuries and diseases.

The final insight relates to perspective. Although there was a slow start in terms of members joining the Prevention Programme in 2022, there is no doubt that it is much needed in the metals space, as indicated by the number of claims received by RMA. There is a need to drive further participation in the programme if it is to make a tangible difference to the severity and incidence rate of injuries and disease in the metals class. Complementing our members' existing health and safety systems and helping them to become legally compliant (and take them to best practice) is at the top of our agenda.

Interventions provided by RMA to create healthier and safer workplaces is the focus for 2023. Sustainability is critical to making a significant difference. This year, we aim to implement solutions and interventions for continuous improvement and the inculcation of safety as a key business imperative. Ultimately, we want our members' employees to return home healthy and safe every day.

For further information about how the Prevention Programme could work in your organisation, contact the RMA team at rmaprevention@randmutual.co.za 

Multi-concerted efforts to eliminate tuberculosis, silicosis, and other occupational lung diseases: legacies in the southern African region and policy reform efforts

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BACKGROUND

Private sector contributions to the reduction of tuberculosis (TB), silicosis and other occupational lung diseases in the southern African region cannot be ignored. These are needed now more than ever, as the contributions have assisted in making significant strides in the fight against TB in South Africa. The private sector, particularly the mining sector, has made a tremendous contribution to safeguarding the safety and health of employees in the last eight to 10 years. This required a concerted effort by all stakeholders, including member states, mining corporations, and employees, and funding partners such as the Global Fund and the World Bank. Historically, TB incidence rates in the Southern African Development Community (SADC) region have been highest in the mining sector, with rates as much as three to eight times higher than in the populations from which mineworkers originate.^{1,2} Through some intensive investments by all stakeholders, the tide is turning, particularly in the South African mining industry.³ A total of 462 515 miners were screened for TB in the year 2022; 0.26%, 3.17%, and 0.58% were diagnosed with TB, multidrug resistant (MDR)-TB and extensively drug resistant (XDR)-TB, respectively. All workers' and families' contacts that were traced were put on TB medication. The same cannot be said about other African Union member states. A recent study reported that TB prevalence among miners in Africa is estimated at 3 000–7 000/100 000, which is about three to 10 times higher than that in the general population; communities living in the vicinity of the mines had much higher TB rates than the general population.⁴

One of the activities of the South African Government and the private sector, particularly the controlled mines, is compensation for current mineworkers and ex-mineworkers. Although the system is highly fragmented, it does work, as many more current and former mineworkers are compensated in South Africa than in many SADC countries. The compensation system is managed by 1) the Department of Employment and Labour (under the Compensation for Occupational Injuries and Diseases Act 130 of 1993 (COIDA)), which compensates injuries and diseases other than those regarding the lungs of mineworkers, 2) the Department of Health (under the Occupational Diseases in Mines and Works Act 78 of 1973 (ODMWA)), which compensates current and ex-mineworkers for occupational lung diseases, and 3) private insurance companies licensed by the Department of Employment and Labour, such as Rand Mutual Assurance (RMA), which receives levies from mining companies and compensates workers on behalf of the Department of Employment and Labour.

Zambia also has a well-established sustainable government compensation system, described elsewhere,⁵ which is supported by the Zambian ministry of Labour and Social Security (MLSS). However, the private schemes provide compensation only to private sector employees, leaving scores of civil servants without insurance against diseases.

Generally, countries in the SADC region have compensation systems that are not responsive and not relevant to the intended beneficiaries, especially mineworkers and ex-mineworkers who have the highest burden of TB, HIV, silicosis, and other occupational lung diseases. In addition to having inadequate benefits and a narrow legislative scope of coverage, most compensation systems in the SADC region are complex and ineffective and have several barriers to benefits and services. The informal sector, particularly the artisanal small-scale miners, is not covered.

The challenge is compounded by difficulties experienced by mineworkers and ex-mineworkers in accessing occupational health and compensation services. In August 2012, heads of SADC member states, in collaboration with mining entities and other key stakeholders, signed a declaration on TB in the mining sector to address the high burden of TB. The declaration emphasised the scourge of TB, HIV, silicosis, and other occupational respiratory diseases.

The SADC and the East Central and Southern African-Health Community (ECSA-HC) are the project's principal recipients, through the Global Fund, supported the 'TB in Mines Phase 3' (TIMS III) project. They are employing a coordinated multi-country and multi-sectorial response to effectively respond to the TB burden in the SADC mining sector, by strengthening critical elements of basic occupational health and compensation systems. In doing so, ECSA-HC will facilitate technical assistance to SADC countries such as Lesotho, Mozambique, South Africa, and Zambia to design and implement action plans to strengthen their compensation systems. This adds to other efforts implemented by the African Union Development Agency-New Partnership for Africa's Development (AUDA-NEPAD) under the project, supported by the World Bank. Lessons learnt will be shared and used to create effective and sustainable compensation frameworks for replication in other SADC countries with significant mining activities.

METHODOLOGY

A regional occupational compensation strengthening meeting was held, in person, at The Capital on The Park Hotel in Sandton, Johannesburg, South Africa. Data for the report were collated from the meeting concept note, meeting agenda, presentations, observations, and dialogues.

The meeting was attended by 25 participants from South Africa, ECSA-HC, and the African Union Development Agency (AUDA)-NEPAD. The South African participants were from the Department of Health, the Medical Bureau for Occupational Diseases (MBOD), the Department of Employment and Labour, the Compensation Commission, the Minerals Council of South Africa, the United Association of South Africa (UASA), Solidarity, Association of Mineworkers and Construction Union (AMCU), National Union of Metalworkers of South Africa (NUMSA), Rand Mutual Assurance (RMA), the Regional Coordinating Mechanism (RCM) of TIMS, and Dr Cleopas Sibanda, an occupational health physician and consultant from Eswatini.

RESULTS

The primary objectives of the meeting were to review the regional compensation situational analysis report of the four SADC member states' (Lesotho, Mozambique, South Africa, and Zambia) compensation policy status, and to develop an implementation roadmap and plan for South Africa. The meeting was officially opened by the Chairperson of the RCM; Jabu Xaba, representative of the South African Mining Association; and Dr Barry Kistnasamy, the Compensation Commissioner for occupational lung diseases in mineworkers. All highlighted the importance of the compensation of workers and ex-workers as a basic and fundamental human right enshrined in the United Nations, International Labour Organization (ILO), and several member states' constitutions. They pledged to support the current work under the Global Fund and the SADC region to promote the fundamentals of the constitutional rights of workers and ex-workers.

Report on the situational analysis of compensation systems in southern Africa

Dr Sibanda presented an overview and genesis of compensation and its trajectory. The report described the results of the analysis of the compensation systems of four southern African countries: Lesotho, Mozambique, South Africa, and Zambia. The aim of the study was to develop and implement action plans to strengthen occupational compensation systems through in-country participatory processes, using a tripartite-plus approach, which includes governments, employers, employees, and other affected key stakeholders, particularly ex-mineworkers.

The meeting participants generally agreed that compensation systems leave much to be desired in several SADC member states. TB is still not a compensatable disease in most member states. Many compensation laws cater only for private sector employees and exclude civil servants. However, South Africa has implemented a better system. Although the South African system is fragmented, it is currently fulfilling its mandate and remains best practice in the region. The South African compensation system dates to the early 1900s, and has evolved to include everyone of all races since the early 1990s. South African compensation is embedded in law, and comprises several ministries, administrative authorities, and information systems. Importantly, TB is compensatable and workers and ex-mineworkers, including those from neighbouring countries who worked in the South African mining industry, are eligible for compensation.

The challenge, as presented in the second paragraph of the background in the report, is that compensation is only given to workers employed in 'controlled mines', viz. those that are registered with, and report to, the relevant departments or ministries. Workers will not be compensated if an employer does not register with, and pay

levies to, the relevant approved compensation structure. However, if an employee is insured by a private insurance company, it is assumed that he/she will be compensated privately. The process is not regulated, however, and reporting is not compulsory except for Rand Mutual Assurance, which is licenced and reports to the Department of Employment and Labour.

