OCCUPATIONALhealth

SOUTHERN AFRICA

Vol. 28, No. 1 January/February 2022

ISSN 2226-6097

OFFICIAL JOURNAL

The South African Society of Occupational Medicine (SASOM)

South African Society of Occupational Health Nursing Practitioners (SASOHN)

Southern African Institute for Occupational Hygiene (SAIOH)

Mine Medical Professionals Association (MMPA)

An accredited journal of the Department of Higher Education and Training (RSA)

RENSAIR

Hospital-grade air purification

- Removes 99.97% of airborne pollutants and pathogens, including the coronavirus
- Trusted by Scandinavian hospital for over a decade and is used by the UK's National Health Service
- Rensair cleans 560 m^3/hour, equivalent to a room size of 210 m^2

Effectiveness documented by leading global laboratories including Eurofins, Norconsult and Oslo University Hospital

Air Purification system can now be rented

Rent your Rensair Hospital-grade air purification system for just R1,700.00 per month (ex. vat, ex. delivery and ex. insurance)

Other rental options available i.e., daily rental at events etc.

Contact Amtronix on +27 11 894 4632 or ohsales@amtronix.co.za

Amtronix PTY LIMITED

Amtronix - breaking the sound barrier

THE OCCUPATIONAL HEALTH SPECIALISTS

ISO 13485:2016 certificate number 210610062701
SAHPRA licence number: 01156MD
Radiation control certificate: 979

0861 268 766 / +27 11 894 4632 / info@amtronix.co.za / www.amtronix.co.za

Front cover
Friendly miner II, 34 cm x 24 cm, pastel on board, by Helena Hugo
https://www.helenahugo.com/Portfolio/Home.html.

OCCUPATIONALhealth
SOUTHERN AFRICA

Vol. 28 No. 1 January/February 2022

The South African Society of Occupational Medicine (SASOM)
Claudia Frost
Tel: +27 (0)87 288 0893
e-mail: info@sasom.org
website: www.sasom.org

South African Society of Occupational Health Nursing Practitioners (SASOHN)
Adele Dumas
Tel: +27 (0)861 727646
Fax: +27 (0)86 263 8757
e-mail: office@sasohn.co.za
website: www.sasohn.co.za

Southern African Institute for Occupational Hygiene (SAIOH)
Kate Smart
Tel: +27 (0)71 672 4916
Fax: +27 (0)86 631 6117
e-mail: info@saioh.co.za
website: www.saioh.co.za

Mine Medical Professionals Association (MMPA)
Mbalenhle Buthelezi
Tel: +27 (0)11 568 2054
e-mail: mbalenhleb@mpas.org.za
website: www.mmpa.org.za

PUBLISHER
MettaMedia (Pty) Ltd
Kevin Beaumont, Cell: +27 (0)82 774 2210
PO Box 210, Tulbagh, 6820
e-mail: kevin@mettamedia.co.za

ADVERTISING
Barbara Spence, Cell: +27 (0)82 881 3454
e-mail: barbara@avenue.co.za

SUBSCRIPTIONS
Kevin Beaumont, Cell: +27 (0)82 774 2210
e-mail: kevin@mettamedia.co.za

PRODUCTION
Perry Digital Media
Michelle Perry, Cell: +27 (0)83 528 7491
e-mail: michelle.perry@perrydigitalmedia.co.za

Audit Bureau of Circulations of South Africa 2019

This Journal is on the Department of Higher Education and Training's list of Approved South African Journals; authors of peer-reviewed papers thus qualify for subsidies for their affiliated tertiary institutions. It is also listed in African Index Medicus; and is on the International Committee of Medical Journal Editors (ICMJE) website list of Journals Following the ICMJE Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals.

Use your personal login details to access past issues. Should you have any queries, e-mail kevin@mettamedia.co.za.

How to subscribe

Join SASOM, SASOHN, SAIOH or MMPA and receive a premier subscription to *Occupational Health Southern Africa* as a benefit of Society membership. Alternatively, contact us at Kevin@mettamedia.co.za to subscribe directly.

PUBLISHED BY
MettaMedia

From the Editor . . .

