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Mine Medical Professionals Association (MMPA)

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

Front cover
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From the Assistant Editor



Ntombizodwa Ndlovu, Assistant Editor

In this issue, we are delighted to profile Professor Gill Nelson, Editor-in-Chief of *Occupational Health Southern Africa*, who was appointed Assistant Dean of Postgraduate Affairs in the Faculty of Health Sciences at the University of the Witwatersrand in April 2025. Professor Mary Ross, a long-time colleague and friend, offers a brief but insightful overview of Professor Nelson's academic journey, achievements, and contributions. On behalf of our contributors, readers, and the OHSA Editorial Board – congratulations, Gill. We wish you every success in this important leadership role.

This issue features three peer-reviewed papers. Mühlbauer and colleagues explore the views of students and academic staff on the physical preparedness and assessment of emergency medical care (EMC) students for the demanding and hazardous environments they face. Rikhotso evaluates the comfort of hearing protection devices used by chemical plant workers who rely on radio communication. Hoopdeo et al. investigate respiratory symptoms and lung function among flour mill workers, noting high dust exposure despite similar symptom rates compared to office workers. Additionally, in an opinion piece, Laurens explores the workplace implications of cannabis legalisation in South Africa and proposes a balanced approach between employers' safety responsibilities and employees' rights to privacy.

In August, I attended the 2025 National Scholarly Editors' Forum (NSEF), an annual meeting convened by the Academy of Science of South Africa (ASSAf) as part of its Scholarly Publishing Programme (SPP). The NSEF is a professional and advisory platform for editors of accredited South African scholarly journals that promotes editorial excellence, ethical publishing practices, and collaboration. This is done through the production of codes of practice to guide scholarly publishing and hosting of webinars and discussion fora for its members.

The meeting included presentations and reflections on activities and achievements of the 2024/2025 reporting period and discussions on a wide range of topical issues. I will highlight some of these here. There are currently 355 South African journals, across all disciplines, accredited by the Department of Higher Education and Training. Using African Journals Online's estimate that there are 898 African journals currently, this means that an impressive third of the continent's journals are of South African origin. With about two-thirds of South African journals being open access and indexed in international databases such as DOAJ, Scopus, and Web of Science, the global visibility, credibility, and impact of local research is enhanced.

Intentional succession planning for editors to ensure the sustainability of journals is required. At the meeting, recruitment and mentoring of early-career editors was put forward as a strategy to grow the next generation of editors. Succession planning should be a standing item on editorial board agendas.

A major achievement in 2024/2025 was the approval of the Revised Code of Best Practice in Scholarly Journal Publishing, Editing and Peer Review, which encourages academic institutions to formally recognise the critical work of editors and peer reviewers. *Occupational Health Southern Africa* highlighted this development in our December 2024 editorial, and we continue to support its implementation (see page 123). The meeting discussed strategies to increase institutional adoption, such as direct engagement with university leadership. We are hopeful that these efforts will bear fruit.

The revised code documents the vital role of reviewers and editors in maintaining the quality and integrity of scholarly publications. *Occupational Health Southern Africa* continues to invite researchers to volunteer as peer reviewers (see page 123). I encourage you to read the code of practice and, whenever possible, accept invitations to review. Thoughtful, constructive peer review is essential to the advancement of science.

Another notable achievement was the endorsement of the POPIA Compliance Framework for Research. The framework is designed to *"demystify POPIA for researchers"* by offering practical guidance on conducting ethical, transparent, and accountable research, including responsible data sharing. This is a significant contribution, especially as many researchers continue to grapple with the practical implications of the Protection of Personal Information Act (POPIA).

The rapid evolution of artificial intelligence (AI) is reshaping the scholarly publishing landscape. In 2024, ASSAf hosted three well-attended webinars on AI, and quarterly virtual *makgotlas* (gatherings) were planned for 2025. Three of these have been held and the final *makgotla*, titled 'New Ways of Doing Things: Embracing Innovation and Change', will take place in the last quarter of the year. Look out for it.

The ASSAf and SciELO Guidelines for the Use of Artificial Intelligence (AI) Tools and Resources in Research Communication, endorsed in September 2024, provide guidance on the responsible use of AI for authors, reviewers, and editors, and on how to cite and reference AI-generated content. Authors must declare any use of AI and avoid incorporating misinformation. Reviewers and editors, in turn, are encouraged to remain vigilant in identifying and correcting AI-generated inaccuracies. While AI tools offer opportunities to streamline workflows, such as formatting and editing, care must be taken to preserve scholarly integrity and confidentiality.

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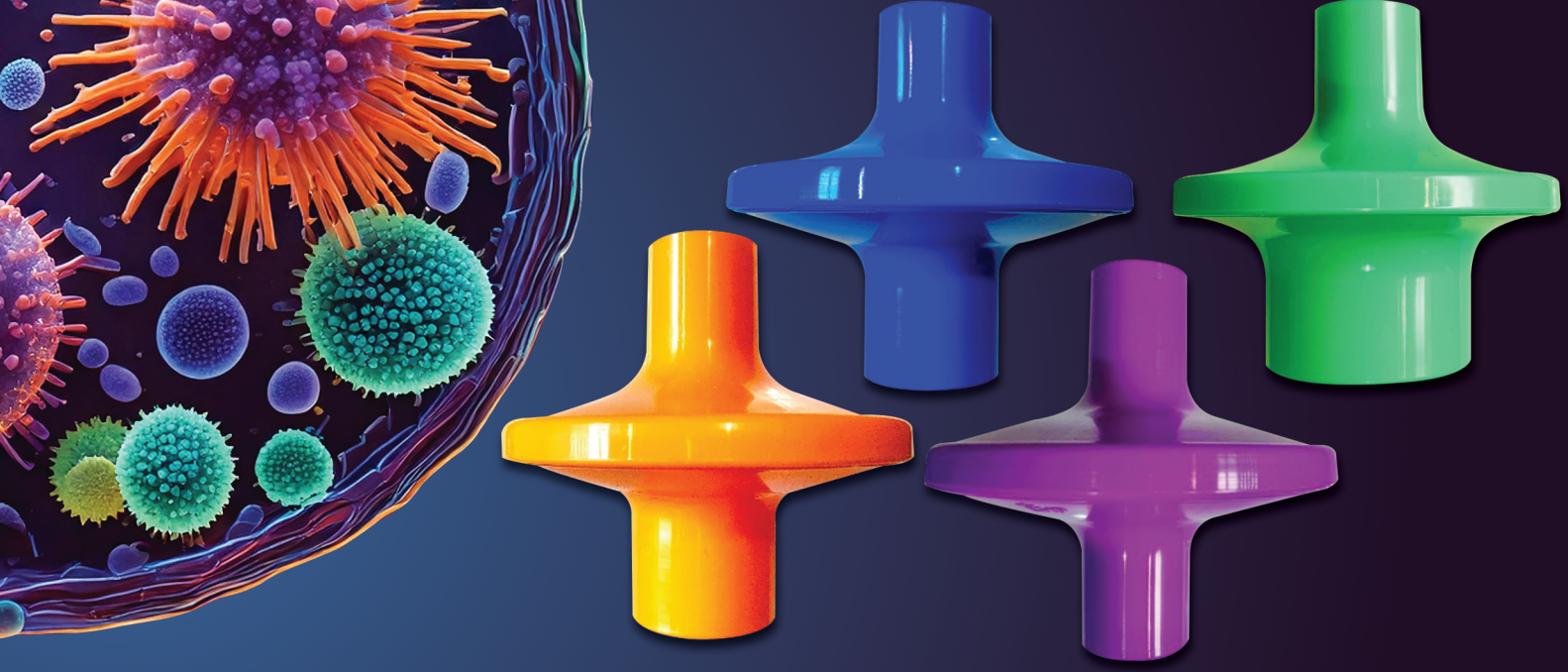
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		In2itive
	Micro Medical	All models
	Schiller	SP-260
	MH	LA303
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	CONTEC	All models

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	Vyaire	Vyntus SPIRO PC
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Professor Gill Nelson

Mary Ross: OHSA Board Member; SASOM Executive Member; Honorary Professor, University of the Witwatersrand

The promotion of the Editor-in-Chief of *Occupational Health Southern Africa*, Professor Gill Nelson, provides the overdue opportunity for recognition of her achievements, both academically and for the journal. In April 2025, Gill was appointed as Assistant Dean of Postgraduate Affairs in the Faculty of Health Sciences, University of the Witwatersrand (Wits). She continues to head the Occupational Health Division in the School of Public Health, a position she has held since 2013, and is concurrently an Adjunct Professor at the Barrow Neurological Institute (USA).

After gaining a BSc Hons degree in Human Genetics at Wits, she completed a Master's degree in Genetics while working in the Epidemiology section at the National Centre (now Institute) for Occupational Health. Gill then undertook postgraduate training at McGill University in Canada and the London School of Hygiene and Tropical Medicine, and subsequently obtained her PhD in Occupational Health. Although she has spent most of her career in the field of occupational epidemiology, she has also had other exciting forays into the pharmaceutical industry and the Perinatal HIV Research Unit at Chris Hani Baragwanath Hospital. This extensive and varied career course has contributed to her impressive reputation for teaching and research, as well as in the role of Editor-in-Chief of *Occupational Health Southern Africa*.

I have had the privilege of observing Gill's academic and career progression over the last 35 years, since I was a registrar in Public Health Medicine and she was an epidemiology researcher and excellent biostatistics lecturer on the Diploma in Occupational Health. My initial experience of being taught occupational epidemiology and biostatistics by Gill was echoed by all the Diploma students – a challenging topic made clear and comprehensible.

Gill has established enduring international alliances with researchers in other countries such as the UK, the USA, and Sweden. The international research collaborations, publications, and presentations speak for the local and international recognition of Gill's research expertise, focused on occupational and environmental exposures and respiratory diseases. Much of her work has involved the mining sector, including her PhD on silica exposure and her current work on manganese exposure. In recognition for her ongoing contribution in research and mentoring postgraduates, Gill was awarded prestigious Oppenheimer Memorial Trust funding to support a sabbatical to conduct projects with international collaborators.

Throughout her career, Gill has been an effective communicator and, in recent years, has concentrated on developing postgraduate researchers. As a National Research Foundation (NRF) rated scientist she has been, and continues to be, an excellent, much-admired lecturer in epidemiology and much sought-after research mentor and advisor to students and other researchers. Her teaching philosophy is to assist postgraduate students to write well, since communication skills are vital for effective dissemination of their research findings. Through her university role and *Occupational Health Southern Africa* editorship, Gill recognised the dire need for research writing tuition:



Professor Gill Nelson *Photograph: courtesy of Gill Nelson*

she initiated various workshops for scientific writing, research report writing, and development of peer-reviewed manuscripts. In addition, she initiated coaching in research ethics for which I provided input for the first MPH students in occupational hygiene.

As Editor of *Occupational Health Southern Africa*, Gill has applied her own considerable abilities in scientific writing to mentoring this skill that is lacking in South Africa. Her teaching role as Editor of the journal is invaluable to all authors submitting papers, with her meticulous editing and encouragement to improve both the research reporting and the quality of the journal. To this end, her own expertise and her extensive global expert contacts that provide a panel of reviewers are invaluable. Gill is responsible for the overall content of *Occupational Health Southern Africa*, including initial and final assessment of the manuscripts submitted, identifying reviewers, communicating with authors, mentoring inexperienced authors, editing papers, plus working with the publication team and chairing the Editorial Board meetings. With her own publication experience of more than 80 papers and several book chapters, Gill's mentorship is invaluable to all authors submitting papers.

Apart from her academic prowess and success, Gill is also a superb negotiator, event organiser, and companion for both work and leisure pursuits. I have benefitted from these talents on many occasions, from her arranging biomarker workshops in idyllic settings, conference accommodation at exotic destinations, visiting a camel market in Egypt, to shopping in the *souks* of Marrakech. Although, unlike her two academic mentors, Professors Margot Becklake and Jill Murray, I cannot bask in the vicarious success of Gill's academic achievements and successful career, I cherish having been able to support her over the years in facilitating obtaining of sponsorship for her research, as well as in her editorial role at *Occupational Health Southern Africa*.

Strengthening trust in research: updated code of best practice released

The Academy of Science of South Africa (ASSAf) is pleased to announce the publication of the *Revised Code of Best Practice in Scholarly Journal Publishing, Editing, and Peer Review*, a key milestone in advancing ethical, professional, and trustworthy standards in scholarly publishing in South Africa.

Originally published in 2004 and updated in 2018, the Code has served as a foundational guide to ensure integrity, transparency, and excellence in scholarly communication. This 2025 revision reflects the evolving landscape of academic publishing and responds to emerging challenges, including the rise of digital publishing, the use of artificial intelligence (AI), the growing emphasis on open access, data transparency, and the promotion of diversity, equity, and inclusion in scholarship.

The revision was initiated by the National Scholarly Editors' Forum (NSEF) and undertaken by a dedicated Working Group comprising volunteers from the NSEF. The draft was shared widely with the NSEF for comment, and the final version was endorsed by the Committee on Scholarly Publishing in South Africa (CSPiSA) on 20 May 2025, and approved by the ASSAf Council on 18 June 2025.

The updated Code provides practical, comprehensive guidance for all stakeholders in scholarly publishing – editors, reviewers, authors, and publishers – covering key areas such as editorial independence, peer review, governance, ethical responsibilities, and adherence to evolving policies and regulations.

This collaborative effort underscores ASSAf's and the scholarly community's commitment to fostering a culture of professionalism, accountability, and – critically – trust in research and academic publishing. By upholding the principles outlined in the Code, stakeholders ensure that scholarly research remains credible, rigorous, and of enduring value to society.

The Revised Code of Best Practice in Scholarly Journal Publishing, Editing, and Peer Review is now available on the ASSAf website at: https://doi.org/10.17159/assaf.2025/117

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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 submit your details here.

Tshiamiso Trust highlights progress and persistent challenges in delivering on its mandate

In its annual general meeting (AGM) on 29 August 2025, the Tshiamiso Trust announced that it has paid out more than R2.27 billion in compensation to former mineworkers and their dependents affected by silicosis and work-related tuberculosis (TB). The Trust's report highlighted significant progress in claimant outreach and processing, while acknowledging persistent operational and legal challenges.

Record payments and regional outreach

The Trust's focused outreach efforts have yielded substantial results, particularly in key regions. To date, the largest proportion of claims (51%) has been paid to South African beneficiaries, with a strong focus on mining areas in the Eastern Cape and Free State provinces. Lesotho follows closely, with 42% of all claims paid, reflecting the long history of Basotho men in South African mines.

Outreach efforts continue in Botswana, Mozambique, and Eswatini. Tshiamiso Trust CEO, Dr Munyadziwa Kwinda, highlighted the success of a pilot project in Zimbabwe, which laid the groundwork for the imminent launch of full services. He also noted significant progress in discussions with the Malawian Government, paving the way for future operations there. *"The period in review saw the establishment of Benefit Medical Examination (BME) services in Botswana, where some claimants were paid within just two weeks of completing their medical examination,"* said Dr Kwinda. *"This demonstrates the effectiveness of our streamlined processes."*

Key amendments to the Trust deed

Two important amendments to the Trust deed were announced at the AGM to address significant barriers to compensation:

- Death certification: The scope for recognising silicosis or TB as the primary cause of death has been broadened. The Trust will now accept a full Death Notification Form (DHA1663) or a Medical Certificate of Cause of Death in addition to a death certificate. This change offers a more practical path to compensation for families.
- Dispute window: The window for claimants to dispute outcomes has been extended from 30 to 120 days, providing more time to ensure fairness in the process.

Persistent challenges in claim processing

While progress has been made, the Trust continues to face significant challenges.

- ODMWA certificates: A long-standing impasse regarding the use of Occupational Diseases in Mines and Works Act (ODMWA) certificates was addressed. The Trust's Medical Advisory Panel has been tasked with assessing the alignment between the Medical Bureau for Occupational Diseases (MBOD) diagnostic criteria and the Trust's criteria. Until this assessment is complete, all claimants with an ODMWA certificate will be required to undergo a BME to determine medical eligibility.
- Eligibility criteria: A major challenge that remains is the strict medical and legal criteria, which were established in the original legal settlement. Of the 83 810 medical certifications completed, 70% were ruled ineligible as the medical evidence did not meet the prescribed criteria.

Tshiamiso Trust Chairperson, Dr May Hermanus, acknowledged the painful reality that *"Many who approach the Trust with hopes of compensation do not meet the strict medical and legal criteria. These criteria are binding on the Trust and were established in the settlement agreement that gave rise to its mandate."*

Operational and partnership focus

Delivering compensation across a wide geographic footprint has presented immense challenges. Dr Hermanus stressed that strategic partnerships and innovative approaches are required to extend the Trust's reach. Dr Kwinda echoed the importance of collaboration, stating, *"As we look ahead, our strategic focus is clear: strengthening partnerships. We know that the scale of our task cannot be met in isolation. Collaboration is the key to expanding our reach, improving efficiencies, and ensuring that all eligible claimants are paid."*

Commitment to the mandate

Closing her address, Dr Hermanus reaffirmed the Trust's determination to continue its work despite the difficulties. *"The Trust remains steadfast in its responsibility to implement the settlement with integrity and transparency, and to ensure that compensation reaches those who are eligible under its terms."*

About the Tshiamiso Trust

The Tshiamiso Trust was established to give effect to the settlement agreement reached between six mining companies and claimant attorneys in the historic silicosis and TB class action. The companies are African Rainbow Minerals, Anglo American South Africa, AngloGold Ashanti, Harmony Gold, Sibanye Stillwater, and Gold Fields.

The Trust is responsible for compensating all eligible current and former mineworkers across southern Africa with permanent impairment due to silicosis or work-related TB, or their dependents, where the mineworker has passed away.

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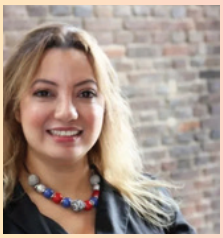
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Perspectives on the physical preparedness of emergency medical care students in South Africa

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Keywords
physical fitness, occupational fitness, physical performance, paramedic, emergency medical care, emergency responder

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ABSTRACT

Background: Emergency medical care (EMC) and medical rescue environments are physically demanding and potentially hazardous to patients and emergency care providers. Emergency medical care students must be physically prepared to operate effectively and safely in diverse hazardous situations and environments. Currently, little has been published about the unique physical preparedness requirements of EMC students exposed to EMC and medical rescue training.

Objectives: To describe the perspectives of academic staff and EMC students, with regards to the physical preparedness of undergraduate EMC students at three higher education institutes (HEIs) in South Africa.

Methods: In this descriptive cross-sectional study, a purpose-designed quantitative questionnaire was administered to probe the perspectives of EMC students and academic staff members involved in the teaching of Medical Rescue and Physical Preparedness modules within the undergraduate EMC degree programmes.

Results: One hundred and seventeen EMC students and 12 academic staff members participated in the study. Most respondents were male: 77 (65.8%) students and 11 (91.7%) academic staff members. Most students agreed (n = 113, 96.6%) that it is important for EMC students to be physically fit and healthy. There was agreement among students (n = 104, 88.9%) and staff (n = 11, 91.7%) that emergency care and rescue workers should be able to swim. It was agreed that all EMC programmes should assess physical preparedness and use similar assessments.

Conclusion: Physical preparedness and the assessment thereof are important components of the EMC degree programme. A validated physical preparedness assessment tool should be developed to address the specific physically strenuous learning outcomes associated with the BHSc EMC programme. This assessment should be standardised at the different HEIs offering the programme, and the assessment should be the same irrespective of student age, sex, and physical attributes.

INTRODUCTION

There is a large body of literature dealing with the physical preparedness requirements and related assessments for paramedics, military personnel, police officers and firefighters.[1-4] However, fewer published studies focus on the assessment of physical preparedness for emergency care providers who engage in both emergency medical care (EMC) and medical rescue as part of their operational duties. This limited information is problematic, as it is the emergency care providers who are commonly required to deliver EMC and rescue services, both during the time that they are students engaging in their academic programmes and later as graduates, fulfilling their operational duties. In this study, we aimed to describe the perceptions of academics and EMC students, regarding the physical requirements and task-oriented activities of students enrolled in the Bachelor of Health Sciences Degree in Emergency Medical Care (BHSc EMC) programme at accredited higher education institutions (HEIs) in South Africa. This was important to determine if physical preparedness and the assessment thereof are important components of the BHSc EMC programme.