Key issues highlighted from the report:

- The situational analysis report was not anchored in a single international best practice, which presented a challenge as the South African Government could not benchmark its compensation system. The meeting requested the consultant (Dr Sibanda) to create a table to illustrate what best practice comprises and how South Africa and other selected countries fare against it.
- The narrative that TB in South Africa is three to six times higher in the mining sectors than the general populations is a concern. Mining experts have expressed that, currently, TB incidence rates in the sector are far lower than those in the general population of South Africa.

Development of an action plan

The meeting participants agreed to continue with the development of an action plan, as Dr Sibanda is working on, describing best practices. The South African Government, workers' unions, and mining industries appreciated the Global Fund's support in harmonising the region's compensation systems. The country will work with SADC member states to align their actions, particularly on harmonisation and integration of information systems, including elements of compensation that are missing from their legislation, such as the compensation of workers employed in uncontrolled mines. A systematic approach was agreed upon, and the action plan was divided into six categories or levels, viz strategic/policy, administrative, operational, systems, research and development, and resources.

Policy level: the stakeholders and the team understood the complexities of integration at this level, but recognised that it requires political commitment. The level seeks to integrate a legal framework for occupational health and safety and workers' compensation in South Africa to reduce fragmentation, expand the scope of coverage, and increase the compensation benefits.

The administrative level will enhance collaboration and facilitate synergies for the administration of occupational health and safety, and compensation; and improve access to compensation benefits and services. The meeting participants requested the Compensation Commissioner to secure a declaratory order for clarity, which will ensure that workers who are not currently covered by legislation receive compensation at the expense of the employer. The meeting members committed to promote occupational health and safety policy and process harmonisation, as espoused by the SADC mining protocol.

The operational level will raise awareness of compensation systems/processes among all key stakeholders, strengthen the compensation claim process, and collaborate regarding roadshows and outreach. This will promote and support: 1) risk-based medical surveillance and integration of occupational hygiene and medical surveillance; and 2) the primary prevention interventions through various means, such as funding the inspectorates to adequately advise, inspect, and enforce compliance in all industries.

At the **information system level**, all stakeholders will seek to create an integrated information management system for occupational health and safety, and workers' compensation stakeholders. They will ensure that all created information systems are interoperable, safe, and government-owned to ensure sustainability. The system should be able to present agreed aggregate data at a continental level, with all African Union member states feeding into it.

The **resource level** seeks national, regional, and continental deliberate, collaborative efforts to undertake resource mobilisations, which will be used strategically to tackle common regional challenges.

The **research and development level** will actively work with research and academic institutions to promote research and implementation of recommendations based on research outcomes. Members will work closely with academic institutions to offer basic occupational health and safety training to all students who endeavour/wish to work in high-risk industries.

CONCLUSION

The national and regional efforts to eliminate TB in mining are showing some positive results, as the prevalence of TB in the South African mines is far lower than it was before the investments. The private sector's contribution to TB control is critical for sustainable and inclusive economic growth. Harmonisation of the occupational health and safety policies is also critical, particularly primary prevention and compensation policies. This will ensure that when workers fall sick or die, they and their families will not be left worse off, and the public health systems will not be burdened with

a high volume of patients due to lack of medical cover. There is a need to strengthen a coordinated information system, and report to effectively measure the contribution of the private sector in reducing TB prevalence in working populations.

ACKNOWLEDGEMENTS

The workshop was funded by the Global Fund TB in the Mines Project Grant Number QPA-CFUND-2101.

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Vision Zero implementation in Africa

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Background

The concept of Vision Zero was launched at the World Safety Congress in Singapore in 2015. It is a campaign that promotes a mindset that all workplace injuries and work-induced ill health are preventable. The high note of the launch was the presentation and story shared by Michael Lopez-Alegria, a former commander of the International Space Station. The bottom line was that there is a shift to the culture of prevention, which was clearly supported with the Vision Zero 7 Golden Rules.

I recall walking up to the (then) Secretary General of the International Social Security Association (ISSA), Hans-Horst Konkolewsky, to congratulate him on the very successful launch of the Vision Zero campaign and the need for us to take the campaign to Africa. I asked for any left-over materials from the launch to be sent to us in Africa for both regional and country-level launches. Not too long after the meeting, I received Vision Zero flags and badges in Lagos, Nigeria. National and enterprise launches of Vision Zero were held across all regions of the world. Currently, the Vision Zero 7 Golden Rules are being translated from English into 11 other languages.

Vision Zero in Africa

The conversation in Singapore gained momentum in Africa with correspondence between several governments' health and safety agencies and institutions, individual health and safety practitioners, and the ISSA. These interactions led to the following launches:

- African Vision Zero regional launch in Abidjan, Cote D'ivoire, 28 April 2018
- Nigeria Vision Zero country launch in Lagos, Nigeria, 24 May 2018
- Ghana Vision Zero country launch in Accra, Ghana, 30 October 2018
- Zambia Vision Zero country launch in Livingstone, Zambia, 14 December 2018

A number of other countries showed interest in the launch of Vision Zero but the collective preparation towards the OSHAfrica International Conference in 2019 slowed the pace of individual country efforts. Shortly thereafter, the COVID-19 pandemic took the stage and our collective priorities shifted from the launch of Vision Zero to a response to the Pandemic. Countries like South Africa, Kenya, Tanzania, Senegal, Cameroon, and Zimbabwe are among those that were on the path of a national launch of Vision Zero before the outbreak of COVID-19.

While Vision Zero launches gained momentum in Africa, there was growth in daily applications to ISSA from health and safety practitioners across Africa waiting to be registered as Vision Zero trainers; this was an applaudable development. Several practitioners were using the ISSA materials to carry out Vision Zero training in African countries. Most organisations in Africa learned about Vision Zero through the coordinated efforts of these practitioners, attendance at the national Vision Zero launches, and/or through the efforts of the registered Vision Zero trainers.

Enterprise and sectoral launches

While Vision Zero is structured through International, national, and enterprise approaches, innovation is an integral part of it, due to its inherent flexible nature. In Nigeria, the enterprise launch was a popular idea, but in Zambia, the sectoral approach was more popular. The two approaches have the same outcome in the long run.

Before the interruption of business processes that came with COVID-19, a few organisations had shown interest in Vision Zero enterprise launches in Nigeria. On 17 May 2019, the first enterprise launch of Vision Zero in Africa was successfully held by a Nigerian Government agency in charge of maritime operations across the country – the Nigeria Maritime Administration and Safety Agency (NIMASA). The commitment shown by the leadership of this Agency, and their willingness to implement the 7 Golden Rules to achieve systems improvement, was impressive. Executive directors of the organisation witnessed the 'Vision Zero Oath of Safe Practice' by health and safety representatives in the Agency. This was a very colourful event that was reported in all national newspapers.

In Zambia, the sectoral launches of Vision Zero were led by the Workers' Compensation Fund Control Board (WCFCB). The sectoral launches that took place in Zambia before the COVID-19 outbreak were:

- Agricultural sector launch in Mkushi, Zambia – 28 August 2019
- Hospitality sector launch in Mfuwe, Zambia – 26 September 2019

The collective launches brought together all the players in these sectors who signed off Vision Zero implementation and the 7 Golden Rules. Zambia has taken the Vision Zero campaign a step further – to the education sector where many campaigns were launched in schools under the slogan 'Safe Workers of Tomorrow' (SWOT). The SWOT programme is designed to create health and safety education and awareness among children at primary and secondary school levels. Sectoral launches in Zambia that were prevented by the COVID-19 pandemic included:

- Small-scale mining sector
- Road and transportation sector
- Petroleum sector
- Water and sanitation sector

A resolution from the OSHAfrica International Conference 2019 in South Africa was to host an all-African Vision Zero event. Discussions with Prof. Kar-Heinz Noetal, President of ISSA Construction Section, at the ISSA Mining 50th Year Anniversary Event in South Africa, further helped to shape this idea. It evolved into the 'Vision Zero Africa Conference', which was held in November 2021 in Lagos, Nigeria; participants from 18 countries attended the conference. The conference will be held every two years in an African country. Zambia hosted the second conference on 7 and 8 September 2023. Uganda has secured the rights to host the 2025 conference.

