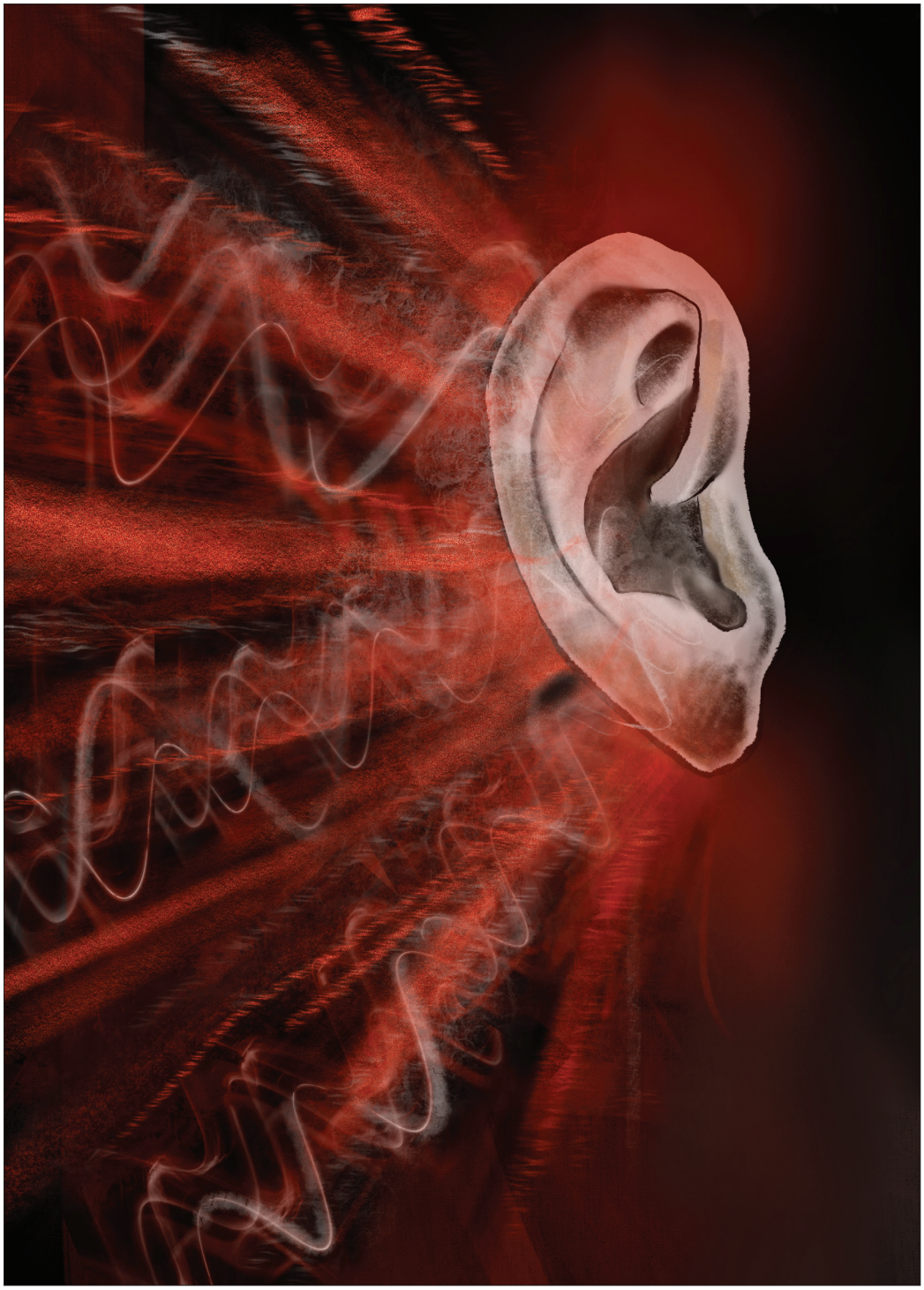
# OCCUPATIONALhealth

## SOUTHERN AFRICA

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South African Society of Occupational Medicine (SASOM)

Southern African Institute for Occupational Hygiene (SAIOH)

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SOUTHERN AFRICA

Volume 30, Issue 4, 2024



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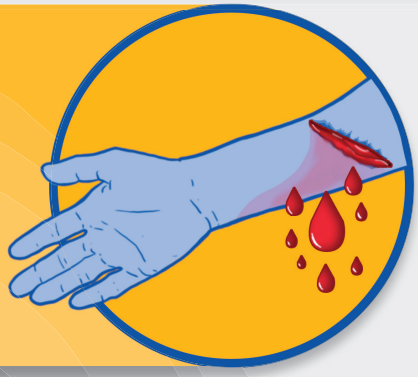

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# FIRST AID
# STOP THE BLEEDING

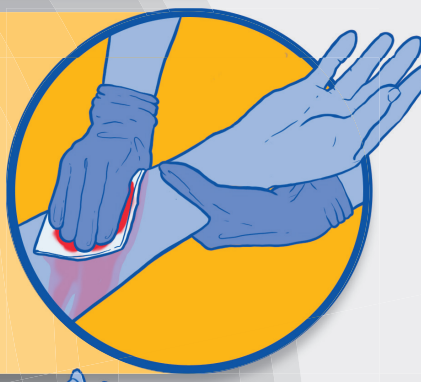
## 1 LOCATE THE BLEEDING

- Expose the wound
- Look for source of the blood



## 2 APPLY DIRECT PRESSURE

- Use a clean pad or cloth
- Press down firmly on the bleeding point
- Keep a constant pressure



## 3 ELEVATE THE INJURY

- If the wound is on an arm or leg, raise it above heart level



## 4 PACK THE WOUND

- For deep wounds, pack it with a clean cloth
- Apply firm, continuous pressure
- Add bandages on top as necessary



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# From the Editor . . .

## ASSAf's *Statement on the Recognition of the Work of Editors and Peer Reviewers of Academic Journals and Books in South Africa*



**Gill Nelson,**
**Editor-in-Chief**

Towards the end of 2021, I wrote an editorial about the thankless task of reviewing manuscripts for scientific journals: https://www.occhealth.co.za/_assets/articles/341/2260.pdf. I emphasised that reviewing is one of the many 'services' that we, as academics, provide to our colleagues. I also inferred that, without peer review, published scientific articles would be regarded as having no more credibility than those read in the popular press.

***Peer-review: the evaluation of scientific, academic, or professional work by others working in the same field*** **(Oxford Dictionary)**

Likewise, being a journal editor, although rewarding in an abstract way, can also be a 'slog' (defined in the Cambridge Dictionary as *"to work hard over a long period, especially doing work that is difficult or boring"*), with no tangible reward other than the odd 'thank you' from authors whose papers have been vastly improved through the review process and intense editing.

***Journal Editor: an individual responsible for overseeing the publication process of scientific journals, ensuring effective communication between authors, copy editors, peer reviewers, and production staff to maintain quality and accuracy in published articles*** **(AI-generated definition)**

It was with cognisance of these frustrations that the Academy of Science of South Africa (ASSAf) developed a document to recognise the efforts of reviewers and editors. The ASSAf Council's *Statement on the Recognition of the Work of Editors and Peer Reviewers of Academic Journals and Books in South Africa*, published on 29 October 2024, was most welcome. In essence, the Statement is in recognition of how the critical and important work done by reviewers and editors is largely unseen and unappreciated by academic institutions, although very much expected. The full Statement can be read at: https://www.assaf.org.za/2024/10/29/assaf-statement-on-the-recognition-of-the-work-of-editors-and-peer-reviewers-of-academic-journals-and-books-in-south-africa/#:~:text=South%20Africa%20%E2%80%93%20ASSAf-,ASSAf%20Statement%20on%20the%20Recognition%20of%20the%20Work%20of%20Editors,and%20quality%20of%20academic%20publications

ASSAf represents South Africa in the international community of science academies. It was formed in 1996 by Nelson Mandela (https://www.assaf.org.za/about-assaf/) with the mission of *"using science for the benefit of society"*, and soon became embedded in the country's legislation under the Academy of Science of South Africa Act No. 67 of 2001. Over the years, ASSAf has produced several Best Practice Guides related to editing scholarly works, including the Code of Best Practice in Scholarly Journal Publishing, Editing and Peer Review (2018), which is well worth reading as an editor and/or reviewer: https://www.assaf.org.za/wp-content/uploads/2015/05/NSEF-Code-of-Best-Practice-March-2018.pdf. The guideline is currently being updated and should be available on the website in early 2025.

Other important issues that ASSAf addressed in 2024 included the use of artificial intelligence in research communication; the World Health Organization (WHO) principles for human genome data access, use, and sharing; and guidance for researchers who process personal information, to ensure that they abide by South Africa's privacy laws (the POPIA code of conduct for research). All of these documents, and more, are available on ASSAf's website.

The ASSAf Statement on the *Recognition of the Work of Editors and Peer Reviewers of Academic Journals and Books in South Africa* draws attention to the *"essential yet often under-recognised contributions of editors and peer reviewers to maintaining research quality and advancing academic standards"*. ASSAf acknowledges the crucial roles of editors and reviewers, recognising that their *"contributions remain under-appreciated within institutional performance frameworks"*, which *"has led to a lack of recognition and resources for individuals whose work is essential to maintaining academic standards"*.

Included in the Statement is that *"advanced research and its communication are essential in addressing national development imperatives. Scholars play an active, transformative role in caring for and developing the research environment and infrastructure. This is especially important given the historical exclusion of many talented individuals from opportunities to develop as researchers"*.

ASSAf calls on academic institutions to formally recognise and value the work of editors and reviewers by 1) recognising high-quality and effective editing and peer review, 2) incorporating editorial work in performance appraisals, 3) allocating dedicated time and resources to editorial duties, 4) including editing and reviewing in academic reward systems, in a similar way in which academics are rewarded for writing and publishing their own research papers. Reviewers and editors play crucial and central roles in the generation, advancement, and quality control of knowledge; without them, there would be no papers to be assessed in applications for promotions or research grants. An additional call by ASSAf is for academic institutions to support the training of new editors and reviewers.

At the 34th triennial International Commission for Occupational Health (ICOH) congress in Marrakesh in April/May this year, the Editors-in-Chief of several international peer-reviewed journals (including *Occupational Health Southern Africa*) pleaded with the audience to accept invitations to review manuscripts; indeed, to go beyond this and offer their time and expertise to help emerging and even established researchers to improve their manuscripts.

I acknowledge that we are all stretched with writing our own papers, supervising students and lecturing, but I hope that ASSAf's Statement will reignite the passion in some of you to teach in less conventional ways.

I hope that this recent, formal recognition of the importance of the extra work we do will make the task of reviewing (and editing) less thankless, more rewarding, and recognised by institutes of higher learning. Often authors of manuscripts complain about the long time that it takes to get their papers reviewed and published. This is largely due to the difficulty in finding competent and willing reviewers, and the many hours it takes to edit some of the papers. I hope that academic institutions will act on ASSAf's recommendation and that, it turn, researchers (including you, as a reader of this journal) will be encouraged to assist in reviewing manuscripts, or to learn a new skill if you have not yet reviewed a paper. Please do register your interest on the *Occupational Health Southern Africa* website (https://occhealth.co.za/index.php?p=reviewers), and thereby become part of the solution.

In the first issue of each year, we publish the names of those who reviewed manuscripts for the journal in the previous year. The number has ranged from 25 to 60 in the past five years; most (55.5% overall) are from South Africa. Given ASSAf's additional recognition of the historical exclusion of many talented individuals from opportunities to develop as researchers, we welcome reviewers from other southern Africa countries and beyond. Please spread the word and encourage your peers to offer their services too.

## Become a reviewer for *Occupational Health Southern Africa*

Submitted manuscripts are most often delayed due to the difficulties in finding reviewers. This causes frustration for authors and the editorial team alike. Authors can wait months for reviewers' comments. The editors spend hours identifying potential reviewers, following up when they promise but don't deliver, and seeking new reviewers when those invited decline or, worse, don't respond at all. We are therefore looking to create a pool of committed reviewers for all aspects of occupational health. If you are interested in joining this pool, please send your details in the link on the website: https://occhealth.co.za/index.php?p=reviewers


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# IOSH call for research proposals

The Institution of Occupational Safety and Health (IOSH) has launched its 2024–2025 call for research proposals.

IOSH is inviting proposals for timely and original research that influences policy and practice in the field of occupational safety, health, and wellbeing.

There are four different topic areas included in the call.

### Firefighters' exposure to toxic chemicals: barriers and facilitators to adopting decontamination practices

With firefighters often exposed to various toxic agents through doing their duties, and research highlighting potential gaps in the cleaning and decontamination of their kit and personal protective equipment, IOSH is looking to understand more about this.

It is seeking research that explores and compares the barriers and facilitators to the implementation of effective decontamination protocols and practices for firefighters in the United Kingdom. As part of this, it would welcome comparisons with developed economies such as Canada, USA, and Sweden.

### Occupational health training for occupational safety and health (OSH) professionals: context, challenges, and opportunities

Despite OSH professionals playing a key role in supporting the health and work ability of employees, often their role is limited to a focus on safety matters. This part of the call is seeking to explore the aspects of existing occupational health training for OSH professionals in countries with sophisticated and mature regulatory frameworks.

This research should support the evaluation of a number of areas, including the knowledge of the health impacts of occupational hazards, the competencies required to prevent work-related diseases and ill health, and the role, type, and content of education and training programmes designed to equip OSH practitioners with the skills and knowledge to prevent and address occupational disease.

### Occupational safety and health and climate change – the impact of psychosocial factors in the agricultural sector

Climate change is increasingly becoming a factor that OSH professionals have to consider in their work. As well as the clear safety factors that it causes, there are many psychosocial risks that it brings about.

This is why IOSH has included this in its list of research topics. There are two aspects to this call:

- To explore the impact of climate change on the mental health of agricultural workers in Africa and/or Asia and identify ways that these impacts can be mitigated to support good practice
- To evaluate the work-related psychosocial impact of climate change on agricultural workers, contrasting those in low- and medium-income countries (i.e. those in Africa and/or Asia) with those in high-income countries such as in Europe

### The robustness of national OSH statistics in the United Kingdom

National statistics provide key insights into many different parts of a country's economy and society. Among them, OSH statistics are crucial when it comes to understanding trends in this area. It is crucial, therefore, that the data provided is accurate and a true reflection of the situation.

IOSH is looking for research that explores three aspects of the UK's OSH reporting structures and statistics. These are:

- The robustness and reliability of current reporting structures, available data sources, data collection mechanisms, and the categorisation for work-related disease, injury, and ill-health to reflect the modern workplace
- Identification of the strengths and weaknesses within the current recognised data sources at both national and local levels
- An analysis of national policy impacts on the reliability of national OSH statistics and OSH enforcement

### The IOSH research team

IOSH commissions a range of projects to establish evidence for health and safety policies and practice on many OSH topics. It often focuses on research that leads to the development of practical resources for the workplace, such as guidance, tools, and case studies.

The IOSH research team includes subject-matter experts involved in:

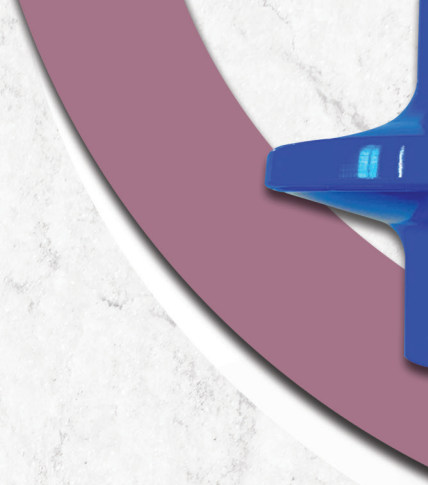
- Research monitoring and reporting
- Attending conferences and events
- Advising on the research activities of others

The Institution's research is overseen by a panel of IOSH-appointed experts and OSH professionals who provide specialist research-related advice to uphold our rigorous process for the commissioning of research.

### Find out more

The IOSH research call involves a one-stage application process with a deadline of 11:59 GMT on Monday, 13 January 2025. For more detailed information on this call, including accessing the application form, visit iosh.com/research24

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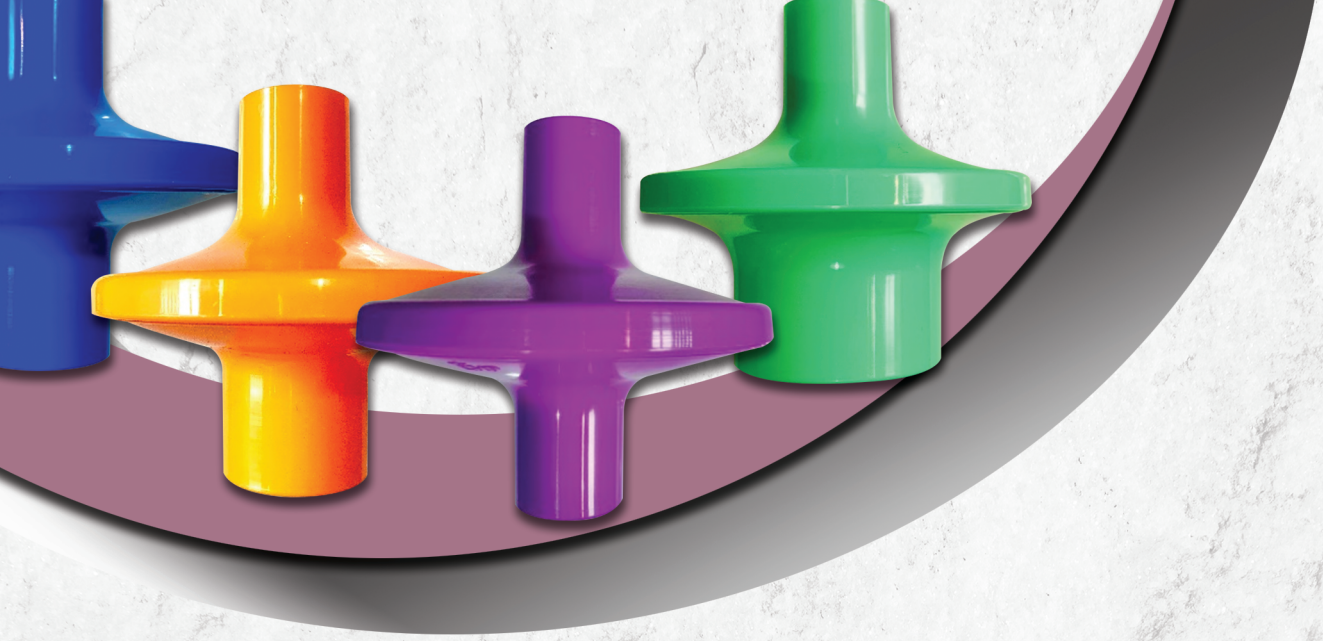
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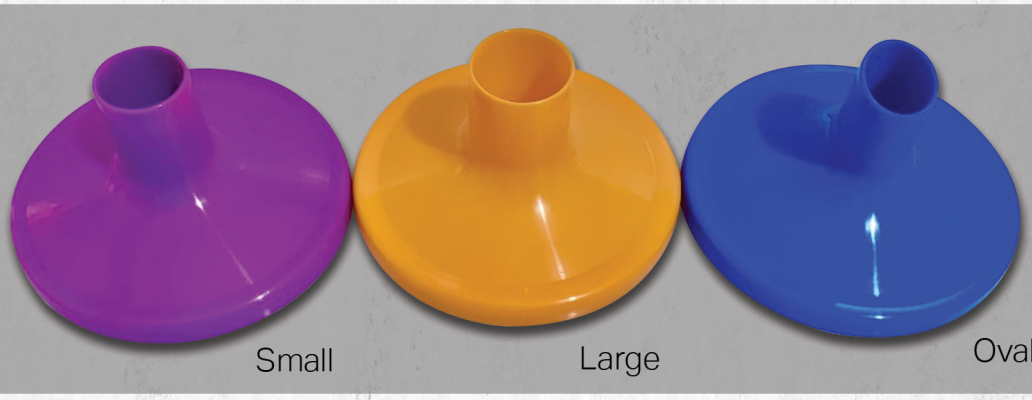
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| | | EasyOne Pro |
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| | Schiller | SpiroScout |
| | | SPIROVIT SP-1 G2 |

| Product Code | Spirometer | Model |
|---|---|---|
| PFT-2030 (Small)<br>PFT-2530 (Standard)<br>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 |
|---|---|---|
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| | | Flowscreen Pro |
| | Jaeger | MasterScope |
| | | MasterScreen |
| | | Flowmate |
| | | Spiro Pro |
| | Vyaire | Vyntus SPIRO PC |
| | | Vyntus ONE |
| | AME | Short Adaptor |
| | IQ TeQ | Short Adaptor |
| | ORCAwave | Short Adaptor |
| | MSG | Short Adaptor |
| | Thor/Spirosonic | All models |

| Product Code | Spirometer | Model |
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# Dr Thuthula Balfour

Dr Thuthula Balfour hails from the small town of Cofimvaba in the Eastern Cape, which is famous for being the birthplace of the late struggle heroes, Chris Hani and Clarence Makwetu. As a migrant to Gauteng of 29 years, she believes she is now a full citizen of the province and absolutely loves the big city.