This study took place within the broad domain of health profession education in the discipline of EMC. Currently, there are two programmes in South Africa that include EMC and medical rescue education and training in their curricula, viz. the Diploma in EMC, which is a two-year qualification (National Qualification Framework (NQF) level 6), and the Bachelor of Health Sciences Degree in EMC (BHSc EMC), which is a four-year qualification (NQF 8).[5] The NQF is a national structure utilised in South Africa to classify levels of learning achievements obtained under the South African Qualifications Authority (SAQA).[6] The BHSc EMC curriculum is approved by the Council on Higher Education (CHE) and the Professional Board for Emergency Care (PBEC).[7,8] Its two core modules, EMC and Medical Rescue, are reflected in the qualification document registered with the SAQA.[9]

This study rested on the premise that both the operational and training emergency care and rescue environments can be physically demanding and potentially hazardous. Consequently, they are associated with a high number of work-related injuries and illnesses if the emergency care provider is not fit for duty.[10]

Although the focus of this research was on the physical preparedness requirements to engage successfully with the physically strenuous learning outcomes on the BHSc EMC programme, the value of swimming proficiency was also investigated. Fatal drownings are a serious health concern and high drowning rates have been

reported in Africa,[11] which are linked to a lack of drowning prevention initiatives, policies, and regulations, insufficient water safety awareness, and poor basic swimming skills.[11] In 2019, the World Health Organization (WHO) estimated that 236 000 people died due to drowning incidents, worldwide.[12] In South Africa, the fifth most commonly reported death in 2018, due to accidental injury, was drowning and submersion, at 3.9% (1 444/36 997).[13] Fatal drownings were reported to have occurred in buckets, bathtubs, swimming pools, dams, rivers, and the sea. Limited data documenting the activity of the victim prior to drowning are available.

Lifesaving South Africa statistics from 2015 to 2016 reported that 27.8% of drowning deaths occurred while swimming: 13.5% while playing near water and 9.4% while fishing.[14] Therefore, the ability to swim is an essential skill for all emergency care providers and students. The PBEC has included swimming proficiency as an assessment criterion in the BHSc EMC programme[7,9] through inclusion of a compulsory, stand-alone aquatic rescue module, covering surface and swift water rescue, and small boat handling.[15] Students are expected to demonstrate sufficient swimming proficiency to meet the physically demanding outcomes of aquatic rescue training and operations.

Upon completion of the BHSc EMC, graduates registered as emergency care practitioners may encounter aquatic rescue incidents in real-world operations. For example, in 2022, during the KwaZulu-Natal floods – caused by 300 mm of rainfall in 24 hours – emergency care providers assisted in evacuations, following widespread destruction and 395 recorded fatalities.[16] Similarly, in December 2023, emergency care providers played a key role in rescue efforts during the Ladysmith flash floods.[17] Providers may volunteer for aquatic events that are not part of their routine duties, such as the Midmar Mile or Dusi Canoe Marathon. Emergency care providers may also assist the National Sea Rescue Institute (NSRI) in evacuating patients from ships at sea. This involves stepping from the NSRI vessel onto a pilot ladder, climbing onto the ship's deck, stabilising the patient, and then descending the ladder to return to the rescue vessel. This process is extremely hazardous and poses significant risks to the provider.[18]

Physical fitness positively impacts overall health by reducing the risk of injury and illness.[19] Enhancing the physical preparedness of emergency care providers has been shown to lower injury rates and health risks associated with operational tasks, and to reduce injury severity.[20-22] Beyond personal health benefits, physically fit individuals perform more effectively and are less prone to fatigue.[23] Similarly, EMC students must be prepared for physically demanding tasks and to operate safely in emergency and rescue environments.[24] Operational and physical fitness are included in the assessment criteria for exit-level outcomes, in both the PBEC's Minimum Standards and the SAQA-registered BHSc EMC qualification.[7-9]

Physical fitness may be divided into two categories: a) general physical fitness for health benefits, and b) task-oriented or sport-oriented fitness, be it for sport performance or physical preparedness for work specific tasks.[25] General physical fitness refers to an individual's ability to carry out daily tasks with vigour and readiness, and without undue exhaustion,[26] whereas task-oriented fitness refers to the degree to which an individual is physically prepared to cope with the physical demands of their work without excessive fatigue.[27] This study focused predominantly on 'physical preparedness', an overarching term that includes task-oriented fitness.

Scientifically validated tools exist to assess task-oriented physical preparedness for vocations such as firefighting, policing, security, and the military, focusing on specific physical abilities required for safe and effective performance.[1,2] Assessing physical preparedness of EMC students presents a unique challenge due to the diversity of rescue environments, which include mountain, water, confined space, rope, and fire. These different contexts demand a broad range of physical abilities to ensure safe and efficient participation. Currently, there is no literature describing the specific physical preparedness requirements of BHSc EMC students. Therefore, we aimed to explore the perceptions of academics and EMC students regarding the physical preparedness of BHSc EMC students in South Africa.

METHODS

This descriptive cross-sectional study was conducted at three HEIs in South Africa. The study population comprised all academic staff involved in teaching and/or assessment of Medical Rescue and/or Physical Preparedness modules in the BHSc EMC programme and third- and fourth-year EMC students. First- and second-year students were excluded due to their limited exposure to the medical rescue modules.

Data collection

Quantitative data were collected using a purpose-designed, online questionnaire in QuestionPro®. The online platform was used to allow respondents to complete the questionnaire at their convenience. Information on demographic characteristics, education, physical activity, physical preparedness, and practice relating to the assessment of physical preparedness was collected. The questions included dichotomous (yes/no) and 4-point Likert scale (strongly agree, agree, disagree, and strongly disagree) responses. Three questions assessed agreement among students and academic respondents on the importance of physical fitness, and three follow-on questions assessed the importance of swimming in the BHSc EMC programme.

The questionnaire was pretested to assess its content and construct validity, and to ensure that the questions were clear and would obtain the required information. Fourteen respondents from the three HEIs, who did not meet the inclusion criteria, participated in the pre-test (11 second-year BHSc EMC students and three academics not involved in the Medical Rescue and/or Physical Preparedness modules). No issues were identified and the data from the pre-test were not included in the final dataset that was analysed.

For the main study, heads of departments (HODs) and relevant academic coordinators for each year of study assisted with the distribution of the introductory e-mail, which contained the information letter and a link to the online questionnaire. Data collection was conducted over three months. Several reminders were sent to respondents to improve the response rate.

Data analysis

The software package SPSS (Version 25) was used. Categorical data were summarised using frequencies and percentages. Continuous variables were summarised using means, standard deviations (SDs), and ranges.

Ethics

The study was approved by the Durban University of Technology's Institutional Research Ethics Committee (IREC 058/19). Permission to conduct the research was granted by the gatekeepers and respective

HODs in the three HEIs. Informed consent was obtained from all respondents. The introductory e-mail sent to potential respondents included a brief overview of the study. It highlighted that participation was voluntary and that the participant could withdraw from the study at any time, without negative consequences. Anonymity of the data was maintained as no names or personal identifiers were collected.

RESULTS

Of the 131 students and 14 academic staff invited to participate in the study, 117 (89.3%) and 12 (85.7%) completed the questionnaire, respectively. The demographic characteristics of the respondents are presented in Table 1. Most students (n = 77, 65.8%) and academic staff (n = 11, 91.7%) were male. The mean age of students was 25.4 ± 5.3 years (range 20–49 years) and that of academic staff was 35.7 ± 5.7 years (range 28–46 years). Some of the academic staff are responsible for teaching more than one module.

The perspectives on physical fitness are presented in Table 2. Most students (n = 116, 99.1%) and all academic staff (n = 12) agreed that the BHSc EMC programme is physically demanding. A few students disagreed that students (n = 4, 3.5%) and lecturers (n = 2, 1.7%) need to be physically fit.

Results on the importance of swimming skills in the BHSc EMC programme are presented in Table 3. There was agreement among students and academic staff that swimming is a valuable life skill (94.0% and 100.0%, respectively) and that BHSc EMC students should be able to swim (91.5% and 91.7%, respectively).

Agreement on the level of physical preparedness on the BHSc EMC programme is presented in Table 4. Although 66 (56.4%) of the students had taken part in strenuous sporting activities at school, 76 (65.0%) were surprised by the level of physical preparedness required by the programme.

Perspectives on the assessment of physical preparedness are presented in Table 5. Almost all students (n = 103, 88.1%) and all academic staff (n = 12, 100.0%) agreed that the physical preparedness of the BHSc EMC students should be assessed. There was also agreement that all HEIs offering the BHSc EMC programme should use similar physical fitness assessments and standards.

Table 1. Demographic characteristics of the academic staff and student respondents

Respondents	Characteristic	Value	n	%
Students (n = 117)	Sex	Male	77	65.8
		Female	40	34.2
	Year of study	3rd year	50	42.7
		4th year	67	57.3
	Institute	HEI 'A'	42	35.9
		HEI 'B'	24	20.5
		HEI 'C'	51	43.6
Academic staff (n = 12)	Sex	Male	11	91.7
		Female	1	8.3
	Module taught	Physical Preparedness	10	83.3
		Medical Rescue	9	75.0
		Physical Preparedness and Medical Rescue	9	75.0
	Institute	HEI 'A'	4	33.3
		HEI 'B'	5	41.7
		HEI 'C'	3	25.0

HEI: higher education institute

Table 2. Agreement on physical fitness of students and academic staff in the BHSc EMC programme

Statement	Students (n = 117)								Academic staff (n = 12)							
	Strongly agree		Agree		Disagree		Strongly disagree		Strongly agree		Agree		Disagree		Stronly disagree	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Programme activities are physically demanding	-	-	116	99.1	1	0.9	-	-	-	-	12	100.0	-	-	-	-
Students must be physically fit to participate in the programme	73	62.4	40	34.2	3	2.6	1	0.9	10	83.3	2	16.7	-	-	-	-
Lecturers should be physically fit to present the programme	69	59.0	46	39.3	2	1.7	-	-	11	91.7	1	8.3	-	-	-	-

EMC: Emergency Medical Care

Table 3. Agreement on the importance of swimming in the BHSc EMC programme

Statement	Students (n = 117)				Academic staff (n = 12)			
	Agree		Disagree		Agree		Disagree	
	n	%	n	%	n	%	n	%
Swimming is a valuable life skill	110	94.0	7	6.0	12	100.0	0	-
Emergency care and rescue workers should be able to swim	104	88.9	13	11.1	11	91.7	1	8.3
BHSc EMC students should be able to swim	107	91.5	10	8.5	11	91.7	1	8.3

BHSc: Bachelor of Health Science, EMC: Emergency Medical Care

Table 4. Level of physical preparedness of students on the BHSc EMC programme (N = 117)

Statement	Students (n = 117)			
	Agree		Disagree	
	n	%	n	%
I took part in strenuous sporting activities at school	66	56.4	51	43.6
The level of physical preparedness on the BHSc EMC programme surprised me	76	65.0	41	35.0

BHSc: Bachelor of Health Science, EMC: Emergency Medical Care

A larger proportion of fourth-year students (n = 55, 89.1%) than third-year students (n = 35, 76.1%) agreed that physical preparedness assessment should be the same for all students (Table 6). Ten (8.5%) students did not respond to this question.

DISCUSSION

In this study, the perspectives of academic staff and EMC students regarding the physical preparedness of students enrolled in the BHSc EMC programme in South Africa were explored. The key findings were the sex differences of participants, the need for physical fitness in EMC students, relevance of previous physical activity, and standardisation of physical preparedness assessments.

More male than female students and academic staff participated in the research, reflecting the traditionally male-dominated nature of emergency care. This trend is consistent with other studies, e.g. Mthombeni et al. (2020) reported 70.3% male participants in a South African study of rural emergency providers,[28] Meadley et al. (2021) found that 12 of 14 helicopter rescue paramedics were male,[29] and Siddall et al. (2021) noted 85.5% male participation in developing physical employment standards for specialist paramedics.[27]

There was agreement that physical fitness of both the academic staff and students is important in the BHSc EMC programme. Our findings support the need for task-oriented physical preparedness training and assessment of EMC students. Studies have shown that emergency care providers require a high level of physical fitness to cope with the physically demanding occupational tasks associated with emergency care.[28,30-32] Providers with appropriate levels of physical fitness can work longer and more efficiently, ensuring optimal patient care with limited risk of injury.[28,33-35] Ružbarská and Turek (2010) found that rescue competence and safety are largely dependent on the physical disposition of the medical rescuers.[36]

Bachelor of Health Sciences EMC students are exposed to a wide variety of physically demanding tasks during simulated and authentic emergency medical care and medical rescue scenarios. Despite previous challenges with swimming in the BHSc EMC programme, including student complaints escalated to the PBEC and CHE, both staff and student respondents strongly supported its value as a life skill and its importance within the curriculum.

We found that students who had engaged in physically strenuous activities at school were not surprised by the physical demands of the BHSc EMC programme. In contrast, many students were unprepared for the required level of physical preparedness. This might be explained by the removal of physical education (PE) from the South African school curriculum. Once a standalone subject, PE was merged with Life Orientation (LO) in 2002, which ceased to be compulsory in public schools by 2023.[37] As a result, PE is no longer prioritised, and South Africa has the highest percentage (32%) of learners not participating in PE among 12 countries.[37] With PE disappearing from school curricula, only half of South African children meet the recommended 60 minutes of daily moderate-to-vigorous physical activity, which negatively impacts their health.[38] Early exposure to physical activity promotes lifelong habits and physical literacy. This presents a significant challenge for programmes such as the BHSc EMC, where staff must support students to meet the physical demands of their chosen programmes and future careers.

Both students and academic staff expressed the need for standardised physical preparedness assessments across HEIs that offer the BHSc EMC programme. This aligns with the PBEC's Minimum Standards, which outline the competencies that graduates must meet to register as emergency care practitioners (ECPs) with the Health Professions Council of South Africa (HPCSA), and serve as a guide for curriculum design and development.[7] The document specifies exit-level outcomes and associated assessment criteria.[9] While HEIs maintain autonomy in curriculum development, programmes leading to professional registration must comply with regulatory requirements. Standardising physical preparedness assessments would ensure that all students are trained and evaluated on the same essential fitness components needed to meet the programme's physically demanding content.

With regard to the structure of the current physical preparedness assessment and the expected pass criteria, the academic staff and student respondents believed that the assessment is not very challenging or difficult to pass. Despite this finding, there was agreement from the student respondents that unfit students do not pass the physical preparedness assessment. Most notably, there was agreement amongst the student and academic staff respondents that the current physical preparedness assessment tool is a good indicator of a student's level of physical preparedness and ability to engage successfully in the physically strenuous learning outcomes associated with the BHSc EMC programme.

There was agreement amongst all respondents that the physical preparedness assessment should be the same for all students, irrespective of their age, sex, height, or weight. Literature supports the use

Table 5. Current practices relating to the assessment of physical preparedness

Statement	Students (n = 117)										Academic staff (n = 12)							
	Strongly agree		Agree		Disagree		Strongly disagree		No response		Strongly agree		Agree		Disagree n(%)		Strongly disagree	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Physical preparedness of BHSc EMC students should be assessed	56	47.9	47	40.2	7	6.0	0	-	7	6.0	11	91.7	1	8.3	0	-	0	-
My HEI currently makes use of a formal physical preparedness assessment	0	-	108	99.1	1	0.9	0	-	8	6.8	0	-	12	100.0	0	-	0	-
All universities offering the BHSc EMC programme should use a similar physical fitness assessment and standard	59	50.4	44	37.6	3	2.6	3	2.6	8	6.8	8	66.7	3	25.0	1	8.3	0	-
The assessments should be weighted throughout the academic year towards a final module mark	42	35.9	45	38.5	15	12.8	7	6.0	8	6.8	6	50.0	6	50.0	0	-	0	-
My current physical preparedness assessment is a good indicator of my level of physical preparedness to engage in the learning activities of the BHSc EMC programme	23	19.7	43	36.8	35	29.9	6	5.1	10	8.5	4	33.3	5	41.7	3	25.0	0	-
My current physical preparedness assessment is very difficult to pass	3	2.6	18	15.4	60	51.3	26	22.2	10	8.5	0	-	1	8.3	6	50.0	5	41.7
Unfit students do not pass my department's current physical preparedness assessment	22	18.8	60	51.3	19	16.2	6	5.1	10	8.5	5	41.7	4	33.3	2	16.7	1	8.3
Physical preparedness assessments should be the same for all students irrespective of age, sex, height, or weight	53	45.3	37	31.6	8	6.8	9	7.7	10	8.5	9	75.0	1	8.3	2	16.7	0	-

BHSc: Bachelor of Health Science, EMC: Emergency Medical Care, HEI: higher education institute

Table 6. Agreement between third- and fourth-year students on physical assessment structure (N = 107)

The physical preparedness assessment should be the same for all students irrespective of age, sex, height, or weight	Agreement							
	Strongly agree		Agree		Disagree		Strongly disagree	
	n	%	n	%	n	%	n	%
3rd year (n = 50)	17	37.0	18	39.1	3	6.5	8	17.4
4th year (n = 67)	36	59.0	19	31.1	5	8.2	1	1.6

of absolute standards in this context, as the physical preparedness assessment is utilised to assess the minimum level of fitness required by students to engage successfully with the physically strenuous content of the BHSc EMC programme.[39,40]

Limitations

The response rates of 89.3% for student and 85.7% for academic staff respondents was good. The sample size for academic staff was very small, which may have affected some of the questionnaire results. However, there were no additional academic staff who could be approached, and who met the study's inclusion criteria. Another limitation of this study was that the questionnaire contained (in the main) closed questions with preset response options, which did not allow the researcher the opportunity to further explore, describe, and understand deeply the meaning of some of the responses provided by the respondents. A study using a qualitative approach may provide richer information.

CONCLUSION

This study's findings highlight the value of task-oriented physical preparedness in the context of the BHSc EMC programme, due to the physically demanding activities associated with the programme. All respondents agreed that there should be a standardised assessment irrespective of age, sex, height, or weight. Further work is required to

transform the gender profile of the profession to attract, support, and provide opportunities for female participation in EMS care provision. Diversity in gender will assist EMC students and graduates to better understand and respond to the varied social, psychological, and physical needs of patients. Gender diversity also ensures that future generations have role models of all genders to assist in the breakdown of stereotypes.

KEY MESSAGES

1. Emergency medical care students and academic staff agree that physical preparedness and the assessment thereof are important for students registered in the BHSc EMC programme.
2. Physical preparedness, including the ability to swim, is an important life skill and students registered in the BHSc EMC programme should be able to swim.
3. Physical preparedness assessments should be standardised at the different HEIs offering the programme; the assessment should be the same irrespective of student age, sex, height, or weight.

CONFLICT OF INTEREST

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: DM, CV-L, YC
Data acquisition: DM
Data analysis: DM
Interpretation of the data: DM
Drafting of the paper: DM
Critical revision of the paper: DM, CV-L, YC

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Comfort ratings of hearing protection devices among chemical manufacturing plant workers who use radio communication

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ABSTRACT

Background: Personal protective equipment (PPE), including hearing protection devices (HPDs), can minimise the adverse health impacts of occupational exposures when properly designed, selected, used, and maintained. Wearer acceptance, compatibility with other protective clothing, and environmental conditions affect the use of PPE. The selection of HPDs should consider wearer comfort and the need for effective radio communication to increase field usage and effectiveness, in addition to their attenuation capabilities.

Objective: To assess the comfort rating of HPDs that are concurrently used with radio communication at three chemical manufacturing plants in South Africa.

Methods: A mixed methods cross-sectional study design, incorporating field observations, a questionnaire survey, and noise measurements, was used. Visits to three chemical plants (A, B, and C) involved 1) noise level measurements, 2) the collection of HPDs in use, and 3) administration of a questionnaire, which was designed to elicit information about workers' subjective rating of comfort (isolation and radio communication) when using the devices. Data were analysed, descriptively, using Stata V13.

Results: Average noise levels were highest in plant C, followed by plants A and B. Nineteen different HPDs were used across the three chemical plants. All were designed for effective attenuation against medium and high frequencies, but only nine were designed for effective attenuation across all frequencies. Fifty-four workers completed the questionnaire, 15 (27.8%) of whom felt completely isolated when using HPDs. Twenty-five (46.3%) rated radio communication as bad when using HPDs.

Conclusion: The feeling of isolation and the quality of radio communication is subjective, varies amongst workers, and is influenced by both the spectral noise characteristics of the plant and the HPD used. To promote usage of HPDs and minimise the feeling of isolation and discomfort, the selection of devices should take the radio communication needs of workers into account.