How has Vision Zero been implemented in Africa?

It is important to note that, at its launch, Vision Zero was first seen in Africa as a campaign. However, it evolved into a strategy. This transition helped the understanding of Vision Zero as a clear business strategy and not a campaign that would be replaced over time. The word 'strategy' was a game changer for Vision Zero as many business leaders and organisations related better to this word than 'campaign'. Business leaders and executives of organisations who have either attended Vision Zero launches and events, or sent delegates to attend these events, were more receptive and willing to embrace and implement Vision Zero.

The 7 Golden Rules is a catchy phrase that is relatable and defines the expectations of the Vision Zero strategy. In Zambia, for example, the company, Zambia Sugar, already had a programme called 'Target Zero' in place. For such corporations, it was easy to align their existing programmes with the Vision Zero strategy, using the 7 Golden Rules as guidance. Several other cities and countries in Africa had programmes that had 'Zero' in the names.

Noticeably, once organisations understood the concept behind the Vision Zero 7 Golden Rules, little convincing was needed. The organisations saw this as attractive and worth identifying with. Leadership commitment, which is the first Golden Rule, was easy to achieve in many organisations. This is the ideal place to start as the next steps needed for the implementation of the Vision Zero strategy follow from here. At the early stages of implementation, organisations' leaders were asked for written commitment, but there was reluctance and we stopped asking for this. Instead, efforts focused on showing organisations how the Vision Zero strategy could transform them.

Creative implementation of the Vision Zero 7 Golden Rules

Vision Zero implementation across organisations is flexible. Although implemented differently, the outcomes are similar. Once commitment from leadership is achieved, any item within the 7 Golden Rules that they want to take as a next step is up to the organisation. Some organisations commit to all the seven rules at the same time, while others prefer to commit to a few at a time; once those first rules gain traction, the organisation takes up another rule. There have been cases where the rules 'Invest in people' and 'Improve competencies' have been merged into one item by an organisation in its commitment plan, and this works for those organisations. Mergers were motivated by the realisation that the organisation could not improve competencies without investing in people. In other words, they saw these as two closely related items, which they collapsed into one item, resulting in 6 Golden Rules. The outcome is the same.

Identifying targets is another item with which organisations easily relate in the implementation. We agree that this is something with which organisations may already be familiar, but they are now able to profile it as one of the requirements in the Vision Zero guiding principles. Now it is done with documentation, using pre-agreed-upon checklists. This is carried out as an organisation-wide programme, while units and departments independently conduct their routine hazards identification programmes. In Nigeria, after leadership commitment, NIMASA hired an external consultant to conduct fire risk assessments across their two operating facilities in Lagos to identify fire hazards, which are common in their operations. Consequently, there is improved incident reporting within these organisations, and they are beginning to use these data to implement corrective actions and set targets in areas needing attention.

The Vision Zero advocates, now known as the African Vision Zero Network, have closely supervised the activities of NIMASA since the enterprise launch of Vision Zero by their organisations, and have taken credible steps towards workplace health and safety improvement, using the Vision Zero 7 Golden Rules. At the time of the launch, the organisation did not have a defined health and safety department. Rather, there were pockets of health and safety activities scattered across several departments. But today, using the leadership commitment approach, they have created a complete health and safety department headed by a qualified health and safety practitioner in the capacity of a deputy director. This is

one of the achievements of the implementation of Vision Zero in this organisation. Since this development, much has been done in terms of capacity building in health and safety, and emergency responses. Recently, attempts have been made for a tele-medicine plan to support responses to cadet and crew members in vessels who may need support in Nigerian territorial waters. I understand that a draft document has been tabled for approval. There are discussions underway with the Institution of Occupational Safety and Health (IOSH) for training and certification of all employees of NIMASA, including cadets in training.

One item within the elements of the Vision Zero 7 Golden Rules that many African organisations found difficult to understand was Rule 5, which deals with ensuring safety and health in equipment and machines. Some organisations have existing systems, such as machine guarding and training employees on the safe use of these machines. We pointed out the need for safety in the procurement and supply chain. While many are still stuck trying to understand this new concept, we have been able to get the buy-in of some organisations, using the the following call to action: *"We should not purchase equipment or machines because they are cheap, we should purchase equipment and machines because they are safe."* They were able to relate to this and some even shared their experiences with procurement processes in the supply of not-fit-for-use personal protective equipment (PPE). Implementation of this rule has been slow due to bureaucracy, perceptions of job threat, and purchasing processes by supply chain managers.

Despite these challenges, we have seen some organisations design very smart health and safety programmes and events, and take advantage of established dates in the International Labour Organisation (ILO) and World Health Organization (WHO) calendars. They go beyond these dates and design their own programmes to speak to prevailing issues around health and safety within their workplaces. While there is room for improvement, it is important to recognise what organisations have achieved and to continue to encourage and remind them why they should keep at it.

The 2019 OSHAfrica Declaration

The OSHAfrica Declaration of 2019 is a policy document that came out of the OSHAfrica Conference in South Africa. The document clearly emphasises the inherent benefits of the implementation of the Vision Zero 7 Golden Rules. These rules were tweaked to speak to African workplace health and safety realities. The call for workplaces to use this strategy for health and safety improvement was one of the high notes of the conference. We have since seen many health and safety professionals from several cities and countries in Africa calling for this document to use in their workplaces and to reference in their work.

Some of the highlights in the OSHAfrica recommendations of the Vision Zero 7 Golden Rules are:

- Promoting the need for visible actions from leadership – walking the talk
- Involving host communities in our overall health and safety programmes; and communities' participatory systems, which cover a large part of environmental health and safety
- Advocating for risk-based thinking and making workplace risk assessments gender sensitive and gender responsive, while considering intra-job variability and social contexts
- Emphasising evidence-based targets, with policies on implementation, enforcement, monitoring, and evaluation
- Consistently collecting occupational health and safety data at all levels (enterprise, country, and global)

- Developing occupational disease hazards surveillance systems with the intention of informing prevention and control measures
- Eliminating child labour, while promoting decent work
- Understanding human interaction with machines and the work environment, with a view of minimising risks
- Ensuring the use of safe equipment to reduce workplace hazards, as safe technology protects human capital
- Encouraging life-long learning from childhood (4–8 years) to adulthood.
- Promoting prevention by using pictorial images
- Instituting a culture of value for employees, and improving social interactions
- Changing the role of employees in occupational health and safety from passive to active
- Ensuring employees’ involvement in setting the stage for health and safety in workplaces

From these points, it is easy to understand where the creativity for the implementation of the Vision Zero strategy came from. What OSHAfrica did was simply to use the 7 Golden Rules to clarify contextual areas needing urgent attention, as seen in the case of child labour and gender inclusivity, which are two key issues confronting African workplaces. We also identified, earlier, a number of challenges faced by the implementation of the Vision Zero strategy.

How are we evaluating the implementation of the Vision Zero 7 Golden Rules in Africa?

Evaluation is proving to be more difficult than expected, as most organisations are too busy to address it. Nevertheless, we are pushing forward and demanding data and reports to enable us to walk the organisations through the process. We are using the Proactive Leading Indicators document, published by ISSA (2020), to assist us in *measuring* health and safety outcomes. However, we are also seeing a number of other creative approaches for measuring the outcomes while using the 7 Golden Rules. These innovative approaches have given us further ideas on how to measure health and safety accomplishments, using the Vision Zero strategy.