Thuthula qualified as a medical doctor at the University of Natal Black Section, which, under apartheid at the time, was only for African, coloured and Indian students. The residence was in the coloured area of Austerville next to the South African Petroleum Refineries (SAPREF) oil refinery, which belched dust and offensive odours most of the time. In those days, 'clever' black people did medicine, law, nursing, and teaching. Even accounting was just becoming fashionable as a career, and one applied to the Minister of Home Affairs to study engineering at universities reserved for white people.

Her first job as a manager, in her 20s, was as the Medical Officer of Health (MOH) at Mthatha Municipality, responsible for the public health services, clinics, street cleaning, and business and dog licensing. This was a steep learning curve made easier by a supportive town clerk and management team. Her passion for preventive health was solidified when she did a Diploma in Public Health, as part of proficiency in executing her job as the MOH.

What stands out during this period was her first contact with HIV, having studied medicine during an era when HIV was not yet in the curriculum, and having never seen HIV-positive people while working as an intern and medical officer. One of her duties was to trace and inform blood donors identified by the Blood Transfusion Services that they were HIV-positive. It was mostly a futile exercise as hardly any were found. Nevertheless, this spurred her interest in becoming an HIV/AIDS activist and member of Networking HIV and AIDS Community of Southern Africa (NACOSA). She describes seeing HIV marching down from Uganda, through Zambia and Zimbabwe, and hoping that South Africa would learn and heed the call for 'ABC' (Abstinence or delay of sexual activity, Be faithful, and Condom use). Alas, the country ended up having the largest HIV epidemic. This she attributes to many historical, structural, and sociological factors that continue to make the population of South Africa vulnerable to HIV transmission.

She spent six years working at the National Department of Health and was part of establishing the Southern African Development Community (SADC) Health Coordinating Unit that was later incorporated into the SADC Secretariat in Botswana. These were some of the best years in her working life, as she travelled around the region. She boasts of having been to all the SADC countries except Seychelles (and Madagascar, which was not a member of the bloc at the time). The highlights of this stint were the signing, in 2003, of the Maseru Declaration on HIV/AIDS by the SADC Heads of State, and the first SADC Race Against Malaria, which was a convoy from all SADC countries to Dar es Salaam, Tanzania. This initiative on raising awareness about malaria continued for many years.

After working as a health policy analyst for four years at the Development Bank of Southern Africa, she was headhunted to join the then Chamber of Mines (now Minerals Council South Africa), which she did with some trepidation as she had no mining experience. As a public health medicine specialist with an MBA and a Diploma in Occupational Health, her experience and qualifications were very suited for her current role of 16 years as the Head of Health at the Minerals Council South Africa.



**Dr Thuthula Balfour, Head of Health, Minerals Council South Africa**

The South African mining industry is still dealing with legacy occupational diseases such as silicosis, coal workers' pneumoconiosis, and noise-induced hearing loss. She joined the Minerals Council South Africa at the height of the TB epidemic in the mining industry, which was driven by HIV and silica dust exposure. The industry was blamed for spreading TB in the SADC region. Through a focused TB and HIV programme that included TB reviews and the Masoyise Health Programme, the industry has made tremendous strides in reducing TB and now has a TB incidence that is lower than that of the South African general population. The Minerals Council South Africa and its members have also vigorously adopted the targets (milestones) that were set through the Mine Health and Safety Council in 2014, and there have been reductions in dust and noise exposures, which are now flowing through to lower occupational disease rates. The mining industry subscribes to Zero Harm and, thus, there is more work to be done to eliminate or reduce occupational diseases, and TB and HIV.

In 2018, Thuthula was named as one of the Top 100 Global Inspirational Women in Mining. She is now also the lead for Women in Mining (WIM) at the Minerals Council and is proud of the work done since 2020 on the WIM Strategy. Her other accolade is serving on the South African Health Ministerial Advisory Committee on COVID-19, from 2020 to 2023. This was at a time of great uncertainty, globally, and the mining industry performed very well, with death rates that were half those of the country.

As she nears retirement, Thuthula is very satisfied with the impact she has had on the health of mineworkers, and is grateful for the support she gets from her team and from mining companies that are the implementers of health interventions on the ground. She looks forward to playing a bigger role as a grandmother and already enjoys knitting, cooking, and baking for her family.

# Dr Albie de Frey

Albert (Albie) de Frey is the 'father of travel medicine' in South Africa and is regarded as an international guru in the field. His reputation, training, expertise, and experience make him the 'go-to guy' in travel medicine, particularly regarding the management of expatriates placed in remote areas of Africa and elsewhere.

After graduating with an MBBCh from the University of Pretoria, Albie lived and worked in South Africa, Malawi, and the United Kingdom, obtaining qualifications and certifications that prepared him to work in emergency evacuation and to conduct specialised occupational medicine examinations, namely, primary emergency care, anaesthesiology, dive medicine, and aviation medicine. These were complemented with short courses in advanced trauma life support, advanced cardiac life support, advanced paediatric life support, and the flight medical attendant course.

After serving as Medical Director of Medical Rescue International (MRI), Albie decided to pursue a career in travel medicine, obtaining a postgraduate diploma in travel medicine from the Royal College of Physicians and Surgeons, Glasgow. He later obtained a Certificate of Travel Health from the International Society of Travel Medicine (ISTM).

In 2000, Albie was a founding member and President of the South African Society of Travel Medicine (SASTM), at its formation during the first travel medicine course held at the University of the Witwatersrand, where he was appointed as an honorary senior lecturer. In February 2004, he was appointed as Co-chair of the African European Travel Medicine Conference, the first regional conference of ISTM. Subsequently, he has been honoured with fellowships in travel medicine from the Faculties of Travel Medicine by both the Royal College of Physicians and Surgeons, Glasgow, Scotland, and the Australasian College of Tropical Medicine, Australia.

Academically, Albie lectures undergraduate and postgraduate medical students at various South African universities, conducts podcasts for ISTM, and will be participating in the Travel Medicine Review and Update Course 2025, for ISTM. His contribution to occupational health and travel at an international level has also involved being a Travel for Work Council Member for ISTM, and facilitating sessions for both the International Commission on Occupational Health (ICOH) and the National Institute for Occupational Health (NIOH). As part of the global surveillance network for returning travellers, GeoSentinel, Albie has been appointed as the site director in Johannesburg.

Albie has contributed to various travel-related publications as both an author and editorial board member of the *Southern African Journal of Epidemiology & Infection*, *Travel Medicine and Infectious Disease*, *Tropical Medicine and Infectious Disease*, and *International Travel and Health* (ITH), World Health Organization (WHO). He also serves on the National Advisory Group on Immunisation, the Technical Working Group on Mpox, and the WHO Expert Roster on Travel Health.

In addition to copious pro bono activities, Albie has established a successful career in travel medicine and public health. As Director of Travel Doctor South Africa, Medical Director of International Health Management Consultants, Geneva, and a founding member of Travel Doctor Corporate, he provides comprehensive corporate and individual travel health risk management, and emergency medical evacuations as medical advisor to multinational companies, overseeing approximately 5 500 corporate travellers and national employees, globally. Furthermore, he has conducted health risk and infrastructure audits across sub-Saharan Africa, Afghanistan, parts of the middle east, and south-east Asia for companies involved in mining, exploration, telecommunications, and retail, providing 24/7 medical care for their expatriate and national staff in remote and offshore locations.



**Dr Albie de Frey, President, South African Society of Travel Medicine**
*Photograph: courtesy of SASTM*

Back in the seat of SASTM President, Albie remains committed to providing comprehensive health risk management solutions to corporate clients, and advancing the field of travel medicine through education, research, and international collaboration. His focus is on developing the next generation of health professionals to continue his legacy within travel medicine.

Albie outlined his vision for the future of travel medicine in the latest SASTM newsletter: *"If I had to have a vision for SASTM over the next three years, it would be to consolidate its position as the leading travel health society in Africa, building on the work already done over many slow, seeding years on the rest of the continent. It is wonderful to see a handful of travel health converts dotted all over the continent, most of them alumni of the SASTM/ WITS Travel Medicine Course, all of them spreading the word."*

*Mary Ross*
*SASTM representative of SASOM Exco*
*Co-founder of the Wits Travel Medicine Course*

# Occupational lung diseases handbook launched to critical acclaim at Wits School of Public Health

Dr Vanessa Govender, a South African occupational medicine specialist who has devoted her 30-year career to the diagnosis, treatment, and compensation of occupational lung diseases in mineworkers, has written a pertinent handbook for occupational medical practitioners in South Africa and beyond: *From Suspicion to Submission – Occupational Lung Diseases in the South African Mining Industry*. Published by MettaMedia, the book was launched in August 2024 at the Wits School of Public Health, in Johannesburg. Attending the celebratory event were some of the luminaries of the occupational health discipline in South Africa, including key health executives from the International Labour Organization (ILO), Department of Mineral and Petroleum Resources (DMPR), Minerals Council South Africa (MCSA), and the Glencore, Harmony, Sibanye Stillwater, and Rio Tinto mining companies.

The programme director of the book launch, Dr Thuthula Balfour, Head of Health at MCSA, opened proceedings with a minute of silence commemorating mineworkers who had passed away due to occupational diseases. In empathy with the many patients she has diagnosed, Dr Govender has dedicated the handbook to mineworkers. She said, *"I've been truly inspired by many patients over the years, and as Thuthula has pointed out, many who lost their lives, and many who are living with debilitating respiratory illness, and the book is dedicated to them to all – mineworkers past, present and future."* Gill Nelson, Professor of Occupational and Environmental Health at the University of the Witwatersrand, and Editor of *Occupational Health Southern Africa*, welcomed the launch audience of academics and colleagues.

Dr Govender wrote the book in collaboration with some of the 'big names' in the South African occupational health discipline: David Rees (Professor Emeritus, School of Public Health, University of the Witwatersrand; Jill Murray, Honorary Associate Professor, School of Public Health, University of the Witwatersrand; and Rodney Ehrlich, Professor Emeritus, School of Public Health, University of Cape Town. Prof. Jack Parker, MD and Professor Emeritus of Medicine, Radiology, Public Health, Occupational and Environmental Health Sciences, West Virginia University, USA, was the international reviewer. All members of this stellar team of occupational health experts attended the book launch.

Dr Govender said that the catchy phrase in the book's title, 'From suspicion to submission', relates to the *"cascade of actions"* that happens when an occupational medical practitioner (OMP) suspects that a worker has an occupational lung disease. After suspicion and investigation, *"there's a lot that happens in between until the OMP gets to the final point of saying, right, this is a case of an occupational lung disease, I've diagnosed the case and now it has to be submitted to the Department of Health."* She noted how the fragmented legislative system, with four occupational health and safety laws, complicates the process.

The handbook features the commonly diagnosed occupational lung diseases in the South African mining industry, and incorporates critical inputs from world-class experts and quick reference guides for evaluating the different occupational lung diseases (ante-mortem and post-mortem). It transcends the minimum statutory requirements, providing invaluable information to stakeholders in the process of assessment, treatment, and/or compensation of mineworkers with occupational lung diseases.

The handbook provides the latest science, best practices, occupational health principles, and key concepts. Salient points are highlighted in boxes and insights are provided at the beginning of each chapter. The numerous case studies are anonymised, but document real examinations that have been conducted.

The responses to questions that are frequently posed about occupational lung diseases, and the related medical examinations, are well structured and informative. The handbook brings global best practice guidelines into a toolkit for occupational medicine practitioners, equipping them to make judicious clinical assessments for the optimal management of mineworkers – from suspicion of an occupational lung disease to submission of a case for compensation and ongoing care.

It is primarily a companion to students and occupational medicine practitioners, but exposure scientists, ventilation and mining engineers, occupational health nurses, mine management, employees, labour representatives, mining lawyers, exposed mineworkers (current, former, and deceased), their families in South Africa and across its borders (from where many mineworkers originate), and communication specialists will all benefit from this publication.

Prof. David Rees, who has been a mentor, teacher, and colleague to Vanessa, played a pivotal role in supporting this work from its conceptualisation to publication. Speaking about the handbook, Prof. Rees described it as addressing *"all the really important topics, and doing so reliably, with great attention to detail and accuracy."* He praised the handbook's scope, noting its *"strong focus on policy"* while



**Dr Vanessa Govender, author of *From Suspicion to Submission – Occupational Lung Diseases in the South African Mining Industry*, fielding questions at the book launch**

*Photograph: courtesy of Vanessa Govender*

also covering *"prevention, social issues, ethics, laws, principles of practice, and many practical and useful aspects of workers' compensation."*

Prof. Jill Murray, also one of Dr Govender's mentors, commended her for writing a readable book: *"Writing does not just happen. It requires skill. It requires hard work. Each sentence in the paragraph you have to add, you have to cut, and you have to rewrite and rewrite and rewrite, so that you end up with what really is an act of creation and it makes the reader want to turn the page."*

Prof. Rodney Ehrlich said that the handbook sets out the work to be done by health professionals, ensuring that miners and ex-miners are properly found, examined, and have their claims submitted with the necessary follow-up. *"It's also important to reach an emerging large constituency, which is the doctors and health professionals, particularly the doctors working outside mine medical services* [contracted in]*, which is a big change from the very large and sophisticated mine medical services which existed 30 years ago. That's due, of course, to the shrinking of the gold mining industry,* [and] *the pressure on costs."* He concluded: *"This book required the marshalling by Vanessa of law, science practice, and ethics. It serves the cause of both efficiency and equity."*

Prof. Jack Parker expressed admiration for Dr Govender's ability to harness multi-disciplinary teams and bring out the best in everyone, making the sum of the whole better than any of the individual parts. He said: *"This book is not only readable, but it's a pleasure to hold in one's hand and to think about the importance of prevention of occupational lung disease."*

Dr Lindiwe Ndelu, Chief Director, Occupational Health, DMPR, gave the handbook a ringing endorsement: *"I wish I could put something in the legislation that says every occupational health practitioner in every mine must have this book, because it has been well written, well structured, and it guides the industry well."* She said it would enhance risk-based medical surveillance programmes (RMSPs) required for airborne pollutants. *"*[The] *book is an easy read, simple, straightforward and I think it will assist in the industry in a big way."*

Dr Llwazi Maepe, Head of Health at Harmony, said, *"I think the book seeks to empower and capacitate… healthcare professionals".* He also said that the following statement in the Preface encouraged him to read the book: *"This handbook emanated from the deep desire to apply science with excellence and with art and heart for the benefit of my patients, many of whom are now former mineworkers."*

Simphiwe Mabhele, Technical Advisor at the International Labour Organization (ILO), said, *"I realised that this book is actually very timely* [because of] *the focus on occupational lung diseases, especially* [in] *the South African mining sector,* [that highlight] *an ongoing challenge we face ensuring safety and health* [in] *working conditions worldwide…* [It is also] *important to mention that the Chapter 2 content aligns very closely with the ILO's recent milestone: the elevation of occupational safety and health to a fundamental right and principle at work,* [which] *happened in March 2022."* He said the ILO endorses the handbook, and that he looked forward to working with Dr Govender, in collaboration with colleagues in Geneva working specifically in the mining industry and occupational safety and health.

Prof. Salome Charalambous, Chief Scientific Officer at the Aurum Institute, highlighted a compelling case study from the book. The case involved a mineworker who was incorrectly diagnosed with silicosis and declared unfit to work underground, when in fact he had community-acquired pneumonia. Prof. Charalambous emphasised the significant consequences of *"getting it wrong".* She expressed confidence in the handbook's impact, noting, *"I'm sure this book will enlighten all of us, as well as the healthcare professionals working in these hospitals and with miners, and help them* [make more accurate diagnoses]."

Prof. Casper Badenhorst, Head of Occupational Health, Glencore, said he read the handbook as a non-occupational medicine specialist, remarking that it successfully navigated the complexities of occupational health: *"Not only does this book work for an occupational hygienist,* [but] *it might be a very easy read for even non-clinical professionals within the health discipline. I think this is a milestone for the industry. I think the reach of this textbook will go well beyond South Africa. The industry has very often been blamed for exporting illness and poverty to the neighbouring countries. I think this textbook is a milestone to show that we actually have got good work we can export to the rest Africa as well."*

Richard Friedland from Netcare, Prof. Mohammed Jheebhay from the Division of Occupational Medicine at UCT, and Prof. Rajen Naidoo from UKZN also all congratulated Dr Govender on her book.

*To order the book, e-mail the author at* **vanessa@masakhanehealth.co.za**.

# Don Emby recommends *From Suspicion to Submission*

I would like to congratulate my long-time friend and colleague, Dr Vanessa Govender, on the publication of *From Suspicion to Submission – Occupational Lung Diseases in the South African Mining Industry*. This is an invaluable contribution to the understanding of occupational lung diseases, and to the care of workers who are at risk.

In the words of Jack Parker, Professor Emeritus of Medicine, Radiology, Public Health and Occupational and Environmental Health Sciences, West Virginia University, USA in his foreword to the to the book: *"Readers will find that this timely handbook comprises an important compilation of approaches directed at the prevention, recognition, treatment and management of, and compensation for, occupational respiratory diseases."*

He continues: *"The specific attention to legislative and policy frameworks, pulmonary impairment, radiographic imaging and abnormalities, guidelines for submission and post-mortem examination findings, guides the user to valuable information quickly and successfully."*

The breadth of information contained within this easily carried handbook, and the user-friendly manner in which the information is set out, is a truly remarkable achievement. This is a goldmine of information that no occupational health practitioner, not only those directly involved in the care of workers at risk of occupational respiratory diseases (whether within mining or any other at-risk industry), can afford to be without.

On a higher level, the author has left me with a sense that this work has been a labour of love, born out of her own dedication to the welfare of those under her care. As such, it is a reminder of the finest traditions of medical practice: to prevent all that is preventable, to care deeply and, when necessary, to uphold the dignity of our patients by ensuring that compensation is received when it is due.

Don Emby
*Emeritus Chief Consultant Radiologist to the Minerals Council South Africa*
*Honorary Emeritus Member of the American Roentgen Ray Society*
*Honorary Life Member of the College of Radiologists of South Africa*

# A review of noise-emitting industries within the manufacturing and utilities sectors

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## ABSTRACT

***Background:*** Operations in the manufacturing and utilities sectors vary in scale, scope, and complexity. The operations conducted in both sectors expose employees to a combination of inherent, unabated, and residual occupational health hazards. Occupational noise remains the most prominent health hazard in both sectors.

***Objective:*** To provide an overview of noise-emitting industries within the manufacturing and utilities sectors, to inform practice and regulation.

***Methods:*** A phased literature search of the United States' National Institute for Occupational Safety and Health (NIOSH) and Occupational Safety and Health Administration (OSHA) databases was conducted. The Web of Science Core Collection database was also searched for journal articles, using key words. Reported noise levels were entered into Microsoft Excel, and interpretive visuals were generated to show differences among industries within the two sectors.

***Results:*** Many of the recorded noise levels in both the manufacturing and utilities sectors were ≥ 85 dBA, the universal level at which hearing conservation programmes should be implemented. Noise levels as high as 100 dBA were reported in the steel product manufacturing, forging and stamping, electrical power generation, petroleum and coal products manufacturing, cement and concrete product manufacturing, and sawmills and wood preservation industries.

***Conclusion:*** Noise levels remain high within the manufacturing and utilities sectors, despite technological advancements in machinery design and availability of quieter equipment. Establishment of national hazard surveillance systems and job exposure matrices can assist in directing policy responses to occupational noise exposure.