Gill Nelson,
Editor-in-chief

The last two years have seen many changes in the workplace, including the sudden move to the work-from-home model, which came with many challenges. Meetings moved online – as did conferences, training workshops and other events. We all missed the 'face-to-face' interactions.

However, travel for work purposes did not stop entirely. On 23 May 2020, the Minister of Home Affairs, Dr Aaron Motsoaledi, issued a statement regarding travel for South Africans. Citizens were permitted to leave the country for work, study or family reunions, to take up permanent residency elsewhere, and to receive medical attention.[1] Restrictions began to open towards the end of 2021, when some airlines resumed flights to and from South Africa, and travel for leisure purposes was once again possible, although limited. Shortly thereafter, our scientists identified omicron – a new variant of the SARS-CoV-2 virus, and most countries' borders closed to us again, almost instantly.

I was lucky to travel in that short window period. In addition to an internationally valid COVID-19 vaccination certificate, I obtained a letter from my health insurance company to say that I had a policy that would cover COVID-19 illness, and any emergency medical treatment and related matters (R5 million for the latter).

My luck turned when I slipped and broke my leg. While waiting for an ambulance, I contacted my health insurer about the accident, confident that they would cover the expenses. These included the treatment at the hospital – various scans and a plaster cast – and costs that I incurred to get to the airport to return home (all stated as being covered in the policy). I was shocked when the request to upgrade my flight and get assistance to get to the airport was denied. Despite having a fit-to-fly form, signed by a doctor at the hospital, I was told that, *"These requests have been reviewed by our medical team at … who … have come to the conclusion that these will not be covered by …"*. The assumption was, obviously, that I could catch a train to the airport, carrying a suitcase and a backpack, with my leg in a cast and using crutches, and that there was no need to elevate my leg on the flight home! The decision was overturned a few days later when 'friends in high places' intervened. However, as of 2 February, the hospital has not been paid, and I have not been reimbursed for my travel expenses. My e-mails remain unanswered.

Perhaps my experience is unusual, but my warning is to not assume that emergency expenses will be covered by your health insurer while travelling or, at least, that the process of claiming what is rightfully yours will be easy.

Although this happened to me while travelling for leisure, accidents happen to many people when travelling for work. It is estimated that, before the Pandemic, approximately two million international trips were made by South Africans, annually (personal communication, Travel Insurance Consultants (TIC)), all of which would have required travel insurance.

Travel insurance is critical as the risk of illness and/or injury increases when travelling, but few of us read the terms and conditions of the policies, or even consider the details about the services that are provided. A Taiwanese study, conducted in 2014, reported that 20–30% of travellers lack an awareness of emergency medical assistance services.[2] Travel insurance effectively protects the traveller against the potentially financially crippling costs of medical care in foreign countries, and even emergency evacuation from those countries.

In 1999, Prof. Peter Legatt and colleagues wrote a comprehensive guide to travel insurance,[3] which still applies more than 20 years later – little has changed. Prof. Legatt is still very active in both travel medicine and occupational health, and in this issue we feature an opinion piece, written with Prof. Mary Ross, on pandemics and infection prevention and control in the workplace.

International travel for work is going to pick up this year. Many upcoming events, including occupational health conferences, are moving back to in-person events – much to the relief of many! Please make sure that you are adequately insured when travelling, locally or internationally, read the small print carefully, and don't be persuaded to accept less than you are entitled to if you do have an accident or fall ill.

REFERENCES

1. South Africa. Department of Home Affairs. The Minister of Home Affairs allows certain categories of South Africans to return to the countries where they are based. Available from: http://www.dha.gov.za/index.php/statements-speeches/1341-the-minister-of-home-affairs-allows-certain-categories-of-south-africans-to-return-to-the-countries-where-they-are-based (accessed 29 Jan 2022).
2. Lee Y-H, Lu C-W, Wu P-Z, Huang H-L, Wu Y-C, Huang K-C. Attitudes and awareness of medical assistance while traveling abroad. Global Health. 2018; 14:67. https://doi.org/10.1186/s12992-018-0382-5.
3. Leggat PA, Carne J, Kedjarune U. Travel insurance and health. J Travel Med. 1999; 6:243-248.