A distinct assessment model was presented at the recently concluded Occupational Risk Prevention (ORP) Fundación Internacional Congress held in Bilbao, Spain from 26 to 28 April 2023. This model is already in use by Hitachi Rail in Japan. It appears to be an easy model to adopt and we are considering using it across workplaces where the Vision Zero strategy is in use in Africa. We are hopeful that, using this approach, we will be able to overcome the evaluation challenges, and be able to show empirical evidence for the positive outcomes of Vision Zero implementation in business in Africa. 📄

UPCOMING EVENTS




INTERNATIONAL
 34th ICOH International Congress
 Marrakesh, Morocco
 28 April - 30 May 2024
 Website: <https://www.occhealth.co.za/pdf/ICOH2024FirstAnnouncement.pdf>

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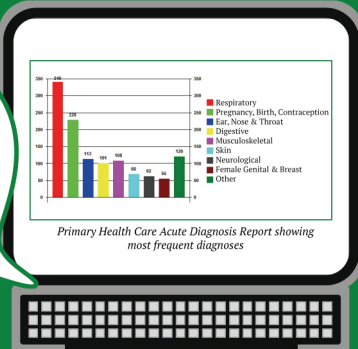
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Countdown to the ICOH2024 Congress: all aboard the 'Marrakesh Express'

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Claudia Frost: SASOM National Office Coordinator
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The Officers of the International Commission on Occupational Health (ICOH) and members of the ICOH Secretariat and the National Organising and Scientific Committees of the upcoming ICOH2024 Congress met face-to-face, onsite in Marrakesh, Morocco, for the last time before the congress, from 6 to 10 January 2024. The four days of meetings were spent finalising the planning of the congress and scheduling the sessions of the scientific programme.

The rich and diverse scientific programme is well aligned with the congress theme, viz. *Enhancing occupational health research and practice: closing the gaps!*, and will bring together world-renowned occupational safety and health (OSH) professionals, industry leaders, policymakers, and researchers in their particular fields of expertise, to share their knowledge and experiences.

One opening keynote, 10 plenary, and 32 semi-plenary presenters have accepted invitations to participate in the congress. A total of 350 scientific content hours will be provided by the aforementioned

presenters and across 150 Special and Free Paper Sessions, as well as 12 e-poster sessions. The Global Policy Forum, titled 'Strategies to improve occupational health and safety policies and implementation in low- and middle-income countries', will be an excellent opportunity for congress participants to learn from several experts, leaders of national and international organisations, and political decision-makers working in the field of OSH.

Accepted abstracts for oral and poster presentations will be published in an online supplement of *Occupational Medicine*, a key international journal in its field and part of the Oxford Academic, Oxford University Press platform, with an impact factor of 5.1 (Source: Journal Citation Reports, Clarivate, 2023).

ICOH and the congress organisers look forward to welcoming many OSH practitioners from around the world in Marrakesh, the 'Ochre City', at the end of April 2024.



The congress 'cutting crew' at the main entrance of the *Palais des Congrès*, in Marrakesh, Morocco

L to R: Fadwa Darid (Morocco), Sara Soltani (Morocco), Pasquale Fruscella (Italy), Prof. Loubna Tahri (Morocco), Valeria Boccuni (Italy), Dr Diana Gagliardi (ICOH Secretary General, Italy), Prof. Abdeljalil El Kholti (ICOH2024 Congress President, Morocco), Prof. Seong-Kyu Kang (ICOH President, Republic of Korea), Claudina Nogueira (ICOH Vice President and Scientific Co-Chair: ICOH2024 Congress, South Africa), Hamid Jaiti (Morocco), and Khadija Ait Ohanni (Morocco)

Inset: Prof. Kamal Wifaq (Scientific Co-Chair: ICOH2024 Congress, Morocco)

Photograph: courtesy of ICOH2024 Congress organisers

SASOM ANNUAL GENERAL MEETING 2023: A REVIEW OF THE YEAR'S HIGHLIGHTS

The South African Society of Occupational Medicine (SASOM) hosted its annual general meeting (AGM) on Friday, 17 November 2023, in association with the 7th International Conference of the History of Occupational and Environmental Health, in Durban, KwaZulu-Natal. The AGM was held in a hybrid format, at the Coastlands Musgrave Hotel, using the SASOM Zoom platform, with onsite attendance for SASOM members who attended the ICOH conference. The last SASOM ExCo meeting of 2023 was held on Monday, 13 November, in fully virtual mode.

At the AGM, Prof. Daan Kocks (SASOM Chair) read the 2023 annual report prepared by the SASOM 2023 National Secretary, Dr Frank Fox, and highlighted the financially sound report of the Society as well as the following activities and outcomes for 2023:

SASOM national office

- The SASOM office bearers for 2023 and 2024 are: Prof. Daan Kocks (Chair), Dr André Kotzé (Vice Chair), Dr Frank Fox (Secretary), and Dr Geoffrey Tafaune (Treasurer). As at 31 October 2023, SASOM had 502 paid-up members in good standing, representing an increase of 11% from 2022. This number includes 451 standard members, 23 student members, 10 honorary life members, nine retiree members, and nine corporate (affiliate) memberships. A total of 397 members (79%) renewed their memberships in 2023 and 95 new members (19%) joined the Society. SASOM also counts among its members representatives from other countries, e.g. Botswana, Canada, Eswatini, Kuwait, Namibia, United Kingdom, Zambia, and Zimbabwe.
- SASOM Guidelines are provided free of charge to members in good standing, as a membership benefit. The Guidelines are regularly revised to ensure that they remain relevant for good practice in occupational health/medicine. Six full sets of SASOM Guidelines and five Guidelines on 'Medical Requirements for Fitness to Drive' were sold to non-members from November 2022 to October 2023.
- On behalf of SASOM, Prof. Kocks thanked SASOM EXCO member, Claudina Nogueira, for her facilitation of the publication of SASOM's pages in *Occupational Health Southern Africa* (OHSA), and Prof. Mary Ross and Claudia Frost (SASOM National Office Coordinator) for drafting and facilitating the continuing professional development (CPD) questionnaires, respectively. Members can earn three CPD/CEU points per questionnaire, potentially earning 12 points per annum (since the beginning of 2023, the Journal has published four issues per annum instead of six as in previous years). Despite all the hard work and time that goes into developing the questionnaires, participation from SASOM members is disappointingly low; less than 10% of members submitted answers to the questionnaires during 2023.
- Formal communication with organisations engaged in the enhancement of occupational medicine continued with SASOM ExCo members (co-opted) from the National Institute for Occupational Health (NIOH), the Compensation Commissioner (CC), ICOH, the South African Society of Travel Medicine (SASTM), and the Mine Medical Professionals Association (MMPA).
- SASOM liaison with other organisations continued at both national and international levels, e.g. the South African Department of Employment and Labour (with SASOM being an active participant in, and contributor to, the Occupational Health Forum); *Occupational Health Southern Africa*; the Council for Health Service Accreditation of Southern Africa (COHSASA); the International

Occupational Medicine Society Collaborative (IOMSC); and the American College of Occupational and Environmental Medicine (ACOEM).

- SASOM's involvement in the Department of Employment and Labour's Technical Committees for Hazardous Biological Agents and Ergonomics Regulations has resumed in 2024.
- SASOM is a member of the newly established Specialist Practice Committee of the South African Medical Association (SAMA), having joined in July 2023. The Committee is tasked to act in the interests of the specialist disciplines in healthcare delivery and to represent the profession in discussions and consultations with funders of healthcare.
- Short-term priorities being addressed by SASOM include the challenges that have been identified as affecting the occupational medical practitioner (OMP) service delivery for occupational health, as they relate to the definitions of the Board of Healthcare Funders (BHF)/ Practice Code Numbering System (PCNS) in terms of tariff billing and other profession transgressions.
- An occupational health interest group was started in Zambia during 2023, with the intention of paving the way for the potential establishment of a SASOM Zambia Chapter. The interest group held seven meetings during 2023, with an average attendance of 15 participants per meeting, most of whom were from the Zambian mining industry.
- The SASOM website (www.sasom.org) remains interactive and is continuously updated. Webscripto continues to act as the web developer, and the SASOM national office as content manager. Summary website statistics for the period 1 November 2022 to 31 October 2023 are as follows:
 - o Number of unique visitors (excluding repeat visits): 7 673 (up from 5 913 in 2021/2022)
 - o Number of unique visitors, including repeat visits: 25 644 (down from 27 455 in 2021/2022)
 - o Top six trending pages in decreasing order: member login, home page, members' information, membership, SASOM Guidelines, and vacancies.