## INTRODUCTION

The various industrial revolutions brought about advancements in machinery and manufacturing processes, which were, and are still, used for mass production of goods.[1] The mechanisation of factories[2] increased exposure to occupational health hazards,[3] which manifested as occupational diseases such as phossy jaw, noise-induced hearing loss (NIHL), and occupational asthma, amongst others.[4] According to the United Nations' Human Rights Commission,[5] workers continue to face challenges of inadequate protection standards, slow progress in exposure prevention, fragmented occupational health strategies, and gaps in exposure monitoring and enforcement. The manufacturing sector, in particular, has recorded a high number of fatalities due to the risky nature of the work performed.[6] Occupational hazards are not limited to factories, but extend to office buildings and other environments.[7]

The manufacturing and utilities sectors are a major source of employment, globally. Both sectors use raw materials sourced from either agriculture, forestry, fishing, mining, and/or quarrying, which are transformed into value-added products.[8] The processing occurs through mechanical, physical, or chemical means and requires the use of power-driven machinery and equipment, and manually operated equipment. Industries in the manufacturing sector include food, fabricated metal products, primary metals, machinery, plastics and rubber products, wood products, and others.[9] According to the International Labour Organization (ILO)[10] and the United States' Occupational Safety and Health Administration (OSHA),[11] workers in the manufacturing sector who are exposed to occupational health hazards, including excessive noise levels, include process operators, electricians, coal equipment operators, instrument technicians, mechanics, boiler turbine operators, and auxiliary equipment operators. The utilities sector, which also utilises power-driven machinery, includes companies involved in the generation, transmission, and distribution of electricity.[8] The Australian regulatory authorities have prioritised the manufacturing sector for intervention in their national occupational health and safety (OHS) strategies, which directs regulatory efforts towards reducing the number of occupational diseases and injuries in the sector.[6] In South Africa, no comparable strategy exists, although there is a repository of historic documents showing guidance notes about previous regulatory efforts.[12]

Globally, exposure in the manufacturing and utilities sectors is regulated in view of the type of labour involved,[13] through specific OHS legislation and accompanying exposure limits.[14] In South Africa, the Noise Induced Hearing Loss Regulations[15] stipulate compliance measures for workplaces with noise levels at, or above, the 85 dBA exposure limit. Employers in both sectors are required to apply hierarchical steps for noise mitigation, covering primary, secondary, and tertiary prevention strategies to eliminate excessive noise exposure and minimise health risks.[16] These preventive measures are a prerequisite for ensuring

workers' exposure to harm is as low as reasonably practicable,[17] which requires that hazard control be addressed through sturdy preplanning, including prior to the erection of new factories.[18] Thereafter, residual risks can be managed through occupational hygiene programmes.[19]

### Occupational health hazards in manufacturing and utilities sectors

Despite the positive human development brought about by industry, employees have paid the high price of developing occupational diseases from workplace exposures.[20] In spite of a strong knowledge base regarding occupational disease occurrence and workplace regulation of exposures, current disease incidence rates indicate a lapse in application of this knowledge.[21]

The extent of exposure to occupational health hazards varies by industry type, locality, and precautionary measures taken by both the employee and employer.[22] Occupational noise is the most pervasive and prevalent health hazard within industry,[23] reflected in the high incidence of NIHL.[24] Despite reported decreases in noise levels over the years, exposure remains above the 85 dBA level – universally accepted as a basis for hearing conservation programmes (HCPs) – in some industries.[25]

Against this background, we reviewed the literature to provide an overview of noise-emitting industries within the manufacturing and utilities sectors, to inform practice and regulation. This study aligns with the United Nations' Sustainable Development Goals 3 (good health and wellbeing) and 8 (decent work and economic growth).[26]

## METHODS

A search, by country, for noise level databases was conducted. Only two publicly available databases were identified, both of which were from Government agencies in the United States of America (USA), viz. the Health Hazard Evaluation database of the National Institute for Occupational Safety and Health (NIOSH HHE), and the OSHA inspection register. To compensate for the lack of databases from other countries, the Web of Science Core Collection (WOSCC) database was included in the search. This database is considered to be the most extensive source of literature, due to its early inception date[27] in comparison to other similar collections.

### *National Institute for Occupational Safety and Health database*

The NIOSH HHE database search covered reports from 1971 to 2022. As per the database repository structure, the literature search was filtered to include 'All States/OSHA Regions', 'Manufacturing', 'Utilities', 'all industry subcategories', and 'sensory systems (eye and ear)'.

### *Web of Science Core Collection database*

The WOSCC database search was limited to full-text articles published in English, with no restriction on year of publication. The articles included in the final analysis were published in the period January 1991 to March 2023. The words used in the search were 'hearing conservation programme', 'occupational noise', 'audiometry', 'noise regulation', 'hearing protection devices', 'noise engineering controls', and 'occupational noise in industry', which returned 5 123 items. Five additional articles identified from South African sources

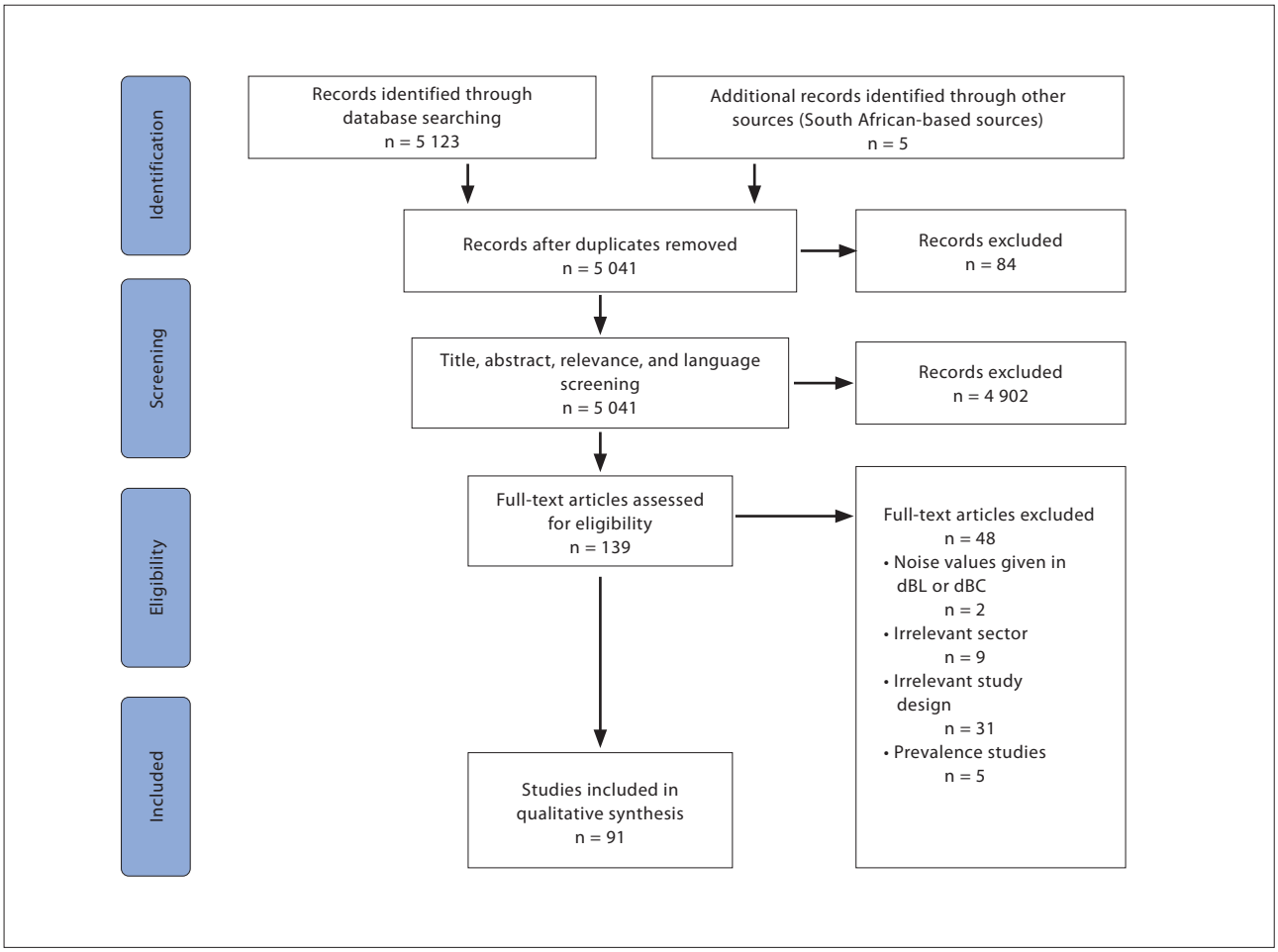



**Figure 1. Flow diagram showing selection of full-text articles to review**

were included to provide a country context to the study. Clarivate analytics filters were applied to remove duplicates and to identify 'full-text' and 'open access' articles. Figure 1 shows the process used to select documents for the review.

### *Occupational Safety and Health Administration inspection database*

Due to the large amount of data in the OSHA inspection register, only the summarised inspection data, covering the period October 2021 to September 2022, were included in the review. As per the database structure, the literature search was refined as follows: 'data and statistics', 'inspection data', 'frequently cited OSHA standards', '19100095 occupational noise exposure', 'federal OSHA', 'manufacturing', and 'utilities'. The summarised OSHA inspection data, available from (https://www.osha.gov/), were accessed to obtain the 2022 inspection records related to the '19100095 occupational noise exposure standard'. We used the University of Michigan noise job exposure matrix (JEM) WebApp data,[28] which synthesises the OHSA inspection data, and their published scientific studies in which they analysed OSHA-derived noise levels. These studies covered the period between 1979 to 2013.

### Data management and analysis

We adopted the North American Industry Classification System (NAICS) to classify the subsectors, industry groups, and specific industries. The NAICS is an American standard used to classify businesses, from which economic data are collected for analysis and publication.[8] The full-text articles and NIOSH HHE reports were downloaded and textually analysed to extract recorded noise levels in the different subsectors (3-digit NAICS classification), industry groups (4-digit NAICS classification), and specific industries (5-digit NAICS classification). Noise levels reported in the OSHA-derived noise JEM, which were arranged by subsector, were also recorded. The noise levels and industry classifications were entered onto Microsoft Excel to generate comparative graphics.

This study was conducted within a broader study, which had received ethical clearance from the Tshwane University of Technology (TUT) Faculty Committee on Research Ethics: FCRE 2020/10/015 (FCPS 02) (SCI).

## RESULTS

Thirty-six NIOSH-HHE reports and 91 journal articles were included in the final review. The University of Michigan noise JEM WebApp and the published analyses provided an historic overview of noise levels in the two sectors.

### National Institute for Occupational Safety and Health HHE database

Supplementary Table S1 shows the industry group and noise levels (including ranges) provided in the 36 NIOSH HHE reports. Transportation equipment manufacturing, which includes motor vehicle and parts manufacturing, constituted 12% (n = 5) of the

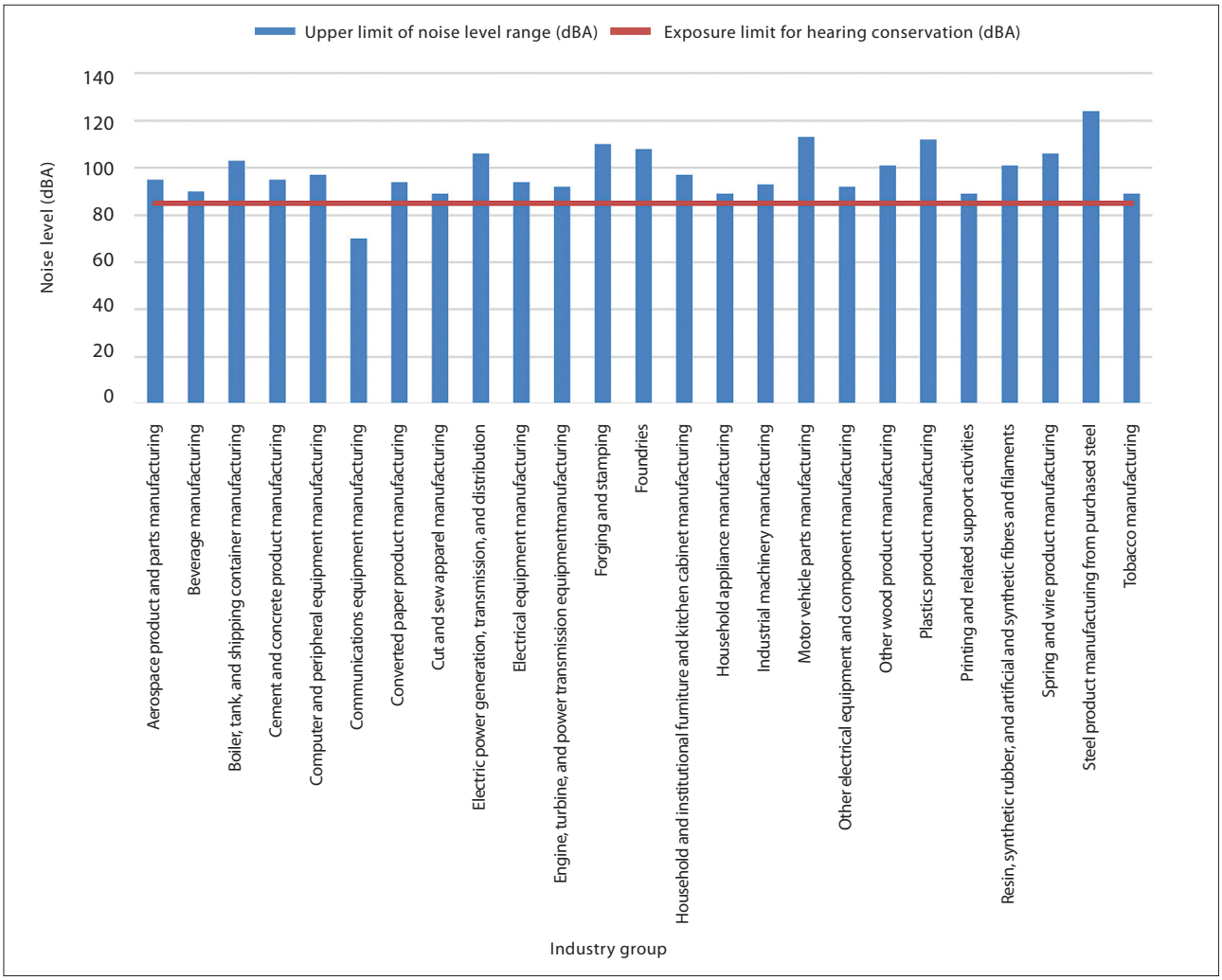



**Figure 2. Upper limits of noise level ranges recorded in the NIOSH HHE database, by industry group**

NIOSH HHE: National Institute for Occupational Safety and Health – Health Hazard Evaluation

industries investigated through the NIOSH HHE programme, regarding noise exposure during the review period. Electricity generation power plants are the most noise-intensive industry group in the utilities sector.

Figure 2 shows industry groups with noise levels ≥ the 85 dBA limit. The fact that noise levels were higher than the limit justified the noise exposure investigations through the NIOSH HHE programme. The highest noise ranges (> 100 dBA) were recorded in the boiler, tank, and shipping container manufacturing; electric power generation, transmission, and distribution; forging and stamping; foundries; motor vehicle parts manufacturing; and plastics product manufacturing industries. The highest noise level (126 dBA) was recorded in steel product manufacturing. Recorded noise levels in the single communications equipment manufacturing industry were below the exposure limit for instituting an HCP.

### Web of Science Core Collection database

Supplementary Table S2 shows the countries, industry groups, and noise levels reported in the 91 articles that were included in the review from the WOSCC database. These articles were published from January 1991 to March 2023. Fifty-one (56.0%) of the articles were from Asia, 15.4% (n = 14) each were from Africa and Europe, and the remaining 13.2% were from Oceana and the Americas. In all articles, the study area and noise levels were described. The majority of the measurements were from personal noise dosimetry (n = 71, 75.5%); 23 (24.5%) were area noise measurements.

Figure 3 shows that in 19 (10.5%) of the industry groups, the highest documented noise levels were ≥ 100 dBA. The sawmills and wood preservation; electric power generation, transmission, and distribution (utilities); metalworking machinery manufacturing; forging and stamping; and boiler, tank, and shipping container manufacturing industries recorded noise levels above 110 dBA. The highest noise levels were recorded in the sawmills and wood preservation industry (up to 116 dBA). These industries utilise noise-emitting machinery and equipment of different shapes and sizes. The water, sewage, and other systems classified under the utilities sector had recorded noise levels below the exposure limit for instituting an HCP.

### Occupational Health and Safety Administration database

The information obtained from the OHSA database related to inspected industries and corresponding citations only; no noise levels were reported. The data from the noise JEM were compared to results from OHSA studies[11] (1979–2006), Middendorf (2004)[23] (1979–1999), and Sayler et al. (2019)[29] (1979–2013) to generalise exposure trends (Figure 4) from OSHA inspection reports. A comparison of the mean noise levels reported by OSHA,[11] Middendorf (2004),[23] and Sayler et al. (2019),[29] in the periods of 1979–1999 and 1979– 2013, showed a 2 dBA decrease in the manufacturing sector, whereas the mean noise levels in the utilities sector remained constant for the same period. The median noise levels in the manufacturing sector, as reported by Middendorf (2004),[23] remained above the 85 dBA limit, as did the mean and maximum noise levels (Figure 5).

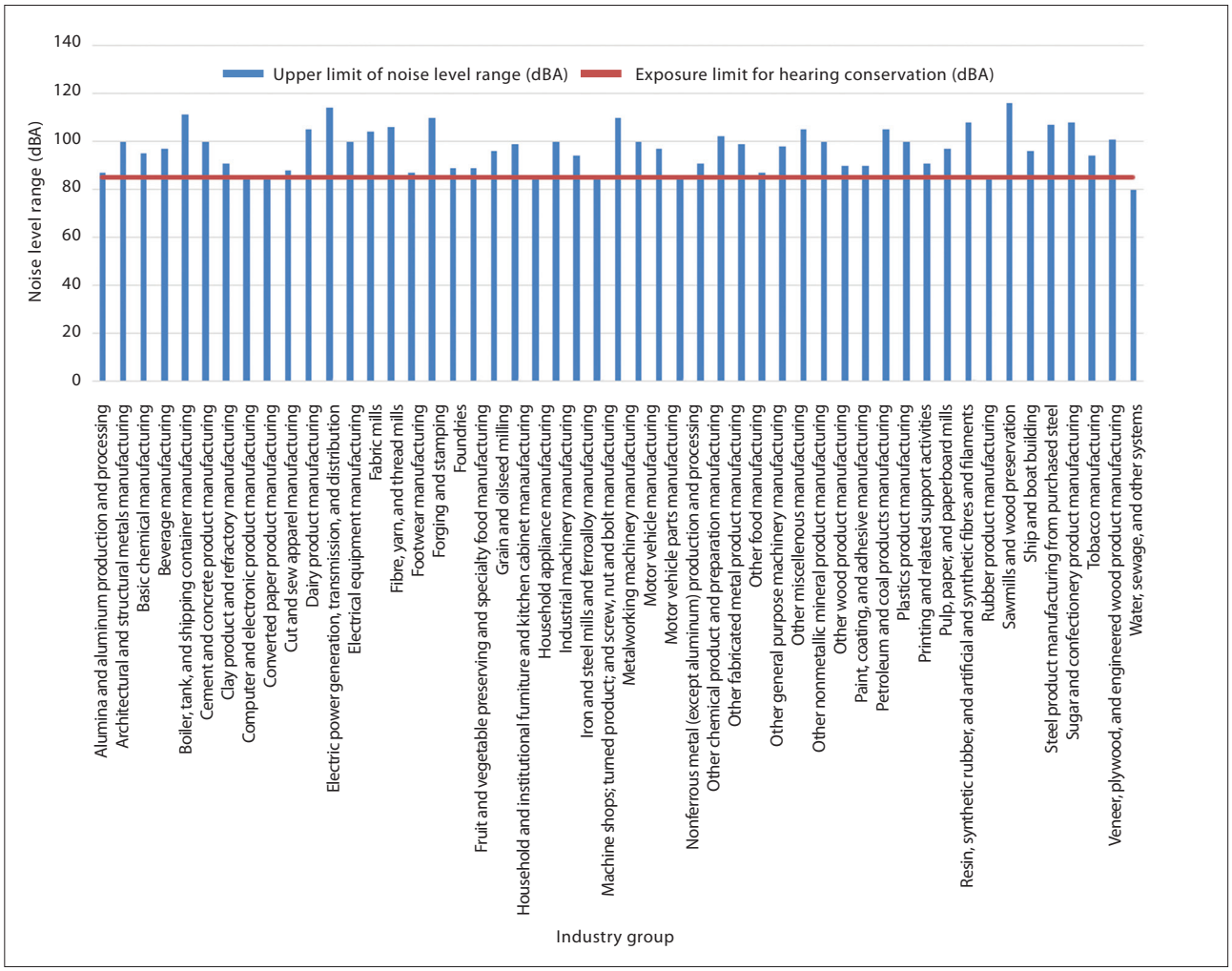



**Figure 3. Upper limits of noise level ranges recorded in articles from the Web of Science Core Collection database, by industry group**