INTRODUCTION

Personal protective equipment (PPE) is generally used to supplement other exposure controls that might not be feasible or optimal; PPE alone cannot completely mitigate occupational exposures.[1] The use of PPE such as hearing protection devices (HPDs) may have negative consequences, such as masking warning signals.[2] All PPE should be designed to increase usage and overall effectiveness.[1]

In the United Kingdom, the requirements for PPE, including HPDs, are regulated through the Personal Protective Equipment (Amendment) Regulations, 2022,[3] but South Africa has no equivalent regulations. However, the South African Bureau of Standards has developed and published safety, construction, and performance standards for HPDs and respiratory protective equipment (RPE).[4-6]

The frequency of exposure and proximity of workers to noise sources in the manufacturing sector requires the critical evaluation of measures intended to reduce noise exposure.[7] The reliance on HPDs to prevent noise-induced hearing loss (NIHL) is further hindered by inconsistent and incorrect use by workers. This is exacerbated by workers' acceptance that noise is an inherent aspect of work processes.[8]

Workplaces that rely solely on HPDs for noise protection should develop policies to guide their selection of HPDs,[9] and design and/or improve training programmes for workers.[10] To increase HPD usage, all stakeholders must have an accurate understanding of the risks and hazards involved.[11,12] Beyond attenuation capabilities, when selecting HPDs, worker comfort, acceptability,[13] compatibility and suitability,[9,13,14] and workforce demographics need to be considered.[15,16]

Comfort as a concept is difficult and complex to define scientifically and objectively. One definition is that it is a *"state of ease, with freedom from pain and anxiety and satisfaction of bodily wants"*.[17] In the workplace, comfort also relates to user acceptance of the need for consistent and correct use of PPE.[18] In the case of HPDs, worker comfort can promote the wearing of devices which, in turn, contributes to noise attenuation and prevents NIHL.[19]

Other health and safety aspects, such as the prevailing safety climate in a company, influence workers' perceptions[11] about the comfort of HPDs. Workers state that wearing earmuffs is cumbersome due to compatibility issues when used together with safety goggles[20] and safety helmets, which restrict head movement.[1,17] The concurrent use of PPE such as safety goggles, respirators, and earmuffs has been reported to degrade attenuation by up to 7 dB.[21] Workers prefer conventional disposable HPDs to earmuffs, citing comfort and ease of use as reasons.[22]

The comfort rating of HPDs should be included in selection initiatives.[23] Discomfort associated with the use of PPE can be reduced by natural adaptations, such as acclimatisation and continuous use.[1] The feeling of comfort related to HPD use varies across devices and is,

Feeling related to the HPD	1	2	3	4	5	6	7	Feeling related to the HPD
Feeling of complete isolation								No feeling of isolation
Bad radio communication								Good radio communication

HPD: hearing protection device

Figure 1. Items from the Bipolar Comfort Rating Scale included in the study questionnaire [34]

to some degree, influenced by the work environment and environmental conditions.[23] Spectral analysis of the noise environment, which involves the measurement of band pressure levels, identifies the dominant frequencies of emitted noise levels that contribute to annoyance[24] and affect radio communication,[17] which is another impediment to the wearing of HPDs.[20] The outcomes from the spectral analysis of the noise environment contribute to the selection of HPDs that minimise discomfort in a particular noise environment.[24]

Comfort issues related to the use of HPDs should be addressed in all sectors and companies to increase usage and the effectiveness of the devices.[1] Little research has been conducted in low- and middle-income countries (LMICs) regarding PPE utilisation and factors that hinder its usage.[25] Against this background, this study was conducted to assess the comfort rating of HPDs when used concurrently with radio communication, at three chemical manufacturing plants in South Africa. This study aligns with the United Nations' sustainable goals 3 (good health and wellbeing) and 8 (decent work and economic growth).[26]

METHODS

Study design

A mixed methods cross-sectional study design, incorporating field observations, a questionnaire survey, and noise measurements, was used. Visits to three chemical plants entailed 1) noise level measurements, 2) the collection of HPDs in use, and 3) administration of a questionnaire designed to elicit information about workers' subjective rating of comfort when using HPDs. The three chemical plants have demarcated noise zones in terms of the Noise-Induced Hearing Loss Regulations and were conveniently selected to represent different noise profiles. Radio communication is used by all process personnel across the three plants. The questionnaire was administered and the HPDs collected over four different shift cycles, to include all available process operators.

Study location

The study was conducted at three plants in a chemical manufacturing company located in the Free State province of South Africa, two of which manufacture inorganic acid (plant A) and ketones (plant B). The third (plant C) is a gas-fired power plant. All emit steady continuous noise.

Selection of study participants

Study participants were selected from a review of the health risk assessment reports of the three plants.[27] These reports capture details about job categories, HPDs used, and corresponding employee exposure times in demarcated noise zones, amongst other factors. Sixty-six process operators, who were exposed to high noise levels, were identified from the reports. These operators worked in demarcated noise zones for more than 90% of their shift cycles, where HPD use is mandatory. Twelve workers were included in a pilot study to determine the feasibility of the methodology, sampling, research tools, and analysis, but were excluded from the main study.

Area noise level measurements and HPD collection

Frequency band pressure levels were measured, using calibrated type 1 Quest 1900 and 3M SoundPro DL integrating sound level meters (SLMs), which incoporate frequency analysers.[28,29] The SLMs were set on the linear weighting (dBL), fast-response, and sound pressure level 'SPL',[30-33] with the microphone positions at 1.5 metres above floor level and 1.2 metres away from reflecting surfaces. The measurements included C-weighted equivalent sound pressure levels, read directly from the SLM.

During visits to the three plants, details about the HPDs used by process operators were recorded. The same types of HPDs used by the operators during the noise measurements were collected from the supervisor office, for the purpose of verifying the attenuation information (the assumed protection values (APVs)) written on the packages of the devices.

Questionnaire on HPD comfort rating

A self-administered questionnaire was used to assess the comfort of the HPDs, regarding feelings of isolation and quality of radio communication. The 54 process operators (16 from plant A, 20 from plant B, and 18 from plant C) completed the coded Bipolar Comfort Lickert Rating Scale, adapted from Park and Casali.[34] Items regarding workers' subjective opinions about isolation and radio communication were selected from the comfort rating scale (Figure 1). The questionnaire included other noise training programme aspects, which measured employee knowledge levels, and were derived from the Noise-Induced Hearing Loss Regulations.[10] The results of the employee knowledge levels have been previously reported by Rikhotso et al. (2019).[27]

Data analysis

The physical characteristics of the collected HPDs and the findings from their manufacturers' websites were tabulated in Microsoft Word. The area noise measurements and questionnaire data were entered into a Microsoft Excel spreadsheet.

Table 1 shows the summarised spectral characteristics of noises measured across the three plants (derived from data in Supplementary Table A). The multiple composite frequency band pressure levels from the three plants were logarithmically averaged using formula 1.

(formula 1)

$$Lp = 10 \log 1/n \Sigma 10 Lp, Ti/10$$

where:

Lp = average equivalent continuous rating level
Lp, Ti = individual equivalent continuous rating level
n = total number of measurement positions (at least three)

The band pressure levels were averaged logarithmically, to allocate them into three frequency bands, viz. low (63–250 Hz), medium (500–2 000 Hz), and high (3 150–8 000 Hz). The averaged frequency band pressure levels were used to calculate the average A-weighted (L_A) and C-weighted (L_C) equivalent sound pressure

levels, which were used to determine the noise classes from the high, medium, low (HML) check method,[9] using formulae 2 and 3.

(formula 2)
$L_C - L_A < 5$ dB noise class HM (medium-to-high frequency noises)

(formula 3)
$L_C - L_A \geq 5$ dB noise class L (dominant low frequency noises)

The results of the calculations, using formulae 2 and 3, enabled the classification of area noise at the three plants in accordance with the HML check method noise classes.

The APVs of the HPDs were logarithmically averaged and then classified into repurposed frequency bands (low, medium, and high) to enable the interpretation of their attenuation characteristics against the noise levels. The noise classes of the three plants and the HPD APV frequency bands were used to assess the suitability of the devices, in line with the HML check method.

Ethics clearance was provided by the Tshwane University of Technology (TUT) Faculty Committee on Research Ethics (FCRE 2016/03/012 (SCI)).

Table 1. Spectral characteristics of noises measured across the three plants

Plant	Average band pressure levels in dB (low frequency*)	Average band pressure levels in dB (medium frequency†)	Average band pressure levels in dB (high frequency‡)	Average L_{Aeq} (dBA)	Average L_{Ceq} (dBC)	Noise class (HML check method)
A	88	85	88	94	97	Low and high frequencies
B	84	79	71	83	91	Dominant low frequencies
C	107	101	98	108	115	Low and medium frequencies

*63–250 Hz, †500–2 000 Hz, ‡3 150–8 000 Hz
L_{Aeq} (dBA): A-weighted equivalent continuous rating level in decibels, L_{Ceq} (dBC): C-weighted equivalent continuous rating level in decibels, Hz: hertz, KHz: kilohertz
HML: high, medium, low

Table 2. Hearing protection device assumed protection values and design attenuation characteristics

HPD name	Testing standard	Assumed protection values			HPD (interpreted) attenuation characteristics		
		Low frequency bands*	Medium frequency bands†	High frequency bands‡	Low frequencies	Medium frequencies	High frequencies
3M 1426 economy earmuff	S3.19 – 1974	13	30.45	31.22	✗	✓	✓
3M Optime 95 earmuff	S3.19 – 1974	12.48	29.37	32.46	✗	✓	✓
3M Optime 98 earmuff	S3.19 – 1974	15	32.56	36.03	✗	✓	✓
Dromex J earmuff	EN 352-1	8.83	26.24	26.72	✗	✓	✓
Elvex HB-25 earmuff	S3.19 – 1974	15.88	33.87	32.75	✗	✓	✓
	EN 352 – 1	10.2	28.04	30	✗	✓	✓
Elvex HM-20 earmuff	S3.19 – 1974	17.96	33.65	35.54	✗	✓	✓
MSA V earmuff	S3.19 – 1974	11.74	28.37	30.49	✗	✓	✓
3M E-A-R Classic foam earplug	S3.19 – 1974	18.97	27.14	36.52	✗	✓	✓
3M E-A-R Classic yellow neon foam earplug	S3.19 – 1974	34.65	37.43	43.64	✓	✓	✓
Dromex EG-3201 corded reusable earplug	EN 352-2	25.48	27.28	34.84	✓	✓	✓
Elvex Quattro corded reusable earplug	EN 352 – 2	20.66	24.73	31.15	✓	✓	✓
	S3.19 – 1974	26.03	29.32	35.02	✓	✓	✓
Howard Leight Bilsom 304L foam reusable earplug	S3.19 – 1974	30.9	32.96	37.62	✓	✓	✓
	AS/NZS 1270	16.24	24.05	35.08	✗	✓	✓
Howard Leight fusion detectable, corded reusable earplug	EN 352-2	22.05	25.11	34.93	✓	✓	✓
Howard Leight fusion, corded regular reusable earplug	EN 352-2	14.56	21.97	27.46	✗	✓	✓
	AS/NZS 1270	14.56	21.97	27.46			
Perfect Fit earplug	S3.19 – 1974	23.21	26.73	33.16	✓	✓	✓
Uvex whisper corded reusable earplug	EN 352 – 2	16.89	22.29	28.93	✗	✓	✓
Uvex whisper+ reusable earplug	EN 352 – 2	20.51	25.06	30.63	✓	✓	✓
Noise Clipper custom-made earplug§	SABS 1451-2:1998§	23.92	28.28	39.1	✓	✓	✓

*63–250 Hz, †500–2 000 Hz, ‡3 150–8 000 Hz, §device testing protocols later amended to EN 352-2
✗: low efficacy, ✓: high efficacy
HPD: hearing protection device

RESULTS

Noise spectrum and HPD characteristics

Table 1 and Supplementary Table A show the spectral characteristics of the noise levels measured at the three plants and the derived HML check method noise classification. Average noise levels were highest in plant C, followed by plants A and B. Noises in all plants were dominated by low frequencies, while those in plants A and C included high and medium frequencies.

Nineteen different HPDs (seven earmuffs and 12 earplugs) were collected from 54 workers in the three plants. Table 2 shows the APVs of the 19 HPDs and the interpreted attenuation characteristics (columns 6–8) in relation to the frequency bands. Only nine (all of which were earplugs) of the 19 HPDs had APVs designated to effectively attenuate noise across low, medium, and high frequencies. None of the earmuffs had APVs designated to effectively attenuate noise at low frequencies.

Table 3 shows the suitability of the HPD APVs in line with the HML check method. Similar to the data shown in Table 2, only the nine earplugs had APVs designated to effectively attenuate noise across low, medium, and high frequencies. None of the earmuffs had APVs designated to effectively attenuate noise at low frequencies.

Hearing protection device usage

Table 4 shows the HPD usage across the three plants by years of enrolment in the company's hearing conservation programme (HCP). Workers are enrolled in an HCP if and when they work in jobs in which they are exposed to noise levels ≥ 85 dBA. Overall, the majority of participants (n = 31, 57.4%) indicated that they had used two types of HPDs since enrolment into the HCP. Five (9.3%) had used a single HPD and 17 (31.5%) had used three or more. One participant did not respond. The majority of employees across all the plants had used more than one HPD type.

Table 3. Suitability of hearing protection devices at the three plants using the HML Check method

HPD name	Testing standard	APV effectiveness Frequency bands		
		low*	medium†	high‡
3M 1426 economy earmuff	S3.19 – 1974	✗	✓	✓
3M Optime 95 earmuff	S3.19 – 1974	✗	✓	✓
3M Optime 98 earmuff	S3.19 – 1974	✗	✓	✓
Dromex J earmuff	EN 352-1	✗	✓	✓
Elvex HB-25 earmuff	S3.19 – 1974	✗	✓	✓
	EN 352 – 1	✗	✓	✓
Elvex HM-20 earmuff	S3.19 – 1974	✗	✓	✓
MSA V earmuff	S3.19 – 1974	✗	✓	✓
3M E-A-R Classic foam earplug	S3.19 – 1974	✗	✓	✓
3M E-A-R Classic yellow neon foam earplug	S3.19 – 1974	✓	✓	✓
Dromex EG-3201 corded reusable earplug	EN 352-2	✓	✓	✓
Elvex Quattro corded reusable earplug	EN 352 – 2	✓	✓	✓
	S3.19 – 1974	✓	✓	✓
Howard Leight Bilsom 304L foam reusable earplug	S3.19 – 1974	✓	✓	✓
	AS/NZS 1270	✗	✓	✓
Howard Leight fusion detectable, corded reusable earplug	EN 352-2	✓	✓	✓
Howard Leight fusion, corded regular reusable earplug	EN 352-2	✗	✓	✓
	AS/NZS 1270			
Perfect Fit earplug	S3.19 – 1974	✓	✓	✓
Uvex whisper corded reusable earplug	EN 352 – 2	✗	✓	✓
Uvex whisper+ reusable earplug	EN 352 – 2	✓	✓	✓
Noise Clipper custom-made earplug§	SABS 1451-2:1998§	✓	✓	✓

*63–250 Hz, †500–2 000 Hz, ‡3 150–8 000 Hz, §device testing protocols were amended to EN 352-2
✗: low efficacy,✓: high efficacy
APV: assumed protection value, HML: high, medium, low, HPD: hearing protection device

Table 4. Previous and current hearing protection device usage across the three plants

	Years enrolled in hearing conservation programme														
	Plant A					Plant B					Plant C				
HPDs used (n)	1–5	6–10	11–15	16–25	26–40	1–5	6–10	11–15	16–25	26–40	1–5	6–10	11–15	16–25	26–40
1	-	-	-	-	-	-	1	1	-	-	3	-	-	-	-
2	4	3	2	1	1	4	3	3	1	2	6	1	-	-	-
3–9	-	-	1	1	3	-	1	2		1	8	-	-	-	-

HPD: hearing protection device

Dual usage of HPDs was observed in all three plants. Custom-made (moulded) earplugs were the main HPD type used at plants B and C (data not shown). Custom-made earplugs, which are designed to filter noise at all frequencies, were used more commonly in plant C (n = 15; 83.3%) than in plant A (n = 3; 18.8%) and plant B (n = 12; 60.0%), which had comparably lower noise levels; 30 operators used these across all plants (55.6%). Earplugs alone (not custom made) were used by 11 study participants (20.4%), while eight used earplugs and earmuffs concurrently. None used earmuffs alone. Operators who had been enrolled in the HCP for 1–5 years made the most use of custom-made earplugs (n = 17), followed by those in the 11–15 years group (Figure 2). None of those in the 16–25 years group used custom-made earplugs.

Hearing protection device comfort

Overall,15 (27.8%) operators felt isolated when the various HPDs were used, compared to 29 (53.7%) who felt no isolation across the three noise environments (Figure 3).

The number of operators who rated radio communication as good or bad in all three plants were equally split at 25 (46.3%) (Figure 4). Twenty (66.7%) operators who used custom-made earplugs rated these devices as inducing bad radio communication; nine (30%) rated them as good.

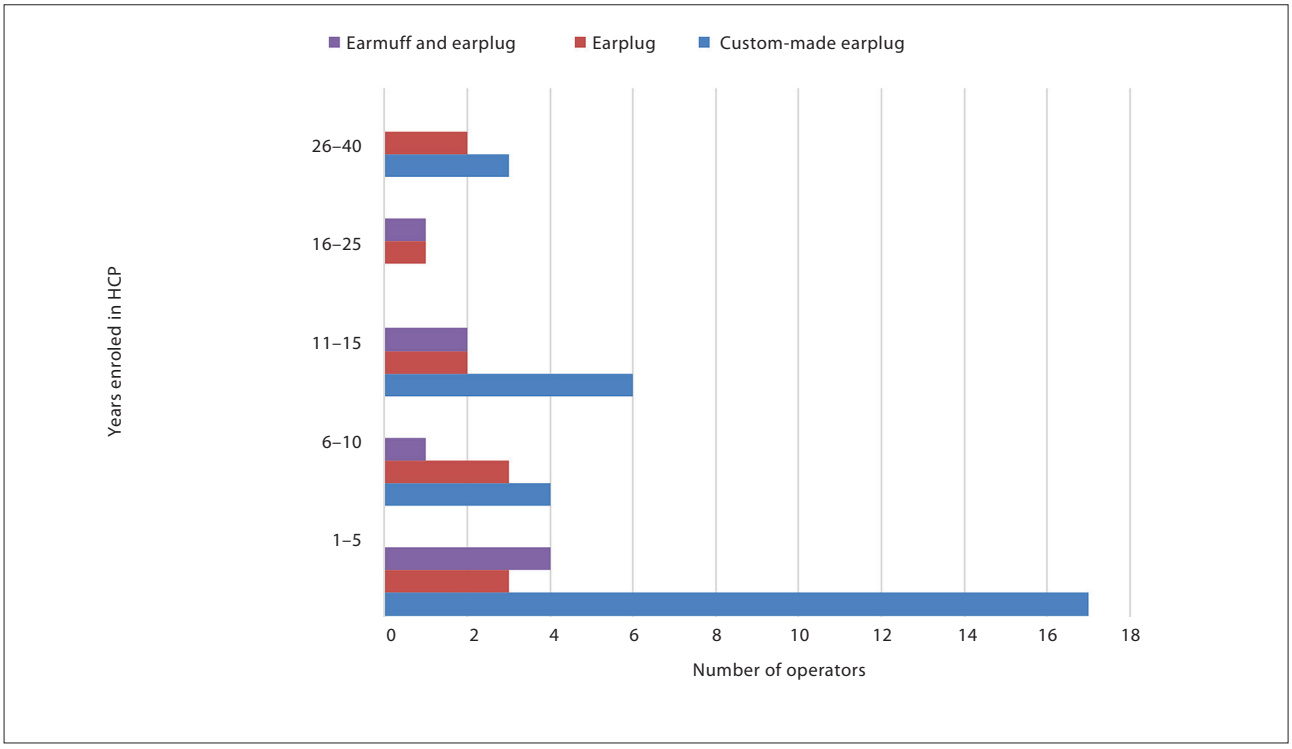


Figure 2. Hearing protection device type used, by years of enrolment in the hearing conservation programme

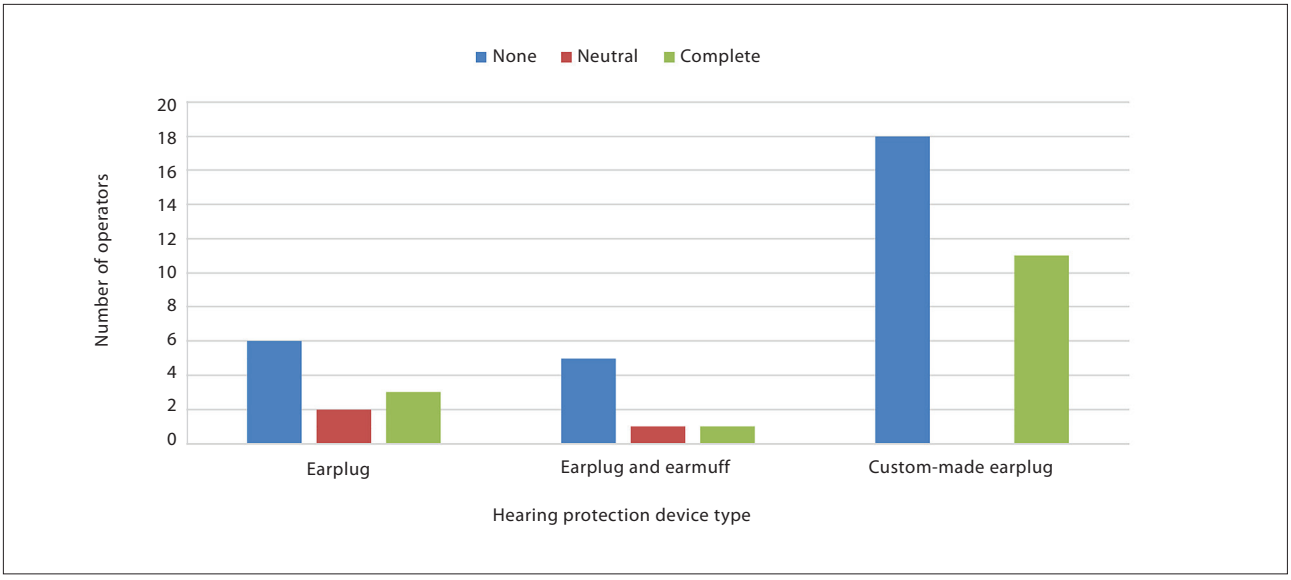


Figure 3. Feeling of isolation, by hearing protection device type used (all plants)