About the front cover artist

Artist Helena Hugo has been interested in 'work' as a theme since 2005, when her first portrait of a worker was selected as one of 50 finalists for the prestigious BP Portrait Award in London. She has a special interest in South African workers and African migrant labourers. Hugo aims to bring to the viewer's attention the significance of every job and the role it plays in a community, and to focus the viewer's attention, not only on the importance of work for survival, but also for psychological wellbeing. In exploring that aspect of an individual's identity that relates to his or her vocation, Hugo acknowledges the significance of the unique skills necessary for, and the metamorphic ability of, every job. *"Catching any person in that moment of utmost concentration or excruciating effort while working will show us a person who has, if only for an instant, become his or her work"*, she says.
(https://www.helenahugo.com/Portfolio/Home.html).

Reviewers of manuscripts in 2021

We are grateful to all our reviewers for their guidance and evaluation of manuscripts submitted to the Journal.

Aliyu Adamu – University of Maiduguri, Nigeria
Elijah Boadu – University of New South Wales, Australia
Mpilo Booi – University of Pretoria, South Africa
Garrett Brown – University of California, USA
Derk Brouwer – University of the Witwatersrand, South Africa
William S Carter – University of Findlay, USA
Daphney Nozizwe Conco – University of the Witwatersrand, South Africa
Thomas Fuller – Illinois State University, USA
Phumzile Hlongwa – University of the Witwatersrand, South Africa
Mo-Yeol Kang – St Mary's Hospital, Republic of Korea
Deepak Khobragade – Datta Meghe College of Pharmacy, India
Willem Kruger – University of the Free State, South Africa
Sankari Malaiappan – Saveetha University, India
Sumaya Mall – University of the Witwatersrand, South Africa
Andrew May – University of the Witwatersrand, South Africa
Saloshni Naidoo – University of KwaZulu-Natal, South Africa
Pietro Napoli – University of Cagliari, Italy
Busisiwe Nyantumbu-Mkhize – National Institute for Occupational Health, South Africa
Siona O'Connell – University of Pretoria, South Africa
Oladapo Olagbegi – University of KwaZulu-Natal, South Africa
Hamid Osman – Taif University, Saudi Arabia
Sinola Rajaram – University of the Witwatersrand, South Africa
David Rees – National Institute for Occupational Health, South Africa
Kate Rees – University of the Witwatersrand, South Africa
Andre Rose – National Cancer Institute, South Africa
Okuhle Sapo – University of Pretoria, South Africa
Tanusha Singh – National Institute for Occupational Health, South Africa
Velibanti Sukati – University of Limpopo, South Africa
Jim teWaterNaude – University of Cape Town, South Africa
Kerry Uebel – University of New South Wales, Australia
Tobias van Reenen – Centre for Scientific and Industrial Research, South Africa
Ushotanefe Useh – North-West University, South Africa
Kerry Wilson – National Institute for Occupational Health, South Africa
Sylvain Honore Woromogo – Inter-State Center for Higher Education in Public Health in Central Africa, Republic of the Congo

Announcement
Results: ICOH Elections 2022–24

SASOM would like to congratulate two of our ExCo members on their elections at ICOH 2022.

Ms. Claudina Nogueira (*left*) has been re-elected in the role of **ICOH Vice President** and **Dr Dingani Moyo** (*right*) as an **ICOH Board Member**, for the triennium 2022–24.

SASOM would like to wish you both all the very best for your tenure and work ahead.