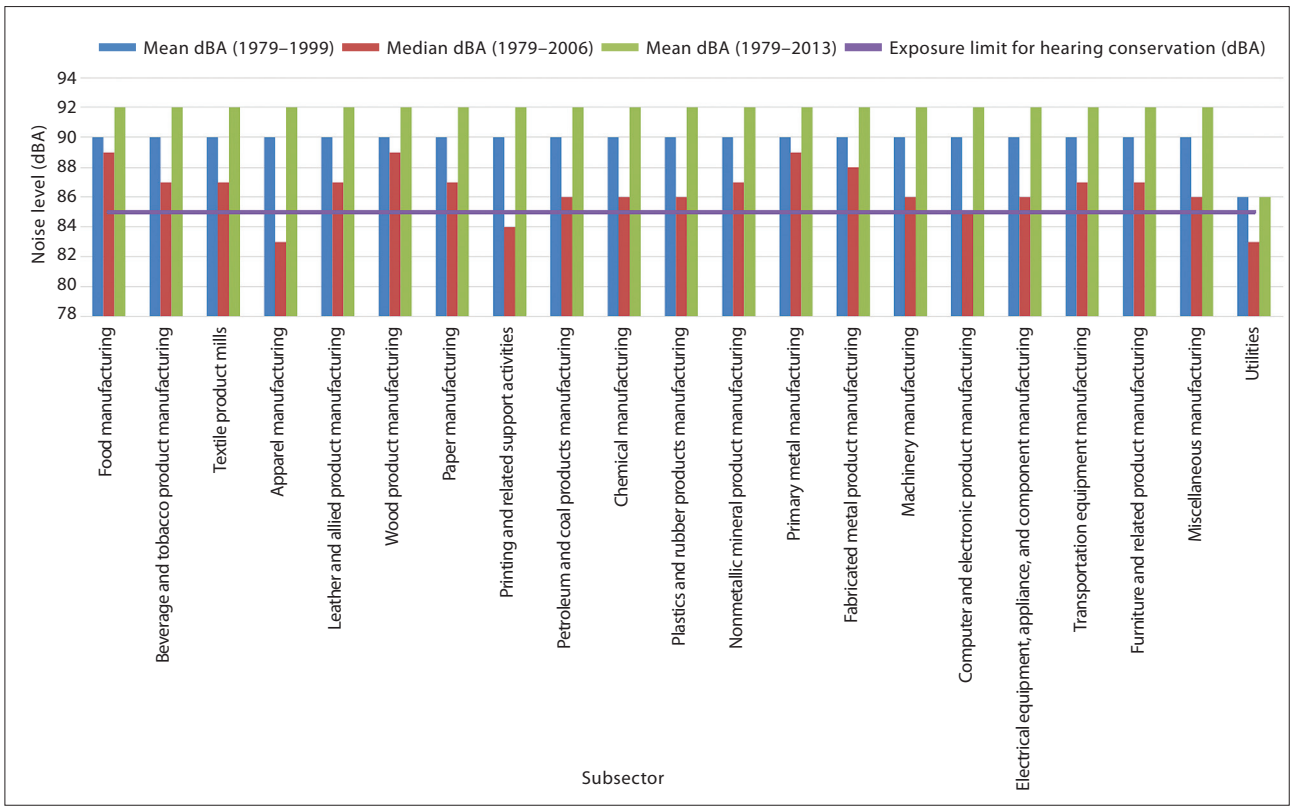



**Figure 4. Mean and median noise levels recorded in the OSHA database, by subsector**

*Sources: OHSA, 2022,[11] Middendorf, 2004,[23] Sayler et al., 2019 [29]*

OSHA: Occupational Safety and Health Administration

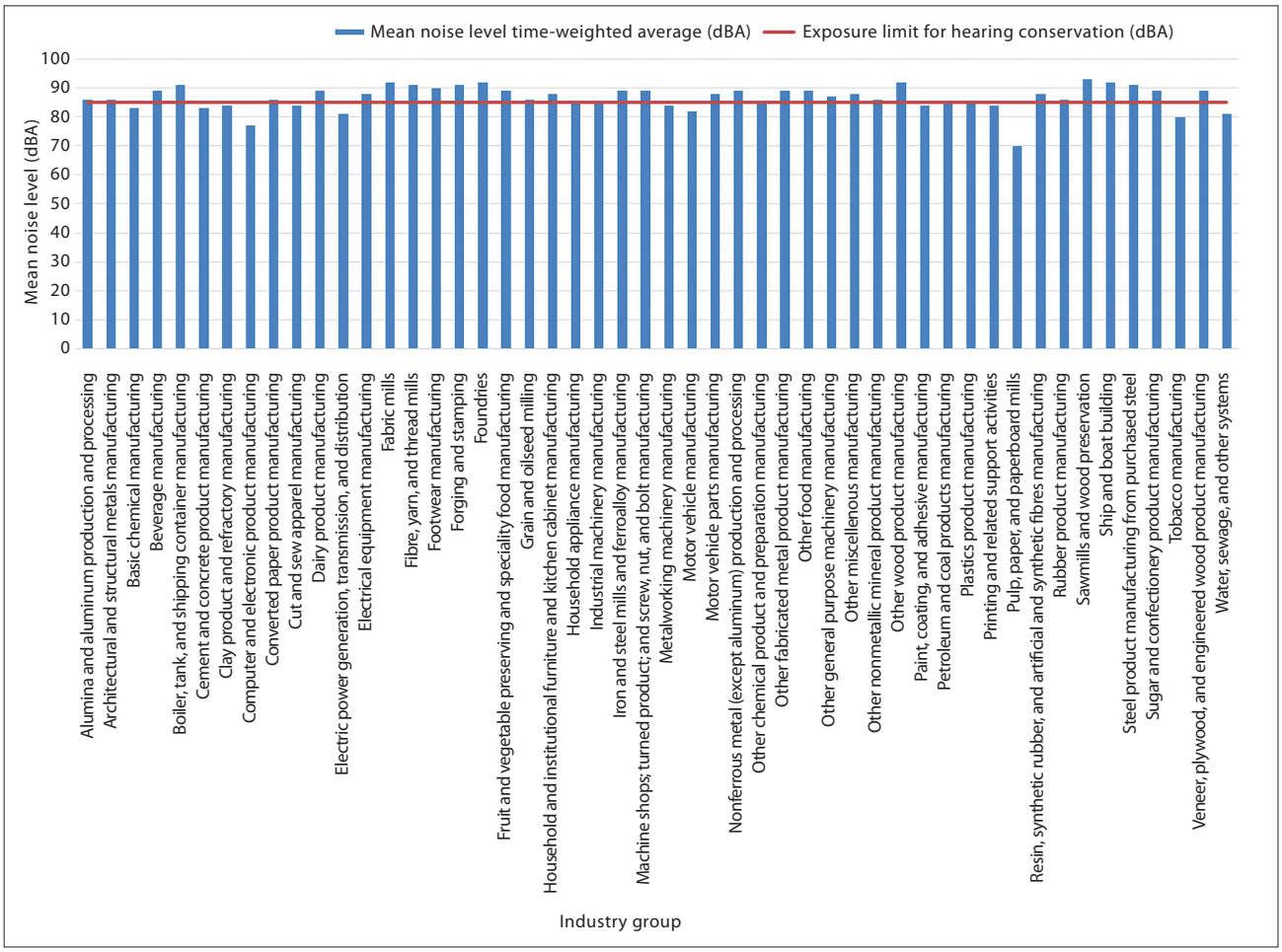



**Figure 5. Mean noise levels recorded in the OSHA database, by industry group**

*Sources: OHSA, 2022,[11] Middendorf, 2004,[23] Sayler et al., 2019 [29]*

OSHA: Occupational Safety and Health Administration

## DISCUSSION

We analysed data from the NIOSH HHE database and peer-reviewed journal articles to generate comparative graphs, depicting reported noise levels in different industries. Literature from both databases, together with relevant information from the OSHA inspection database, provided different perspectives on noise-emitting industries. This can be useful for researchers and regulators alike, as a synopsis of noise-emitting industries provides a basis for identifying where targeted interventions should be focused, as well as occupational health hazard surveillance and future research. Our findings affirm that occupational noise continues to feature in modern production processes.[30]

The majority of OSHA inspections regarding the occupational noise standard, from October 2021 to September 2022, were conducted in the manufacturing sector. The industries identified in our study continue to be monitored through regulatory inspections, worldwide. Industries such as coal-fuelled power plants, textile mills, chemical manufacturing plants, and steel plants typify hazardous noise exposure levels above the regulated exposure limits during routine activities.[31] Noise levels emitted by machines in these sectors can reach as high as 120 dBA,[32] and encompass different spectral frequencies.[33] Worker exposures above regulatory limits remain unabated in both sectors,[11] despite regulatory bodies issuing citations and penalties as deterrence to noncompliance.

Even though noise levels have decreased somewhat since the late 1970s,[23] attributable to process automation in some operations,[34] statistics from Asia, the US Bureau of Labor Statistics, and the South African Compensation Fund indicate that NIHL remains a problem in the manufacturing sector, specifically.[35] In contrast, the incidence of NIHL has remained consistently low in the United Kingdom.[36] From an exposure control perspective, every diagnosed occupational disease associated with workplace hazards should be prevented.[7] The observed decreases in noise levels, although commendable, are negligible. In general, this reflects inadequate capital allocation to risk management, as contended by Zheng et al. (2021).[37] The implementation of HCPs, notwithstanding the contribution to reduction in NIHL, also relies on hearing protection devices, for which use and selection has often been shown to be incorrect.[38]

The type of equipment used, and the nature of activities, determine exposure to occupational noise. Specifically, machinery operated in the manufacturing and utilities sectors, such as pumps, compressors, valves, turbines, vents, and combustion fans, emit excessively high noise. Employees are exposed during activities such as machining, switching, charging, loading, flushing of process lines, and venting, amongst many others, depending on the process and/or the industry type.

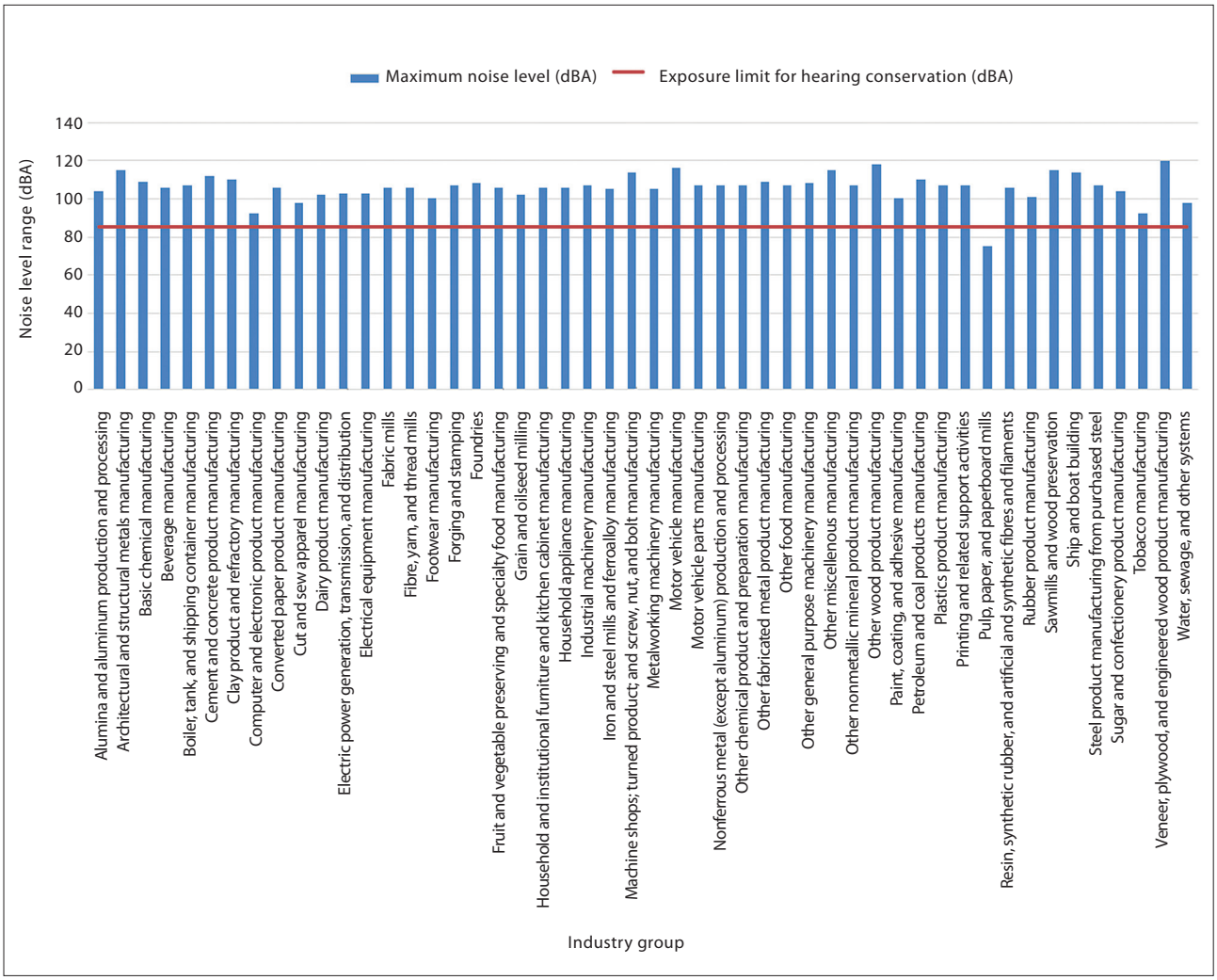



**Figure 6. Maximum noise levels recorded in the OSHA database, by industry group**

*Source: University of Michigan School of Public Health, (2023)* [28]

OSHA: Occupational Safety and Health Administration

### Study limitations

One limitation of our study was that government-based data were publicly available only from the USA. Similar data from other countries, especially low- and middle-income countries (LMICs), are sparse. Although the results of our review are not generalisable to countries where government-based data are not available, the WOSCC database articles included in our review indicate that the universal noise rating limit for hearing conservation of 85 dBA is exceeded in LMICs. The strengths of this study are 1) the papers published in the WOSCC provide noise data from a variety of countries, and 2) the USA Government databases provide a blueprint for noise data that should be collected by governments of other countries.

## CONCLUSION

Occupational noise exposure at hazardous levels remains unabated within the manufacturing and utilities economic sectors, despite technological advancement in machinery design and availability of quieter equipment. Interventions to reduce noise levels, and protect workers from noise-induced hearing loss,[39] include occupational health hazard surveillance systems and job exposure matrices for different industries. Such interventions should be established in all countries, including in South Africa. Governments across the world, especially those in LMICs, should incentivise companies to implement hazard control initiatives by reducing compensation fund contributions, a strategy reported to have been successful in a number of European countries.[40]

## KEY MESSAGES

1. Noise exposure in the manufacturing and utilities sectors remains unabated, and employees in these sectors are at risk of noise-induced hearing loss.
2. Quantitative visualisation of noise levels from different sectors can be used as a diagnostic tool for targeted regulatory intervention.
3. Noise measurements conducted by regulatory authorities indicate slow progress in efforts for achieving impactful reductions in noise levels.

## DECLARATION

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

## AUTHOR CONTRIBUTIONS

Conception and design of the study: OR, TJM, DMM
Data acquisition: OR
Data analysis: OR
Interpretation of the data: OR
Drafting of the paper: OR
Critical revision of the paper: TJM, DMM, OR

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# Visual Analogue Scale for Stress Overload: a validation assessment to support occupational health surveillance in South Africa

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## ABSTRACT

***Background:*** Clinicians and researchers increasingly require short, efficient methods for assessing distress, in both applied research and clinical settings. Available questionnaires may be unsuitable due to language constraints or time burdens. The Visual Analogue Scale for Stress Overload (VAS-SO) is brief and may lessen the risk for semantic misinterpretation.

***Objectives:*** The validity of the VAS-SO to screen for stress overload was assessed in the context of occupational health screening, in a South African sample of skilled workers.

***Methods:*** Employees (N = 428) participating in occupational health assessments completed the VAS-SO and other mental health measures. Correlation, linear regression, and receiver operating/operator characteristic curve analysis were conducted to determine criterion validity and scale thresholds for clinical application.

***Results:*** Negligible socio-demographic effects were observed. The VAS-SO appeared to be as effective as the longer scales in identifying stress overload. Practically useful lower and upper thresholds (> 4 and > 7) were identified to guide clinical decision-making. The VAS-SO scores were associated with a history of recent experience of workplace trauma, as well as with the severity of depression and anxiety symptoms.

***Conclusion:*** The study provided evidence that the VAS-SO is a good alternative to longer questionnaires to identify high stress overload and risk for common psychiatric disorders. It further highlights the importance of locally developed thresholds to guide clinical decision-making.

## INTRODUCTION

Recent reports have revealed that workers in sub-Saharan Africa are suffering from extremely high levels of stress, with 48% of the workforce reporting excessive stress daily.[1] Worldwide, stress has steadily increased over the past decade.[2] Psychological stress is typically described from a transactional perspective,[3] where individuals evaluate both the demands they face (referred to as primary appraisal) and the resources available to them (referred to as secondary appraisal). In the transactional definition, stress may occur when individuals appraise the demands of their environments as exceeding their personal resources – a state termed 'overload'. When overload is experienced, wellbeing is negatively affected.[3] Stress is generally understood as part of daily life. Stress overload refers to a person's perception that the demands of life are overwhelming his or her available resources.[4]

Surveillance of psychological stress is not specifically addressed in the Occupational Health and Safety Act (Act No. 85 of 1993, and as amended) or its Regulations. However, given the deleterious effect of stress overload on both general health and workplace safety,[4] some form of basic screening within the occupational health environment may be beneficial.

Several tools are available to measure stress, such as the older 14-item Perceived Stress Scale (PSS)[5] and the more modern 10-item Stress Overload Scale-short form (SOS-S).[6] Scores on the SOS-S indicate respondents' perceptions that the demands of their lives are overwhelming their available resources.[6] Evidence of its validity in the South African context exists, as well as its utility to predict the presence of major depressive disorder (MDD) and general anxiety disorder (GAD).[7] The Patient Health Questionnaire (PHQ-9) and the Generalized Anxiety Disorder Scale (GAD-7) are commonly used to screen for depressive and generalised anxiety symptoms; for both, scores ≥ 10 indicate cases of probable MDD or GAD.[8-10] In spite of the widespread use of stress measurement scales such as the PSS or SOS-S, they are often impractical for routine clinical use in occupational medicine due to their length or language requirements.[11-13] A simpler and more feasible alternative is the single-item Visual Analogue Scale for Stress Overload (VAS-SO).

Visual analogue scales (VASs), first described by Hayes and Patterson in 1921,[14,15] were initially used to measure subjective pain, but have since become more widely used for the measurement of other subjective characteristics that cannot easily be measured directly, such as mood, distress, or attitudes.

Typically, VASs comprise a continuous or dashed horizontal line with a descriptive phrase, or anchor text, at each end. The scale commonly ranges from 0 or 1 on the left (least extreme) to 10 on the right (most extreme). Respondents specify their level of agreement with a statement by indicating a position along the line. Horizontal scales are the most common and are generally more sensitive than vertical ones.[16]

VASs are particularly useful when assessing single constructs with multiple gradations, and evidence suggests that unipolar VASs ('not at all anxious' to 'extremely anxious') are more easily understood than bipolar VASs ('extremely calm' to 'extremely anxious').[17] A VAS can be presented in several ways, including a straight line with anchor texts at start and end, the inclusion

of other elements such as additional anchors, incorporating a numeric index (e.g. 1 through to 10), the use of colour to represent graduations, or 'box-scales' with equidistant markers.

Evidence supports VASs as having superior metrical characteristics compared to discrete scales, allowing a broader range of statistical analyses.[18] When compared with other discrete linear scales such as Likert or Borg scales, VASs have similar sensitivity and reproducibility, but often outperform these tools in specific scenairos.[18,19]

VASs offer several advantages over other types of scales.[20] Their analogue nature provides higher sensitivity to small changes, particularly when measuring variations within individuals.[21] It is brief, and the visual presentation lessens the risk of semantic misinterpretation due to literacy or language concerns. Additionally, data from some VASs can be converted parametrically to an interval-scale, enabling a greater range of statistical analyses. The VAS has some limitations in that it may not be appropriate for very young and very old respondents, and photocopying may distort the line, making manual measurement difficult.[21,22] Despite these drawbacks, its overall simplicity and effectiveness make it a compelling choice in occupational health settings – it is easy to administer, quick to complete, and readily understood by respondents. In response, occupational physicians have, over the past two decades, increasingly used a 10-point VAS to assess stress among workers.[11,23,24] This tool enables rapid identification of individual or collective distress within a workgroup, paving the way for timely interventions at both the individual and organisational levels.[12]

The VAS-SO is an application of a visual analogue scale to assess specifically for stress overload. It comprises a 150-mm horizontal line with anchors at 1 and 10, accompanied by descriptive phrases and equidistant numerical guides (see Figure 1). Workers are asked to *"indicate how stressed and overwhelmed you have felt over the past two months"*. The inclusion of dashes between the numerical guides allows for scoring to one decimal through visual inspection, enhancing precision.