SASOM and ICOH activities

- The ICOH mid-term meeting for the current triennium (2022–2024) was held in hybrid mode from 15 to 17 May 2023, in Angers, France, hosted by the University of Angers. The event included the following meetings: ICOH Officers, two ICOH Board meetings, and a meeting attended by leadership representatives of the ICOH Scientific Committees (SCs). For the first time, selected ICOH National Secretaries (NSs) were invited to participate (one from each region), including Prof. Kocks, ICOH NS for South Africa (and representative of the African region) and Chair of SASOM, who participated virtually and presented his NS report on the second day of the meeting. Claudina Nogueira, ICOH Vice President for SCs and ExCo member of SASOM, attended and presented in person.
- The 7th International Conference on the History of Occupational and Environmental Health (organised by the ICOH SC on the History of Prevention of Occupational and Environmental Diseases) was held in Durban, South Africa, from 15 to 17 November 2023. SASOM was represented on the organising committee of the conference, and members chaired sessions and delivered oral and poster presentations. The conference abstracts were published in the Journal (Volume 29, Issue 4, 2023).
- SASOM invited members in good standing who have registered to participate in the upcoming ICOH2024 Congress in Marrakesh, Morocco, to submit applications for partial funding to attend the congress, and selected four eligible recipients of the SASOM grant.

SASOM awards

- The SASOM award for best publication in OHSa for 2022 was bestowed on Leandr e To ia from the Central University of Technology in the Free State, whose profile was published in the Journal (Volume 29, Issue 3, 2023). Her paper, titled ‘Chest radiography: optimising the radiation dose at industrial mines in the Northern Cape province of South Africa’, was published in the first issue of OHSa in 2022.
- The 2023 SASOM Medal of Excellence, which is awarded to candidates for the Fellowship of the College of Public Health Medicine of South Africa – Division of Occupational Medicine – was awarded to Dr Martin M ller who attained his MBChB degree from the University of Stellenbosch in 2003. Martin started his career as a general practitioner, but gradually gravitated towards the preventive aspect of occupational medicine. In 2015, he returned to academia to complete a diploma in Occupational Medicine followed by a master’s degree (MMed) in Occupational Medicine in 2023. Martin is interested in risk-based medical surveillance and is currently consulting in the private sector.



Dr Martin M ller
Photograph: courtesy of SASOM

Webinars and conferences hosted by SASOM

- SASOM held a CPD-accredited virtual annual congress, themed *Occupational Health Practice in 2023: shining a light on the shadows of medicine*, over four months (June to September 2023) to offer its members four congress sessions in webinar format with individual sub-themes, and four presentations in each session. Prof. Kocks, Dr Tafaune, and Ms Nogueira facilitated and

- coordinated the scientific programme, and Mrs Frost provided technical and logistics support. The 17 presenters were both international and local; seven hold leadership posts in ICOH. The congress was well attended (391 delegates across the four sessions, including presenters) and represented countries from across the globe. The webinar recordings are available in the ‘Members only’ area on the SASOM website and show how SASOM is extending its range and sphere of influence in occupational health at national, regional, and global levels. From 2024 onwards, SASOM plans to hold its Annual Congress and other scientific events in a hybrid format.
- The Public Health Association of South Africa’s (PHASA’s) Occupational and Environmental Health (OEH) Special Interest Group (SIG), in partnership with SASOM, hosted a hybrid workshop titled ‘Bridging the gap between academia and the workplace: re-imagining occupational health training – Preparedness of the occupational medicine provider to enter the working world’. The workshop was facilitated by Dr Blanche Andrews (Stellenbosch University) and formed part of the programme of the annual PHASA conference, which was held at the Boardwalk Convention Centre, Gqeberha (Port Elizabeth) from 10 to 13 September 2023.
- SASOM and its Northern Cape Chapter, the Asbestos Relief Trust, the Kgalagadi Relief Trust, and Cipla, sponsored and/or co-organised a CPD-accredited hybrid workshop at the Red Sands Country Lodge near Kuruman, on 12 October 2023. Sixty-six delegates participated – 12 in person and 54 online. This was the second hybrid event co-organised by the SASOM national office in 2023.

Condolences

It is with a heavy heart that SASOM and its members offer deepest condolences to the family, friends, and colleagues of Professor Emeritus Tony Davies, a long-time friend of SASOM, promoter and ambassador of the occupational health and medicine disciplines in southern Africa, and a stalwart protector of workers. Ever the inspiration and a guiding light to generations of OSH professionals and occupational medical practitioners, Prof. Davies’ legacy lives on. He will be sorely missed by all of us! 🇿🇦



Upcoming ICOH2024 Congress

The third and final announcement for the upcoming congress was launched at the end of February 2024. New information includes the list of invited semi-plenary speakers and the topics and organisers of the 75 Special Sessions. The final scientific programme is now available on the ICOH2024 Congress website (www.icoh2024.ma)

Photograph: courtesy of
ICOH2024 Congress organisers

SAIOH news

As part of our service to members, in this newsletter we provide feedback on the latest developments within the Southern African Institute for Occupational Hygiene (SAIOH). SAIOH exists for its members and is reliant on them to continue to serve this noble profession ethically. Therefore, we invite your inputs and feedback on any matters communicated below.

SAIOH PRESIDENT'S ADDRESS

Naadiya Mundy: SAIOH President
e-mail: president@saioh.co.za



Naadiya Mundy

Photograph: courtesy of SAIOH

We are living in truly extraordinary times and 2024 will, I am sure, be no different. I would like to take this opportunity of welcoming you into the new year and reminding you that we are where we are because of you – thank you.

Exhaling clarity on electronic nicotine delivery systems (ENDS): considering occupational hygiene management in our daily lives

Occupational hygiene, which is an essential discipline within the broader field of occupational health and safety, is committed to managing and mitigating workplace hazards to protect the wellbeing of employees. It involves a systematic approach to identifying, assessing, and controlling various activities that may pose risks and hazards to workers' health. One prevailing concern, demanding attention within the realm of occupational hygiene, is the use of electronic nicotine delivery systems (ENDS), commonly known as e-cigarettes or vaping devices. Traditional combustible tobacco cigarettes present substantial risks to human health, extensively documented and comprehensively understood, with many of these health effects manifesting only after prolonged cigarette smoking over decades.

Direct scientific comparisons with combustible tobacco cigarettes are challenging, regarding most health effects.¹ Electronic nicotine delivery systems employ a battery-powered heating element to vaporise a liquid solution, often containing nicotine.¹ Housed within metal or plastic tubes, these devices incorporate a cartridge filled with liquid (typically propylene glycol, vegetable glycerine, flavourings, nicotine, humectants and, in some instances, metals),² which, upon heating, produces an aerosol. Users inhale this aerosol by drawing on the device, akin to the action of smoking a conventional tobacco cigarette, subsequently exhaling the aerosol into the surrounding environment. As ENDS have gained popularity as an alternative

to traditional tobacco products, their presence in workplaces introduces new challenges for occupational hygiene practitioners. The evolving landscape of nicotine consumption, coupled with the potential health impacts of ENDS aerosols, demands a nuanced discussion within the framework of occupational hygiene.