33rd International Congress on Occupational Health 2022

Join the Congress

International Commission on Occupational Health

ICOH 2022
33rd International Congress on Occupational Health

SASOM
South African Society of Occupational Medicine
FOUNDED IN 1948

Time to infectious dose for someone not infected with COVID-19

Source is wearing	Receiver is wearing: Nothing	Cloth FC*	Surgical mask	N95 FFR* (10%)	N95 FFR* (1%)
Nothing	15 min	20 min	30 min	2.5 min	25 hour
Cloth FC*	20 min	27 min	40 min	3.5 min	33 hr
Surgical mask	30 min	40 min	60 min	5 hr	50 hr
N95 FFR* (10%)	2.5 hr	3.3 hr	5 hr	25 hr	250 hr
N95 FFR* (1%)	25 hr	33 hr	50 hr	250 hr	2,500 hr

*FC: face covering
*FFR: filtering facepiece respirator

Adapted from: ACGIH® Pandemic Task Force Fact Sheet: Workers Need Respirators; 2021, with permission. (https://www.acgih.org/covid-19-fact-sheet-worker-resp/)

Chest radiography: optimising the radiation dose at industrial mines in the Northern Cape province of South Africa

L Toüa, B van der Merwe, B van der Linde

Department of Clinical Sciences, Faculty of Health and Environmental Sciences, Central University of Technology, Free State, Bloemfontein, South Africa

Correspondence: Leandré Toüa, Kuruman Hospital, Main Street, Kuruman, 8460,South Africa
e-mail: vanrooyen.leandre@gmail.com

Keywords: entrance surface dose, diagnostic reference level, occupational medical examination, chest X-ray, CXR

How to cite this paper: Toüa L, Van der Merwe B, Van der Linde B. Chest radiography: optimising the radiation dose at industrial mines in the Northern Cape province of South Africa. Occup Health Southern Afr. 2022; 28(1):5-10.

ABSTRACT

Background: Occupational medical examinations of permanent mine employees include one biennial postero-anterior (PA) chest X-ray (CXR) for pulmonary evaluation. Similar testing is required for contracted employees who could, however, have more than one annual PA CXR, which is required for entrance, periodic and exit medical examinations. Furthermore, employees may be contracted by more than one mine in a year, resulting in additional CXRs.

Objectives: To determine baseline diagnostic reference levels (DRLs) for four occupational health clinics, to optimise contracted mine employees' radiation doses.

Methods: Radiological and demographic data were collected for 400 contracted employees from four clinics in the Northern Cape province of South Africa, in 2019/2020. Technical parameters were used to calculate the CXR entrance surface dose (ESD) for each employee, i.e. the radiation dose absorbed by the skin. The ESDs were used to determine a diagnostic reference level (DRL) for each clinic.

Results: Of the 400 participants, 217 (54.3%) had one CXR, 89 (22.3%) had two, and 34 (8.5%) had three CXRs in the one-year study period; one employee had 10 CXRs. The DRLs for the four clinics ranged from 0.144 to 0.391 mGy.

Conclusion: The baseline DRLs determined in this study can be used to optimise contracted mine employees' ionising radiation doses, and can be reviewed regularly, using the methods described. The clinics in the Northern Cape province should develop a central database of mine workers' CXR examinations to reduce the number of X-ray examinations performed. The mines should implement strategies to limit the number of annual CXRs to one, to further minimise employees' radiation exposure.

INTRODUCTION

In the Northern Cape province of South Africa, occupational health clinics affiliated with mines are contracted by different mining companies. The purpose of the the Mine Health and Safety Act No. 29 of 1996 (MHSA), as amended in 2008 by the Department of Mineral Resources and Energy, is to safeguard the health and safety of mine employees and communities affected by mining operations.[1] Accordingly, every mine worker must undergo a series of mandatory annual medical examinations, as well as a biennial diagnostic chest X-ray (CXR) examination.

Occupational medical surveillance of contracted mine employees comprises specific examinations that include CXRs at start of employment (entrance medical), during employment (periodic medical), when transferred from one site to another (pre-placement medical), and at termination of the employment/contract (exit medical). These medical examinations provide an effective monitoring system to improve health and safety.