The single-item VAS-SO to measure perceived stress has demonstrated satisfactory stability and high inter-rater reliability, and has been shown to be correlated strongly with results from the PSS-14 ($r = 0.69$; Lin's CCC = 0.66).[11,12,25,26] Additionally, studies have found moderate to strong correlations between VAS-SO scores and measures of depression and anxiety.[11] These findings underscore the tool's validity as a measure of psychological distress in occupational settings.

Linear regression and receiver operating/operator characteristic (ROC) curve analysis have previously identified a VAS-SO score of 7 as the optimal cut-off to indicate 'high stress' in occupational environments.[12] Other researchers advocate for a more nuanced approach, using a 'grey-zone' model to account for variability, whereby lower and upper cut-offs are established to balance sensitivity and specificity.[13] Previous reports suggested that a score of 5 may delineate the 'at-risk' threshold – interpreted as requiring closer surveillance, and that a score of 8.2 or higher may delineate the 'intervention' threshold – interpreted as requiring urgent action.[13]

In this study, the validity of the VAS-SO to screen for stress overload was assessed in the context of occupational health screening, in a South African sample of skilled workers with at least grade 12 education. The specific objectives were 1) to describe the VAS-SO responses and possible socio-demographic associations in a group of workers, 2) to compare VAS-SO and SOS-S responses, using criterion validity analysis, and 3) to investigate the practical usefulness of the VAS-SO for identifying cases of high stress overload and other common mental disorders.

## METHODS

This was a retrospective record review of data collected from September to November 2022, from records maintained by an occupational health practice in Cape Town, South Africa. The data came from the occupational health assessments of 428 skilled workers, and included age, sex, occupational field, home language, and the occurrence (yes or no) of a traumatic experience at work in the past two years. A description of the 'traumatic event' was not provided. The workers were employed by companies that provide technical support to the maritime, aviation, and associated security industries, or were employed directly within those industries. The majority of workers were based in the Western Cape. The workers represented a wide range of vocational backgrounds, detailed in Table 1. Workers also completed four psychometric measures, in pen-and-paper format, namely the VAS-SO, the SOS-S, the Patient Health Questionnaire (PHQ-9), and the Generalized Anxiety Disorder Scale (GAD-7). The SOS-S was used as the reference standard for stress overload, while the PHQ-9 was used to assess depressive symptoms, and the GAD-7 to assess generalised anxiety.

### Data analysis

Statistical analyses were conducted using Statistical Package for Social Sciences (IBM SPSS for Windows, version 27). The VAS-SO responses were described using score means, standard deviations, and ranges. Pearson's correlation was used to assess the association of VAS-SO scores with age, while t-tests for independent samples were used to compare VAS-SO scores across sex and language categories.

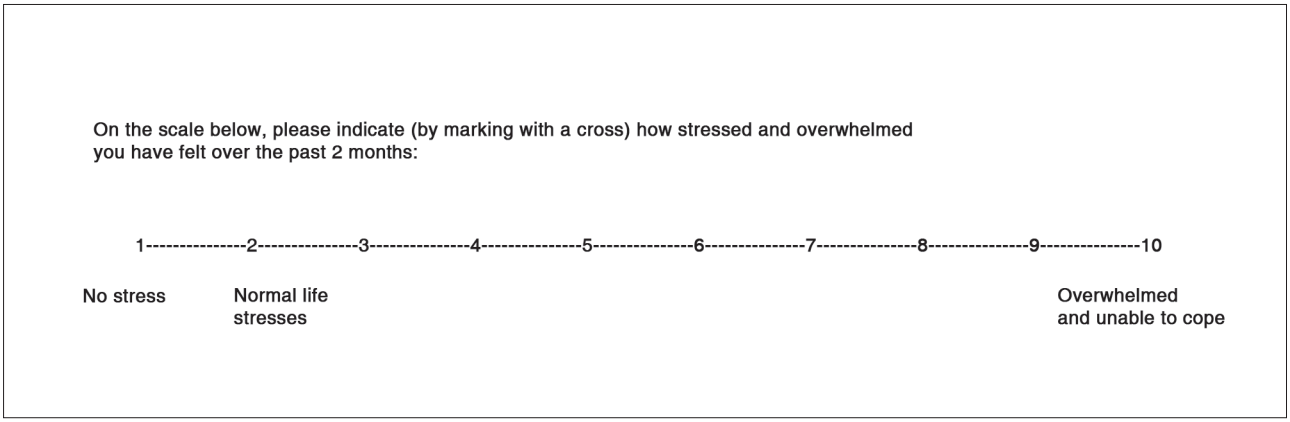



**Figure 1. Visual Analogue Scale for Stress Overload**

**Table 1. Socio-demographic characteristics of the study participants (N = 428)**

| Characteristic | n | % |
|---|---|---|
| Sex | | |
| Female | 114 | 26.6 |
| Male | 314 | 73.4 |
| Language | | |
| English | 90 | 21.0 |
| Afrikaans | 67 | 15.7 |
| Setswana | 62 | 14.5 |
| isiXhosa | 49 | 11.4 |
| Sesotho | 41 | 9.6 |
| Sepedi | 40 | 9.3 |
| isiZulu | 39 | 9.1 |
| Tshivenda | 17 | 4.0 |
| Tsonga | 10 | 2.3 |
| siSwati | 7 | 1.6 |
| Ndebele | 6 | 1.4 |
| Vocational background | | |
| Technical/engineering | 96 | 22.4 |
| Maritime | 59 | 13.7 |
| Clerical/administrative | 58 | 13.6 |
| Security | 28 | 6.6 |
| Catering/hospitality | 24 | 5.5 |
| Other* | 163 | 38.1 |

* Vocational groups comprising ≤ 3% of the study sample were categorised as 'other', e.g. surveyors, radar operators, data analysts.

**Table 2. Scores from, and internal consistency measures of, the different stress measurement scales**

| Stress measurement scale | Score | | | Internal consistency | |
|---|---|---|---|---|---|
| | Mean | SD | Range | Cronbach's α | McDonald's ω |
| VAS-SO | 3.31 | 1.69 | 1–10 | | |
| SOS-S | 3.24 | 1.44 | 1–10 | 0.926 | 0.929 |
| PHQ-9 | 2.06 | 3.38 | 0–23 | 0.836 | 0.846 |
| GAD-7 | 1.40 | 2.78 | 0–20 | 0.881 | 0.885 |

GAD-7: Generalized Anxiety Disorder Scale, PHQ-9: Patient Health Questionnaire-9, SD: standard deviation, SOS-S: Stress Overload Scale–short form, VAS-SO: Visual Analogue Scale for Stress Overload

*Criterion validity:* The same descriptive analyses were conducted for the SOS-S responses, to allow for comparison of the data from the two scales. Further analysis of the relationship between the two tools was conducted using Pearson's correlation, and Lin's concordance correlation. T-tests for independent samples were conducted, for both measures, to explore score differences between workers with, and without, histories of recent traumatic experience at work.

*Practical utility:* An optimal VAS-SO single cut-off score as well as lower and upper grey-zone thresholds, for the purpose of identifying high stress overload during occupational health screening, were determined by replicating earlier studies that used a linear regression equation and ROC curve analysis.[12,13] The equation of the linear regression to determine the cut-off score for high stress overload was: VAS-SO = 0.658 + 1.171 x South African SOS-S score reference of 4.4.[7,12] The correlation of VAS-SO scores with PHQ-9 and GAD-7 scores was also calculated. Optimal cut-off VAS-SO scores to identify cases of MDD and GAD were determined by means of an ROC curve analysis, using probable cases as state variables, with results reported as area under the curve (AuC) and sensitivity/specificity ratios.

The Health Research Ethics Committee of Stellenbosch University approved the analysis of the psychometric data (clearance certificate #N20/07/078).

## RESULTS

The mean age of the participants was 34.2 years (± 10.5, range 20–64), and English as first language was spoken by 90 (21.0%), as shown in Table 1. All workers had at least a Grade 12 education, as well as vocational training qualifications (which were reportedly obtained in English).

The means, standard deviations, and ranges of the VAS-SO, SOS-S, PHQ-9, and GAD-7 scores are shown in Table 2. As may occur with unipolar scales, the VAS-SO scores were not normally distributed, as shown in Figure 2 (skewness = 1.351, SE = 0.118; kurtosis = 2.357, SE = 0.235).

Both the VAS-SO and the SOS-S scores showed very weak but statistically significant correlations with age (Table 3). There was also a negligible but statistically significant difference between the VAS-SO scores of women and men (women scored < 0.5 points higher than men, $p < 0.001$). There was no significant effect of sex on the SOS-S scores ($p = 0.096$), and no significant language-related differences were observed for either the VAS-SO or the SOS-S mean scores ($p = 0.485$ and $p = 0.429$, respectively).

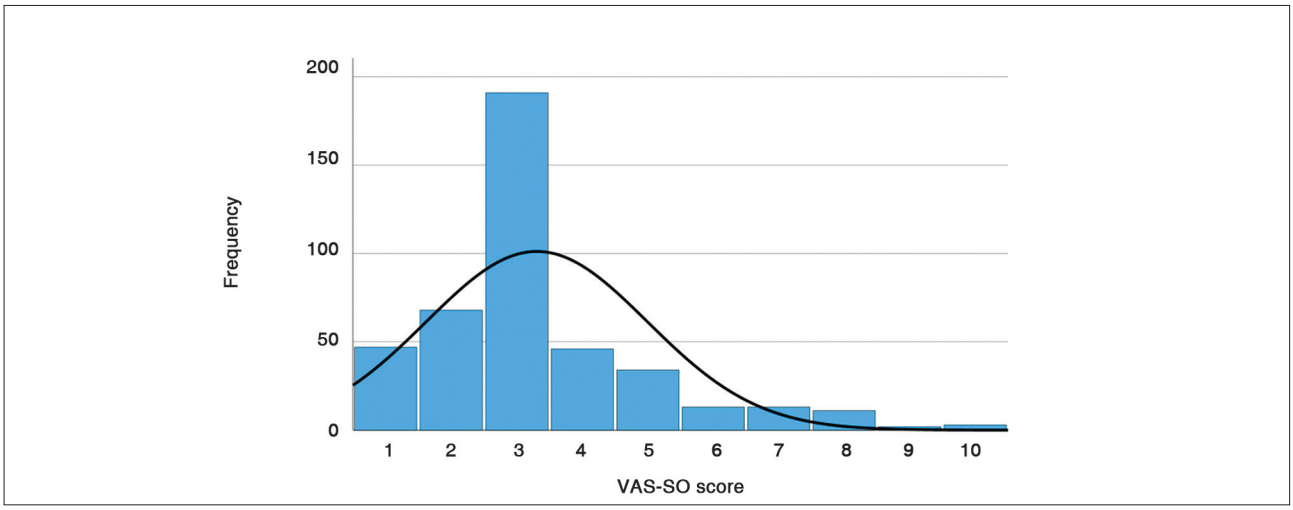



**Figure 2. Distribution of Visual Analogue Scale for Stress Overload scores**

The VAS-SO scores were strongly correlated with the SOS-S, the PHQ-9, and the GAD-7 scores (see Table 3). Lin's concordance correlation was 0.611. Scores from both the VAS-SO and the SOS-S differentiated between workers with, and without, history of recent traumatic experience at work ($p < 0.001$ for both). Workers with a recent history of traumatic experiences scored 1.0 point higher on the SOS-S, and 3.5 points higher on the VAS-SO, which provides substantially stronger differentiation than the SOS-S.

The linear regression equation yielded a VAS-SO cut-off score > 6 for the identification of high stress overload. The same score to identify high stress overload was observed in an ROC curve analysis. This process to locate grey-zone lower and upper thresholds for clinical use identified a score of > 4 as the lower threshold ('at risk'), and a score of > 7 as the upper threshold ('urgent action').

VAS-SO scores likewise identified cases of probable MDD (AuC = 0.908, sensitivity = 84%, specificity = 94%) and probable GAD (AuC = 0.953, sensitivity = 78%, specificity = 92%) at an optimal cut-off point of > 6 for both conditions.

## DISCUSSION

This analysis was conducted to assess the validity of the VAS-SO in the context of occupational health screening, in a South African sample of skilled workers. The novelty of the study was the validation of the VAS-SO against the more modern but lengthier and language-dependant SOS-S instrument, and to investigate its utility in identifying high stress overload by reporting South African cut-off values for stress overload. The absence of significant differences in the mean VAS-SO and SOS-S scores, as well as their strong correlation, provides evidence of criterion validity (i.e. that both scales measure the same construct). As such, the findings suggest that the simpler VAS-SO is as good as other existing scales for measuring stress overload, similar to previous findings from comparable measures like the PSS.[12] The VAS-SO outperformed the SOS-S in differentiating workers with recent histories of traumatic experience at work from those without. The large difference of 3.5 points could be clinically useful in this regard, and alert practitioners to potential maladaptive post-trauma distress. The absence of a significant language effect provided support for the use of the VAS-SO in multilingual populations with similar education as the current sample.

A colour-coded VAS-SO (Figure 3) may be of benefit for workers with low literacy levels. The colours could support interpretation for health personnel, although colour blindness in participants would limit the usefulness of such a tool. As such, its potential benefits would need to be rigorously tested before any widespread use in southern Africa's multicultural and multilingual populations.

The ability of VAS-SO scores to track the severity of depressive and anxiety symptoms is similar to previous reports.[11] Its accuracy in identifying cases of probable MDD and GAD has application in clinical practice. Specifically, a score > 6 was clinically useful to indicate high stress overload and risks for MDD and GAD in this sample of workers. This cut-off score for a South African worker population was 1.0 point lower than reported for European workers in a study published by Lesage and Berjot (2011).[12] The description of the 'grey-zone' is useful to indicate if workers should be more closely monitored (score > 4 = 'at risk') or if there should be immediate intervention (score > 7 = 'urgent action'). It is noteworthy that both the lower and upper thresholds were 1.0 point lower than those reported in an occupational medicine environment in France,[13] emphasising the importance of using locally developed thresholds for decision-making. It should be cautioned that the VAS-SO is not a case-finding tool for MDD or GAD.[11] While high chronic stress levels may constitute a major risk factor for common mental disorders, the aetiology of mood and anxiety disorders is located in complex intersections of biological, environmental, social, and psychological factors, and their occurrence cannot necessarily be attributed to specific experiences of stress.

The study sample was limited to skilled workers with some English proficiency, which restricts generalisability to less educated or non-English-speaking populations. Further, 'recent experience of trauma in the workplace' was not defined and, although the occurrence of trauma was reflected in higher mean scores, it is not clear whether this would be practically useful to identify individuals at risk for post-traumatic psychological distress – at least not until more clearly assessed in future research.

Given the hypothesised advantage of the visual (versus verbal) nature of the tool, future studies need to evaluate the VAS-SO in more diverse groups and consider user feedback to refine its design. A colour-coded version could enhance usability for workers with low literacy, although this requires further testing in multilingual settings.

**Table 3. Correlations between the stress measurement scales, age, and mental health measures**

| Stress measurement scale | Age | | SOS-S | | PHQ-9 | | GAD-7 | |
|---|---|---|---|---|---|---|---|---|
| | r | p value | r | p value | r | p value | r | p value |
| VAS-SO | - 0.165 | < 0.001 | 0.604 | < 0.001 | 0.634 | < 0.001 | 0.666 | < 0.001 |
| SOS-S | -0.102 | 0.035 | | | 0.587 | < 0.001 | 0.602 | < 0.001 |

GAD-7: Generalized Anxiety Disorder Scale, PHQ-9: Patient Health Questionnaire-9, SOS-S: Stress Overload Scale–short form, VAS-SO: Visual Analogue Scale for Stress Overload

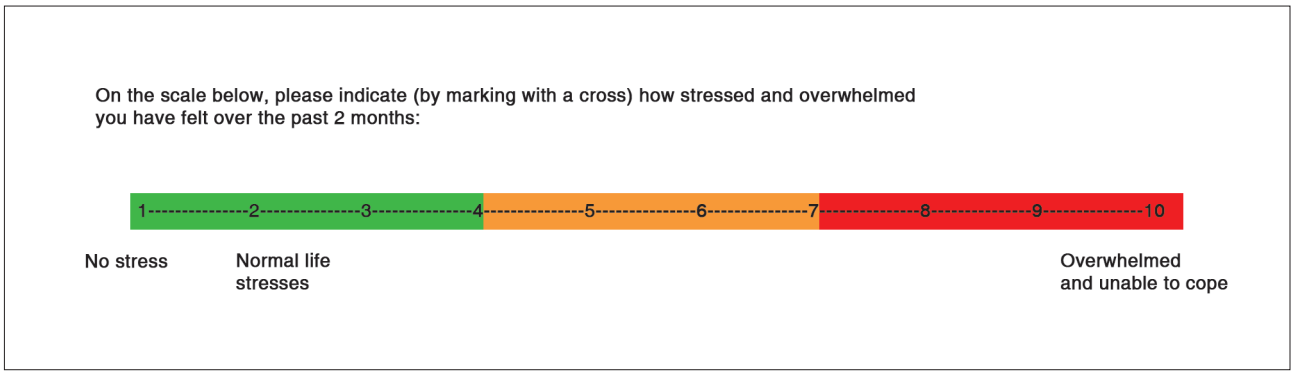



**Figure 3. Colour-coded Visual Analogue Scale for Stress Overload**

## CONCLUSION

The VAS-SO appears to be a good alternative to lengthier perceived stress overload questionnaires. Good criterion validity and practical utility, and negligible age, sex, and language effects, were observed. It displays good accuracy in identifying high stress overload, and can also identify possible risks for MDD and GAD. The grey-zone approach is clinically useful in that it allows for both a lower threshold, to support sensitivity ('at risk'), and an upper threshold, to support specificity ('urgent intervention'), which could be visually represented in colour for easy interpretation. In this regard, the study also highlighted the importance of locally developed thresholds to guide clinical decision-making.

## KEY MESSAGES

1. The Visual Analogue Scale for Stress Overload (VAS-SO) is useful to identify high stress overload and other mental health risks in occupational settings.
2. The VAS-SO is brief, visually intuitive, and minimises language barriers, making it suitable for diverse, multilingual workplaces.
3. South African workers reported lower VAS-SO thresholds than European counterparts, emphasising the importance of locally derived norms to support decision-making regarding monitoring or intervention of workers' stress.

## DECLARATION

The author declares that this is his own work, that all the sources used in this paper have been duly acknowledged, and that there are no conflicts of interest.

## AUTHOR CONTRIBUTIONS

CHvW was responsible for all aspects of the study, from conception and design to writing of the manuscript.

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# Workplace accommodation and physical activity support for firefighters at risk of developing cardiovascular disease

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## ABSTRACT

***Background:*** Firefighters who die from cardiac arrest often have underlying conditions such as narrowed coronary arteries or structural heart damage, both of which are forms of cardiovascular disease (CVD). Modifiable clinical risk factors include hypertension, elevated blood glucose levels, high blood lipids, obesity, and lifestyle factors such as insufficient physical exercise and smoking.

***Objective:*** We explored how the workplace accommodates and supports firefighters at risk of developing CVD.

***Methods:*** This was a qualitative study. We purposively selected 12 firefighters with risk of CVD from the City of Cape Town Fire and Rescue Service (COCTFRS). Semi-structured interviews were conducted and the responses were recorded, transcribed, and thematically analysed.

***Results:*** The study results indicated that firefighters are supported and accommodated by the COCTFRS. Support includes regular physical evaluations, access to gym facilities, organised fitness activities, and opportunities for participation in sports events. Participants reported that they did not meet the recommended minimum 150 minutes of physical activity per week. They expressed a need for guidance regarding physical activity to reduce their risk of CVD, and for better mental health support.

***Conclusion:*** The COCTFRS supports and accommodates firefighters at risk of CVD. At least 150 minutes of physical activity per week should, however, be mandatory.

## INTRODUCTION

Cardiovascular disease (CVD) is a leading cause of mortality and morbidity, globally; South Africa has one of the highest rates of death and disability from heart disease and stroke in the world.[1] Although family history and age are important risk factors for CVD, so are hypertension, hypercholesterolemia, insulin resistance, diabetes, obesity, and lifestyle factors such as smoking, poor nutrition, alcohol consumption, and lack of physical activity.[2] Modifiable risk factors for CVD can be altered through changes in behaviour, lifestyle, and work conditions.

Under the South African Employment Equity Act No. 55 of 1998, employers are obliged to reasonably accommodate employees with disabilities, unless such accommodation causes undue hardship to the employer.[3] Employee wellness programmes (EWPs) have, therefore, been established in many companies to promote health and decrease stress to boost productivity and efficiency.[4,5]

Firefighters are exposed to occupational hazards that may precipitate sudden cardiovascular incidents, often resulting in premature exit from the workforce, and/or death.[6,7] It is essential for both fire departments and firefighters to prioritise good health in the fire and rescue services.