The National Institute for Occupational Safety and Health (NIOSH) in the United States of America (USA) recommends that employers "establish and maintain smoke-free workplaces that protect those in workplaces from involuntary, second-hand exposures to tobacco smoke and airborne emissions from e-cigarettes and other electronic nicotine delivery systems".³ The World Health Organization (WHO) advises against the indoor use of electronic smoking devices (ESDs), particularly in smoke-free settings.⁴ These recommendations aim to reduce the potential risk, for bystanders, of inhaling the aerosols emitted by these devices, and to uphold the effectiveness of smoke-free regulations. The issue of aerosol exposure is a significant concern for environmental health, primarily due to the particles' ability to deeply infiltrate the respiratory system and cell membranes.⁵ They have the potential to translocate from the airways into the bloodstream⁶ and deposit in various organs, including the brain, carrying with them condensed toxic compounds.⁷ The quality of indoor air is a critical concern for human health, as individuals typically spend much of their time indoors where particle concentrations are often elevated.⁸

Nicotine contributes to central and peripheral nervous system effects and causes dependence and addiction; "exposure to nicotine from e-cigarettes likely elevates cardiovascular disease risk in people with pre-existing cardiovascular disease(s)".¹

There has been limited research on the health effects of ENDS aerosols; however, some contain heavy metals such as lead (Pb), nickel (Ni), and chromium (Cr), which occur from the contamination of e-liquids or leaching from elements of ENDS devices.⁹ The discovery of potentially harmful metals in e-liquids raises concerns as these metals have the capacity to transfer to the aerosol and be inhaled. Lead, Cr, copper and Ni have adverse effects on human health even at low levels of exposure. Lead is a toxicant that can contribute to neurological damage, particularly in developing brains; high levels of Ni and Cr are linked to short-term health effects such as decreased lung function, bronchitis, and asthma, and long-term risks of cancer.⁹⁻¹¹

The integration of occupational hygiene with ENDS presents a challenge in maintaining workplace health and safety standards. As ENDS continue to reshape the landscape of nicotine consumption, it is evident that a comprehensive approach within the framework of occupational hygiene is essential to safeguard the wellbeing of the workforce. The chemical complexity of ENDS aerosols demands a thorough understanding of their composition and potential health effects. Occupational hygiene practitioners play a crucial role in assessing, monitoring, and controlling these exposures to effectively mitigate risks. Ventilation systems and engineering controls are critical in the arsenal of occupational hygiene strategies. Effectively managing the dispersion of ENDS aerosols, through well-designed ventilation systems, contributes significantly to maintaining

a healthy indoor air quality. Moreover, the implementation of clear workplace policies, supported by robust education and training programmes, is paramount in fostering worker awareness and ensuring compliance with safety guidelines.

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NATIONAL COUNCIL FEEDBACK

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Membership fees

SAIOH is aware that, in the current economic climate, many of our members find it difficult to renew their memberships and, in our bid to proactively respond to this, we found it hard to justify a substantial increase in professional membership fees. Your membership and participation are what builds SAIOH, and we have, therefore, increased the 2024 membership fees by only 3%. We call on all our members to timeously renew their memberships, upload their CPD points, and participate in our exciting plans for 2024.

Strategic plan

The SAIOH strategy for 2023–2027 was circulated to all SAIOH members in October 2023, after being launched at the SAIOH annual general meeting. The SAIOH Council is meeting in May to ensure that targets are being met and to explore further strategic developments for the Institute and its members.

Ethics

SAIOH's memorandum of incorporation (Mol) has been concluded by the legal team and submitted to members for their information. SAIOH's legal advisors will soon begin the task of reviewing the SAIOH ethics policy and procedure(s), enabling the Ethics Committee to start its work in earnest. The ethics plan forms an important part of the SAIOH strategy (strategy #3).

Please note

As from 1 January 2023, all SAIOH-certified members are required to provide proof that they have completed an acceptable occupational hygiene ethics training course.

SAIOH branch activities

The Gauteng branch hosted its third meeting on 4 August 2023 at the National Institute for Occupational Health (NIOH) offices in Johannesburg. Prof. Anja Franken (from North-West University) discussed 'Invitro permeation of platinum group elements.' On 1 December, the branch held its last meeting for 2023, online, during which a call was made for nominations for new Gauteng branch committee members.

The Mpumalanga branch hosted its second meeting on 11 August 2023 at Seritiza Coal in Middelburg. Two presentations were made by personal protective equipment (PPE) providers and one by Trysome, regarding the new technology to control indoor air quality (IAQ) in heavy-duty mining vehicle cabs. On 24 November, the branch held its third and final meeting of 2023, at Exxaro Matla. This was a hybrid event.

The KwaZulu-Natal branch hosted its second hybrid meeting on 31 August 2023. Prof. Jérôme Lavoué (University of Montreal, Canada) presented on industrial hygiene statistics and the use of ExpoStat in occupational hygiene.

The Western Cape branch hosted a hybrid meeting on 15 September 2023. Tobias van Reenen (Council for Scientific and Industrial Research (CSIR)) presented the new building regulations draft, SANS 10400-0, covering indoor ventilation.

The final Western Cape branch meeting took place on 17 November 2023, in person, and was followed by an election of the new branch committee members and a lawn bowls social competition.

IOHA and OHTA feedback

Deon Jansen van Vuuren, in his role as SAIOHs interim caretaker, attended three online International Occupational Hygiene Association (IOHA) National Accreditation Recognition Committee (NARC) meetings on 17 August, 19 October, and 7 December 2023.

The IOHA Board of Directors held its autumn meeting in Cape Town, hosted by SAIOH, on 22 October 2023. This coincided with the SAIOH 2023 Conference. SAIOH and the Professional Certification Committee (PCC) were represented by Corlia Peens (PCC Chairperson), as an observer, and Deon Jansen van Vuuren.

SAIOH also hosted a formal dinner for the IOHA Board Directors and SAIOH Council on 23 October 2023 at the African Gold Restaurant. It was a huge success and enjoyed by everybody.

SAIOH Technical Committee feedback

The SAIOH Technical Committee's research on 'Welding fumes, the measurement and the analyses thereof' is in limbo. To help kick-start this research, the Occupational Hygiene Approved Inspection Authorities (OH AIA) Association co-hosted an interactive session at the SAIOH mini-conference on 31 July 2023, at the CSIR's International Conference Centre (ICC). The session was coordinated and chaired by Mr Lloyd Askham, who discussed welding fume measurements, sampling media and, specifically, the use of the Institute of Medicine (IoM) samplers. To keep the momentum going, a sub-committee will be formed by SAIOH and the OH AIA Association to develop a position paper on its research.

SAIOH's second Technical Committee started developing technical procedures and a SAIOH position paper on heat stress management. This Committee will continue doing research on heat stress with a focus on developing a technical paper and enabling SAIOH to provide comprehensive and relevant proposals to strengthen the newly launched Physical Agents Regulations (PAR) – the 'old' Environmental Regulations for Workplaces.

The Council Technical Co-ordinator, Wessel van Wyk, is finalising a position paper on real-time monitoring. As soon as this is approved by the SAIOH PCC Executive Committee's sub-committee, it will be circulated to all SAIOH members and stakeholders.

Dr Ivan Niranjana (SAIOH PCC Vice-Chair) was co-opted to preside over a more active Technical Committee, commencing with peer reviewing of heat stress and real-time monitoring. Research emanating from this Committee will be shared in future communications.

SAIOH Annual Scientific Conference

The hybrid SAIOH 2023 Annual Scientific Conference, with close to 600 attendees, took place from 23 to 26 October 2023, and was extremely successful. The Botswana Association of Occupational Hygiene (BAOH) will host the 2024 SAIOH Annual Scientific Conference in Gaborone, Botswana. The Conference Committee has already had several meetings as it begins its preparations for the conference.



Image: courtesy of SAIOH

Communications

SAIOH continues to communicate daily with its members and stakeholders, using various platforms.

FROM THE PROFESSIONAL CERTIFICATION COMMITTEE (PCC)

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Certification assessments

A summary of results for 2023 assessments is provided in Table 1. Assessment dates for 2024 are provided in Table 2.

PCC assessment improvements

The PCC technical teams continue to revise the PCC oral assessment format and questions in line with the occupational hygiene self-assessment tool. Sixteen of the 17 OH modules are already completed.

Two PCC technical teams are working in parallel. The first is updating the SAIOH self-assessment tool and revising the PCC oral assessment format, and the second is developing questions and the required answers. Improvements in the assessment format will ensure that the growing field of occupational hygiene is covered, and that the assessment format and tools still are relevant and current.

The PCC Chief Examiner is busy improving the application and written format.

Occupational Hygiene Skills Forum (OHSF)

The OHSF took part in the first OHTA Approved Training Provider forum meeting in August 2023. The second meeting took place on 31 January 2024.