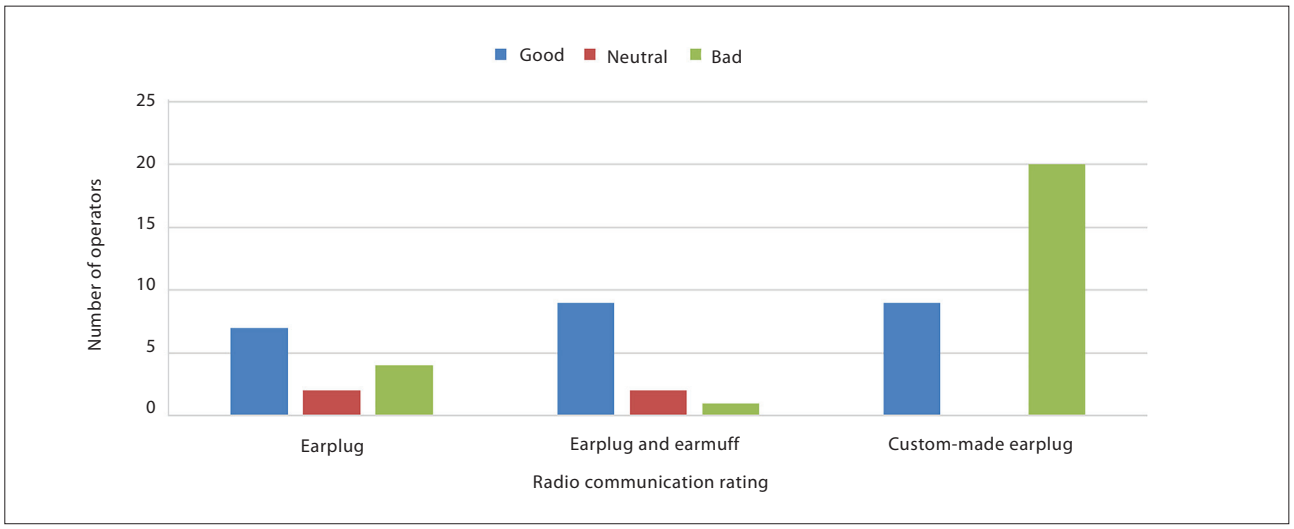


Figure 4. Rating of quality of radio communication with hearing protection device use

DISCUSSION

This study was conducted to assess the comfort of HPDs when used concurrently with radio communication, at three chemical manufacturing plants in the Free State province. Comfort was assessed by rating feeling of isolation and quality of radio communication.

Earplugs, including those that were custom made, were the most commonly used HPDs. The use of custom-made earplugs represents technological advances in the design of PPE[1] and indicates that companies are adopting the use of these devices. Those who have worked for many years are likely to be using HPDs that were provided in the past. The reasons for the use of multiple HPD types across the HCP enrolment years requires further investigation. All 19 HPDs used had APVs that were presumed to be effective against medium- and high-frequency noise classes, but only nine had APVs that were presumed to effective against low-frequency noise classes.

Feeling of isolation and rating of radio communication

Several operators reported discomfort relating to feeling of isolation and bad radio communication when using some of the HPDs. In a study conducted on manufacturing company employees in the United States, described in a paper by Davis et al. (2011),[22] the HPDs were rated as causing discomfort when compared to conventional disposable earplugs. Modern HPD designs do not necessarily eliminate discomfort.[1,22] Specific problems reported about custom-moulded earplugs include that employees are 'startled' when they are used in environments where impulsive noise in emitted.[22]

Earmuffs, which were less frequently used, as well as in conjunction with earplugs, are less preferred because they increase temperature and humidity, which, in turn, may increase the risk of external ear canal infections amongst susceptible workers.[20] The head band pressure on the sides of the head, caused by earmuffs, also leads to restricted blood flow, and creates discomfort with continued use.[17] The design factors that affect comfort when earmuffs are used are largely related to weight and texture of the devices.[35]

Overall, HPD use is inherently associated with discomfort caused by the occlusion effect, which induces booming, loud, and muffled voices heard by the wearer. This creates speech intelligibility problems when working in the plants as booming, loud, and muffled voices lead to lowering of the voice of the wearer.[21]

Several of the study participants reported feeling isolated and rated radio communication as 'bad' when using different HPDs. Similar findings were reported in a New Zealand study conducted in the manufacturing sector (Reddy et al., 2012).[8] Discomfort is a barrier to effective HPD use[20] and leads to a decrease in the usage of the devices.[7] This can affect production output and also lead to NIHL. Isolation and poor radio communication can mask emergency alarms, affecting occupational safety.[1]

Study limitations

In view of the many different HPDs used, we could not precisely identify the devices that induced feelings of isolation and were associated with bad radio communication. The retrospective aspects of the study, including the study participants' recall of the number of HPDs used in the past, may have introduced bias.

Recommendations

In view of the spectral noise differences, the selection of HPDs should follow a logical and balanced approach,[1] considering both the noise environment and the type or design of the device – aspects that affect comfort during use. Efforts should be made to minimise feelings of isolation and to maximise communication quality.[15] Continuous improvement in health and safety programmes, including HCPs, is necessary to ensure the use of PPE and minimise discomfort.[1,25] Early interventions targeted at both new and existing employees, regarding correct fitting procedures, should be implemented, as many workers lack the necessary knowledge about the correct fit and use of PPE.[23] Worker involvement in the selection of PPE, including HPDs, and the introduction of individual fit testing can assist in alleviating issues regarding discomfort, fit, and consistent usage.[1] In view of the need for good radio communication in the workplace, electronic noise filtering earmuffs should be introduced in the three plants in this study, in favour of passive devices, as recommended by Hsu et al. (2004).[35] Only two aspects of comfort were investigated, and future studies should be designed to assess the contribution of HPD comfort to NIHL in industry.

CONCLUSION

The feeling of isolation and the quality of radio communication is subjective, varies amongst workers, and is influenced by both the spectral noise characteristics of the plant and the HPD used.

To promote usage of HPDs and minimise the feeling of isolation and discomfort, the selection of devices should take the radio communication needs of workers into account.

KEY MESSAGES

1. Selection of HPDs should consider the spectral characteristics of the noise environment, matched to the APVs of the device, to enhance radio communication.
2. The majority of HPDs in use are geared towards attenuating noises at middle and high frequencies, resulting in some devices inducing a feeling of isolation when inappropriately selected for use in certain noise environments.
3. Wearer comfort, though highly subjective, should be considered during HPD selection.

DECLARATION

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

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AUTHOR CONTRIBUTIONS

Conception and design of the study: OR
Data acquisition: OR
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Interpretation of the data: OR
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Exposure to dust and associated respiratory outcomes among workers at a flour mill in KwaZulu-Natal province, South Africa

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ABSTRACT

Background: Inhalation of flour dust is associated with respiratory health effects, but there has been little research conducted on flour mill workers in South Africa. South Africa has an occupational exposure limit (OEL) for grain dust, but no OEL for flour dust. The former is used as the OEL for flour dust, despite the difference in composition and particle size of the two dusts. Flour mill workers report work-related respiratory health effects; therefore, it is essential to establish an OEL for flour dust.

Objectives: We assessed reported respiratory symptoms and pulmonary function amongst workers in a flour milling company, and associated factors.

Methods: This cross-sectional study was conducted at a flour mill in KwaZulu-Natal province, South Africa, amongst 63 employees: 48 mill workers and 15 office workers. Self-reported symptoms (chest tightness/breathing difficulties, dry cough, sneezing, and running/blocked nose) and work-related factors were elicited in 2021, using a questionnaire. Pulmonary function data were obtained from medical records; personal dust exposures from 2017, 2019, and 2021 were obtained from environmental monitoring reports. Categorical data, including respiratory symptoms and pulmonary function, were summarised using frequencies and percentages. Logistic regression was used to assess the association between exposure and respiratory symptoms, with odds ratios (ORs) and 95% confidence intervals (CIs) reported. Multiple linear regression was used to identify predictors of pulmonary function.

Results: The proportions of mill and office workers who reported respiratory symptoms was similar (50.0% and 46.7%, respectively). Mill workers had slightly higher adjusted odds of reported respiratory symptoms than office workers, but this was not statistically significant. In general, the forced expiratory volume in one second/forced vital capacity (FEV_1/FVC) ratios of the office workers and the laboratory staff were higher than those of the mill workers in other departments. The FEV_1/FVC ratios were slightly higher amongst all participants in 2020, during the severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) pandemic, than in 2019. Age was a predictor of pulmonary function (β = -0.377 (p = 0.007) in 2019 and β = -0.393 (p = 0.006) in 2020). Some mill workers were exposed to dust at concentrations exceeding the OEL for grain dust.

Conclusion: Although mill workers had slightly poorer pulmonary function than office workers, the prevalences of reported respiratory symptoms were similar. However, the high dust exposures in the milling and packing departments indicate that there is a need for improved dust control measures. The establishment of an OEL for flour dust will go a long way to protecting worker health.

INTRODUCTION

The American Conference of Governmental Industrial Hygienists (ACGIH) defines 'flour' as a complex organic dust used in baking; it comprises cereals such as wheat, rye, sorghum, barley, oats, rice, or corn (maize), or a combination of these, which have been processed by milling grains.[1,2] Flour dust refers to the particles that are created when cereals or non-cereal grains, such as wheat, are finely milled, and may contain contaminants such as silica, fungi, aflatoxins, insects, mites, pesticides, and herbicides.[3]

Exposure to flour dust has been linked to several adverse health effects, especially among bakers, and grain and flour millers.[3] For example, a study in Norway, published in 2004, found that flour dust exposure was associated with decreased pulmonary function among bakery workers.[4] Similarly, respiratory symptoms, such as cough and wheezing, were reported among workers exposed to flour dust in grain processing facilities in Egypt by Mohammadien et al. in 2013.[2] Only a few studies have been published about flour dust exposure in South Africa.[5-8]

While South Africa has an occupational exposure limit (OEL) for grain dust, there is none for flour dust. The grain dust OEL is used to assess over-exposure to flour dust, even though both dusts are organically different. In 2021, the grain dust OEL was reduced from 10 mg/m^3 to 8 mg/m^3.[9,10]

In this paper, we describe exposure to dust and associated respiratory outcomes (symptoms and pulmonary function measured as forced expiratory volume in one second/forced vital capacity (FEV_1/FVC) among employees in a flour mill, and factors associated with both outcomes.

METHODS

This was a descriptive cross-sectional study. The flour mill is located in Durban, KwaZulu-Natal province, South Africa. General milling processes are conducted, namely wheat purchasing, wheat receiving and storage, main production line activities, packaging, treatment, storage, and despatch. There are eight departments: administration, mill, maintenance, packing, laboratory, bakery, warehouse, and despatch. The mill operates 24 hours a day, seven days a week. Day shift employees work eight-hour shifts and night shift employees work 12-hour shifts for five or six days a week. Office workers are responsible for administrative tasks, while mill workers are involved in manufacturing, packaging, quality control, maintenance, storage, and dispatch in the mill and warehouse, and in the laboratory. The two work areas – mill and office – were used as proxies for flour dust exposure. The study population comprised 65 permanent employees aged 18 years or older, who had worked in the company for at least one year since 2020.

Table 1. Grading of pulmonary function

	Degree of pulmonary impairment			
Parameter (%)	**None**	**Mild**	**Moderate**	**Severe**
FVC	≥ 80	60–79	51–59	≤ 50
FEV_1	≥ 80	60–79	41–59	≤ 40
FEV_1/FVC	≥ 75	60–74	41–59	< 40

FEV_1: forced expiratory volume in one second, FVC: forced vital capacity

Source: Govender, 2024[12]

Table 2. Demographic and work characteristics of study participants (N = 63)

Characteristic	n	%
Age (years)		
18–25	10	15.9
26–35	24	38.1
36–45	19	30.2
46–55	6	9.5
> 55	4	6.3
Race		
Black	50	79.4
White	9	14.3
Indian	3	4.8
Coloured	1	1.5
Sex		
Male	56	88.9
Female	7	11.1
Work area		
Office	15	23.8
Mill	48	76.2
Department		
Administration	15	23.8
Milling	18	28.6
Maintenance	3	4.8
Packing	16	25.4
Laboratory	5	7.9
Warehouse	6	9.5
Duration of employment (years)		
1–3	26	41.3
4–6	22	34.9
7–10	8	12.7
> 10	7	11.1
Highest education level		
Primary	7	11.1
Secondary	37	58.7
Vocational training	5	8.0
National diploma	10	15.9
University degree	4	6.3

Posters describing the study and inviting workers to participate were displayed in common areas. Data were collected, using a self-administered questionnaire, from February to April 2021. The questionnaire was divided into three sections, viz. demographic characteristics (age, race, and sex), work-related questions (work area, duration of employment, FFP2 dust mask usage, and access to basic first aid), and questions regarding lifestyle and medical history (smoking, allergies, and respiratory symptoms, viz. chest tightness/breathing difficulties, dry cough, sneezing, and running/blocked nose). The questionnaire was provided in both English and isiZulu.

Pulmonary function results from spirometry tests from 2019 and 2020 were obtained from medical records and were used to assess pulmonary function. No spirometry tests were conducted during 2021, due to the severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) pandemic. The assessment of pulmonary function was based on the FEV_1/FVC ratio (Table 1).

Personal dust sampling is conducted every 24 months in accordance with the South African Department of Labour's Occupational Health and Safety Act No. 85 of 1993,[11] and the company's policy of measuring the dust exposure of at least one person from each work area, with a maximum of 10 people in total. The measurement of dust followed the National Institute for Occupational Safety and Health (NIOSH) Method 0500, which uses a 37-mm closed-face cassette and gravimetric analysis.[11] This method measures total dust, rather than flour dust specifically. Dust measurements from 2017, 2019, and 2021 were extracted from company records.

Permission was obtained from the occupational medical practitioner working in the company to amend the medical questionnaires used, to enable the collection of the data required for the study. Ethics approval was obtained from the Durban University of Technology's Institutional Research Ethics Committee (clearance certificate no. IREC 150/20).

Data analysis

The data were captured on Google forms and downloaded into a Microsoft Excel spreadsheet, after which they were imported into SPSS version 26 software for analysis. Respiratory symptoms and pulmonary function were compared between the office and mill workers. Frequencies and percentages were used to summarise demographic and work-related characteristics, and reported respiratory symptoms. The presence of any of the respiratory symptoms was categorised as 1, and the absence as 0. Logistic regression analysis was used to assess the association between work area – as a proxy for exposure (independent

variable) and respiratory symptoms (dependent variable). In the adjusted analysis, potential confounding factors, viz. age, sex, highest education level, and access to basic first aid were controlled for. Adjusted odds ratios (ORs) with 95% confidence intervals (CIs) were reported and statistical significance was set at $p < 0.05$. Multiple linear regression analysis was used to assess the influence of work area, age, use of FFP2 dust mask, and smoking (independent variables), on pulmonary function (dependent variable) for the years 2019 and 2020. The model was evaluated for its overall fit, including assumptions of linearity, normality of residuals, homoscedasticity, and multicollinearity among the predictors. The regression coefficients (β), standard errors (SEs), and p-values are reported for each variable.

RESULTS

Sixty-three of the 65 employees who fulfilled the inclusion criteria for the study agreed to participate (96.9% response rate). Forty-eight of the study participants were mill workers (76.2%), while 15 (23.8 %) were office workers. Most participants were aged 26–45 years (n = 43, 68.3%) as shown in Table 2. Most were black (n = 50, 79.4%), and the majority were male (n = 56, 88.9%). The largest staff complements were in the milling, packing, and administration departments. Forty-one percent (n = 26) of the study participants had been employed for 1–3 years, and most (n = 37, 58.7%) had secondary school as their highest education level.

Dust concentrations

Table 3 shows the personal dust exposure concentrations for the years 2017, 2019, and 2021 by work area, department, and job title. Those working in the packing and milling departments had the highest exposures to dust across the three years, with several exposed to concentrations higher than the grain OEL. None of the office workers were exposed to dust above the grain OEL in any of the three years.

Respiratory symptoms

Table 4 shows the frequencies of the reported respiratory symptoms based on work area. Twenty-four mill workers (50.0%) and seven (46.7%) office workers reported one or more respiratory symptoms.

Table 3. Personal dust exposures, 2017, 2019, and 2021

Year	Work area	Department	Job title	Mean TWA dust concentration (mg/m^3)
2017	Office	Administration	Administration cleaner	0.48
	Mill	Milling	Miller	2.43
		Packing	Packing supervisor	0.28
			Packer #1	**15.37**
			Packer #2	2.72
		Laboratory	Laboratory technician	0.08
		Warehouse and dispatch	Warehouse supervisor	0.20
			Forklift driver #1	0.11
			Forklift driver #2	0.53
2019	Office	Administration	Administration cleaner	0.50
	Mill	Milling	Mill cleaner	**27.13**
			Miller	**23.98**
			Maintenance assistant	**13.18**
		Packing	12.5 kg mixer packer	7.07
			Packer #2	**12.75**
			Carousel operator	7.12
		Laboratory	Laboratory technician	0.12
		Warehouse and dispatch	Vehicle assistant	1.87
			Forklift driver	0.44
2021	Office	Administrative	Weighbridge operator/ administrator	0.25
	Mill	Milling	Maintenance assistant	1.20
			Mill cleaner	1.68
			Mill packer	**12.24**
			Miller	0.23
			Mill cleaner	1.39
		Packing	Packer #1	**8.58**
			Packer #2	**13.92**
		Laboratory	Laboratory technician	2.10
		Warehouse and dispatch	Forklift driver	0.86

TWA: time-weighted average

Table 5 shows the association between work area and reported respiratory symptoms. There were no statistically significant associations between sociodemographic or work-related characteristics and respiratory symptoms.

Pulmonary function

The FEV_1/FVC ratios declined gradually with age (Table 6). The FEV_1/FVC ratios remained relatively stable from 2019 to 2020 in the different departments, with the exception of the laboratory, where lung function values were higher in 2020 than in 2019. Office workers and laboratory workers had marginally higher FEV_1/FVC ratios (better pulmonary function) than those working in the other departments. Overall, the ratios across all categories were within the normal range, indicating no pulmonary impairment within the study participants.

Table 7 shows the results of the linear regression analysis for the 2019 and 2020 data. Age was negatively associated with FEV_1/FVC in both years. For every one-year increase in age, the FEV_1/FVC decreased by 0.377% (p = 0.007) in 2019, and by 0.393% (p = 0.006) in 2020. Although smoking was significantly associated with an increase in FEV_1/FVC in 2019 (β = 0.317, p = 0.022), there was no association in 2020 (β = 0.116, p = 0.361). Work area was also not associated with pulmonary function.

Table 4. Reported respiratory symptoms

Respiratory symptom	Work area			
	Office n = 15		Mill n = 48	
	n	%	n	%
Chest tightness/breathing difficulties	2	13.3	12	25.0
Dry cough	3	20.0	8	16.7
Sneezing, running/blocked nose	3	20.0	16	33.3
None	8	53.3	24	50.0
Any respiratory symptom	7	46.7	24	50.0

DISCUSSION

We assessed the respiratory outcomes (reported symptoms and pulmonary function) amongst mill and office workers exposed to flour dust, and factors associated with these outcomes. Globally, research has linked flour dust exposure to decreased pulmonary function and other adverse health effects.[2, 3, 13-16]

Some mill workers (those in the milling and packing departments) were exposed to concentrations of dust that were much higher than the grain dust OEL – almost four times higher in one case. The mill workers work closely with flour – typically within an arm's length – for prolonged periods, using only FFP2 dust masks for protection against exposure. The office workers are located in an enclosed area, which is isolated from the production areas. The laboratory workers are similarly physically removed from the dust as the laboratory is also enclosed and, therefore, relatively dust free. This might explain the better lung function of study participants who worked in these two departments, compared to those who worked in departments where there are no physical barriers to protect them from dust exposure.