Routine CXR examinations consist of a postero-anterior (PA) and a lateral (LAT) projection. The LAT projection complements the PA CXR as it provides a side image of the chest cavity at a 90° angle to the PA CXR. However, in an occupational setting, only the PA view is required.[2]

The radiation dose may vary considerably when performing a diagnostic X-ray examination. Consequently, the Royal College of Radiologists (RCR) and the National Radiological Protection Board (NRPB) recommended that regular patient-dose monitoring should be a key component of quality control (QC) programmes.[3] Annual QC tests are carried out in the clinics where mine workers are sent for CXRs, according to the SA Directorate: Radiation Control.[4] The International Commission on Radiological Protection (ICRP) recommends setting local and national diagnostic reference levels (DRLs) for imaging examinations and procedures performed on patients.[5]

A DRL is an effective tool to optimise the protection of patients exposed to ionising radiation.[5] The DRL is not an ideal target for an imaging examination but can be used to identify individual high radiation exposures.[6] It is not a radiation dose limit and does not apply to a single individual.[3] It is a representative or standard radiation dose level for an examination type or procedure used for comparative purposes to optimise dose between practices, clinics, departments, regions, countries, etc.[7] DRLs are only applicable to medical radiation exposure, and not to that from environmental sources and occupational sources.[6] A DRL is expressed as a defined dose that can be measured easily, with precision and accuracy,[8] and is used primarily as a dose optimisation tool for diagnostic imaging.[6]

Before a DRL value can be determined, the entrance surface dose (ESD) must be obtained.[9] The ESD is the radiation dose (in milligray [mGy]) that is absorbed by the skin.[10] It can be measured directly with a thermoluminescent dosimeter (TLD), or it can also be calculated using

technical parameters from the CXR and reference tables.[3] Methods of calculating the ESD to estimate radiation dose have been described in the literature.[11] It is important to note that several alternative terms are used for 'ESD', i.e. 'incident air kerma', 'radiation dose', 'entrance surface air kerma', and 'kerma to the air'.

Contracted mine employees comprise a large proportion of the mining employee population, as external companies provide various services to mines on a non-permanent basis. Contract periods vary from three to 12 months. It is therefore possible that contract employees are referred for more CXRs than permanent employees, and therefore exposed to unnecessary ionising radiation, which increases their accumulative radiation dose. This prompted the investigation of employees' safety regarding repetitive exposure to ionising radiation, since the fundamental principle that radiographers are taught, and which they practise, is the 'as low as reasonably achievable' (ALARA) principle.[12]

The objective of the study was to determine baseline DRLs for four occupational health clinics in the Northern Cape province, to optimise contracted mine employees' radiation doses.

METHODS

Convenience sampling, based on proximity of the clinics to each other, was used to select four of the 15 occupational health clinics in the Northern Cape province for inclusion in the study. These clinics provide diagnostic radiography services to the mines. None of the four clinics had recorded ESDs and, therefore, DRLs for PA CXRs were not available.

Purposive sampling was used to select 100 contracted mine employees who visited each clinic (N = 400) from November 2019 to October 2020. CXR data were collected, using a technical parameters sheet and an X-ray data sheet.

Technical parameters sheet

The radiographer at each clinic obtained informed consent from participants and recorded technical parameters before performing the PA CXR, collecting demographic information, including South African identification (ID) number or passport number, height and weight, and measuring chest thickness. The chest thickness measurement was performed at the height of thoracic vertebra 7 (T7), which is the centring point for a CXR. Refer to Box 1 for a more detailed explanation of terms.

Ionising radiation exposure parameters, viz. the X-ray strength or peak potential voltage applied to the X-ray tube (kVp), the X-ray tube current (milliamperage, mA) over a set amount of time (seconds) via the X-ray tube (mAs), and the source-to-image distance (SID) were also recorded. The kVp selected on the machine determines the energy of the X-ray beam. The half-value layer (HVL) was determined, using Table 1. The material inside the tube (usually aluminium) filters out weak or harmful rays that will increase the patient's radiation dose. The stronger the X-ray strength, the thicker the HVL that is required to halve the tube output, and the greater the tube output (intensity of radiation) produced.

X-ray datasheet

All CXRs performed on the participants were linked using ID or passport numbers recorded on the technical parameters sheet. Rejected or repeated projections were also recorded, i.e. CXRs that were not diagnostically acceptable due to movement, incorrect exposure factors, etc. and had to be repeated. All projections were recorded as a mine employee may have been referred to the clinic for other imaging, e.g. for an injury on duty.