The objective of this study was to investigate how the City of Cape Town Fire and Rescue Service (COCTFRS) accommodates and supports firefighters at risk of developing CVD, with regard to physical activity.

## METHODS

This was a qualitative study. Firefighters with one or more CVD risk factors (see Table 1) were purposively selected to participate. All firefighters are screened by the COCTFRS medical doctor annually, and are prescribed medication as required. Participants needed to be full-time career firefighters employed in the COCTFRS, and be at least 20 years old. Eligible firefighters were those who indicated that they were on anti-hypertensive, diabetes, or cholesterol medication.

Twelve firefighters from three fire departments across Cape Town were purposively selected to participate in this study. Semi-structured interviews were conducted, using an interview guide, comprising open-ended questions and prompts, in November and December 2020. Due to the COVID-19 pandemic and subsequent lock down in South Africa, interviews were conducted online and recorded using Google Meet.

### Data analysis

The recorded interviews were transcribed by Google Meet and confirmed by the research team members. Thematic analysis, following the six-step approach of Braun and Clarke (2006), was used to analyse the data, viz. 1) familiarisation, 2) coding, 3) generating themes, 4) reviewing themes, 5) defining and naming themes, and 6) writing up.[9] The principles of trustworthiness, credibility, transferability, dependability, and confirmability were adhered to.

**Table 1. Risk factors for cardiovascular disease**

| Risk factor | Criteria |
|---|---|
| Age | Men ≥ 45 years, women ≥ 55 years |
| Family history | Myocardial infarction, coronary revascularisation, or sudden death before 55 years of age in father or other 1st-degree male relative, or before 65 years of age in mother or other 1st-degree female relative |
| Smoking | Current cigarette smoker, or having quit within the previous six months, or exposure to environmental tobacco smoke (second-hand smoke) |
| Physical activity | Not participating in at least 30 minutes of moderate-intensity physical activity at least three days/week for at least three months |
| Obesity | Body mass index ≥ 30 kg/m$^2$, or<br>Waist girth > 102 cm for men, > 88 cm for women |
| Hypertension | Systolic blood pressure ≥ 140 mmHg and/or diastolic pressure ≥ 90 mmHg, or taking medication |
| Dyslipidaemia | Low-density lipoprotein (LDL) cholesterol ≥ 130 mg/dL (3.37 mmol/L), or<br>high-density lipoprotein (HDL) cholesterol < 40 mg/dL (1.04 mmol/L), or currently on lipid-lowering medication<br><br>If total serum cholesterol is all that is available, then ≥ 200 mg/dL (5.18 mmol/L) |
| Diabetes | A fasting blood sugar level less than 100 mg/dL (5.6 mmol/L) is normal.<br>A fasting blood sugar level from 100 to 125 mg/dL (5.6 to 6.9 mmol/L) is considered prediabetes. If it is 126 mg/dL (7 mmol/L) or higher on two separate occasions, then diabetes is present |

*Adapted from: Ryg, 2015*[8]

Approval to carry out the research project was granted by the Human and Social Sciences Research Ethics Committee at the University of the Western Cape (BM21/02/07) and the Chief Fire Officer at the COCTFRS Department.

## RESULTS

Data saturation occurred after the 12 interviews. Eleven of the 12 firefighters were male. Six were municipal firefighters (operations level) with 1–3 years of service, three were platoon commanders (middle management) with 15–20 years of service, and three were divisional commanders (high-level management) with more than 20 years of service.

### Workplace support for firefighters at risk of cardiovascular disease

Members of the COCTFRS participate in physical activities and make use of available exercise resources. While fire stations are equipped with on-site workout facilities like gyms, these are not fully utilised. The COCTFRS also conducts annual physical assessments and health screenings for all employees.

*"Annually, we undergo a physical evaluation. If you fail your physical evaluation, you are sent to physical training bootcamp to improve, become fit, and pass."* (P4)

*"At our workplace, we have a gym and all the necessary facilities to maintain a high fitness level, so I believe we are all above the required fitness level here."* (P3)

*"We will engage in drills such as situational drills involving throwing hoses, pulling tires, emptying water drums, carrying ladders, as well as weightlifting, cardio, and using a sledgehammer."* (P4)

*"At work, I'm forced to keep fit, otherwise I am going to let myself go and burn out very quick and fast. So, it keeps me up there with the young guys."* (P6)

*"Yes, the workplace supports us with sports time off. It's when you do anything sports related, to represent the COCTFRS. So, I used the time and competed in the Toughest Firefighter Alive 2014."* (P5)

*"I have access to time and gym space for exercise at work, but I have been ignoring it, although I make an effort every day."* (P4)

*"I like to go on courses, to learn more about exercise and study other things. Things have been set back because of COVID so I'm going to relook at it soon."* (P6)

Annual fitness assessments include the Physical Ability Test, which comprises six tasks: stair climb, charged hose drag and pull, forcible entry, equipment carry, ladder raise and extension, and rescue drag. Firefighters must complete the simulation protocol in nine minutes (540 seconds) to pass the test.[10]

### Workplace accommodation for firefighters at risk of cardiovascular disease

While firefighters are cognisant of the services offered by the COCTFRS, many fail to take advantage of the available training facilities due to a lack of exercise prescription. All firefighters are required to see the COCTFRS medical doctor before being declared fit for duty. In this way, the COCTFRS supports firefighters at risk of developing CVD.

*"The workplace accommodates us by providing services like the chaplain and medical doctor if we don't feel well and need medical screening."* (P4)

*"We get time off to use the exercise facilities and gyms to help us with our BMI and reduce our blood pressure."* (P6)

*"I don't know what exercise I can do to lower my blood pressure, I'm sure there are more firefighters with CVD that do not know what exercises to do while on medication."* (P4)

*"At times we are sick and cannot exercise regularly, so we get off when we are ill, and perform light duty in the station, but we need someone to help us with the exercises."* (P1)

*"We have the option to call for the chaplain, who will respond to on-site incidents at the fire station."* (P5)

*"Not everyone is clear on the light-duty job tasks, but we do get help from the commanders."* (P2)

Although many of the participants were aware of the resources and facilities available to them, not all were knowledgeable about the exercises to do whilst on medication. The participants strongly recommended that physical activity interventions be implemented for firefighters with CVD risks, and that exercise trainers be established within fire departments.

### Operational recommendations by study participants

Obstacles to engaging in physical exercise included the perception that working out could be detrimental to the participants' health. Many felt uneasy about exercising on their own and requested supervised workout sessions, led by healthcare professionals. Participants encouraged the COCTFRS to arrange group fitness activities away from the fire stations to enhance motivation among firefighters, requested the resumption of sports and meals to boost morale, and indicated that psychological services needed improvement.

*"Organising a weekend morning fitness camp with multiple stations for group participation would be more motivating than solitary exercise at a station."* (P4)

*"Previously, fire and police departments competed in soccer, cricket, rugby, and netball, activities we eagerly anticipated and trained for as firefighters. However, everything, including meals, came to a halt. Resuming these sports and meals will significantly boost our morale."* (P6)

*"The COCTFRS offers competent psychological services, but the system is flawed. We lack feedback in debriefings, and one-on-one sessions are preferred over group sessions. I'm contemplating consulting a psychologist."* (P6)

*"Not all fire stations are equipped with gym facilities and pools, which is why those with such amenities are underutilised compared to when we were young firefighters. Currently, it appears that the personnel are less motivated to use the gym and pool regularly."* (P9)

*"Yes, I believe that one of the mistakes we made in the past was focusing too much on structured exercise like going to the gym. We need to stay productive, which is a message I am urging the firefighters near me to embrace."* (P8)

*"If you have an entire day or an eight-hour workday, make sure to take action by cleaning the engine bay, wiping equipment, painting, or pulling weeds in the garden. Currently I'm seated for long periods and living a very inactive lifestyle."* (P8)

### Recommendations for support made by study participants

Participants recommended that the employee wellness programmes (EWPs) build and maintain physical activities to improve quality of life, available to new recruits, incumbents, and retirees. Components of such an EWP should include medical evaluation, fitness, injury/fitness/medical rehabilitation, behavioural health, diet, and data collection.[4,5] The EWP should be crafted to enhance the overall wellbeing of firefighters, while demonstrating the benefits of allocating resources to wellness initiatives. This can be achieved by highlighting the substantial cost effectiveness of implementing a holistic wellness-fitness programme, related to work absences, workers' compensation claims, and disability payments.[11]

*"To start with, make sure to consume plenty of water. Avoid excessive alcohol consumption, regardless of the stressors they may be facing, as using them as an excuse is not justified. They must assess their own lives. You get out what you put in."* (P6)

*"Staying active is vital as we age; management must facilitate opportunities while individuals need to prioritise physical and mental health."* (P8)

*"The programme focuses on assessment, physical activity, and dietary intake. Firefighters now bring their own meals, affecting access to healthy options. A balanced approach to health is essential for wellbeing."* (P9)

Several participants discussed the lifestyle changes needed to encourage healthy habits in the COCTFRS. Cognitive-behavioural therapy is a crucial element of interventions aimed at modifying behaviour.[12] These behavioural changes concentrate on altering an individual's perspective on nutrition, his/her physical activity actions, and the situations around him/her, as well as adjusting his/her way of living.[13]

## DISCUSSION

The participants in this study engaged in physical activity and utilised the resources provided to maintain physical fitness and mitigate their risks for CVD. Although most were aware of the services provided, many of them did not use them and requested assistance to do so. They preferred activities that involve team training, outdoor activities outside of the fire station, and the use of health professionals such as psychologists and exercise professionals to assist them to modify their behaviour. Research indicates that the use of fitness equipment improves health outcomes, enhances physical fitness, and reduces risk for CVD.[14-16]

Only a few fire departments have implemented comprehensive fitness programmes in South Africa. Studies in the USA suggest that workplace wellness-fitness programmes are a valuable investment for fire departments, potentially reducing costs and enhancing firefighters' physical condition and mental wellbeing.[16-18] Fahy (2005) reported that sudden cardiac death was the primary cause of fatalities in firefighters,[18] and Kales et al. (2003) reported that the majority of on-duty CVD-related deaths were triggered by work and occurred in firefighters with pre-existing coronary heart disease.[16] Firefighters not participating in health and wellness initiatives exhibit poor health outcomes, decreased morale, reduced efficiency, and increased healthcare expenses.[11,19-21]

The Fire Brigade Services Act: White Paper on Fire Services (2020) references the Occupational Health and Safety Act No. 181 of 1993, which states that as soon as an employer considers an employee to be disabled, the employer must take steps to accommodate that employee unless this results in an unjustifiable hardship.[22,23]

Although the firefighters at risk of CVD, who participated in this study, were provided with accommodations and support in the workplace to engage in physical activities, they perceived that exercise was potentially hazardous to their health and lacked motivation. Supervised training sessions with health professionals would alleviate the discomfort of exercising independently. The COVID-19 pandemic presented an additional barrier to exercise, as

firefighters reported that fatigue and illness limited their exercise time. Despite the physical demands of their occupational responsibilities, many firefighters reported being sedentary for extended periods due to the nature of their jobs. This is not true for all, however, as many engage in physical activity at the start of their shifts, between fire calls, or during 'off time'. Nevertheless, it is necessary to implement mandatory fitness and holistic wellness programmes throughout the COCTFRS.

Policy-makers and local union representatives should collaborate to establish mutual agreements to combat CVD in the fire service through wellness strategies, focusing on fitness, medical care, rehabilitation, and behavioural health. A mandatory exercise regimen would reduce the overall incidence of injuries, the severity of injuries, and worker compensation claims.[11,14,21]

Fighting fires and conducting rescue operations requires power, strength, and both muscular and anaerobic/aerobic endurance. Physical fitness results in fewer injuries, better health, less absenteeism, and increased productivity.[11,14,20] Education about heart disease, support for exercise, and counselling to improve health can reduce anxiety related to heart disease.

The findings from this study strongly suggest that firefighters do understand their heart health and can offer advice to other firefighters regarding CVD. Fitness programmes need to be tailored to fit the needs of individuals and the culture of the fire department, focusing on functional abilities, teamwork, fitness, and overall wellbeing.[15,24] Firefighters are tactical athletes, and training programmes should include combat readiness. Functional exercise training regimens that mimic the movements firefighters use in daily tasks such as lunging, squatting, hinge movements, pull exercises, bracing, rotation, and pressing are recommended.[25,26] Tactical athletes use all facets of strength, power, speed, and agility to improve their combat fitness level to their highest potential.[24,25]

## LIMITATIONS

During the data collection period, firefighters were considered to be frontline essential workers in the fight against COVID-19. Many firefighters were infected with COVID-19, which created a staff shortage and caused several shift work changes. The restrictions that were put in place to combat the Pandemic affected participation in the study, as several firefighters were ill, on duty, or not willing to meet in person or in groups at the risk of infection. Data collection also coincided with the peak fire season (September–April), which further reduced the number of potential participants.

## CONCLUSION

The COCTFRS assists firefighters to reduce their CVD risks by providing medical care and exercise training facilities. To improve physical fitness and reduce work-related fatalities, the COCTFRS should collaborate with health experts, key stakeholders, and decision-makers to establish health promotion initiatives. Firefighters should engage in at least 150 minutes of physical activity a week. Engaging in physical activities and receiving relevant education can improve fitness, strength, and endurance, and reduce the risk for CVD. This will also benefit the public that is served by firefighters.

## KEY MESSAGES

1. The City of Cape Town Fire and Rescue Service (COCTFRS) supports firefighters at risk of cardiovascular disease (CVD), by providing resources to encourage physical activity.
2. Assisted physical training programmes will motivate firefighters with CVD risks to improve their fitness levels.

## DECLARATION

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

## ACKNOWLEDGEMENTS

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## AUTHOR CONTRIBUTIONS

Conception and design of the study: GA, CE, LL, JK
Data acquisition: GA, CE, LL, JK
Data analysis: GA, CE
Interpretation of the data: GA, CE
Drafting of the paper: GA, CE, LL, JK
Critical revision of the paper: GA, CE, LL, JK

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# Occupational health and safety for the informal worker: whose responsibility is it?

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During the 34th International Commission on Occupational Health (ICOH) 2024 triennial congress in Marrakech, Morocco, extensive attention was given to the plight of informal and migrant workers across the globe. What is the informal economy? Who is an informal worker? These were some of the questions raised. According to the International Monetary Fund (2021), the informal economy is a worldwide phenomenon that is growing at an unstoppable rate.[1] The International Labour Organization (ILO) estimates that 2 billion people, or 60% of all employed people in the world, work in the informal economy, even if occasionally.[2] Therefore, understanding the scale, impact, and challenges that the informal economy presents is crucial for countries when developing relevant policies, specifically in relation to occupational injuries and diseases.

Factors such as artificial intelligence, changing demographics, and the COVID-19 pandemic significantly changed the world of work.[3] Technological advances, such as chatbots that have replaced customer-service workers, led to millions of job losses.[3] This exacerbated inequality and increased job insecurity. However, digital platforms also created new and varied jobs, such as food deliveries and taxi services, work-from-home opportunities, and many others. All these changes imply that new occupational health and safety (OHS) hazards are emerging.

Chen (2012) states that the informal economy initially referred to independent contractors that worked for small, unregistered businesses.[4] However, the informal economy now comprises a diverse range of businesses, jobs, industries, and workers that are not subject to government regulations and protection. According to Deléchat and Medina (2020), the informal economy has market value and contributes to the gross domestic product (GDP) of countries.[5] In lieu of this, who then is an informal worker? The informal economy is often branded as 'illegal' or 'underground'. These terms are used to describe unethical and unlawful activities, which puts workers in the informal sector at risk of exploitation.

Informal workers, such as street vendors, are typically not under the auspices of government control or regulation. Their work practices are inherently unpredictable and unregistered. It is, therefore, challenging for them to embrace most regulations that are pertinent to the formal sector.[6] Laws that deal with environmental health and safety, and preventive measures to reduce occupational dangers for informal workers, are often disregarded. Even though international laws protect the OHS rights of informal workers, national laws commonly exempt informal workers from that protection.

Workers in the informal economy make money to provide for their families. However, they frequently operate in hazardous environments.[7] For example, street vendors often struggle to get access to clean water, and waste pickers often handle hazardous materials without using appropriate personal protective equipment (PPE). Under these conditions, OHS regulations, including those related to electrical and fire safety, and the use of PPE, are regularly ignored. Access to sanitation, ergonomic tools, and immunisations is essential to workers in informal employment, as the lack thereof leads to illnesses and injuries. However, these workers have poor control over their physical work environments, limited access to adequate training, and little control over their working hours. This predisposes them to injuries, psychological stress, and poor mental health outcomes as they often work in environments that are not governed by legislation.[8] Bamu-Chipunza (2018), in a study in South Africa, found that some of the major health and safety challenges within the informal economy included ergonomics, psychological dangers, and general safety.[9]

According to a report published by Kamau et al. in 2019, vendors in Durban, South Africa, were spending approximately 12% of their daily earnings on water and toilet use.[10] The absence of fundamental OHS regulations also indirectly affected workers' incomes. Vendors were forced to work long hours to make up for income lost while searching for adequate water and sanitation. Informal workers have limited access to healthcare services, as they cannot afford to wait in a primary healthcare facility during working hours.[11] Healthcare has become increasingly expensive. Workers, worldwide, fall into debt by having to pay for their treatment of diseases and injuries sustained in their working environments.

There is a global move towards evidence-based policies to improve the health and wellbeing of workers in the informal economy. The emphasis is on expanding access to primary and occupational healthcare. Health ministries of the World Health Organization (WHO), and national health systems, are responsible for providing health services to workers in the informal economy to prevent work-related injuries and diseases.[11] In South



**Waste pickers often handle hazardous materials without using appropriate PPE** *Image: courtesy of www.weforum.org*

Africa, the National Institute for Occupational Health (NIOH) is undertaking research in the informal sector in workers such as waste pickers.

If the informal economy is indeed expanding and contributing to GDPs, it would serve countries well to calculate the financial burden of ignoring the impact of occupational injuries and diseases amongst these workers. It is reasonable to conclude that national OHS policies should also apply to workers in the informal sector, and that the governments should drive such policies.

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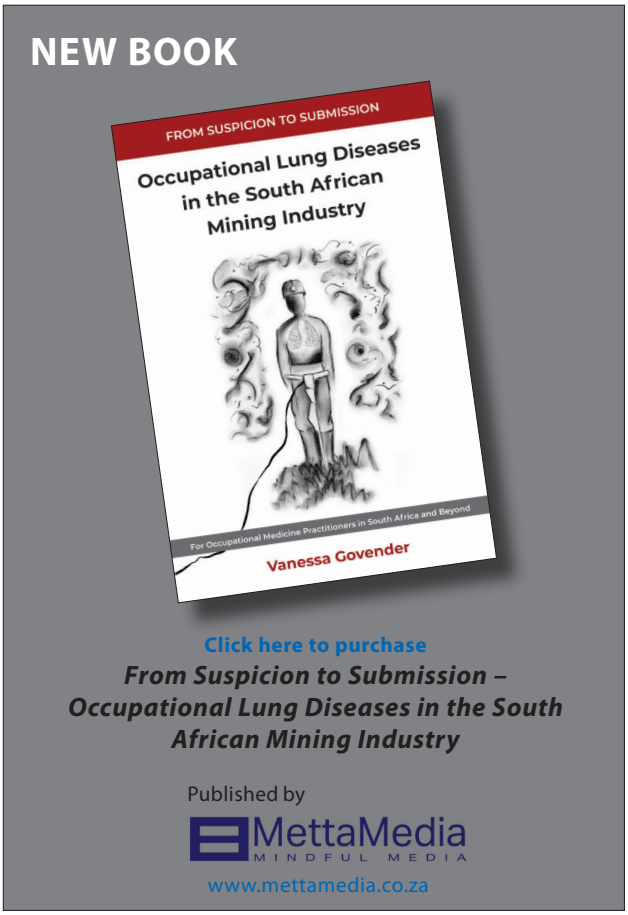
# Save the date for Securex South Africa, A-OSH EXPO, FM Expo, and Firexpo in Cape Town

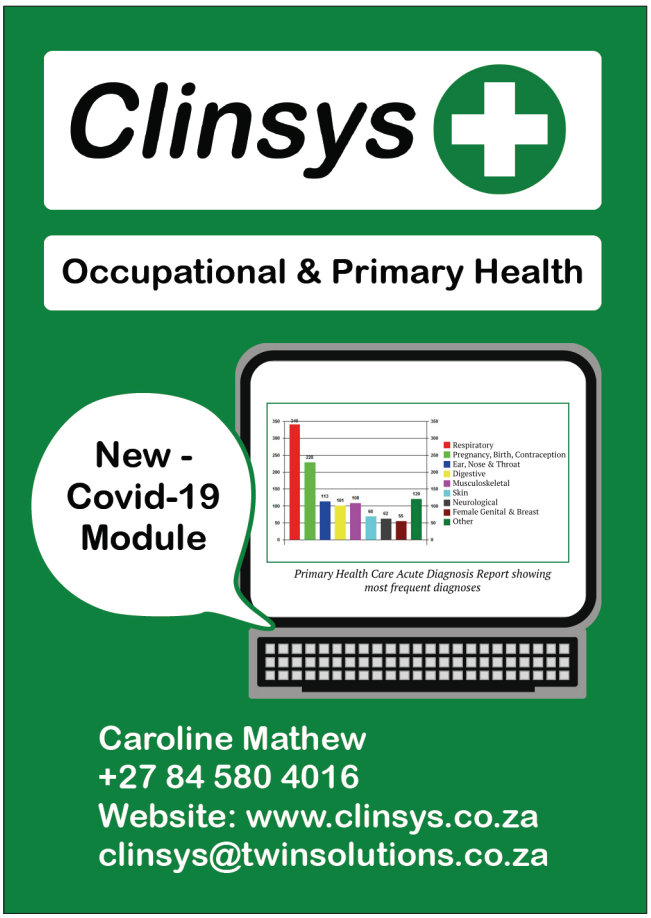
Specialised Exhibitions – a division of Montgomery Group – will be launching Securex South Africa, A-OSH EXPO, Facilities Management Expo, and Firexpo in the Western Cape in 2025. Taking place from 21 to 23 October, the four co-located trade shows will follow a similar format to their Johannesburg counterparts, which take place from 3 to 5 June at Gallagher Convention Centre.