Several factors, other than the department in which a person works, can affect exposure to dust in these workers. For example, the workers rotate job tasks within departments, e.g. from placing bags on pallets to filling bags with flour. Dust exposure is likely to differ during these different tasks. Dust extraction efficiency also differs within the mill. The extractor fans are positioned approximately 4 metres above the ground to remove hot air, while free-standing fans are placed on the floor to reduce temperatures. While heat stress is mitigated in this way, the dust is airborne and dispersed throughout the work area. Vibrations from milling operations can cause deterioration of equipment, leading to perforations and malfunctions, which, in turn, lead to dust spillages. Regardless of the reason for the high dust exposures in some departments in the mill, they are a cause for concern.

Table 5. Association between work area and reported respiratory symptoms among study participants

		n	OR	95% CI	p value	AOR	95% CI	p value
Work area	Office	15	Reference			Reference		
	Mill	48	1.1	0.33–3.36	0.933	25.6	0.80–820.37	0.067
Age group (years)	18–25	10	Reference					
	26–35	24	0.2	0.04–1.06	0.059	0.3	0.04–1.56	0.140
	36–45	19	0.9	0.18–4.90	0.930	2.4	0.34–16.21	0.382
	46–55	6	0.2	0.02–1.88	0.164	0.4	0.04–4.18	0.434
	≥ 55	4	a			a		
Sex	Male	56	Reference			Reference		
	Female	7	1.5	0.32–7.52	0.595	5.97	0.36–99.45	0.213
Highest education	Primary	6	Reference					
	Secondary	37	1.7	0.28–10.45	0.567	2.4	0.28–20.72	0.423
	Vocational	5	1.3	0.11–15.70	0.819	1.3	0.07–24.95	0.843
	National diploma	10	4.7	0.53–40.89	0.164	56.7	0.99–3245.6	0.051
	University degree	5	1.3	0.11–15.07	0.819	2.9	0.10–81.46	0.535
Access to first aid	Yes	53	Reference			Reference		
	No	8	1.2	0.27–5.35	0.803	0.7	0.13–4.48	0.762
	unsure	2	a			a		

AOR: adjusted odds ratio, OR: odds ratio, CI: confidence interval, a: not calculated as no respiratory symptoms were reported

While the frequency of reported respiratory symptoms varied slightly between office and mill workers, with mill workers reporting more symptoms, there was no association between work area and respiratory symptoms. Mohammadien et al. (2013)[2] showed a statistically significant relationship between reported respiratory symptoms, work area (links to level of flour dust exposure), and tobacco smoking in a study in Egypt; 96.8% of workers with high exposures reported respiratory symptoms. In 2009, the NIOSH reported that employees in a poultry breading plant – who were exposed to high levels of flour, spices, etc. – reported more work-related runny nose, stuffy nose, and frequent sneezing symptoms than the low-exposure group.[11] According to Brisman et al. (2000)[17] and Bohadana et al. (1994),[18] there is a risk of developing rhinitis even at low exposure levels to flour dust. Exposure to flour dust concentrations higher than 1 mg/m^3 may increase the risk of developing rhinitis (Brisman et al.).[17]

Pulmonary function is typically assessed using spirometry. Mohammadien et al. (2013)[2] place a large emphasis on duration of employment when interpreting spirometry results, and Kakouei et al. (2005)[19] state that job activities also influence these results. Study participants who did not work in the administration department or the laboratory had the lowest FEV_1/FVC ratios, possibly due to dust exposure. The FEV_1/FVC ratios were slightly higher amongst all participants in 2020 – during the SARS-CoV-2 pandemic – than in 2019, which might have been due to the increased usage of masks. Age was negatively associated with pulmonary function in both 2019 and 2020, as expected. Pulmonary maturity is obtained between the ages of 20 and 25 years – after which, pulmonary function steadily declines – particularly FEV_1, FVC, and FEV_1/FVC ratios (Barroso et al. (2018).[20] Smoking is associated with pulmonary impairment.[3] In our study, smoking was significantly associated with an increase in FEV_1/FVC in 2019 (but not in 2020). This unexpected association of smoking with an increase in FEV_1/FVC may be due to the small number of participants in our study.

Table 6. Mean FEV_1/FVC by age group, duration of employment, and work area, 2019 and 2020

		Year	
		2019	2020
Variable		FEV_1/FVC (%)	FEV_1/FVC (%)
Age (years)			
18–25		89	88
26–35		84	86
36–45		83	84.4
46–55		82	84
> 55		79	86.5
Duration of employment (years)			
1–3		85.2	86.3
4–6		83.6	85.7
7–10		84.3	85.3
11–15		83.7	81.3
> 15		86	86.3
Work area			
Office		87	87.8
Mill	Laboratory	87.5	94
	Packing	84.2	84.1
	Warehouse	83.3	85
	Mill	82	84.3
	Maintenance	82	83.5

Limitations

Our inability to detect any associations between reported respiratory symptoms and pulmonary function, and exposure (work area) may be due to the small number of study participants. Nevertheless, we did find that workers in some departments had high exposures to dust – much higher than the OEL for grain dust. The dust sampling method used measures total dust, not flour dust specifically. The results from the personal dust sampling reports, thus, reflect exposure to all types of dust that an employee may have been exposed to during a work shift. Respiratory symptoms could be due to exposure to contaminants and not to the flour dust component. Available data were limited in that no spirometry tests were conducted in 2021 due to the coronavirus disease-2019 (COVID-19) lockdown in South Africa. Personal dust sampling is influenced by the task, worker behaviour, ventilation, the condition of equipment, and other factors, which were not available for inclusion in the analysis.

Recommendations

It is imperative that the relevant South African governing bodies differentiate between grain dust and flour dust in determining appropriate OELs for each. The NIOSH 0500 dust sampling method is inadequate for measuring exposure to flour dust, as it is used to measure total dust. A better method needs to be identified to measure flour dust specifically. Regular inspections and planned maintenance programmes must be entrenched practices in the company to minimise exposure of workers to dust.

CONCLUSION

Although we found no associations between exposure to dust and reported respiratory symptoms or pulmonary function, our findings do provide evidence for enhancing health and safety regulations and policies within flour mills. The high dust exposures in the milling and packing departments indicate that there is a need for improved dust control measures. The establishment of an OEL for flour dust will go a long way to protecting worker health.

Table 7. Factors associated with pulmonary function in study participants, 2019 and 2020

	Year					
	2019			2020		
Variable	β	SE	p value	β	SE	p value
Age	-0.377	0.804	0.007	-0.393	0.758	0.006
Work area	-0.098	0.653	0.500	-0.178	0.551	0.193
Use of FFP2 dust mask	0.188	1.873	0.204	0.145	1.073	0.288
Smoking	0.317	2.090	0.022	0.116	0.922	0.361

β: standardised beta coefficient, SE: standard error

KEY MESSAGES

1. Flour mill workers in some departments were exposed to dust concentrations way above the OEL for grain dust.
2. Pulmonary function appears to be lower in workers in departments where workers are exposed to high dust concentrations.
3. An OEL for flour dust will assist in protecting the respiratory health of workers.

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: SH, SG, VN
Data acquisition: SH
Data analysis: SCO, SH
Interpretation of the data: SH, SCO, SG
Drafting of the paper: SH, SG, SCO
Critical revision of the paper: SG, SH, SCO, VN

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Cannabis testing in the post-legalisation era: beyond zero-tolerance to a risk matrix approach balancing safety and privacy

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ABSTRACT

The legalisation of cannabis for private use in South Africa has created significant challenges for workplace substance testing protocols. The landmark *Enever v Barloworld* case demonstrated the inadequacy of traditional 'zero-tolerance' approaches that fail to consider job-specific risks and privacy implications. In this paper, I propose a comprehensive risk assessment methodology for workplace cannabis testing, using a risk matrix approach. The process includes hazard identification, risk analysis, job role categorisation into high, medium, and low-risk categories, and the establishment of appropriate testing protocols with evidence-based THC thresholds. The methodology advocates for oral fluid testing with differentiated THC thresholds (2 ng/mL for high-risk roles and 5 ng/mL for medium/low-risk roles) and tailored testing scenarios based on risk level. By implementing this structured approach, employers can balance their duty to maintain workplace safety with employees' constitutional rights to privacy, creating testing regimens that are proportionate, defensible, and aligned with current legal precedents.

INTRODUCTION

The legalisation of cannabis for private use in South Africa represents a significant shift in the social and legal landscape, following the Constitutional Court's judgement in the *Minister of Justice and Constitutional Development and Others v Prince* in 2018.[1] This landmark ruling decriminalised the private use of cannabis, creating new challenges for employers attempting to maintain workplace safety, while respecting employees' constitutional rights to privacy. The subsequent promulgation of the Cannabis for Private Purposes Act has further solidified this legal framework, requiring employers to recalibrate their approach to substance testing policies.[2]

The post-legalisation environment has revealed significant challenges for South African employers, most notably highlighted in the pivotal Labour Court of Appeal case *Enever v Barloworld Equipment South Africa* ('Barloworld' case hereafter).[3] In this watershed ruling, the court determined that an employee, whose urine cannabis test was positive, could not be dismissed without clear evidence that her impairment posed a genuine risk to workplace health and safety. This case exposed the inadequacy of the widespread 'umbrella approach' to drug testing, wherein employers implement 'zero-tolerance' policies that subject all employees to identical testing regimens, typically using urine as the biological matrix, regardless of their specific job responsibilities or the privacy implications.

This judgement signalled an urgent need for employers to move away from blunt zero-tolerance approaches towards more nuanced testing protocols that consider specific job requirements and risks. As Laurens notes, *"Drug testing policies may not be unnecessarily stringent to the extent that they prescribe to an individual's private behaviour, thereby invading their right to privacy"*.[4] Employers must now provide robust justification for their chosen testing methodologies, including the specific biological matrix (blood, oral fluid, urine, or hair), the cut-off concentration levels, and the substances targeted. Risk assessment methodologies provide a structured framework for making these determinations. The risk assessment process – comprising hazard identification, risk analysis, risk evaluation, and risk control – enables employers to quantify the likelihood of undesired events and the severity of potential consequences, thereby establishing objective criteria for testing protocols.[5] A risk matrix approach, specifically, allows for the visual representation of risk levels based on likelihood and consequence, facilitating evidence-based decision-making regarding which employees should be tested, how they should be tested, and what threshold concentrations should apply.

In this paper, a comprehensive risk assessment scheme for workplace cannabis testing is proposed, providing employers with a practical framework that balances their duty to maintain a safe workplace with employees' constitutional rights to privacy. By adopting a methodical approach to risk categorisation and testing protocols, employers can establish testing regimens that are proportionate, defensible, and aligned with both legal precedent and occupational health best practices.

RISK ASSESSMENT

Understanding the foundations of risk assessment for cannabis use

The legalisation of cannabis for private use has created a complex situation, where employers must distinguish between legal private use and workplace impairment that could pose safety risks. Implementing an adequate risk assessment protocol requires a clear understanding of the unique challenges presented by cannabis use, particularly delta-9-tetrahydrocannabinol (THC), the primary psychoactive compound of the plant. Unlike alcohol, for which there is a relatively predictable relationship between blood concentration and impairment, cannabis presents more complex detection and interpretation challenges. THC can remain detectable

Table 1. Risk matrix for cannabis-related workplace risks

	Likelihood				
Severity (impact)	**Rare**	**Unlikely**	**Possible**	**Likely**	**Almost certain**
Catastrophic	Medium	High	High	Extreme	Extreme
Major	Medium	Medium	High	High	Extreme
Moderate	Low	Medium	Medium	High	High
Minor	Low	Low	Medium	Medium	High
Negligible	Low	Low	Low	Medium	Medium

in specific biological matrices long after the impairing effects have dissipated, with chronic users potentially testing positive for weeks after the last use.[6] As Ramaekers et al. (2006) demonstrated, THC follows a less predictable impairment pattern than alcohol, complicating the establishment of per se limits that reliably indicate current impairment.[7]

A proper risk assessment must account for these pharmacokinetic complexities, while also considering the specific workplace context. McKinnon defines risk assessment as *"the evaluation and quantification of the likelihood of undesired events and severity of injury and damage that the risks could cause"*.[8] Applied to cannabis in the workplace, this means systematically evaluating how cannabis-induced impairment might interact with job responsibilities to create safety, financial, or operational risks.

Step 1: Hazard identification and risk assessment

The first step in the risk assessment process involves identifying the specific hazards associated with cannabis use in relation to workplace activities. This requires a structured approach that McKinnon refers to as hazard identification and risk assessment (HIRA), which aims to *"identify hazards and evaluate the probability of injury or illness arising from exposure to a hazard"*.[9]

For cannabis-specific workplace risk assessment, employers should begin by conducting a comprehensive job analysis for each position within the organisation. This analysis should document:

1. Safety-critical functions (e.g. operating machinery, working at heights, driving)
2. Financial authorities (e.g. signing authority, budget control, investment decisions)
3. High-responsibility functions (e.g. supervision of others, emergency response, care of vulnerable individuals)
4. Cognitive demands (e.g. complex decision-making, attention to detail, vigilance requirements)

Wadsworth et al. (2006) demonstrated that cannabis use can impair cognitive functions and mood in workplace settings, with users experiencing impairments in working memory, psychomotor speed, and episodic recall throughout the workweek.[10] Importantly, these users typically show no heightened awareness of their decreased performance, despite measurable deficits in cognitive performance. These findings underscore the importance of identifying roles where such impairments could have significant adverse consequences.

For each job function, employers should document potential cannabis-related hazards. For example, cannabis use has been shown to impair coordination, reaction time, motor skills, judgment, decision-making, attention, and concentration.[11] Moreover, these effects can persist for up to 24 hours post use, and combining cannabis with alcohol significantly worsens and prolongs impairment.[12] Chronic cannabis use may continue to affect job performance even after the acute effects of intoxication have subsided, particularly in roles demanding high cognitive functioning.[13]

Step 2: Risk analysis using a matrix approach

Once the hazards have been identified, the next step involves analysing the risks, using a structured matrix approach. A risk matrix provides a visual representation of risk levels, by plotting the likelihood of an adverse event against the severity of potential consequences. This approach allows employers to prioritise their risk mitigation efforts, based on objective criteria rather than subjective judgements. A typical risk matrix for cannabis-related workplace risks is shown in Table 1.

For cannabis risk assessment, 'likelihood' refers to the probability of cannabis-impaired work occurring, while 'severity' is the potential consequence of such impairment. Severity can be defined as follows:

- Catastrophic: potential for fatalities, severe injuries, or catastrophic financial/reputational damage
- Major: potential for serious injuries, major economic losses, or significant operational disruption
- Moderate: potential for moderate injuries, notable financial impact, or operational disruption
- Minor: potential for minor injuries, limited economic impact, or minimal operational disruption
- Negligible: no significant safety, financial, or operational impact

The likelihood assessment should consider factors such as the prevalence of cannabis use in the general population, history of substance-related incidents in similar workplaces, level of supervision and existing controls, and work scheduling (e.g. shift work that might increase risk). This matrix approach aligns with established risk assessment methodologies in occupational health and safety. As noted by Blows et al. (2005), habitual cannabis use is associated with a significant increase in vehicle crash injuries, underlining the importance of proper risk assessments for roles involving driving or similar safety-critical tasks.[14]

Step 3: Job role risk categorisation

Based on the risk analysis, employers should categorise all job roles into risk levels that will determine the appropriate testing protocols. This categorisation process is a crucial step that directly addresses the concerns raised in the Barloworld case, where the court criticised indiscriminate testing without considering the actual risks associated with specific job functions.[3] A three-tier categorisation system provides sufficient granularity without unnecessary complexity.

1. High-risk roles

These positions involve activities where impairment could lead to catastrophic or major consequences, with a possible to almost certain likelihood of occurrence. Such activities typically include

operating heavy machinery or dangerous equipment; working at heights or in confined spaces; responding to emergencies (emergency response personnel); transportation/driving responsibilities; and safety-critical decision-making roles. Other positions include those with significant financial authority (e.g. investment managers, roles with high purchasing authority); and those with high responsibility for others (e.g. healthcare providers, childcare workers).

Sexton et al. (2000) demonstrated that cannabis significantly impairs driving ability, with effects persisting for several hours after consumption.[15] Similarly, Pickworth et al. (1997) documented the effects of cannabis on psychomotor performance that could directly impact workplace safety in high-risk environments.[16]

2. Medium-risk roles

These positions involve activities where impairment could lead to moderate consequences or significant consequences with a rare or unlikely likelihood. Such roles might include working with potentially harmful substances, roles requiring high levels of alertness and coordination, security personnel, financial roles with moderate authority, middle management positions, and project managers of significant initiatives.

3. Low-risk roles

These positions involve activities where impairment would likely lead to minor or negligible consequences. Such roles might include administrative positions, remote work roles, roles with minimal safety implications, positions with limited financial or responsibility impacts, and roles with close supervision or multiple review levels.

This risk categorisation should be documented with clear rationales for each position, considering the nature of work performed, potential consequences of impairment, supervisory responsibilities, legal requirements for the role, financial authorities and stakeholder impact, and critical decision-making requirements. A structured approach to documenting this assessment process is essential for both implementation and legal defensibility.

Step 4: Establishing testing protocols and THC thresholds

Once job roles have been categorised according to risk, employers can establish appropriate testing protocols and THC thresholds. This step addresses another key issue highlighted in the Barloworld case – the need for testing methodologies that are proportionate to the actual risk and that don't unnecessarily infringe on privacy rights.[3]

Testing matrices

The choice of the biological matrix for testing is crucial, as different matrices provide different information about cannabis use.

1. *Oral fluid testing:* detects recent use (typically within the past 24 hours), correlates better with current impairment, and is less invasive than blood testing. Research by Huestis and Cone (2006) confirms that oral fluid concentrations of THC correlate reasonably well with blood concentrations during the initial hours after smoking, making this an appropriate matrix for detecting recent use.[17]
2. *Blood testing:* provides the most accurate determination of current THC levels, but is more invasive than oral fluid or urine testing; requires healthcare professionals for collection. Studies by Ramaekers et al. (2006) established that serum THC concentrations between 2 and 5 ng/mL represent a range where impairment becomes significant for tasks related to driving.[7]
3. *Urine testing:* detects use from days or weeks prior, with limited correlation with current impairment. As highlighted in the Barloworld case, urine testing alone is generally insufficient to establish current impairment.[3]

Per se THC thresholds

Based on current research and international standards, appropriate THC thresholds can be established for different risk categories.

1. *High-risk roles:* 2 ng/mL THC in oral fluid or blood
   This threshold aligns with international standards, including those established by the Substance Abuse and Mental Health Services Administration in the USA and the European Workplace Drug Testing Society.[18] In South Africa, this corresponds with the per se blood level for professional drivers under the National Road Traffic Act.[20]
2. *Medium and low-risk roles:* 5 ng/mL THC in oral fluid or blood
   This higher threshold acknowledges the lower risk associated for drivers, while providing a reasonable safety margin. This level corresponds with the per se level for regular drivers under the National Road Traffic Act in South Africa.[20]

Testing scenarios

The frequency and circumstances of testing should also be tailored to risk categories.

1. *All risk categories:* pre-employment testing, reasonable suspicion testing, and post-incident testing
2. *Medium and high-risk categories:* random testing

This differentiated approach was supported in the *Marasi v Petroleum Oil and Gas Corporation of South Africa* case, which emphasised that testing policies must be aligned with workplace requirements and that indiscriminate testing infringes on employees' rights.[21]

Step 5: Implementation and integration with safety management systems

For effective implementation, the cannabis testing protocol must be integrated into the organisation's broader safety management system (SMS). As McKinnon (2024) notes, *"The hazard identification and risk assessment (HIRA) process will ensure that an undertaking has identified all the hazards, analysed the risks, evaluated them, and ascertained which risk control methods to apply. These controls would form the basis of the Safety Management System (SMS)".*[22]

The implementation process should include:

1. *Policy development:* create a comprehensive substance use policy that includes a clear statement of purpose, focusing on safety, definitions of prohibited behaviours, testing procedures and circumstances, consequences of policy violations, support resources for employees, and appeal procedures. The policy should explicitly state the risk classification of different occupational categories, the testing requirements for each category, and the per se threshold limits. This transparency is essential for legal defensibility and employee acceptance.
2. *Employee education:* provide comprehensive education on the effects of cannabis on work performance, company policy and testing procedures, consequences of policy violations, and available support resources. Research indicates that providing information about the risks associated with cannabis and driving has a limited effect on risk reduction compared to enforcement measures, underscoring the importance of clear policies that include consequences of non-compliance.[23]

3. *Supervisor training:* provide specialised training for supervisors on recognition of impairment signs, proper documentation of reasonable suspicion, handling of testing situations with dignity and respect, and non-discriminatory application of policies.
4. *Documentation and record keeping:* maintain secure records of risk assessments and job categorisations, testing procedures and results, reasonable suspicion documentation, training completion, and policy acknowledgements.