Estimation of entrance surface dose

Entrance surface dose (ESD) was estimated, using three equations. The ESD was estimated for each mining employee, using the demographic and technical parameter data. The ESD was then used to determine the DRL for each clinic.

The factors included in the estimation of the ESD are:

1. X-ray tube strength (kVp)
2. X-ray tube current (mAs)
3. Source-to-image distance (SID)
4. Air gap
5. Chest thickness
6. Source-to-skin distance (SSD)

To explain estimation of the ESD for a participant, let us use a scenario where the following technical parameters were recorded: X-ray strength of 125 kVp, X-ray tube current per second of 3.3 mAs, SID of 180 cm, chest thickness of 26.8 cm, and air gap of 2 cm. The tube output at an X-ray strength of 125 kVp is 0.164 mGy/mAs as per Table 1.[9]

Box 1. Explanation of terms

X-rays or projections:
- CXR: chest X-ray (image of the chest cavity)
- PA CXR: postero-anterio chest X-ray (front image of chest cavity)
- LAT CXR: lateral chest X-ray (side image of chest cavity)

Ionising radiation exposure parameters selected on the X-ray machine:
- energy of X-ray beam or strength of X-rays, measured in kVp (peak potential voltage)
- X-ray tube current, measured in milliamperes (mA)
- X-ray tube current over a set number of seconds, measured in milliamperes per second (mAs)
- source-to-image distance (SID): distance from radiation source to image receptor, measured in cm

Calculated and measured parameters:
- chest thickness: front-to-back width of the chest, measured in cm, using a calliper
- air gap: gap between the patient and the image receptor, measured in cm
- source-to-skin distance (SSD): distance from the source of the radiation to the patient's skin, measured in cm; can be calculated from SID, chest thickness, and air gap
- entrance surface dose (ESD): radiation dose absorbed by the skin, measured in milligray (mGy); also referred to as 'incident air kerma', 'radiation dose', 'entrance surface kerma (ESK)', and 'kerma to the air'
- half-value layer (HLV): the thickness of aluminium or equivalent material at which the tube output is reduced by half, measured in mm; material directly affects the X-ray tube output as it is added to the X-ray tube as a filter. HVL is determined at different kVp values during annual quality control (QC) testing of the X-ray machine
- X-ray tube output: intensity of radiation beam per unit of mAs (mGy/mAs) at a specific SSD; a comparable definition is the kerma to the air rate per unit of X-ray tube current at a predefined distance from the radiation source. If not measured during annual QC testing, reference tables may be used if the HVL is within limits
- diagnostic reference level (DRL) is used primarily as a dose optimisation tool for diagnostic imaging; calculated from the 75th percentile of the ESD

Table 1. X-ray tube output and half-value layer as a function of X-ray strength for a typical diagnostic X-ray machine, measured at 100 cm SID[9]

X-ray strength (kVp)	HVL (mm Al)	Tube output (mGy/mAs)
80	2.86	0.067
85	3.08	0.075
90	3.29	0.085
95	3.50	0.095
100	3.71	0.105
105	3.92	0.116
110	4.12	0.127
115	4.32	0.139
120	4.51	0.151
125	**4.71**	**0.164**
130	4.89	0.178
135	5.08	0.192
140	5.25	0.206

Equation 1:

ESD_{100cm} = X-ray tube current (mAs) x X-ray tube output (mGy/mAs)

When applied to the scenario:

ESD_{100cm} = 3.3 mAs x 0.164 mGy/mAs
= 0.541 mGy

In equation 1, ESD is calculated at an SSD of 100 cm. However, in the scenario, the SID is 180 cm – the SID that is prescribed for CXRs. Therefore, the SSD for a CXR should be calculated utilising equation 2. Thus, for the scenario, where the SID is 180 cm, the chest thickness is 26.8 cm, and the air gap is 2 cm:

Equation 2:

SSD_{CXR} = SID – (chest thickness + gap)
= 180 cm – (26.8 cm + 2 cm)
= 151.2 cm

From equation 2, it is noted that the SSD is > 100 cm. Therefore, a correction is needed for this difference, which is done by using the inverse square law, represented as equation 3.