Table 1. SAIOH PCC certification assessment results, 2023

Certification category	Written assessments				Oral assessments			
	Assessed	Passed	Failed	Pass rate	Assessed	Passed	Failed	Pass rate
	n	n	n	%	n	n	n	%
OH assistant	203	183	20	90.1	203	183	20	90.1
OH technologist	69	42	27	60.9	52	27	25	51.9
Occupational hygienist	48	29	19	60.4	40	28	12	70.0
Total	320	254	66	79.4	295	238	57	80.7

Table 2. SAIOH PCC registration and assessment dates, 2024

Assessment type	Application closing date	Payment deadline	Assessment date
Written	12 January	16 February	15 March
Oral	12–19 April		
Written	26 April	31 May	28 June
Oral	26 July–2 August		
Written	2 August	6 September	4 October
Oral	15–22 November		
Written assessments (universities)			November/December

The OHTA W201 Multiple-Choice Question (MCQ) Consortium, comprising SAIOH, Workplace Health Without Borders (WHWB), the American Industrial Hygiene Association (AIHA), and the Australian Institute of Occupational Hygienists (AIOH) met in September 2023. This working committee developed and verified MCQs, which were placed in a database that will be accessible to all assessment paper developers to use in the 2010HTA papers and, in SAIOH’s case, also for the occupational hygiene assistant papers.

Another function of the OHSF is to evaluate applications from tertiary institutions for recognition of their occupational hygiene-related qualifications. The OHSF is progressing well with these accreditations, and is currently evaluating the Cape Peninsula University of Technology’s (CPUT) occupational health qualification. All tertiary institutions that offer occupational hygiene qualifications are encouraged to contact the PCC administrator for information regarding application for recognition: lee@saioh.co.za.

Occupational & Primary Health

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With over 28 years’ experience, we provide industry-leading occupational health solutions including medical surveillance and primary care to enhance your business’ financial health. We have the expertise to engage and guide your business, to successfully integrate your workplace wellness requirements by making sure of the following:



Risk insights and management are reported



Employees are declared fit for duty through a medical



All occupational health legal requirements are met successfully



Early risk identification and management measures are put in place



Mobile and walk-in clinics, where medical surveillance is provided, are present



Injury-on-duty and COID claims are effectively managed



Chronic conditions are monitored

Diabetes: fitness to work

Leonard Mahlare: MMPA Exco Member

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This article was originally delivered as a presentation at the 2023 Mine Medical Professionals Association (MMPA) Annual Congress by Dr LM Mahlare.

BACKGROUND

Diabetes mellitus is one of the most common endocrine diseases, and one of the leading causes of mortality in the world. The disease is characterised by the body's inability to utilise glucose effectively. It can be due to insulin resistance by the body, or by pancreatic beta cell dysfunction, amongst other things.¹

Type 1 diabetes is thought to be an autoimmune disease affecting the beta cells in the pancreas, which leads to low or no insulin production.¹ Type 2 diabetes can be a combination of insulin resistance, decreased insulin production and/or excessive secretion of glucagon.² Individuals with the disease are either insulin dependent or non-insulin dependent.

Fitness to work in the presence of diabetes mellitus is a contested issue, especially for insulin-dependent individuals.

Statistics

The International Diabetes Federation (IDF) estimated that 537 million adults (20–79 years of age) were living with diabetes in 2021.³ They report that three in four adults with diabetes live in low- or middle-income countries.³ The IDF reported that, as of 2021, the adult population living with diabetes in South Africa was 11.3% – equivalent to more than 4 million adults.⁴

The Global Burden of Disease Study (2019) reported that 41 million people die from non-communicable diseases (NCDs) every year.⁵ Diabetes contributed to around 1.5 million of the deaths worldwide, as reported in 2019.⁶

The mining industry is held accountable, to an extent, by the Minerals Council South Africa as well as the Department of Mineral Resources and Energy (DMRE). The Council established the Masoyise Health Programme, which was implemented in 2018. The programme has recently adopted a 'wellness approach', which is now not only aimed at TB and HIV but has expanded to include NCDs and occupational lung diseases, with the aim of improving the overall health and wellness of employees.⁷

Mines were expected to screen all employees for diabetes in 2022. In its 2022 annual report, the Minerals Council reported that the industry had improved remarkably from previous years.⁸ More than 80% of employees were reported to have been screened for diabetes in 2022 (improved from the 59% in both 2021 and 2020).⁸

Minimum standard of fitness

A 'blanket approach' should be avoided when deciding about fitness to work, and each case should be judged on its own merit. The minimum standard of fitness code of practice⁹ is a good reference tool.

According to the document 'Guidelines for a mandatory code of practice on minimum standards of fitness to perform work on a mine', caution should be exercised when deciding on fitness to work for individuals diagnosed with diabetes mellitus.⁹



Dr LM Mahlare addressing the 2023 MMPA Annual Congress

Photograph: courtesy of MMPA

As per Table 1 and Box 1, sourced from the minimum standard of fitness code of practice (CoP), fitness category 1 and 2 employees diagnosed with diabetes and working on the surface can be deemed fit if their diabetes is controlled. This applies to both insulin- and non-insulin-dependent diabetics (IDDM and NIDDM).⁹

Category 3 employees with controlled NIDDM who work underground are considered fit for their occupation. However, those who have IDDM are deemed unsuitable to work underground except under exceptional circumstances, which is at the discretion of the occupational medicine practitioner (OMP).⁹

Category 4 employees, who are "drivers of non-passenger and ordinary goods conveyance and work involving heavy or potentially dangerous machinery", can be deemed fit to work if they have NIDDM and are controlled. However, the minimum standard states that individuals with IDDM are unsuitable to be placed in this work.⁹

Category 5 employees, who are "passenger and dangerous goods conveyance drivers", according to the CoP, are unsuitable to be placed if diagnosed with either IDDM or NIDDM.⁹

Table 1. Minimum Standard of Fitness code of practice – Mining

Parameter	No hazard	Mines/works surface	Mines underground	Surface or underground	
Fitness category	1	2	3	4	5
Frequency of examination	3 yearly	Annual	Annual	Annual	Annual
Minimum age (years)	16	18	18	21	21
Diabetes	Well controlled Diabetes – OK Well controlled NIDDM – OK IDDM – OK, depending on hazards exposure. Adequate sugar control for the work environment		Well controlled NIDDM – OK IDDM – Unsuitable, except in special circumstances (Refer OMP)	Well controlled NIDDM – OK IDDM – Unsuitable	NIDDM/IDDM – Unsuitable

Source: *Guideline for a mandatory code of practice on the minimum standards of fitness to perform work on a mine, 2016⁹*
(Annexure 1: Minimum Standards Table – for compliance)

Box 1. Minimum standard of fitness to perform work at a mine (from original document)
Diabetes mellitus

Diabetics may be employed in such occupations as the OMP may consider safe having regard to their condition. Insulin dependent diabetics should not work underground except under exceptional circumstances where the OMP is satisfied that all required health or safety concerns have been met. Well-controlled, mild non-insulin dependent diabetics may be certified fit to work in a particular category of work underground. Well-controlled, mild non-insulin dependent diabetics may be certified fit to work by the OMP as drivers for non-passenger or ordinary goods conveyance.