Step 6: Continuous evaluation and improvement

A robust risk assessment process is not static but requires ongoing evaluation and improvement. This includes:

1. *Monitoring and measurement:* track metrics such as the number and types of tests conducted, positive test results by substance and job category, incidents related to substance use, programme costs and benefits, and employee feedback and concerns.
2. *Periodic review:* regularly review testing technologies and methods, legal requirements and case law, scientific research on impairment, and programme effectiveness and outcomes.
3. *Adaptability:* be prepared to adapt the programme based on changes in legislation, new court rulings, advances in testing technology, and emerging research on cannabis effects.

This continuous improvement approach ensures that the testing programme remains aligned with both legal requirements and scientific knowledge, reducing the risk of legal challenges while maximising effectiveness in preventing impairment-related incidents.

CONCLUSION

The legalisation of cannabis for private use has created a new paradigm for workplace substance testing in South Africa. The Barloworld case served as a watershed moment, highlighting the inappropriateness of traditional 'zero-tolerance' approaches, and emphasising the need for nuanced, risk-based testing protocols that respect employees' privacy rights while maintaining workplace safety.

The risk assessment methodology outlined in this paper provides employers with a structured approach to navigating this complex terrain. By systematically identifying hazards, analysing risks using a matrix approach, categorising positions according to risk level, and implementing proportionate testing protocols with appropriate THC thresholds, employers can establish testing regimens that are both effective and legally defensible.

The key insights from this approach are threefold. First, not all positions carry the same risk when it comes to cannabis impairment; testing protocols should reflect these differences. Second, the choice of biological matrix and threshold concentration is crucial, with oral fluid offering advantages in detecting recent use that might correlate with impairment. Third, implementation must be accompanied by clear policies, comprehensive education, and ongoing evaluation to ensure effectiveness and adaptation to changing circumstances.

Moving forward, employers should review their existing substance testing policies through the lens of this risk assessment framework, making necessary adjustments to ensure alignment with current legal precedent and scientific knowledge. This balanced approach will enable them to fulfil their duty of care, while respecting the constitutional rights of their employees in the post-legalisation era.

KEY MESSAGES

1. Move away from 'zero-tolerance' cannabis testing towards nuanced protocols based on actual job risks; indiscriminate testing needlessly invades privacy and lacks legal defensibility.
2. Classify positions as high, medium, or low risk based on potential consequences of impairment; tailor testing frequency and THC thresholds accordingly, rather than testing everyone identically.
3. Oral fluid testing best balances detecting recent cannabis use with current impairment; urine testing often detects past use unrelated to workplace safety and unnecessarily infringes on privacy.
4. Legal precedent requires that workplace testing be proportionate to genuine safety concerns; employers must justify their testing protocols with evidence of specific job-related risks.

DECLARATION

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

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Increasing capacity for occupational hygiene in Zambia

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INTRODUCTION

The International Occupational Hygiene Association (IOHA) currently incorporates 42 member organisations, which represent more than 20 000 occupational hygienists, worldwide. Only three of these 42 member organisations represent African occupational hygienists, namely the Southern African Institute for Occupational Hygiene (SAIOH), the Association of Industrial Hygienists Nigeria (AIHN), and the Occupational Hygiene Society of Tanzania (OHST).[1] It is estimated that there are approximately 530 million working people in Africa,[2] which points to a tremendous shortage and need for occupational hygiene professionals on the continent. This need was also highlighted by Khoza et al. (2023),[3] who emphasised that meaningful collaboration between organisations such as academic institutions, governmental departments, and developmental partners is crucial to build capacity for occupational hygiene on the continent. This report describes one such collaboration: between the Occupational Hygiene Group (OHG) at the Copperbelt University (CBU) in Kitwe, Zambia and several South African universities, developmental partners, the Zambian Ministry of Labour, and mining companies in the Copperbelt and North-Western provinces of Zambia. The aim of this collaboration is to advance capacity for occupational hygiene in the region.

COLLABORATION BETWEEN CBU-OHG AND SOUTH AFRICAN UNIVERSITIES

The Copperbelt and North-Western provinces of Zambia are well known for their copper mines, some of which have been operating since the 1930s.[4] A review of regulated occupational respiratory diseases and exposure to respirable crystalline silica (RCS) in the Zambian copper mining sector, published in 2023, identified a number of published studies reporting the presence of silicosis, pneumoconiosis, tuberculosis, and/or lung impairment in the industry, and concluded that the absence of legislative guidelines for monitoring programmes in the region is a major hurdle in the management of particulate exposure and related diseases.[5] Only two studies (published in 1983[6] and 2008,[4] respectively) reported RCS exposure concentrations in the industry.[5] The reason for this paucity of literature is 1) there are no accredited analytical occupational hygiene laboratories in Zambia, 2) it is not a legislative requirement to measure and report occupational exposure to hazardous chemicals, and 3) Zambia does not have enough qualified occupational hygienists to guide research into occupational exposures.

The collaboration between CBU-OHG and South African universities is making progress to increase the capacity for occupational hygiene practice in Zambia with the aim of establishing infrastructure, procedures, and expertise to supply the industry with timely exposure assessment results that can inform exposure management strategies, and ensure compliance with best practice/legislative guidelines.

Capacity building

The collaboration started in 2021, when Mr Patrick Hayumbu (who assessed RCS exposure at two copper mines in 2008)[4] approached IOHA to find mentors for two PhD students who wanted to investigate RCS exposure in copper mines. He was referred to SAIOH and, subsequently, registered occupational hygienists from North-West University (NWU) and the University of the Witwatersrand (Wits) were appointed as external co-supervisors for the students. One of these students, Dr Mwaba Sifanu, received her PhD in 2024 (the thesis included four published scientific articles) and the other, Mr Lubinda Nabiwa, submitted his thesis in 2025 with three published scientific articles.

In addition to postgraduate training, several SAIOH-registered occupational hygienists have presented Occupational Hygiene Training Association (OHTA) courses (OHTA201, OHTA501, OHTA502, OHTA503, and OHTA507) to more than 20 Zambians who are working in the field of occupational health and safety, or in academia. The participants include professionals from copper mining companies and the Ministry of Labour and Social Security who are conducting occupational health and safety inspections. Currently, Mr Patrick Hayumbu, Dr Mwaba Sifanu, and Mr Lubinda Nabiwa are developing academic courses in occupational hygiene to be presented at CBU. Additionally, there are newly registered PhD and Master's students conducting occupational hygiene research with supervisors from CBU, NWU, and Durban University of Technology (DUT). The CBU-OHG team has also been training occupational hygienists from the mining industry on the use of statistical packages for the analysis of exposure data, such as EXPOSTATS; most hygienists from the industry were conducting basic analyses in Microsoft Excel. Thus, the capacity of occupational hygiene in the region is being increased, through investment in the development of the professionals in the field and in academia.

Infrastructure development

To facilitate increased capacity for the collection and analysis of dust exposure samples in Zambia, the CBU-OHG collaboration is in the process of establishing an analytical laboratory on the CBU Riverside Campus in Kitwe. The laboratory will be equipped with a microbalance, a portable Fourier-transform infrared (FTIR) spectrometer, and associated instruments to collect exposure samples and determine the quartz content of those samples. Additionally, the laboratory will be equipped with personal direct reading instruments to measure personal exposure to particulate matter, a method that has already been successfully used, and reported in a paper by Nabiwa et al. (2025).[7] The CBU-OHG team is planning to apply for accreditation for the laboratory and is working with NWU, Sedulitas (https://sedulitas.co.za/), and accredited South African laboratories to improve their accuracy in performing the techniques. Once operational, the laboratory will increase access of occupational hygiene professionals in Zambia to analytical services for dust and quartz, and the laboratory will provide an opportunity to train students in the relevant analytical techniques.

Legislation

Zambia is in the process of updating its occupational health and safety legislation to include monitoring of exposure to respirable dust, RCS, and other occupational hazards such as noise, as a legislative requirement (as of August 2025, the Bill has been presented to Parliament, but is yet to be enacted). Since legislative requirements play such an important role in the practice of occupational hygiene, these updates open numerous opportunities for the CBU-OHG, and its collaborators from industry and Government, to advance the practice of occupational hygiene in the region.

CONCLUSION

Recent high-level engagements between the management teams of CBU and the NWU, and visits to Zambia, have led to the establishment of a memorandum of agreement (MoA) between the two universities, which will facilitate the formal institutional research collaboration. In the space of four years, the CBU-OHG has worked tirelessly to foster meaningful collaborations with stakeholders in academia, Government, the mining industry, and the occupational hygiene fraternity to increase capacity in the field of occupational hygiene in the region. We are all looking forward to seeing what the future holds for this group.

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SASOM news

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'GLOBAL HEALTH WORKFORCE FORUM – BARCELONA 2025'

Barcelona calling…

Barcelona – the city of Gaudí and dreams, where the mountains meet the sea… Barcelona - a mosaic of history, art, and passion… Barcelona – Mediterranean vibrancy, sun-drenched streets, soul-stirring rhythms…

Situated on the Mediterranean coast, Spain's second largest city mingles centuries of history with a vibrant contemporary spirit, and has long been a crossroads for trade, culture, and ideas. Barcelona is a captivating blend of Gothic charm and modernist brilliance. Renowned for its cosmopolitan flair and laid-back vibe, as well as its thriving arts scene, world-class research institutions, and dynamic economy, the city is a top choice for history and culture enthusiasts. Often described as an architectural wonderland, the capital of the autonomous province of Cataluña offers a wealth of sights and attractions for every type of traveller, be it for leisure or business. Famed for the bustling markets of La Boqueria, the winding streets of the medieval Gothic Quarter, lively plazas, innovative gastronomy, splendid mosaics, and a welcoming atmosphere, Barcelona is a place where creativity and tradition meet at every turn.

The official languages of Cataluña are Catalan and Spanish, and the city and its wider metropolitan area accommodate more than five million people, and host many more visitors every year (11.71 million in 2024)[a].



Iconic Barcelona – where creativity touches the sky: The *Sagrada Família*, Gaudí's unfinished masterpiece, soars above the city as a symbol of imagination, devotion, and architectural innovation
Photograph: Dr Blanche Andrews (South Africa)

[a] https://hotelagio.com/barcelona-tourism-statistics
[b] https://en.wikipedia.org/wiki/Royal_Gold_Medal

Barcelona is the only city awarded the Royal Gold Medal for Architecture, in 1999[b]. Since 1848, this medal has been awarded annually by the Royal Institute of British Architects on behalf of the British monarch, in recognition of an individual or group's substantial contribution to international architecture. It is awarded for a distinguished body of work, rather than for one building and is, therefore, not awarded for merely being currently fashionable.

Antoni Gaudí (1852–1926), a Catalan architect, is considered the great master of Catalan Modernism, especially in Barcelona; his unique works were inspired by his three passions in life – nature, religion, and geometry. Barcelona is often associated with Gaudí's work, with numerous buildings designed by him scattered throughout the city. He is celebrated for the *Sagrada Familia* (Basilica and Expiatory Church of the Holy Family), which is still under construction that started in 1882, and many other iconic structures, including i) *Park Güell*, a park with whimsical architectural elements and vibrant mosaics, a true expression of Gaudí's unique style; ii) *Casa Batlló*, a residential building with a distinctive façade, characterised by its flowing lines and colourful tiles; iii) *Casa Milà* (La Pedrera), a private residence known for its undulating roof and innovative construction techniques; iv) *Palau Güell*, a presidential palace and museum with a grand entrance and intricate details; v) *Casa Vicens* – Gaudí's first major commission – a house showcasing his early architectural style; and vi) Church of *Colònia Güell*, a unique and unfinished architectural masterpiece, which served as a testing ground for Gaudí's later, more famous works like the *Sagrada Familia*. Gaudí's buildings are a defining feature of Barcelona's skyline and identity; his final resting place is the crypt of the *Sagrada Familia*.

Barcelona stands out as the home to nine United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites. Of these, seven are Antoni Gaudí's works. While nine may seem a small number, this is impactful for a city. Collectively, these sites are known as the 'Works of Antoni Gaudí' and show his *"exceptional creative contribution to the development of architecture and building technology in the late 19th and early 20th centuries"*[c].

Thanks to Barcelona, we celebrate the World Book and Copyright Day. St Georges Day, or *La Diada de Sant Jordi*, is among the most renowned festivals in Barcelona. It falls on 23 April and aims to honour love and literacy. In 1995, UNESCO was inspired by the festival and its meaning, and so declared the day the World Book and Copyright Day[d].

Barcelona – a global city for ideas, culture, discovery, and health innovation

From its sunlit shores to its rich mosaic of art, architecture, and innovation, Barcelona is ranked among Europe's leading conference destinations, combining excellent infrastructure with a welcoming environment that offers the perfect backdrop for international collaboration. Against this iconic milieu, the 'Global Health Workforce (GHW) Forum – Barcelona 2025' brought together health experts, policymakers, and practitioners from across the globe to connect, share, inspire, exchange knowledge, foster partnerships, and explore strategies for shaping the future of health. The 'GHW Forum – Barcelona 2025' was held from 11 to 14 March 2025, at



'Global Health Workforce Forum – Barcelona 2025' venue – The Sant Pau Art Nouveau site, where history and innovation go hand in hand, has become a new point of reference in Barcelona

Photograph: courtesy of the organisers of the GHW Forum – Barcelona 2025

[c] https://unescoworld.com/heritage/works-of-antoni-gaud/
[d] https://unexpectedcatalonia.com/sant-jordi/

the Sant Pau Art Nouveau Site in Barcelona. This landmark event placed occupational health at the forefront of the global agenda, and recognised that resilient and sustainable healthcare systems are built on the health, wellbeing, and safety of their workforces.

After serving as the *Hospital de la Santa Creu i Sant Pau* for over a century, the site underwent a major restoration after healthcare services moved to a new hospital. This project revived the cultural and artistic splendour of the Sant Pau Art Nouveau Site, showcasing the most important work of Catalan architect Lluís Domènech i Montaner. With the recovery of the Art Nouveau complex, part of the Administration Pavilion was converted into a venue for meetings and events. With a capacity for more than 600 people, its splendid interiors are an ideal setting for corporate meetings, courses, conferences, and other proceedings. The Administration Pavilion also houses the Historical Archive of the *Hospital de la Santa Creu i Sant Pau*, one of the most important collections of hospital documentation in the world, which includes historic books and documents from the 15th to 20th centuries. Sant Pau hosts several resident organisations working in the fields of innovation, sustainability, health, and culture, among others. Declared a World Heritage Site by UNESCO, the Sant Pau Art Nouveau Complex occupies a privileged space in the culture and tradition of Barcelona. It is a modern complex of multipurpose rooms with functional spaces, combining the artistic richness of architecture and design with state-of-the-art technical facilities.



Culture, heritage, art, and design meet modern conference and technical facilities – The 'Global Health Workforce Forum – Barcelona 2025' brought together 182 attendees from 26 countries, comprising 73% women. The scientific programme featured 94 presentations across 19 sessions

Photograph: courtesy of the organisers of the GHW Forum – Barcelona 2025

The Forum's theme, *Toward Sustainable Health Systems: Healthy Workers, Gender Equity, and New Leaderships,* focused on key global issues, including the healthcare workforce shortage and improving working conditions. Jointly organised by four Scientific Committees (SCs) of the International Commission on Occupational Health (ICOH) and Women in Global Health (WGH; https://womeningh.org/), and held under the auspices of the University of Barcelona, the GHW Forum addressed pressing challenges in occupational health, including gender equity, transformational leadership, and improving working conditions for healthcare professionals.

With much gratitude and enthusiasm, Rosa María Orriols (Spain), Chair of the GHW Forum, extended a warm welcome to all participants of this transformative event, *"where collaboration was the main driver for the development of innovative solutions and policies, to ensure the health and safety of those who care for us all".*

Launched in 2015, WGH is a not-for-profit volunteer organisation, with 60 chapters in 65 countries. With around 6 500 members and 100 000 supporters in more than 100 countries, WGH are nurses, midwives, doctors, public health professionals, health policymakers, community health workers, researchers, pharmacists, and private sector health workers, among others. The WGH focus is on five key advocacy areas: i) equal representation in global health leadership, ii) new social contracts to create fair and supportive working conditions for female health and healthcare workers, iii) gender equity in health emergency preparedness and response, iv) gender-responsive Universal Health Coverage (UHC) Movement, and v) alliance building for gender equity in global health. By leveraging its women-led global movement – the fastest growing and largest of its kind – WGH has advanced gender equity in global health. Overcoming challenges in these areas will have far-reaching benefits, including strengthening health systems and health security, advancing women's empowerment, and boosting national and global economic growth.

The agenda for the week's programme was built around three core pillars:

- 'Women's Health Workforce Leadership' (Tuesday 11 March 2025): A day dedicated to advancing women's leadership in healthcare, focusing on bridging structural gaps and ensuring equitable representation in decision-making roles. This kick-off event welcomed the ICOH SCs to Barcelona, served as a social and networking platform for delegates, and presented the context and objectives of the 13th ICOH Joint Conference on Occupational Health for Health Workers. This first welcome session for congress participants and guests was led by representatives of three partner organisations: *Foment del Treball,* the main business association in Cataluña and host of the session; *Mieses Global*, the International Movement for Excellence, Health and Sustainability, committed to assisting small- and medium enterprises achieve health and sustainability; and the Catalan Society of Labour Health (SCSL), which brings together occupational health professionals to continuously improve their skills and promote health.
- 'Sustainable Health Systems – Global Day' (Wednesday 12 March 2025): A platform where international experts explored integrating occupational health into global health systems. Topics included prioritising worker wellbeing, achieving pay equity, innovative strategies to tackle challenges such as climate change and an aging workforce, and supporting vulnerable working communities.

The 'Global Day' programme consisted of the following round-tables, with five moderators and 25 speakers:

- Gender equity in UHC: women health workers closing the gender health gap – chaired by Shabnum Sarfraz (Founder and Senior Advisor: WGH Pakistan and Chair of the 'Global Day')
- Recognising informal, migrant, and community workers: supporting the vulnerable working communities – chaired by Neus Rosell (President and Co-founder: WGH Spain)
- Creating gender inclusive workplaces: policies for safe and decent work in health settings – chaired by Marcela Henriquez (WGH Argentina)
- Preparing for future challenges: the next generation of health workforce – chaired by Xavier Prats Monné (*Hospital de Sant Pau*, Barcelona, Spain)
- From policy to practice: call for action for gender-responsive health workforce development – chaired by Irene Tato and Elena Torrente (WGH Spain)



South African Society of Occupational Medicine (SASOM) in the Sant Pau House – L to R: SASOM members, Dr Charlotte Kasiringua, Claudina Nogueira, and Dr Blanche Andrews delivered presentations, participated in panels, and chaired sessions at the Global Health Workforce Forum – Barcelona 2025. Charlotte and Blanche presented a clinical case focused on fostering psychological safety in the workplace to highlight the importance of a healthy workforce. Claudina presented on challenges for health workers in the developing world and was a panel member for the roundtable, 'Recognising informal, migrant and community workers: supporting the vulnerable working communities'

Photograph: Dr Charlotte Kasiringua (South Africa)

The discussions and take-home messages across the various round-tables of 'Global Day' were crystalised into an official statement titled 'Ensuring Equity and Sustainability in the Health Workforce: A Call to Action', accessible at https://wghspain.es/eventos/ensuring-equity-and-sustainability-in-the-global-health-workforce-a-call-to-action/.