The security market in the Western Cape is expanding rapidly, driven by technological advancements and rising crime rates. Economic growth and urbanisation in the region are also contributing to the increasing demand for advanced security solutions. Several Johannesburg-based security companies recently extended their operations into the Western Cape to meet this growing need. This shift from Johannesburg to the Western Cape is fuelled by both market demand and the integration of cutting-edge security technologies, such as AI and enhanced surveillance systems.

*"With this in mind and reinforced by the Western Cape Government's implementation of focused safety initiatives – including the Law Enforcement Advancement Plan (LEAP), which has successfully lowered crime rates in certain hotspots – we took a strategic decision to introduce our current winning formula for the four co-located shows into the Western Cape. This sentiment for a Cape Town-based event is echoed by the growing number of occupational safety and health (OSH), facilities management, and fire safety companies in the Western Cape. The event will provide these Western Cape companies with an unrivalled opportunity to showcase their products and services to a captive local audience actively seeking high-quality solutions"*, says Mark Anderson, Portfolio Director at Specialised Exhibitions.

Organisations wishing to exhibit at Securex South Africa, A-OSH EXPO, Facilities Management Expo, and Firexpo in the Western Cape in 2025, can contact the Securex South Africa team at zelda.jordaan@montgomerygroup.com or dijan.vandermerwe@montgomerygroup.com to book a space or capitalise on a sponsorship opportunity.

# SASOM News

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## SASOM National Roadshow 2024 – Session 3

Following the first two sessions of the National Roadshow in July and August 2024, in lieu of its annual congress, the South African Society of Occupational Medicine (SASOM) held its third and final session in hybrid format, hosted by the SASOM KwaZulu-Natal (KZN) Chapter, at Incredible India Restaurant and Conference Centre, the Pearls of Umhlanga, Durban, on 16 October 2024. The annual general meeting (AGM) of the SASOM KZN Chapter followed in the evening and was facilitated by the Chapter Co-chairs, Drs Rakesh Goordeen and Basil Dhaniram.

The final Roadshow session was themed *Duties and responsibilities of occupational medicine practitioners*, in line with the broader Roadshow theme, *Occupational medicine is a highly specific discipline in workers' health*. The session was chaired by Dr Goordeen, and three invited speakers delivered presentations:

- Dr Jan Lapere (private practitioner – occupational medicine, medico-legal and social labour law, Gqeberha, South Africa) presented 'The occupational medicine practitioners' (OMPs') competency, functions and duties assisting employees and employers with occupational health matters'. He commented on the OMP's obligation to assist employers with the planning, implementation, evaluation, and ongoing health and safety risk controls in the workplace. Dr Lapere also discussed how, in current practice, many employers' inappropriate choices of service providers, and lack of resources to protect the health and safety of employees, leads to unsafe workplaces, and illegal and unethical practices.
- Dr Sujatha Hariparsad (consultant/lecturer – Discipline of Occupational and Environmental Health, University of KwaZulu-Natal (UKZN), Durban, South Africa) presented 'Mercury toxicity: a burden to bear in the struggle to maintain duties and responsibilities of OMPs'. She discussed how mercury has been proven to have long-standing latent effects on exposed workers and communities and that, although decades have passed since exposure in the region, many people are still affected by the sequelae of mercury toxicity, whether community members or workers. Mercury continues to be a global pollutant and has become increasingly predominant in the occupational setting, more commonly in the artisanal mining sector. Dr Hariparsad stressed that it is the duty of OMPs to have greater awareness and suspicion of chemical toxicity, especially in cases where toxins can have such detrimental health effects.
- Dr Christel T Nagoorsamy (sessional lecturer – Discipline of Occupational and Environmental Health, UKZN, Durban, South Africa) presented 'The effects of SARS-CoV-2 infection on occupational functional status: optimising return to work programmes in the post-COVID-19 era'. She shared the findings of a cross-sectional study conducted at a tertiary hospital in eThekwini Health District, KZN to determine the relationship between SARS-CoV-2 infection, post-COVID-19 condition, and occupational functional status among healthcare workers 12 months post-infection. She showed that a considerable number had at least one symptom of the post-COVID-19 condition, and increased overall work impairment. The findings are relevant regarding the return to work of employees experiencing impaired occupational functional status and reduced work ability post SARS-CoV-2 infection, and OMP recommendations are critical for adaptative workplace interventions that promote job retention.

The 25th anniversary of the Diploma in Occupational Health (DOH) programme at UKZN was marked with a celebratory tea and cake gathering for on-site attendees. The event was presided over by Prof. Rajen Naidoo (Head of the Discipline: Occupational and Environmental Health, UKZN).

The SASOM Roadshow sessions were accredited for continuing professional development (CPD) points by the South African Medical Association (SAMA), and contributed to the enhancement of occupational health standards and practices. The Roadshow was organised in hybrid and online formats in response to the many concerns raised by OMPs regarding service provision by non-OMPs, convoluted and illegal business settings, and unethical practices in the field of occupational medicine.




## SASOM as an affiliate member of ICOH

SASOM has renewed its affiliate membership with the International Commission on Occupational Health (ICOH) for the current triennium (2024–2027), and continues to be the only ICOH affiliate member in Africa. To this end, it endeavours to keep its members and other occupational health practitioners in South and southern Africa, and across the rest of Africa, informed about ICOH events and news from the global occupational health arena. Examples include the publicising of ICOH and other occupational health and safety (OHS) events, and reports on events attended by its members. Below is a

non-exhaustive list of links to the type of information shared with members and readers of *Occupational Health Southern Africa*, over the past two triennia (2018–2022, 2022–2024):

ICOH2018 Congress, Dublin, Ireland:
https://www.occhealth.co.za/_assets/articles/313/1873.pdf

Joint SASOM-MEDICHEM Congress 2019, Johannesburg, South Africa:
https://www.occhealth.co.za/_assets/articles/327/1987.pdf

OCCUCON 2020, Mumbai, India:
https://www.occhealth.co.za/_assets/articles/333/2102.pdf

ICOH2022 – The Melbourne-Rome Global Digital Congress (virtual event):
www.icohweb.org/site/multimedia/news/pdf/ICOH%202022%20-%20CONGRESS%20REPORT.pdf
https://www.occhealth.co.za/_assets/articles/347/2385.pdf
https://www.occhealth.co.za/_assets/articles/348/2414.pdf

ICOH2024 Congress, Marrakesh, Morocco:
https://www.occhealth.co.za/_assets/articles/345/2343.pdf
https://www.occhealth.co.za/_assets/articles/349/2432.pdf
https://www.occhealth.co.za/_assets/articles/352/2479.pdf
https://www.occhealth.co.za/_assets/articles/353/2496.pdf
https://www.occhealth.co.za/_assets/articles/353/2495.pdf
https://www.occhealth.co.za/_assets/articles/355/2525.pdf
https://www.occhealth.co.za/pdf/ICOH2024_Congress.pdf

ICOH midterm meetings:
https://www.occhealth.co.za/_assets/articles/256/1783.pdf
https://www.occhealth.co.za/_assets/articles/332/2075.pdf
https://www.occhealth.co.za/pdf/links/Bella_Roma.pdf
https://www.occhealth.co.za/_assets/articles/350/2449.pdf

For more information on OHS events (ICOH and non-ICOH), please access the 'Events' page on the ICOH website as events are loaded frequently by the webmaster. Occupational health and safety colleagues are also welcome to submit information on their upcoming events on the 'Events' page: www.icohweb.org

## ICOH webinar series – a new offering, free to members

The ICOH webinar series, covering a wide range of topics in occupational health, was launched on 21 October 2024 with the maiden webinar titled, 'Connection from occupational practice to research and global evidence: an ICOH webinar for practitioners'. The aim of this first webinar was to provide some important points for practitioners who are less experienced in research: a basic presentation on assisting with communication (key elements of presentation abstracts), and how to use (and contribute to) reports for agencies, social media databases, and networks. Registered participants have access to the recordings of the webinars, which are accredited for CPD points. ICOH members in good standing have free access to the webinars as an additional benefit of their membership. Non-ICOH members will be charged a small fee for participation.

The decision to establish a structured programme for the ICOH webinar series is an important contribution to the ICOH mission for the promotion of scientific progress, knowledge, and development of OHS, in all its aspects. ICOH operates according to the principle of the overriding importance of increasing the knowledge of members – who are the OHS experts – to enable them to face the rapidly changing world of work. It is hoped that the ICOH webinar series will contribute to the CPD of colleagues around the globe, and become a valuable channel for exchanging knowledge and experiences.

## New and renewed ICOH membership

ICOH members are reminded that their membership fees for the current triennium (2024–2027) are due. New applicants and returning members can access more information on the ICOH website and follow the instructions for submitting applications for ICOH membership: https://www.icohweb.org/site/members.asp. Should you have any queries about ICOH membership and the procedure for submitting an application, please contact the ICOH National Secretary for South Africa, Claudina Nogueira (2024–2027): claudinanogueira@hotmail.com

## ICOH national secretaries from the 'Global South' collaborate to host a webinar on 'OHS in mining'

The ICOH National Secretary (NS) for Colombia, Dr Diana Cuervo, organised and hosted a webinar titled, 'Occupational health and safety (OHS) in mining: an overview of management, legislation, and current challenges in low- and middle-income countries (LMICs)', with collaboration and support from the following ICOH NSs – Dr Adolfo Hernández (current NS) and Prof. Dr Claudio Taboadela (past NS) from Argentina; Dr Norvil Mera Chú from Peru; and Claudina Nogueira from South Africa.

The free webinar was held on 21 September 2024 as an ICOH collaboration from the 'Global South', with two presentations in English and two in Spanish. Approximately 70 participants attended the full webinar and the links to the recordings of the individual presentations are indicated below, in the programme. The opening and closing messages of the webinar, as well as the introduction to the presenters, are captured in one recording.

The webinar programme:

- Dr Diana Cuervo – Welcome in English and Spanish and introduction to the webinar and the NSs collaborating on the webinar https://youtu.be/TAkzQMk3t3Q
- Dr Adolfo Hernández – Brief introduction of each speaker in English and Spanish https://youtu.be/TAkzQMk3t3Q
- Speaker 1 – Claudina Nogueira – 'ICOH Scientific Committees (SCs) in a nutshell, with a special focus on the SC on Mining Occupational Safety and Health (SC MinOSH)' https://youtu.be/HIN24cI_Uws?si=rpuI3j5SsCHypAPR
- Speaker 2 – Yolanda Beltrán (Colombia – Secretary of the National OHS Commission of the Mining Sector, Occupational Risk Directorate) – 'Advances in the mining sector in Colombia' https://youtu.be/THgaj64PdiU?si=2yHwgBK5g8x59iRf
- Speaker 3 – Dr Thuthula Balfour (South Africa – public health and occupational medicine specialist working in mining) – 'Prevention culture in the mining industry: a female perspective from the African region' https://youtu.be/dPphyH9gfFU?si=zNno-mJq-1imF2f2
- Speaker 4 – Mirella Bernal (Peru – lawyer and OHS expert in mining) – 'Mining in Latin America: comparison between selected countries in the region, including informal mining' https://youtu.be/K2pfKvGw6Vg?si=XwlDx5SFaPnfTfJx
- Dr Norvil Mera Chú – Wrap-up with closing remarks, and vote of thanks https://youtu.be/TAkzQMk3t3Q




Main take-home messages from the webinar:

- ILO Convention 176 has garnered positive impact on Latin American legislation. Despite recent improvements, current OHS legislation in Latin America still has challenges, especially in underground mining, such as defining working time, shift-work, and resting time for workers, changing the safety culture, and eliminating restrictions on women working in mining.
- In Colombia, there is a National Committee of Safety and Health at Work for Mining, which works towards developing new policies and national programmes in OHS along five strategic thrusts. Job accidents in underground mining are still a challenge, and are mainly caused by the polluted atmosphere and geo-mechanical failures. Working in education and training has contributed to improving accident prevention and OHS management systems.
- In Peru, the main challenges in mining are the definition (medical and legal) of 'occupational disease', under-reporting of job accidents, gender (in)equality, informal sector workers, and OHS management in contracting companies and providers. The Ministry of Health is currently working on identifying carcinogenic agents in the work environment.
- In South Africa, mining is a significant contributor to the African gross domestic product (GDP), with big reserves of platinum, phosphate, and manganese, among other commodities. Rates of accidents are 6–7 times higher in small-scale than in larger formal mines. In artisanal mining, exposure to mercury, silica dust, and cyanide has a large impact on the development of occupational diseases. Prevention culture is a crucial aspect of OHS, with a focus on critical controls for hazards and applying 'bow-tie' analysis (a simple but powerful risk management tool) in industries. With modernisation of processes and work organisation, more women are entering the mining sector. They still have to deal with discrimination, violence, and other unfavourable working conditions and challenges, as in Latin America. Therefore, ongoing improvements in OHS policies and education programmes are needed.
- The ICOH SC MinOSH has made valuable contributions to global mining by organising conferences, webinars, and business meetings, and drafting regular newsletters to update their members on new information and publications in OHS in mining. In 2017, SC MinOSH members co-authored a comprehensive article titled, 'Safety and health in mining', which was published in three parts in *Occupational Health Southern Africa*. The publications are available from:
  https://www.occhealth.co.za/_assets/articles/256/1787.pdf
  https://www.occhealth.co.za/_assets/articles/257/1793.pdf
  https://www.occhealth.co.za/_assets/articles/258/1807.pdf

*Acknowledgement: The collaborators of this webinar would like to thank Dr Diana Cuervo, NS for Colombia, for personally covering the costs associated with the recordings and the translation of transcripts of the presentations.*

## News from the SASOM National Office

SASOM held its AGM and Conference on 9 November 2024 at the Vineyard Hotel in Newlands, Cape Town. The hybrid event, themed, *Occupational Health in the digital age: navigating the challenges,* was hosted by the SASOM Western Cape Chapter. A report will be published in the first issue of *Occupational Health Southern Africa* in 2025.

SASOM members can renew their memberships for 2025 through the SASOM member portal. New applicants can access more information on the website and follow the instructions for becoming members of SASOM: https://sasom.org/membership/

## Season's greetings from SASOM

As the festive season approaches, we are reminded of the importance of gratitude, mindfulness, hope, and reflection. SASOM extends its heartfelt wishes to all its members – and their families, friends, and communities – for a joyful, safe, and peaceful holiday season filled with health, hope, and countless blessings. Wishing you a Merry Christmas (or equivalent celebration) and may the New Year bring peace of mind, kind hearts, contented spirits, and success in all areas of life. SASOM remains dedicated and committed to supporting its members with excellence in occupational health and medicine. SASOM is also proud and delighted to continue the fruitful partnership with *Occupational Health Southern Africa*, a cornerstone of knowledge and resources in our region. Thank you for being part of our journey and our professional community. Together, let's make the coming year one of growth, impact, and shared achievements!



# SAIOH News

*The Southern African Institute for Occupational Hygiene (SAIOH) is dedicated to its members and the profession as a whole. As part of our commitment, we regularly share updates and developments with our members. The Institute exists for its members and relies on their involvement and ethical contributions in the field of occupational hygiene. To strengthen this bond, we encourage feedback and input from members on the matters discussed, ensuring a collaborative and member-driven approach to our Institute.*

## SAIOH PRESIDENT'S ADDRESS

**Naadiya Mundy:** SAIOH President
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**Naadiya Mundy**
*Photograph: courtesy of SAIOH*

The current Council's term is ending – a poignant moment as we bid farewell to the outgoing members who leave behind a legacy of enthusiasm for SAIOH and occupational hygiene, driving excellence and individuality. Their creativity, positivity, and passion energise the Institute. Although their terms have ended, the members remain impactful – Immediate Past President, Chair, and Council members. This also marks the beginning of a new era of opportunities and possibilities.

### Decoding the pathophysiology of noise-induced hearing loss: insights into interventions

Noise-induced hearing loss (NIHL) is sensorineural auditory damage that results from prolonged or acute exposure to high noise levels.[1] It primarily affects the inner ear structures, notably the cochlear hair cells, which are responsible for converting sound waves into electrical signals. Damage to these cells leads to permanent loss of hearing sensitivity.

Imagine a dandelion, a fluffy, delicate flower made up of hundreds of tiny white seeds. With the slightest breeze, the seeds take flight, drifting away on the wind. Now, picture your inner ear as that dandelion. Every tiny hair cell inside your cochlea is like one of those seeds, soft and fragile, essential for catching and converting sound vibrations into signals that are interpreted by your brain. When exposed to noise – on a construction site, from factory machinery, or at a concert – the effect is the same as a strong gust of wind blowing against that dandelion. The more intense the wind, the more seeds are scattered and lost. Once those seeds are gone, they do not come back. Just like a dandelion missing its seeds, the inner ear, once damaged by loud noise, cannot regenerate its hair cells. As noise exposure continues, more of the delicate seeds are lost and your hearing slowly fades. It's not immediate, like a sudden storm wiping the dandelion clean of all its seeds, but rather a gradual loss of your hearing ability. Each gust – each burst of loud noise – takes a few more seeds until, eventually, you've lost a large proportion of that once-fluffy dandelion.

The biological mechanisms responsible for this type of hearing loss, known as the pathophysiology of noise, involve complex processes within the auditory system. Understanding these processes is crucial for preventing and mitigating the risks associated with noise exposure. This mechanical damage is a critical factor in the development of NIHL.

Noise-induced hearing loss is associated with a variety of factors – environmental, physiological, genetic, and lifestyle. Loud noise induces hearing loss through several mechanisms: mechanical damage to cochlear structures,[2] decreased blood flow, sterile inflammation, and oxidative stress, alongside excitotoxicity as a result of overstimulation of hair cells and nerves.[1] The severity of damage from noise exposure is influenced by several factors, including characteristics of the sound stimulus such as intensity, spectral energy, and duration, and the physical, mechanical, and chemical properties of the outer, middle, and inner ear.[3] The middle ear, which includes the tympanic membrane and ossicular chain, amplifies sound waves for transmission to the inner ear. However, exposure to high-intensity noise can cause mechanical damage to these structures, leading to impaired sound transmission and increased vulnerability to further auditory injury.[3] In the inner ear, the cochlea converts sound waves into neural signals. According to the widely supported travelling wave theory of cochlear mechanics, different regions of the basilar membrane are stimulated based on sound frequency. This is because sound waves create a displacement wave that travels from the base to the apex of the cochlea.[3] Exposure to loud noise can lead to cochlear synaptopathy, characterised by the loss of synapses between inner hair cells and auditory nerve fibres, resulting in difficulties in hearing, particularly in noisy environments, and symptoms such as tinnitus and hyperacusis. The combined effects of mechanical damage in the middle ear and cellular damage in the inner ear highlight the complex pathophysiological processes underlying NIHL, underscoring the importance of protective measures and interventions to mitigate hearing loss.