OMP: occupational medicine practitioner

Source: *Guideline for a mandatory code of practice on the minimum standards of fitness to perform work on a mine (Section 8.5.3.1), 2016⁹*

SOME CONCERNS REGARDING DIABETES AND FITNESS TO WORK
Hypoglycaemia

The major concern about individuals who have diabetes, regarding fitness to work, is the occurrence of hypoglycaemia while on duty.¹⁰ A severe hypoglycaemic episode is associated with an effect on cerebral function, and can lead to transient cognitive dysfunction, seizures, reduced level of consciousness, or coma.¹¹ It is worth noting that the major cause of hypoglycaemia is the use of insulin, often related to inappropriate use (dosage, administration, timing with food, etc.).^{11,12}

Hypoglycaemia can also be associated with some oral hypoglycaemic agents, primarily sulphonylureas.¹³ Under normal circumstances, every individual has counterregulatory mechanisms in the event of hypoglycaemia. This happens via glycogenolysis as well as gluconeogenesis, where the body will find other means to increase or maintain a normal plasma glucose level until a food or other source of glucose is introduced into the body. Thus, hypoglycaemia takes place mainly in the presence of defective counterregulatory mechanisms or hormone regulation.¹¹

Some individuals with diabetes, especially those with longstanding poorly controlled disease and on insulin, often do not have a functional counterregulatory mechanism, putting them at risk of severe hypoglycaemia. Some individuals have hypoglycaemia unawareness, which is mostly linked to repeated episodes of hypoglycaemia – a state where the body is desensitised to hypoglycaemic episodes for various reasons.¹¹

Under normal circumstances, hypoglycaemic individuals experience symptoms that would alert them to ingest something to elevate their blood sugar levels. These include sweating, irritability, tachycardia, fatigue, difficulty concentrating, light headedness, etc. With time, this can extend to confusion, slurred speech, incoordination, and other symptoms. If hypoglycaemia is not addressed, it can lead to seizures, loss of consciousness, or coma.¹⁴

Individuals with hypoglycaemia unawareness often only present at the later stage when they have neuroglycopenia, and exhibit some of the neurological symptoms mentioned above.¹¹

Hypoglycaemia in the workplace, especially in high-risk areas, can lead to fatal or serious injuries, not only for the employee, but also for colleagues.

Fatigue

A South African study, published as 'Contributors to fatigue of mine workers in the South African gold and platinum sector' by Dr Jodi Pelders and Prof. Gill Nelson, listed common contributors to fatigue; diabetes was one.¹⁵ It is well documented that diabetes can lead to fatigue. The mechanism involved is thought to be the disruption of the body's ability to absorb sugar, which is needed for energy. Therefore, individuals who are uncontrolled would have a high blood sugar level, but their cells would be deficient of sugar, leading to fatigue.¹⁶ Polyuria, in association with high blood sugar, can lead to dehydration, which is also a major contributor to fatigue.¹⁶ This further emphasises the need to control diabetic individuals, as fatigue can be detrimental, particularly in the mining industry in which there are high-intensity jobs, long working hours, and awkward shift work. Even in the absence of diabetes, these factors lead to fatigue.

Other concerns

There are other multiple factors of concern regarding diabetes, which should be addressed individually, with each patient. Patients need to be educated about these problems and how to avoid or control them. These factors include target organ damage, hyperglycaemia, and/or increased risk of diabetic ketoacidosis. Appropriately fitted safety shoes are essential for diabetic workers, especially in the presence of peripheral neuropathy. There is a risk of diabetic foot that is characterised by small, often unnoticed pressure ulcers.¹⁰

Newer molecules

Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) are a relatively new treatment for diabetes. Most are injectable and should not be confused with insulin when assessing fitness to work.

These agents are protective against hypoglycaemia, unlike insulin. They stimulate the secretion of insulin only after glucose is introduced into the body. Thus, when blood glucose is low, they cease to stimulate insulin secretion. However, when blood glucose is elevated, they also inhibit the secretion of glucagon, and stimulate the secretion of insulin. These agents are neuroprotective, lower blood pressure and cholesterol, and are linked to weight reduction, all of which contribute to a reduction in all-cause mortality.¹⁷

Examples of this class of treatments include liraglutide, dulaglutide, semaglutide, and exenatide. It should be noted that an oral semaglutide was recently approved by the US Food and Drug Administration (FDA).¹⁷ Semaglutide has recently attracted media attention due to abuse by non-diabetic individuals.¹⁸ It must be noted that in some countries, semaglutide and other GLP-1 RAs are registered for treatment of obesity.¹⁹ However, in South Africa, they are currently registered only for treatment of diabetes. Nevertheless, there is currently inadequate stock for diabetic patients as non-diabetics are reportedly using it off-label and without a prescription via the 'black market'.¹⁹ Using the medication off-label and without a prescription, and without monitoring by a qualified medical practitioner, can lead to severe adverse events, such as gastrointestinal-related diarrhoea and vomiting,¹⁷ and, although rare, pancreatitis and cholecystitis.¹⁸

CASE LAW

IMATU and Mr M vs City of CPT

In 2005, the City of Cape Town was taken to court by a Mr M and Independent Municipal and Allied Trade Union (IMATU) after he was declared unfit for his job due to having IDDM.²⁰ Mr M was a 31-year-old male who had been diabetic for more than 20 years. He had been a volunteer reservist firefighter at Fish Hoek since 1991 when at high school. In 2003, he successfully interviewed to become a firefighter. However, after a medical examination, Dr J declared him unfit and unsuitable for the position, although he noted that Mr M was physically fit and had good vision. He attributed his decision to the risk of hypoglycaemia associated with insulin.

Mr M and the union contested the finding. He was referred to a principal medical specialist who supported Dr J's decision. The specialist stated that he had not examined the patient, but that his decision was based solely on the risk of hypoglycaemia associated with the use of insulin. The case was escalated to senior human resources, and then to the Commission for Conciliation, Mediation and Arbitration (CCMA), where it still could not be resolved.

Ultimately, the case landed in the Labour Court, where it was established that the last hypoglycaemic episode was close to 20 years ago, in the first year of diagnosis. It was also noted that, in the years Mr M worked as a reservist, there had been no report of hypoglycaemia. The court ruled that the employment policy of refusing to employ individuals with IDDM as firefighters was unfair discrimination, and that each case should be looked at separately with its own merits.

EMPLOYEE RIGHTS IN THE MINE

The Mine Health and Safety Act includes an instruction to "safeguard the health and safety of mine employees and communities affected by mining operations".²¹ Section 20 of the Act speaks to the rights

of employees to dispute findings of unfitness to perform work. An employee is entitled to appeal to the Medical Inspector in the event of a decision taken that he/she is unfit for an occupation, or against any finding contained in an exit certificate. The appeal must be lodged within 30 days (or 90 days after an exit examination); exceptions may apply at the Medical Inspector's discretion. All employees should be made aware of this right.²²

CONCLUSION

There should be no blanket approach in making decisions regarding employees' fitness to work. Occupational medicine practitioners should familiarise themselves with disease processes as well as complications associated with each condition. The final decision of fitness should not be made on the worst-case scenario or out of fear. As Dr Dipalesa Mokoboto (Department of Mineral Resources and Energy Medical Inspector) said at the Mine Medical Professionals Association (MMPA) Annual Congress in 2023, "The decision of fitness is made using the minimum requirements of the job, not the maximum".

Another experienced OMP, Dr Selborne Marhanele, had the following to say (personal communication, 30 January 2024):

"A few aspects need to be considered when assessing the suitability of employees with diabetes mellitus to perform certain categories of work. The duration of impairment, viewed in conjunction with the experience of the employee in a certain occupation or type of work, may enable the employee to perform such work safely and without risk to their own or fellow employees' health or safety. Experience in a particular occupation may compensate for impairment, allowing the employee to continue working effectively without any increased risk to health or safety. Closely related to duration is the employee's insight into their condition, which should also be considered in assessing fitness to work. Insight leads to, inter alia, early recognition of symptoms, earlier intervention, and better control in the long run leading to reduced risk of unwanted events such as hypoglycaemic episodes. In declaring an employee fit to work, the OMP should also consider any anticipated deterioration in the condition and possible increase in risk. The OMP may therefore set strict conditions that include closer supervision and monitoring in the workplace, and more frequent medical surveillance."

A decision about fitness is not to be taken lightly, as it has consequences for the worker. Employers have a moral obligation to ensure that their wellness programmes are strengthened to increase awareness about non-communicable diseases in the mine, and to motivate employees to lead healthy lifestyles. A healthy lifestyle, coupled with weight loss, has proven to have benefits in reducing cardiovascular risk factors in patients with diabetes.²³ The programmes need to facilitate employees to take care of their chronic conditions prior to complications arising. Failure to do so may have financial consequences for both the employee and employer.

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