- '13th ICOH Joint Conference on Occupational Health for Health Workers' (Thursday-Friday 13–14 March 2025): Led by four ICOH SCs (Occupational Health for Health Workers; Women, Health and Work; Biohazards and Occupational Health; and Industrial Hygiene), this conference explored critical issues such as mental health, exposure to biological and carcinogenic agents, musculoskeletal disorders, and strategies to combat workplace violence. The two-day programme consisted of keynote addresses, round-tables, panels, plenary, and oral and poster presentations across a range of hot topics in occupational health. Examples included:
  - 'Women's occupational health' – keynote presentation by Aitana Garí (National Institute for Occupational Health and Safety, Spain)
  - 'Occupational exposures to carcinogens and biological risks in health and other sectors' – keynote presentation by Jukka Takala (Past ICOH President, Finland)
  - 'The ILO approach to psychosocial risk management' – keynote presentation by Ana Catalina Ramírez (ILO Lab Admin OSH, Switzerland)
  - 'Violence at health settings' – roundtable, covering the topics of violence against health workers – a vision from public policies; the difficult patient – delivering healthcare with a kind approach; and ILO Convention 190 – prevention of violence and harassment at work
  - 'Working women and ageing' – roundtable, covering risk allowance for pregnancy in healthcare workers, age management for women in the workplace, and menopause and its implications in health workers
  - 'Women leadership and healthy workforces' – roundtable, covering women leadership and healthy workplaces in Cataluña, reproductive medicine updates, advancing feminine leadership in the health industry, and work-related stress and its effects on women's overall health – management through leadership
  - 'Pregnancy and lactation' – panel presentation on breastfeeding and work, Zika virus infection and pregnancy, and work-life balance and professional wellbeing
  - 'Infectious agents and vaccines' – panel presentation on health worker immunisation, managing infections through innovative research in testing, and tuberculosis in 2025
  - 'Global health safety and pandemic preparedness' – panel presentation on the topics of a COVID-19 prevention strategy for health workers in Korea (presented by Seong-Kyu Kang, ICOH President, South Korea), response strategy to COVID-19 in a tertiary hospital in Korea, evaluation of the Pan-American Health Organization (PAHO) response to COVID-19, and official recognition of the biosafety officer in the biological risk management system

- o 'Occupational hygiene in health settings' – panel presentation, covering determinants and control of formaldehyde exposure in pathological anatomy laboratories, comprehensive radon management in health facilities, and occupational exposure to chemical substances in the hospital environment
- o 'Vulnerable workers: aging, disability, informal' – panel presentation on the topics of '4D' (dull, dangerous, dirty, and demeaning) jobs, new forms of work, the future for decent work, and disability improvements inspired by gender equity gains
- o 'Carcinogens/toxins in health workers' – panel presentation on hazardous medication surveillance for healthcare workers, an official guide to the management of hazardous drugs, and endocrine disruptors and the gender perspective in healthcare workers
- o 'Ergonomics in health workers' – panel presentation on the state of play of national occupational safety and health (OSH) programmes for health workers, work-related musculoskeletal disorders (MSDs) in rehabilitation professionals, prevention of MSDs in healthcare workers from a gender perspective, and decedent patient handling – lessons learned for future mass fatality events

Other topics of poster and oral presentations included:

- Advancing occupational health services for healthcare workers (Taiwan)
- Occupational health services in health settings (India)
- Hazardous substances and waste in hospital environments (Mexico)
- Challenges for health workers in the developing world (South Africa)
- Association between shift night work and burnout among health workers (China)
- Epidemiology of smoking habits among healthcare workers (Italy)
- Blood and body fluid exposures among healthcare workers (Canada)
- Shift work, mental health, and sleep disorders (Spain)
- The challenges facing health workers in the context of global climate change (Argentina)

The GHW Forum aspired to foster meaningful global dialogue, while laying the foundation for the 'Global Observatory on the Health Workforce'. This initiative will track progress toward building more equitable and resilient health systems, culminating in a collaborative review with health ministers in 2030. A key focus area of this event was female health workers, who form the backbone of healthcare systems, worldwide. Now is the time to empower them, prioritise their health and wellbeing, and ensure that their working conditions become the cornerstone of sustainable and effective healthcare systems. Advancing workplace health and equity is only possible when women, who comprise the majority of health workers, globally, are empowered in several ways.

The GHW Forum was much more than a scientific event; it was a testimonial. It was a global commitment to *"We protect those who protect us"*. The final day summarised the rich and rewarding GHW Forum content and context – transformative proposals grounded in equity, evidence, and intersectoral action. The collective knowledge and collaborative spirit evidenced at the GHW Forum have laid the foundation for real-world change, driving progress in workplaces, worldwide. As we continue shaping the future of occupational health on a global scale, we look forward to the '14th ICOH Joint Conference on Occupational Health for Health Workers', taking place in Malaysia in 2028.

SASOM Chapters host CPD events for members

SASOM KwaZulu-Natal Chapter

The SASOM KwaZulu-Natal Chapter, co-chaired by Drs Basil Dhaniram and Rakesh Goordeen, convened an onsite continuing medical education (CME) event at Coastlands Musgrave Hotel, Durban, on the evening of 30 July 2025, to coincide with the contact week of the Diploma in Occupational Health (DOH) of the University of KwaZulu-Natal. Approximately 40 participants attended the event, which was followed by a buffet dinner. Attendance was free for SASOM members, and Universal Pathology Laboratory SA (Pty) Ltd (UPL) was the major sponsor of the event. Established in 2020, UPL is an exclusive provider of diagnostic and clinical pathology services, aiming to grow beyond the region into Africa and the global market.

The academic programme included the following presenters and topics:

- Mr James David (UPL) – 'Laboratory tests in occupational medicine'
- Prof. Rajen Naidoo (Head of Discipline of Occupational and Environmental Health, University of KwaZulu-Natal, Durban) – 'Occupational heat exposure and heat stress among workers'
- Drs Rakesh Goordeen (occupational medicine practitioner, OccDoc Medicare, Durban) and Basil Dhaniram (occupational and travel medicine practitioner, Medical Director at Medexcel, Ballito) – 'Case studies: Mercury poisoning and the Compensation Fund' with inputs from Dr Nandipha Kahla (Provincial Head: Compensation Fund, Free State)

The next CME event is planned for 10 September 2025, during the next contact week of the DOH programme, with UPL as a co-sponsor again.



Lifelong learning – The SASOM KwaZulu-Natal Chapter hosted and organised an onsite academic event in Durban for its members on 30 July 2025

Photograph: courtesy of Dr Basil Dhaniram

SASOM Western Cape Chapter

The SASOM Western Cape Chapter hosted a webinar on the evening of 12 August 2025. The continuing professional development (CPD) session, themed, *From chemicals to catastrophes: integrated approaches to occupational and process safety*, was moderated by Dr Casper Joubert, co-chair of the SASOM Western Cape Chapter, a registrar in occupational medicine at Stellenbosch University, and employee in the Western Cape Government Department of Health. Dr Joubert opened the session, welcomed participants, introduced the presenters, managed the question-and-answer segments, and delivered the concluding remarks.

The academic programme included two presentations, which underscored the importance of comprehensive data and systematic approaches to ensure health and safety in industrial settings:

- Mr Hein Nieman, an environment, health, and safety (EHS) consultant from Cape Town with extensive work experience in the mining, chemical, and pharmaceutical industries, presented 'Understanding process safety as part of industry asset risk management'. Mr Nieman's discussion focused on preventing and mitigating risks from hazardous materials, distinguishing process safety from traditional health and safety by its emphasis on worst-case scenarios (e.g. fire, explosion, and loss of containment) and engineered controls, and highlighting incident analysis and quantitative risk assessments. Major incidents like those at Bhopal and Chernobyl highlight the devastating multi-layered complications and potential for organisational collapse when process safety fails. Common methodologies include hazard identification, structured what-if, hazard and operability studies (HAZOP), and layers of protection analysis (LOPA). The 'as low as reasonably practicable' (ALARP) principle is used to justify significant capital expenses for process safety improvements, balancing the cost and practicality of mitigation against the likelihood and severity of harm. This approach ensures that safety investments are both effective and reasonable.
- Dr Haidee Williams, an occupational medicine specialist in private practice and senior honorary lecturer at the University of Cape Town, with extensive work experience in the textile and pharmaceutical industries, presented 'Occupational health strategies for chemical risk management: integrating risk assessment, exposure profiling, medical surveillance, and the Globally Harmonized System (GHS) for safer workplaces'. Dr Williams' presentation was centred on the cornerstone of occupational health, which is chemical risk assessment, detailing how hazard identification, exposure assessment, and risk categorisation lead to medical surveillance programmes, and emphasising the utility of safety data sheets (SDSs) for consistent risk scoring and designing health monitoring programmes. The GHS standardises the classification and labelling of chemicals, with SDSs being a critical source of information. A good SDS provides valuable data for hazard identification, toxicological information, and the inherent toxicity of a substance. Occupational health strategies involve a continuous cycle, where health risk assessments feed into occupational risk exposure profiles (OREPs), which drive medical surveillance programmes. The outcomes of these programmes, including any noted deviations or work-relatedness investigations, feed back into the risk assessment, ensuring ongoing improvement of OSH systems in the workplace.

Save the date: SASOM Annual Conference 2025 and AGM

The SASOM Annual Conference 2025 and associated meetings will be hybrid events (in person and online) and will take place at the Marriott Hotel Fire & Ice, Menlyn, Pretoria, on the following dates:

- ExCo meeting: Friday, 14 November 2025, 17:00–19:00 (for SASOM ExCo members)
- Conference: Saturday, 15 November 2025 (full-day event – the detailed programme is under development and will be shared once finalised)
- Annual general meeting (AGM): immediately after the Conference on 15 November 2025, concluding at 19:00 (for SASOM members in good standing)

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SAIOH news

The Southern African Institute for Occupational Hygiene (SAIOH) remains steadfast in its dedication to its members and the ongoing advancement of the occupational hygiene profession. In pursuit of this commitment, we regularly provide updates and share key developments with our community. SAIOH flourishes through the active participation and ethical contributions of its members, whose engagement continues to shape the field. To further strengthen our collective efforts, we welcome and encourage feedback on the topics covered in this edition of the Journal.

SAIOH PRESIDENT'S ADDRESS

Karen du Preez: SAIOH President
e-mail: president@saioh.co.za



Karen du Preez, SAIOH President
Photograph: courtesy of SAIOH

The work we do as occupational hygienists has a significant impact on the health and wellbeing of employees at work. Occupational hygiene practitioners and approved inspection authorities (AIAs) spend a lot of time and effort to ensure that they and their staff are qualified, experienced, and competent to perform their work accurately and effectively.

Have confidence in your competent person

Recent Regulations promulgated under the Occupational Health and Safety Act No. 85 of 1993 (OHSA) require that occupational health risk assessments and exposure assessments are conducted by a competent person.[1-3] This places a duty on the employer to ensure that they secure the services of a person competent in the full scope of work contracted.

SAIOH is a professional body concerned with certification of its members at three professional levels/designations, as approved by the South African Qualifications Authority (SAQA).[4] Members need to have obtained prescribed qualifications and experience before they can apply for assessment at these levels/designations. The curriculum on which the assessments is based consists of 17 skill sets, as described in the self-assessment tool that members need to complete as part of the application process. SAIOH assessments are based on theoretical knowledge, as assessed in the written assessments at all three professional levels, and practical experience that is assessed in oral assessments. Oral assessments are not applicable to an assistant, as this is viewed as an entry level with minimal occupational hygiene exposure, i.e. Grade 12 certification, or certification in the OHTA201 or the AIHA Basic Principles course, or the BOHS M200.[5]

Personnel competence forms an integral part of the requirement for South African National Accreditation System (SANAS) accreditation under ISO/IEC 17020.[6] SANAS accreditation under ISO/IEC 17020 is a prerequisite to obtain certification from the Department of Employment and Labour (DoEL) as an AIA for occupational health and hygiene.[7] Competence, as defined by SANAS, includes education, training, technical knowledge, skills, and experience. Personnel competence, as declared by the AIA, is verified by SANAS during assessments. Staff employed as inspectors by an AIA must be registered with SAIOH. The reporting guideline issued by the DoEL requires that copies of the valid SAIOH certificates, of staff involved in an inspection done by an AIA, should be attached to all occupational hygiene reports.[8]

By engaging a reputable AIA accredited by SANAS, the proprietor can be assured that all work falling within the scope of accreditation will be carried out by individuals registered with SAIOH and formally deemed competent by the AIA, verified through SANAS oversight. Furthermore, where work falls outside the AIA's accredited scope, the presence of a robust, documented quality management system increases the likelihood that equivalent quality principles will be applied. Prior to commissioning any specific work, the proprietor may request written confirmation from the AIA regarding the competence of the personnel assigned to the task.

Occupational hygiene practitioners are encouraged to maintain their levels of competence for any work conducted, by attending and participating in relevant learning activities and interventions. The system of continuous professional development (CPD) is compulsory, with each member responsible for keeping their own records and submitting an annual CPD points return, as a prerequisite for renewal of membership.

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NATIONAL COUNCIL FEEDBACK

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Deon Jansen van Vuuren: SAIOH General Manager
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SAIOH Management activities: 20 May–6 August 2025

During the period under review, SAIOH Management actively engaged in several strategic meetings and sector-related events, aimed at advancing occupational hygiene initiatives and internal governance.

General Manager position

On 4 June 2025, SAIOH senior management convened a special session to discuss the succession plan for the position of General Manager, as the current incumbent's contract ends on 31 March 2026. The job description was updated, and a Mailchimp campaign was subsequently shared with SAIOH members, inviting applications for the position. All shortlisted applicants were interviewed as part of the selection process. Effective 1 October 2025, the Assistant General Manager position will be assumed in a shadow capacity, with a view to full transition into the role by 1 April 2026.

Governance meetings

- Council meeting: the second Council meeting was held online on 12 June 2025.
- Board meeting: the third Management Board meeting was held on 30 July 2025 in a hybrid format.
- Internal co-ordination: several impromptu Zoom and MS Teams sessions were conducted with the conference planning committee.

Sector engagement and advocacy

- On 23 May 2025, SAIOH Management members attended the Occupational Hygiene Approved Inspection Authority (OH AIA) Association's meeting, where SAIOH updates were presented.
- A Mailchimp call for nominations to the DoEL Noise Technical Committee was circulated to SAIOH members on 30 May 2025. The nominations were adjudicated.
- On 2 June 2025, SAIOH members, Ms Bulelwa Huna and Mr Deon Swanepoel, represented the DoEL at the International Labour Organization (ILO) conference in Geneva, Switzerland. SAIOH circulated ILO Recommendation No. 209 on 13 June 2025, which addresses biological hazards in the workplace.
- On 26 June 2025, the DoEL, in partnership with SAIOH and the OH AIA Association, hosted an online webinar on the newly promulgated Noise Exposure Regulations (NER) and Physical Agents Regulations (PAR).

Event attendance

SAIOH leadership, including the President and General Manager, attended the official book launch of *In a Rain of Dust*, written by David Kinley – a compelling narrative of crocidolite and amosite asbestos mining in South Africa and related legal proceedings in the United Kingdom. The National Institute for Occupational Health (NIOH) hosted this insightful event, featuring the author and legal counsel, both of whom engaged attendees with personal stories and book signings.

Accreditation and industry discussions

SAIOH Management participated in the SANAS (Occupational Hygiene Special Technical Committee) meeting on 19 June 2025. Topics included updates to the DoEL occupational hygiene report template and conformity body classifications.

Staff development and team building

The SAIOH administrative team convened online staff meetings on 28 May 2025 and 4 August 2025. From 25 to 27 June, the administrative team embarked on a successful team-building retreat at Mangwa Valley Game Lodge in Dinokeng. Activities included a staff planning session, a spa day, game drives, a wine-tasting experience, and a celebratory dinner. The retreat offered an enriching combination of professional development and camaraderie, with close-up wildlife encounters adding a special touch.



The administration team, L to R: Lee Doolan, Deon Jansen van Vuuren, Rebecca Doolan, Kate Smart, and Tracy Mphaphuli
Photograph: courtesy of SAIOH

SAIOH Strategic Plan

The SAIOH five-year Strategic Plan is led by Jaco Pieterse. Matters arising, key targets, and progress evaluations are reviewed regularly during the bi-monthly SAIOH Management Board meetings and the quarterly Council sessions.

Ethics

SAIOH Management, in collaboration with the Ethics Committee Chair, Dr Oscar Rikhotso, and legal advisors NGO Law, have successfully concluded a rigorous two-year process to develop, review, and finalise the SAIOH Code of Practice and its associated Disciplinary Procedure. The final meeting of this comprehensive effort was held on 9 June 2025, attended by eight dedicated contributors. These foundational documents will be incorporated formally into Chapter 1 of the SAIOH Quality Management System (QMS). With this milestone achieved, the Ethics Subcommittee will commence full implementation, embedding approved ethics protocols into SAIOH's governance practices. The ethics procedure forms a key pillar of SAIOH's strategic priority #3.

Mandatory ethics training for members: effective 1 January 2023, all certified SAIOH members must provide evidence of completing an approved occupational hygiene ethics training course. A one-year phase-in period was granted in 2022.

Terry McDonald (British Occupational Hygiene Society (BOHS)) led professional development courses (PDCs) on ethics during the 2021 and 2022 SAIOH Annual Conferences, as well as via an online webinar on 25 July 2024. Recordings of these sessions remain available for purchase.

Development of SAIOH ethics course

To address regional relevance, SAIOH has partnered with North-West University (NWU) to develop a bespoke ethics course, tailored to occupational hygiene within the southern African work environment. Following multiple online planning sessions, a formal memorandum of agreement (MoA) was signed in early July 2025. With the agreement in place, NWU will now proceed with the development of this vital training programme.

SAIOH branch workshops and meetings

- North-West Branch: Earlier this year, the North-West Branch partnered with Sedulitas to host an insightful electro-magnetic fields (EMF) workshop at North-West University (NWU).
- Gauteng Branch meeting: The branch held its second meeting of the year in person on 9 May 2025 at the Draeger SA facility in Midrand.
- Western Cape Branch meeting: The meeting was conducted online on 23 May 2025, and featured presentations by Dale Kennedy (Ergomax) on ergonomic regulations and risk assessments, and by Jaco Pieterse (Gijima OHES&L) on non-ionising radiation and the 2024 PAR. The next Western Cape event is a mini-conference, scheduled for 29 August 2025.
- The Council Branch Co-ordinator, Ms Yvette Greeff, and Dr Shuan Ramroop from Nelson Mandela University in Gqeberha are actively working on the establishment of an Eastern Cape Branch.
- The following branches and discussion group remain inactive: Central (Free State), Northern Cape, Mpumalanga, and Zululand.

SAIOH, in collaboration with the NWU Occupational Hygiene and Human Risk Institute (OHHRI) and the North-West Branch, is organising a one-day course on ISO 23785 – Indoor air quality: operated cab air filtration, pressurisation, and certification. This session is scheduled for 15 October 2025 and will be limited to 20 participants. SAIOH has arranged for Mr Jeff Moredock of the International Society of Environmental Enclosure Engineers (ISEEE) (USA) to present a PDC on the same topic at the upcoming SAIOH Annual Conference on 21 October 2025. A comprehensive advanced training workshop (ATW) will be offered again on 24 October 2025, immediately after the conference, providing participants with an applied learning experience using the cab simulator.

SAIOH 2025 Annual Scientific Conference

Preparations for the SAIOH Annual Conference, to be hosted by the KwaZulu-Natal Branch, are well underway. The conference and technical organising committees convened multiple planning sessions throughout June, July, and August 2025, demonstrating hard work and commitment.

Following initial logistical challenges, the venue has been relocated to the Coastlands Hotel and Conference Centre in Umhlanga, KwaZulu-Natal. A call for abstracts has been circulated, and a dedicated subcommittee is adjudicating submissions. Conference fees and registration details have been distributed via Mailchimp, and a dedicated conference webpage has been created.

Conference format

This year's conference will once again follow a hybrid format, enabling both in-person and online participation via livestream. The four-day programme promises to deliver a diverse and high-impact experience.



Programme highlights

Monday, 20 October 2025

- Conference opening at 13:30
- Two consecutive four-hour PDCs

Tuesday, 21 October 2025

- Four PDCs
- SAIOH Council in-person meeting

Wednesday, 22 October 2025

- Official conference opening, featuring keynote addresses from distinguished speakers
- Gala dinner

Thursday, 23 October 2025

- Annual general meeting (AGM) held in the morning – a notable change from previous years

New additions and advanced planning

Friday 24 October 2025: A specialised one-day workshop on indoor air quality (IAQ), including cab simulator training, will be hosted by Jeff Moredock of ISEE, and SAIOH.

Sponsor engagement: Platinum sponsors will be allocated a 10-minute slot during the conference to showcase their products.
2026 Annual Conference: Preliminary planning for the 2026 SAIOH conference is in progress, with a proposed collaboration with the NIOH. A second planning session has already taken place with Dr Spo Kgalamono.

IOHA Board, the National Accreditation Recognition Committee, and Occupational Hygiene Training Association feedback

The Occupational Hygiene Training Association (OHTA) and the IOHA continue to publish their newsletters, with links e-mailed to all SAIOH members and posted on the SAIOH website: www.saioh.co.za. Members can also access OHTA resources via www.ohtatraining.org.

On 3 July 2025, SAIOH promoted the IOHA-hosted online webinar titled 'Driving Change in Occupational Hygiene', further supporting global communication and innovation within the field.

SAIOH is proudly represented on the IOHA Board and the National Accreditation Recognition (NAR) Committee by Corlia Peens. She continues actively to attend meetings and provide regular feedback to the SAIOH Professional Certification Committee (PCC) Executive, ensuring strategic alignment with international developments and best practices.

SAIOH TECHNICAL COMMITTEE FEEDBACK

SAIOH's Technical Committee continues to drive key research and development efforts aimed at strengthening occupational hygiene Standards and supporting regulatory advancement.