Noise-induced hearing loss presents primarily as temporary threshold shifts (TTS) or permanent threshold shifts (PTS). The former occurs after short-term exposure or acoustic trauma, and recovery is typically within a few days. It is caused mainly by the reversible uncoupling of outer hair cell stereocilia from the tectorial membrane, although synaptopathic mechanisms may also play a role.[2] In contrast, PTS results from chronic noise exposure or trauma, leading to irreversible loss of outer hair cells, particularly at the cochlea's basal turn, followed by degeneration of the auditory nerve.[2]

Noise-induced hearing loss arises from the interplay of genetic and environmental factors, adhering to the equal-energy principle, which posits that equal amounts of noise exposure – whether high levels over a short duration or lower levels over an extended period – cause similar cochlear damage.[3]

Understanding the mechanisms and effects of NIHL is essential for the implementation of occupational hygiene interventions because they inform risk assessment and prevention strategies. Recognising noise as a toxin, with acute and cumulative effects,

allows occupational hygienists to implement effective control measures, e.g. engineering controls, administrative changes, and the use of personal protective equipment (PPE) to minimise exposure. Awareness of TTS and PTS enables the development of monitoring programmes to detect early signs of hearing loss, facilitating timely intervention and management. Educating workers about factors that contribute to NIHL empowers them to take proactive measures for their hearing protection. Additionally, knowledge of the underlying pathological processes involved in NIHL can lead to innovative interventions and research into effective protective strategies.

*This is Naadiya's final piece in this newsletter, marking the culmination of her presidency. Karen du Preez will take over the reins as she assumes the position of SAIOH President in 2025.*

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## NATIONAL COUNCIL FEEDBACK

**Naadiya Mundy:** SAIOH President
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Two SAIOH Management Board meetings took place on 30 July 2024 and 1 October 2024, respectively. The third SAIOH National Council was held at the SAIOH Conference in Gaborone on 22 October 2024. SAIOH Council members have had a busy few months with numerous meetings. Some of these interactions included the revamping of SAIOH's website, organising the 2024 SAIOH Annual Conference, committee meetings, and discussions with Prof. Johan du Plessis of North-West University (NWU) regarding the development of SAIOH's ethics course. Meetings also took place to evaluate SAIOH fellow award nominations, the SAIOH 2023 Annual Awards, and administrative staff meetings.

The SAIOH Management Board hosted the Department of Employment (DEL)/SAIOH/Occupational Hygiene Approved Inspection Authority (OH AIA) Association liaison meeting on 6 September 2024. Management also attended the South African National Accreditation Authority's occupational hygiene Special Technical Committee, where it was announced that four new occupational hygiene technical assessors had qualified.

The Southern African Institute for Occupational Hygiene participated in the *Occupational Health Southern Africa* Editorial Board meeting in November, and Naadiya attended the ongoing meetings with Workplace Health Without Borders (WHWB), the International Occupational Hygiene Association (IOHA), and occupational hygiene organisations to discuss strategies concerning the threat to occupational hygiene, worldwide.

### Strategic plan

The current SAIOH strategy (5-year) plan is steered by Jaco Pieterse. The strategy is discussed, and progress thereof is evaluated, at each monthly SAIOH Management Board and quarterly Council meetings.

### Ethics

NGO Law is moving forward with the legal review of SAIOH's ethics policy and procedures. This development is time-sensitive as it enables the Ethics Committee to commence its tasks. The ethics plan is important within SAIOH's overall strategy, emphasising its vital role in achieving key objectives.

From 1 January 2023, all SAIOH-certified members are required to provide proof that they have completed an acceptable occupational hygiene ethics training course. A one-year phase-in period was allowed during 2022. Terry McDonald, from the British Occupational Hygiene Society (BOHS), presented professional development courses (PDCs) at the 2021 and 2022 annual conferences, and again on 25 July 2024. These online seminars are available to purchase.

### SAIOH branch activities

The Western Cape branch has had two online meetings. Patrick Baleseng, Chair of the Botswana Association for Occupational Hygiene (BAOH), discussed occupational hygiene in Botswana and the plans for the SAIOH-BAOH Conference in Gaborone. The Western Cape's new Branch Committee was elected; Vuyiseka Zikolo is the new Chair. We welcome Vuyiseka to the SAIOH family.

The Gauteng branch hosted its third meeting in September. Discussion topics included 'Mechanics covered in hexavalent chromium' by Chris Warnick (USA), and 'Life of an occupational hygienist living and working in Europe' by Elaine van der Nest (the Netherlands).

The Botswana branch (BAOH) and the BAOH conference team met on 12 August 2024 to discuss and prepare for the SAIOH 2024 Conference, which took place in Gaborone in October 2024.

Unfortunately, the Central (Free State and Northern Cape), Northwest (Potchefstroom and Rustenburg), and Mpumalanga branches remain inactive.

### SAIOH 2024 Annual Scientific Conference

The SAIOH 2024 Conference, in partnership with the BAOH, took place from 21 to 24 October at the Phakalane Golf Estate Convention Centre in Gaborone, Botswana. This was the first SAIOH annual conference held outside South African borders.

### Conference highlights

***PDC 1: Advance cab theory training workshop***, facilitated by Jeff Moredock (ISEEE, USA) over two days

The workshop covered international standards, real-world case studies from industry, the National Institute of Occupational Health and Safety (NIOSH), the International Society of Environmental Enclosure Engineers (ISEEE), and current research for an in-depth review of engineering controls, testing requirements and procedures, performance metrics, and administrative controls necessary for integration of an environmentally controlled operator enclosure into an occupational health and safety management system in mining and mineral processing. The workshop incorporated a fully functional teaching cab to demonstrate how cabs work to protect operators and why they fail to do this. ISO 23875, the international cab air quality standard, was studied as a means to comply with the 25 ug/m$^3$ crystalline respirable silica dust exposure threshold.

***PDC 2: PCC webinar on how to prepare for SAIOH assessments***, facilitated by Dr Johan Schoeman and Jaco van Rensburg
Attendees were provided with a comprehensive overview of the SAIOH Professional Certification Committee's (PCC's) certification system, accredited by the South African Qualifications Authority (SAQA) and IOHA. The PDC covered the requirements and reasoning behind accreditation and clarified the certification process. The methodology for future assessments was presented, and the advantages of becoming a SAIOH-certified member were highlighted.

***PDC 3: Occupational hygiene statistics: data analysis and interpretation***, facilitated by Garth Hunter, Dr Greg Kew, and Deon Swanepoel
This PDC enabled occupational hygiene professionals to improve their skills in statistical analysis and interpretation. Motivation for this includes preparing for the implementation of the revised oral assessment system, changes in the Regulations for Hazardous Chemical Agents (RHCA) and the trickle-down impact on SANAS 17020 accreditation. The course covered the essential occupational hygiene statistical methods and tools used in the analysis of occupational hygiene data, including exposure measurements, risk assessments, and trend analysis. The presenters shared their knowledge of integrating occupational hygiene into business processes. This included formulating similar exposure groups (SEGs), integrating statistics into reports, developing and maintaining a database, and reporting statistics.

***PDC 4: Heat stress management and heat tolerance screening***, facilitated by Dr Johan Kielblock
The aims of this PDC were 1) to review the origins and consequences of occupational heat stress, inclusive of standards, and 2) to consider specific occupational settings and associated risks as nominated by participants.

Day 1 of the conference kicked off with a grand opening ceremony, featuring five esteemed guests: senior officials from industry and government departments. Notable speakers included Naadiya Mundy, SAIOH President, and Patrick Baleseng, BAOH Chair. The event also showcased a keynote address from the Chief Executive Officer (CEO) of Debswana Diamond Company. This impressive lineup set the tone for a thought-provoking and engaging conference. The day included two keynote addresses, nine plenary sessions, and a roundtable discussion. The day ended with the SAIOH annual general meeting (AGM) in a hybrid format, followed by the gala dinner hosted by the BAOH at the Phakalane Hotel.

Day 2 of the conference offered attendees one keynote address, seven plenary sessions, and one roundtable session.

The total number of attendees at the conference was 574: 237 in person and 337 online. Setting a new precedent, some conference sessions were recorded by the media and broadcast on national television in Botswana at the end of October.

A highlight of the conference was the thought-provoking keynote address delivered by Charles Siwawa, CEO of the Botswana Chamber of Mines, at the gala dinner. Following this, the SAIOH President presented the prestigious fellow awards to Garth Hunter, Dr Hennie van der Westhuizen, and Prof. Cas Badenhorst. Completing the successful prestigious event was the announcement of the SAIOH 2023 award winners:
Occupational hygienist of the year – Brandon Nothling
Occupational hygiene personality of the year – Naadia Mundy
Occupational hygiene article of the year – Marelize van Ree
Tertiary occupational hygiene student of the year – Monica M Young
PCC assessment top achievers were:
Occupational hygiene assistant – PL Musandiwa
Occupational hygiene technologist – Connor R Shuttleworth
Occupational hygienist – Keabetswe Kgame

The 2025 SAIOH Conference will be held in Durban, hosted by the KwaZulu-Natal branch of SAIOH.




## International Occupational Hygiene Association and Occupational Hygiene Training Association (OHTA) feedback

The Occupational Hygiene Training Association and IOHA continue to publish their newsletters. Links are e-mailed to all SAIOH members and published on the SAIOH website: www.saioh.co.za

***The Executive Committee of the International Occupational Hygiene Association (IOHA) has confirmed the recognition of the Southern African Institute for Occupational Hygiene (SAIOH) certification programme under the IOHA National Accreditation Recognition (NAR) programme. The next five-year renewal application is due in October 2029.***


IOHA

*This is to Certify*

*the*

***Southern African Institute for Occupational Hygiene (SAIOH)***

*as an*

***IOHA Recognized Certification Program***

Certificate Issued: 18 October 2024

Certificate Expires: 18 October 2029

***Samantha Connell***
***President 2023/2024***

***Sharann Johnson***
***Chair, NAR Committee 2023/2024***

**Table 1. SAIOH PCC certification assessment results (March–September 2024)**

| Certification category | Written assessments | | | | Oral assessments | | | |
|---|---|---|---|---|---|---|---|---|
| | Assessed | Passed | Failed | Pass rate | Assessed | Passed | Failed | Pass rate |
| | n | n | n | % | n | n | n | % |
| OH assistant | 179 | 176 | 3 | 98.2 | 0 | 0 | 0 | - |
| OH technologist | 84 | 70 | 14 | 77.6 | 67 | 34 | 33 | 50.7 |
| Occupational hygienist | 41 | 22 | 19 | 65.5 | 27 | 13 | 14 | 48.1 |
| **Total** | **304** | **268** | **36** | **87.2** | **94** | **47** | **47** | **50.0** |

The Institute's IOHA representatives, Deon Jansen van Vuuren and Corlia Peens, met with the National Accreditation Recognition Committee (NARC), where they presented SAIOH's certification and registration system. In a second meeting, SAIOH's reaccreditation submission was discussed.

The International Occupational Hygiene Association held a governance meeting in September, where the draft IOHA strategy document for 2026–2030 was discussed.

The IOHA Board meeting and AGM took place in Kuala Lumpur on 20 October 2024. Corlia Peens attended online.

### SAIOH Technical Committee feedback

The SAIOH Technical Committee's research on the measurement and analysis of welding fumes was brought to life by the SAIOH Technical Portfolio co-ordinator, Dr Ivan Niranjan. A SAIOH sub-committee and the OH AIA Association met to develop a technical and position paper on this topic. The final position paper is due in early 2025.

The Southern African Institute for Occupational Hygiene's second technical committee started developing technical procedures and a position paper on heat stress management. A setback occurred with the death of Schu Schutte, but Deon Jansen van Vuuren is consulting with the Council for Scientific and Industrial Research (CSIR) and Dr Johan Kielblock to conduct the necessary research. The due date for publication of this position paper is early 2025. The focus is two-fold, viz. to develop a technical paper, and to enable SAIOH to provide comprehensive and relevant proposals to strengthen the launched Physical Agents Regulations (PAR) – the old Environmental Regulations for Workplaces.

Wessel van Wyk, the previous SAIOH Technical Co-ordinator, is still involved in finalising a position paper on real-time monitoring. As soon as this is approved by the SAIOH PCC Executive Committee and Technical Committee, it will be circulated to all SAIOH members and stakeholders.

### Communications

SAIOH publishes its newsletter/President's page in two electronic media formats, namely *Occupational Health Southern Africa* and the *African OS&H magazine* (A-OS&H).

## FROM THE PROFESSIONAL CERTIFICATION COMMITTEE (PCC)

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### Occupational Hygiene Skills Forum

One of the Occupational Hygiene Skills Forums' (OHSF's) functions 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 in the final stages of evaluating the Cape Peninsula University of Technology's (CPUT's) 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). Details of recognised training providers and recognised qualifications are available on the SAIOH website (www.saioh.co.za), making it easier for students and certification candidates to select suitable occupational hygiene training programmes that meet SAIOH and international certification requirements.

Dr Hennie van der Westhuizen assisted the OHSF in developing questions, based on articles in *Occupational Health Southern Africa*, to enable members to earn CPD points and ensure more active involvement in the Journal. SAIOH will launch this initiative soon.

### PCC activities

The sub-committee charged with revising the skillset and self-assessment tool meets bi-monthly. The 17 occupational hygiene skillsets are now fully developed. Focus is now on creating scenario-based questions that align with the requirements of the skillset modules. These questions will be utilised in the oral assessments, ensuring a comprehensive evaluation of candidates' competencies.

### Certification assessments

A summary of results for the assessments that took place from mid-March to September 2024 is provided in Table 1.

# Mine Medical Professionals Association Annual Congress 2024

**Dipalesa Mokoboto:** MMPA Immediate Past President; Medical Inspector, DMRE
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## BACKGROUND

The Mine Medical Professionals Association (MMPA) held its continuing professional development- (CPD-) accredited Annual Congress from 22 to 24 November 2024 at Sun City Resort's conference centre. The congress is for the benefit of health professionals, especially those in the mining industry. The objectives of the Annual Congress are to ensure that the Association shares leading practices and updates delegates on the latest legislation, and to provide an opportunity to engage in emerging topical issues that might affect the health and safety of mineworkers.

## INTRODUCTION

The 2024 MMPA Annual Congress focused on occupational health dilemmas, looking at different challenges faced by health professionals in the occupational health space. An array of speakers was invited to present on different topics, addressing delegates that included occupational medicine, occupational hygiene, audiology, occupational therapy, and medicolegal professionals.

## FIRST DAY

The first day of the congress was opened by the Vice President of the MMPA, Dr Mzwandile Dlamini. Session one, chaired by Dr Leonard Mahlare, was kick-started by Advocate Gezile Masilo, who presented the recently promulgated gender-based violence and femicide (GBVF) guidance note on behalf of the Mine Health and Safety Council (MHSC). The guidance note was prompted by a research project, 'SIM130903: Safety and security challenges impacting women in the SAMI', conducted by the MHSC. The outcomes of the study indicated, amongst others, that:

- Women are at a higher risk of workplace violence than men.
- The risk is high in hostile work environments with large male populations, such as mining.
- Workplace violence and sexual harassment continue to pose a threat to the health and safety of women.
- Policies and procedures for managing workplace violence and sexual harassment are non-existent, obsolete, or ineffective.
- Workplace violence and sexual harassment at the mines should be recognised as a serious and common problem, requiring regulatory interventions.

Based on the research outcomes, one recommendation was that employers should have prevention strategies in place that include workplace policies and procedures based on a sound legislative, regulatory, and enforcement framework.




**Figure 1. South African mining industry framework for prevention and management of mental health disorders and non-communicable diseases**

MHDs: mental health disorders, NCDs: non-communicable diseases

The objectives and scope of the 'Guidance note for the management of GBVF: safety and security challenges for women in the South African Mining Industry', were discussed at length and delegates had many questions for Advocate Masilo.

Advocate Vanessa Doble presented the Anglo American case study of the implementation of the gender-based violence (GBV) prevention programme. She focused on the measures that Anglo American had taken to assist female workers who were exposed to GBV, and how they were accommodated into places of safety and ensured medical attention. They were also assisted with the legalities involved in such cases. The work done by Anglo American was regarded as best practice from which other employers could learn.

The South African mining industry (SAMI) framework for prevention and management of mental health disorders (MHDs) and non-communicable diseases (NCDs) was presented by Florence Magampa from the MHSC. The framework includes factors in the mining industry that cause/exacerbate NCDs and MHDs, as depicted in Figure 1.

The framework was based on the MHDs and NCDs guidance note that was drafted by the tripartite stakeholders. Delegates were asked for inputs before it could be promulgated. They were appraised on the following objectives and scope of the guidance note, which is SAMI-specific and applicable to all mine employees, irrespective of employment category:

- To provide information to employers on how to conduct risk assessments, and develop and implement a programme to prevent and manage NCDs and MHDs in the SAMI
- To ensure that the programme is part of the mine's health and safety policy, in line with Section 8 of the Mine Health and Safety Act (MHSA)

Delegates were made aware that the guidance note complements other public health guiding principles, and should not be used in isolation.

The second session of the day was facilitated by Dr Nothando Moyo. Topics covered were an overview of the SAMI's post-employment care framework, by Dr Balfour from the Minerals Council South Africa (MCSA), and the new Mining Industry Employee Database for South Africa (MIEDSA), by Dr Mpho Rabada from the Medical Bureau for Occupational Diseases (MBOD)/Compensation Commissioner for Occupational Diseases (CCOD). The post-employment care framework was presented as a vital initiative aimed at enhancing the health and wellbeing of ex-mineworkers. The framework addresses the critical need for continuous medical care and support for individuals who have dedicated their careers to the mining industry. The aim is to improve these individuals' quality of life and provide them with the support they need during their post-employment years. The MIEDSA was mentioned as a comprehensive surveillance system with all the necessary information to assist with the post-employment programme.

Recommendations included:

- Standardising processes, enhancing communication and collaboration, allocating resources, and providing training and capacity building, where required
- Ensuring a database/system to track incapacitated ex-mine employees and ensuring follow-up care, particularly for those moving to remote areas of the country or across its borders
- Collaborating across sectors, provinces, and countries to break down barriers in the private and public health systems

The gala dinner gave the delegates an opportunity to network in a relaxed manner and unwind with music and dance.

## SECOND DAY

Day 2 was short but interesting, covering two sessions. Session 1 included quality assurance (QA) in occupational health, presented by Dr Reginald Setlhakgoe. This was defined as a planned, systemic means for assuring management that defined standards, procedures,



**Dr Govender (R), author of *From Suspicion to Submission – Occupational Lung Diseases in the South African Mining Industry*, presents a copy of her book to Dipalesa Mokoboto (L)**

*Photograph: courtesy of MMPA*



**From L–R: Tia-Mari Hofman, Dipalesa Mokoboto, and Dalene Schoombee at the gala dinner**

*Photograph: courtesy of MMPA*

and practices are applied. The advice was to implement QA through auditing, which should be at operational, middle management, and senior management levels.

Session 2 covered work-related musculoskeletal assessments by occupational therapists, and included when and how compensation is considered by Rand Mutual Assurance (RMA). Dalene Schoombee shared what the Rehabilitation and Functional Assessment (RFA) data are telling us in terms of future trends. She zoned in on ergonomics and musculoskeletal disorders. The following practical steps were suggested as an holistic approach to mitigating ergonomics risk factors:

- Understanding the job: risk-based medical surveillance, where comprehensive occupational risk exposure profiles (OREPs) are important
- Informed placement: matching worker capabilities with job demands
- Monitoring work capacity throughout employment: early identification and management of limitations
- Health and wellness programmes: implementing programmes that promote healthy lifestyles, including weight management and physical activity

Dr Tim Laurens, a forensic toxicologist, dealt with decoding intoxication, focusing on workplace substance testing. He pointed out that it was important to select the correct biomarkers for definitive legal outcomes, to ensure fairness to employees. He delved into the nuances of choosing the correct biomarker-biomatrix combinations, essential for deriving rational conclusions about an individual's substance use. Factors influencing biomatrix selection were examined, aiming to provide medical professionals with the knowledge needed to enhance the integrity and efficacy of workplace substance testing in a legal context.

Dr Dipalesa Mokoboto and Dr Vanessa Govender presented complex cases that practitioners are likely to come across. Dr Mokoboto presented a case in which it was not clear if it was occupationally related or not, due to conflicting test results and reports from the National Institute for Occupational Health (NIOH) and a private dermatologist. This conflict affected the decision regarding the employee's compensation by the RMA (the claim was rejected), and caused the disgruntled employee to want his job back because an occupational disease could not be proven. Dr Govender addressed the challenges experienced in diagnosing occupational lung diseases and shared chest X-rays showing normal lungs and pneumoconiosis. The two presentations were interactive, and delegates were asked to respond to questions about the case study and to quizzes posed regarding occupational lung disease chest X-rays.

Dr Tumi Legobye, MMPA President, closed the session by thanking the presenters, the delegates, the task team that planned the congress, the MMPA administrator who took care of the logistics, and the sponsors.

## CONCLUSION

The MMPA Annual Congress has remained relevant for mine medical professionals over the years, and delegates could claim 13 CPD points, which included ethical points. Delegates will always be updated about the latest developments regarding health and safety in the mining industry; the congress is a great platform to share best practices from different mines and outcomes of research conducted through the MHSC or the MCSA.