Welding fume analysis

Research on the measurement and analysis of welding fumes is currently being led by Dr Ivan Niranjan and Technical Portfolio Coordinator, Dr Goitsemang Keretetse. A joint subcommittee formed by SAIOH and the OH AIA Association has convened several times to develop a comprehensive technical and position paper. The final paper is expected to be released in the near future.

Heat stress management

A second technical committee has been established to develop procedures and a SAIOH position paper on heat stress management. Following the unfortunate passing of Schu Schutte, collaboration has been initiated with the Council for Scientific and Industrial Research (CSIR) and Dr Johan Kielblock to support the research. The deliverables are scheduled for completion during 2025. This initiative aligns with SAIOH's commitment to contributing technical guidance that strengthens the updated PAR, formerly known as the Environmental Regulations for Workplaces.

Real-time monitoring

Prof. Stefan Linde has taken over the role of technical coordinator from Mr Wessel van Wyk, to spearhead the development of a position paper on real-time exposure monitoring – a priority area in occupational hygiene innovation.

Ergonomic risk assessment procedures

Under the leadership of Naadiya Mundy, a dedicated technical subcommittee has begun work on establishing procedures and guidelines to support SAIOH occupational hygiene practitioners in conducting ergonomic risk assessments. Initial meetings have already taken place, laying the groundwork for practical and implementable standards.

New SAIOH website and quality management system

The SAIOH administration team, led by Naadiya Mundy and Kate Smart, is actively working on populating the new SAIOH website, ensuring that it is a comprehensive and easily navigable resource for members. We look forward to launching the new website soon, and delivering an improved and streamlined platform for the SAIOH community.

Chapter 2 of the PCC's Quality Management System (QMS), which outlines the PCC assessment rules and procedures, is available on the SAIOH website and offers essential guidance and supporting documentation.

SAIOH publications and engagements: mid-year update 2025

SAIOH's contributions to both the *A-OSH* magazine and *Occupational Health Southern Africa* journal are scheduled for submission in July and August 2025. These articles highlight SAIOH's ongoing activities, strategic initiatives, and technical developments.

The latest editions of *OHTA Global Link* (July 2025) and *IOHA Global Exposure Manager* (June 2025) have been published on the SAIOH website, and were distributed to all members via Mailchimp as soon as they became available.

A meeting of the OH AIA Association took place on 22 August 2025.

Ongoing member and stakeholder communication

SAIOH maintains daily contact with its stakeholders through e-mails and Mailchimp notifications, phone calls, and online meetings. These communications cover a range of critical topics, including legislative developments, updates on new Standards, job postings in occupational hygiene, relevant products and services, course offerings, and webinar announcements in the areas of occupational hygiene, health, and environmental safety.

Webinar and conference notifications issued in 2025

SAIOH has circulated multiple international and national online webinar alerts and early announcements for key events, including:

- IOHA: Driving change in occupational hygiene, 3 July 2026
- AIHA Academy: Ototoxicants and occupational hearing loss, 23 July 2025
- Workplace Health Without Borders (WHWB): Workplace heat stress parts 2 and 3, 27 May and 25 July 2025
- WHWB: Global advocacy for occupational health and safety, 11 June 2025
- South African Society of Occupational Medicine (SASOM): Annual webinars on occupational health
- Wave Control and Sedulitas: Electromagnetic field (EMF) assessment for active implanted medical devices (AIMD), 12 June 2025
- Ergonomics Society of South Africa (ESSA): three-part quarterly webinar series (July– August 2025) and Annual Conference, October 2025
- Safety-First Personal Protective Equipment (PPE) conference: Early heads-up for the event scheduled for 9–11 March 2026
- International Commission on Occupational Health (ICOH) 2026: Conference on the History of Occupational and Environmental Health, April 2026, in Leuven, Belguim

PROFESSIONAL CERTIFICATION COMMITTEE

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The PCC Executive Committee (ExCo) and broader PCC teams remain actively engaged in advancing SAIOH's certification framework through scheduled meetings, subcommittee work, and process improvements.

Governance meetings and key decisions:

- The PCC ExCo held its second online meeting of the year on 20 June 2025.
- A full PCC meeting followed on 11 July 2025.
- After several iterative discussions ('round-robins'), the revised PCC assessment rules and procedures – as detailed in SAIOH QMS Chapter 2 – were formally approved by the PCC ExCo and published on the SAIOH website.
- A special session to review and amend the CPD guideline document was convened on 30 May 2025.
- On 27 May 2025, the PCC hosted a feedback session for the South African OHTA Approved Training Providers (ATPs).
- PCC Chair, Dr Ivan Niranjan, SAIOH General Manager, Deon J van Vuuren, and PCC Administrator, Lee Doolan, participated in a virtual consultation to address CPD compliance matters.

Ongoing subcommittee activities

A subcommittee continues to develop the occupational hygiene skill set for SAIOH's self-assessment/gap analysis tool. The first draft was completed earlier this year and is undergoing refinement. Bi-weekly meetings are expected to continue well into the future. This sustained effort reflects the PCC's continued commitment to the continuous refinement of oral assessments, maintaining consistency, rigour, and fairness, while developing an empathetic setting for both candidates and assessors. The seven-member team is actively engaged in developing oral question scenarios, and conducting a thorough review of the oral assessment guideline. This subcommittee also initiated online workshops for PCC assessors, with sessions held in February and May 2025.

Professional development and conference planning

A free hybrid PCC PDC will be held at the 2025 SAIOH Annual Conference on 21 October 2025. The first hour is open to all SAIOH members, while the remaining two-to-three hours are dedicated exclusively to PCC assessors.

Assessment systems and compliance updates

The PCC is exploring a transition to an electronic written assessment platform, using MS Excel as an alternative to the current Learning Management System (LMS) and proposed Moodle LMS. Technical challenges and data integrity risks (including AI misuse and paper leaks) have led to a temporary return to invigilated hard-copy assessments, administered at secure venues with oversight by at least two PCC assessors. Oral assessments will continue via Zoom, MS Teams, or in person and, where applicable, be recorded for verification purposes. The second quarter's assessments occurred as follows: written: 13 June 2025; oral: 11–22 July 2025.

CPD system enhancements

SAIOH-registered members may now upload CPD activities throughout the year via their MySAIOH profiles. Effective 1 February 2025, all CPD submissions will be audited, and certificates released only once requirements are met; this includes:

- Settlement of outstanding fees
- Payment of annual membership
- Uploading proof of CPD claim
- Upload of a valid ethics certificate

CPD accumulation has moved from a five-year rolling cycle to an annual point requirement. For each certification level indicated below, the following minimum annual CPD points are required:

- Occupational hygienist – 12
- Occupational hygiene technologist – 10
- Occupational hygiene assistant – 9
- Retired members/fellows – 4

Written requests for amnesty or extension may be submitted to the PCC ExCo via the PCC Administrator, with appropriate motivation.

Certification assessments

A summary of results for the assessments that took place from February to July 2025 is provided in Table 1. The PCC assessment dates for 2025 are in Table 2.

Table 1. SAIOH PCC certification assessment results as of July 2025

Certification category	Written assessments				Oral assessments			
	Assessed	Passed	Failed	Pass rate	Assessed	Passed	Failed	Pass rate
	n	n	n	%	n	n	n	%
OH assistants	71	69	2	97.2	-	-	-	-
OH technologist	36	31	5	86.1	47	28	19	59.6
Occupational hygienist	31	14	17	45.2	21	13	8	61.9
Total	**138**	**114**	**24**	**82.6**	**68**	**41**	**27**	**60.3**

Table 2. SAIOH PCC written and oral assessment dates and deadlines, 2025

Assessment type	Deadline for applications	Deadline for assessment evaluations and payment	Assessment date
Written	12 January	14 February	14 March
Oral	-	-	Week of 11 April
Written	25 April	30 May	27 June
Oral	-	-	Week of 25 July
Written	1 August	5 September	3 October
Oral	-	-	Week of 14 November

Occupational Hygiene Skills Forum – mid-year update 2025

The Occupational Hygiene Skills Forum (OHSF) continues to play a pivotal role in strengthening occupational hygiene training, accreditation, and qualification recognition within South Africa and the broader southern African region. The final OHSF meeting for the year was held on 11 September 2025.

Stakeholder engagement and sector representation

Throughout 2025, the OHSF actively participated in the OHTA Approved Training Provider Forum meetings, promoting alignment with international best practices. The second official OHSF meeting for the year took place on 22 May 2025, with all attendees contributing to strategic discussions.

Qualification recognition and institutional liaison

A key mandate of the OHSF is to assess applications from tertiary institutions seeking formal recognition of their occupational hygiene-related qualifications. Notable progress includes the Cape Peninsula University of Technology's (CPUT's) occupational health qualification receiving full approval in early July 2025. Congratulations to the CPUT team on this milestone! Ongoing liaison is being conducted with institutions in Botswana, University of Pretoria (UP), Durban University of Technology (DUT), University of Johannesburg (UJ), and University of Limpopo (UL) to expand accreditation coverage.

Tertiary institutions offering occupational hygiene qualifications are encouraged to contact the PCC Administrator at lee@saioh.co.za for application procedures and guidance.

A full list of recognised training providers and accredited qualifications is published on the SAIOH website (www.saioh.co.za), ensuring students and certification candidates can easily identify programmes that align with SAIOH and international standards.

Mandate and curriculum development

Established to coordinate efforts around training provider recognition, the OHSF oversees:

- Approval of occupational hygiene training materials (e.g. asbestos-related content)
- Endorsement of provider institutions
- Development and management of assessment and examination systems, where appropriate

The OHSF is also planning to design a bespoke SAIOH occupational hygiene legislation course, to be delivered in-house – particularly targeting non-AIA members seeking formal exposure to legal occupational hygiene frameworks.

CPD enhancement via Journal engagement

In collaboration with Dr Hennie van der Westhuizen, the OHSF began developing CPD-linked questions based on articles published in *Occupational Health Southern Africa*. This initiative fosters member engagement with scholarly content, while providing a structured pathway to earn CPD points. Following the first engagement and positive feedback, SAIOH plans to continue this initiative. Many thanks to Dr Hennie – round two is underway!

UPCOMING EVENTS

SOUTH AFRICA

SAIOH Annual Scientific Conference
Coastlands Hotel and Conference Centre, Umhlanga, KZN
20-24 October 2025
Website: https://www.saioh.co.za/page/SAIOHConference2025
e-mail: info@saioh.co.za

INTERNATIONAL

Round Table: Work-related ophthalmologic diseases
Goiania, Brazil
2 October 2025
e-mail: ctaboadela@fibertel.com.ar

Go to

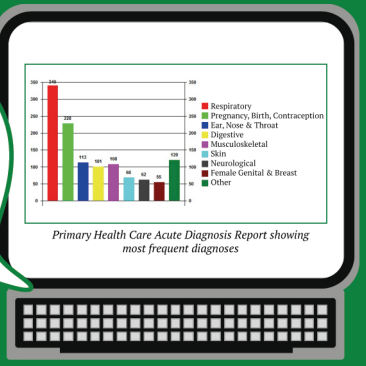
www.occhealth.co.za
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to see upcoming local and international OH events

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New - Covid-19 Module



Primary Health Care Acute Diagnosis Report showing most frequent diagnoses

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WEBBER WENTZEL
in alliance with > Linklaters

New mandatory codes of practice for mines: Road and Rail Safety Management, Fire Prevention, Change Management, and Prevention and Management of Non-Communicable Diseases and Mental Health Disorders

Kate Collier: Partner, Webber Wentzel
Kalene Watson: Senior Associate, Webber Wentzel

Mining employers must implement mandatory codes of practice (CoPs) in accordance with Chief Inspector guidelines under section 9 of the Mine Health and Safety Act. Non-compliance constitutes an offence and may result in enforcement action by the Mine Health and Safety Inspectorate. Employers must develop operation-specific CoPs and implement these new systems and requirements before the applicable effective dates. All CoPs must be subject to implementation auditing and monitoring measures.

For Prevention and Management of Non-Communicable Diseases and Mental Health Disorders, employers must implement a CoP by 1 November 2025. Requirements include: risk assessment quantifying disease burden through medical records, identifying vulnerable employees; safe health condition declaration systems; specialist committees (healthcare providers, occupational medical practitioners, nurses, wellness coaches, nutritionists) for awareness campaigns, prevention, early detection, treatment, and rehabilitation; dedicated wellness committees managing policies, budgets, and employee assistance programmes; community health collaboration; compliance plans with assigned responsibilities; annual auditing and monitoring; and guidance documents for employees and trade unions.

For Change Management, employers must implement a CoP by 1 October 2025 governing organisational change across all mining operations, including operational, structural, cultural, market, and regulatory changes. Requirements include robust governance frameworks with clear accountability; designated senior leader oversight; comprehensive training for all change management personnel with ongoing competence development; and material risk management processes.

Also by 1 October 2025, employers must implement CoPs on *Fire Prevention* and *Road and Rail Safety Management*. The fire prevention CoP requirements include comprehensive fire risk assessments, reviewing fire prevention measures and, potentially, upgrading equipment and infrastructure (fixed infrastructure, mobile systems, and conveyor systems) to meet the listed SANS standards. Specific training programmes must be implemented, including basic fire prevention awareness (with 12-month refresher training obligations), specialised competency-based training for mobile equipment operators, fixed plant operators, maintenance personnel, and electrical workers. All training and assessment records must be maintained.

In respect of Road and Rail Safety Management, the CoP must address the significant health and safety hazards associated with mine transport operations, covering everything from employee passenger transport to mineral haulage. The CoP must encompass three core areas: vehicle specifications and maintenance (including design registers, braking system protocols, and pre-use inspections), operational safety measures (route planning, level crossing management per SANS 3000-2-2-1 standards, fatigue management, and mobile device restrictions), and personnel requirements (valid licences, medical fitness declarations, and substance testing compliance). For operations functioning as a network, train, or station operators, specific level crossing safety standards must address design requirements, operational procedures, and incident management protocols.

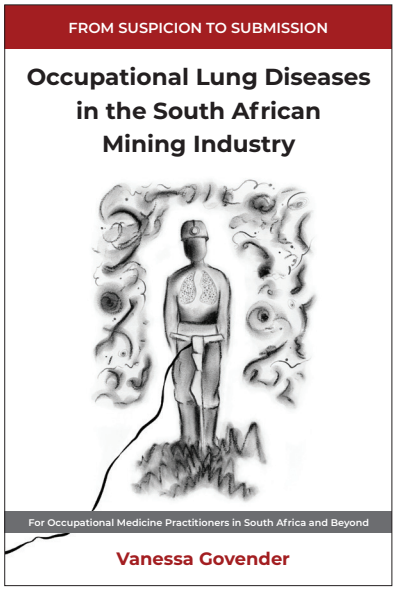
Employers are urged to ensure compliance with the implementation dates, which will require action well before those dates to ensure necessary engagement and implementation of these various health- and safety-related measures.

From Suspicion to Submission: Occupational Lung Diseases in the South African Mining Industry

by Vanessa Govender

Prof. Dingani Moyo (FRCP, FFOM, MFOM, MOHS, MApMgnt, MBChB)
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The subtitle of this handbook is limiting; while focused on occupational lung diseases (OLDs) in South Africa, it espouses invaluable principles and concepts in occupational health, specifically OLDs in mining settings, that are relevant to the entire African space. It includes Quick Reference Guides and chapters that extend beyond the South African legislative context, covering concepts that are relevant to most southern African states – many of whose citizens have worked or still work as migrants in the South African mining industry.



While focused on South Africa, this handbook is highly relevant to mining health practitioners and policy makers across Africa – and beyond

An expert in her field, Dr Govender meticulously explores the subject of OLDs, describing the case continuum from initial suspicion to diagnosis and compensation, in the context of South Africa. With abundant clarity in an easy-to-read yet detailed discourse, she provides a critical and well-researched account of OLDs and the lasting legacy of the mineral extractive industry in South Africa. This well researched book stands as an invaluable contribution to the scientific body of knowledge and illuminates the injustices of apartheid, poor regulatory frameworks, and inadequacies of occupational health services, including how they have influenced the patterns of mortality and morbidity in South Africa. Reflecting on both medical evidence and historical analysis, the book highlights the vulnerability of mineworkers and ex-mineworkers, even in the post-apartheid era.

The book is well ordered with each chapter providing a good foundation for subsequent chapters. It sets the context with a reflection on legislative and policy frameworks in South Africa, and further contextualises these by highlighting key international frameworks and guidelines. In Chapter 2, Dr Govender dissects occupational health principles of practice and key concepts with scientific precision and exactitude.

The book provides a holistic but simple approach to the interpretation of pulmonary and other medical tests. Its utility is epitomised in how it demystifies the perceived difficulties in interpreting spirograms. It will be of invaluable assistance to general practitioners and other related professionals who need to interpret spirometry test results accurately. The high prevalence of OLDs in Africa, against a background of a high burden of tuberculosis, presents a diagnostic challenge to most health practitioners. The inclusion of Quick Reference Guides for common OLDs, other OLDs, and post-mortem examinations provides a convenient, precise, and invaluable resource for clinicians. The Quick Reference Guides are powerful and concise, and explore the subject themes in the context of current evidence and practice. The book concludes with a succinct and precise description of benefit medical examinations (BMEs). It provides a comprehensive description of BMEs from definition, to the frequency of conducting these examinations, the requisite tests that should be part of the process, and the step-by-step process of submitting claims for compensation in South Africa.

This is an invaluable book, not only to occupational medical practitioners, but also to specialists, and related health professionals dealing with OLDs. Its utility extends to non-medical professionals in human resources, legal disciplines, and other disciplines. Its focus on policy and guidance on compensation processes makes it an important resource for national-level policy makers and implementers.

The book will also be of interest to students and practitioners working in occupational health and public health. Students undertaking postgraduate studies such as a Diploma in Occupational Health/Medicine, a Master's in Occupational Health, or a Master of Medicine (Occupational Medicine) will find this to be an invaluable resource, not only for South Africa, but for the entire global South. The book is also an important resource for those preparing for international examinations such as Membership Examinations in Occupational Medicine. It is a vital reference resource in the spirometry education space, especially regarding the interpretation of spirograms. Policy makers will find the book to be an invaluable reference guide for the development of policies related to OLDs. The author calls on policy makers to engage and focus on continuously improving the health of mineworkers and ex-mineworkers.

Congratulations to Dr Govender for producing this timely masterpiece, replete with a fountain of knowledge on diagnostic and management principles and procedures for OLDs.

Click here to purchase your copy: https://mettamedia.co.za/handbook.php

A-OSH EXPO – Meeting the Western Cape's occupational health and safety needs

The Western Cape's economy is as varied as its landscapes – home to global shipping routes, high-rise commercial developments, vineyards, manufacturing plants, and fast-growing construction zones. With such diversity comes a wide range of occupational health and safety (OHS) challenges. From ensuring compliance on a remote agricultural site to maintaining safety standards in a bustling CBD office tower, the demands on OHS managers are complex and ever-changing.

"A-OSH EXPO Cape Town, taking place from 21 to 23 October 2025 at the Cape Town International Convention Centre (CTICC), is designed to meet these challenges head-on. It's a dedicated platform where visitors can explore the latest products, services, and training to safeguard their teams, improve workplace conditions, and ensure compliance with evolving legislation," says Mark Anderson, Portfolio Director at Montgomery Group Africa.

Addressing regional realities

In the Western Cape, occupational hazards can be as unique as the industries themselves. Seasonal workers in agriculture face different risks than staff in the port and logistics sector, while the construction industry must constantly adapt to new safety requirements as the city skyline changes. OHS professionals need solutions that are adaptable, reliable, and relevant to these conditions.

At the expo, visitors will find personal protective equipment (PPE) suited to local climates, advanced safety signage systems, noise and dust monitoring solutions, and digital compliance tools. Exhibitors will showcase innovations in risk assessment, emergency response, and workplace wellness – essential in a region where health and safety considerations must balance both productivity and worker wellbeing.

"A-OSH EXPO Cape Town is co-located with Securex South Africa, Facilities Management Expo, and Firexpo, giving visitors the chance to see how occupational health and safety integrates with fire prevention, facility operations, and security measures. This one-stop format allows attendees to explore interconnected solutions, from access control systems that double as timekeeping tools to building maintenance practices that reduce hazards before they arise," says Anderson.

Building safer workplaces together

Whether you're managing a small team or overseeing safety across multiple sites, attending A-OSH EXPO Cape Town offers the opportunity to connect with industry experts, compare products side-by-side, network with knowledgeable specialists in the field, and discover new methods for keeping your workforce safe. It is a chance to build a safety strategy that is not only compliant but forward-thinking – positioning your organisation to protect both its people and its reputation.

Visit the A-OSH EXPO website to find out more about the show at www.aosh.co.za, and to pre-register for fast access.

Contact:
Specialised Exhibitions – Marketing Department
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A-OSH EXPO Cape Town, taking place 21–23 October 2025 at the Cape Town International Convention Centre (CTICC), is designed to meet OHS challenges head-on *Photograph: courtesy of A-OSH*