Equation 3:

Inverse square law correction from 100 cm to 151.2 cm to surface of patient:

Distance correction factor = $\left(\frac{100}{151.2}\right)^2 = 0.44$

ESD = ESD_{100cm} x distance correction factor
= 0.541 mGy x 0.44
= 0.237 mGy

The ESD for this scenario participant example is thus 0.237 mGy.

Equation 1 makes use of the free-in-air measurements of kerma or ESD and, therefore, backscatter in tissue does not influence the outcome (the free-in-air measurements are known as measurements without backscatter). The radiation dose at the skin surface is included in the measurement that is referred to as the ESD. This is defined as the kerma to the air measured at the central beam axis to the position of the patient's skin surface. The incident radiation on the patient and the backscatter radiation are included in the measurement.[13]

Data analysis

The data from the technical parameters sheet were transferred to a Microsoft Excel spreadsheet and analysed using SAS Version 9.2. Descriptive statistics (frequencies and percentages) were calculated for categorical data. The Shapiro-Wilk test was used to test if the continuous data were normally distributed. Subsequently, means and standard deviations (for normally distributed data), or medians and percentiles (non-normally distributed data), were calculated. The independent t-test and Mann-Whitney U-test were used to compare mean and median values between groups (in this case the four different clinics), respectively. The Kruskal-Wallis test was used to compare the median values between all the independent groups. A significance level (a) of 0.05 was used.

The DRL was determined by calculating the mean, median and 75th percentile of the ESD values for the 100 patients at each clinic. The DRL is the 75th percentile.

Ethics approval for this study was obtained from the Health Sciences Research Ethics Committee (HSREC) of the University of the Free State (ethics clearance no. UFS-HSD2019/0520/2708). Permission was granted from the occupational health clinic at each mine. Informed consent was obtained from all participants.

RESULTS

The median chest thicknesses for participants at the four clinics were very similar, at 24.21 cm, 24.78 cm, 21.92 cm and 21.41 cm, respectively.

Table 2 shows the number of CXR projections performed on the study participants. All had at least one PA CXR in the study period. Most of the participants had only one PA CXR (n = 217; 54.25%). Eighty-nine (22.25%) had two PA CXRs, while 34 (8.5%) had three PA CXRs. One participant had 10 CXRs in the one-year period. A LAT CXR was performed in only one (0.3%) of the 400 contracted mine employees.

Table 2. Total postero-anterior chest X-rays performed on contracted mine employees (N = 400)

Cumulative CXRs	n	%
1	217	54.3
2	89	22.3
3	34	8.5
4	14	3.5
5	13	3.3
6	13	3.3
7	14	3.5
8	5	1.3
10	1	0.3

Across all clinics, 17 (4.3%) participants had one repeat PA CXR, one (0.3%) had two repeat PA CXRs, and two (0.5%) had three repeat PA CXRs (data not shown). The mean tube currents were 2.39, 3.64, 5.32 and 2.31 mAs for clinics 1–4, respectively. Figure 1 shows the median ESD per clinic, and the interquartile ranges.

Clinic 3 had the highest median ESD, followed by Clinic 2. The median ESD for Clinic 3 was more than double that for Clinics 1 and 4. Overall, the median ESDs of the four clinics were significantly different ($p < 0.001$). The median ESD for Clinic 1 (0.155 mGy), Clinic 2 (0.273 mGy), and Clinic 3 (0.337 mGy) were significantly different from each other ($p < 0.001$). The median ESD of Clinic 4 (0.142 mGy) was significantly lower than those of Clinics 2 and 3 ($p < 0.001$).

The baseline DRLs determined for each clinic ranged from 0.144 mGy for Clinic 4 to 0.391 mGy for Clinic 3 (Figure 2).

DISCUSSION

We set out to determine a baseline DRL for four occupational health clinics in the Northern Cape province, to optimise contracted mine employees' radiation doses. We showed that ESD values could be calculated from technical parameters, and that baseline DRLs could be determined easily. The four clinics in the study did not share employee information regarding CXRs, which added to the multiple CXRs for a single contracted mine employee.

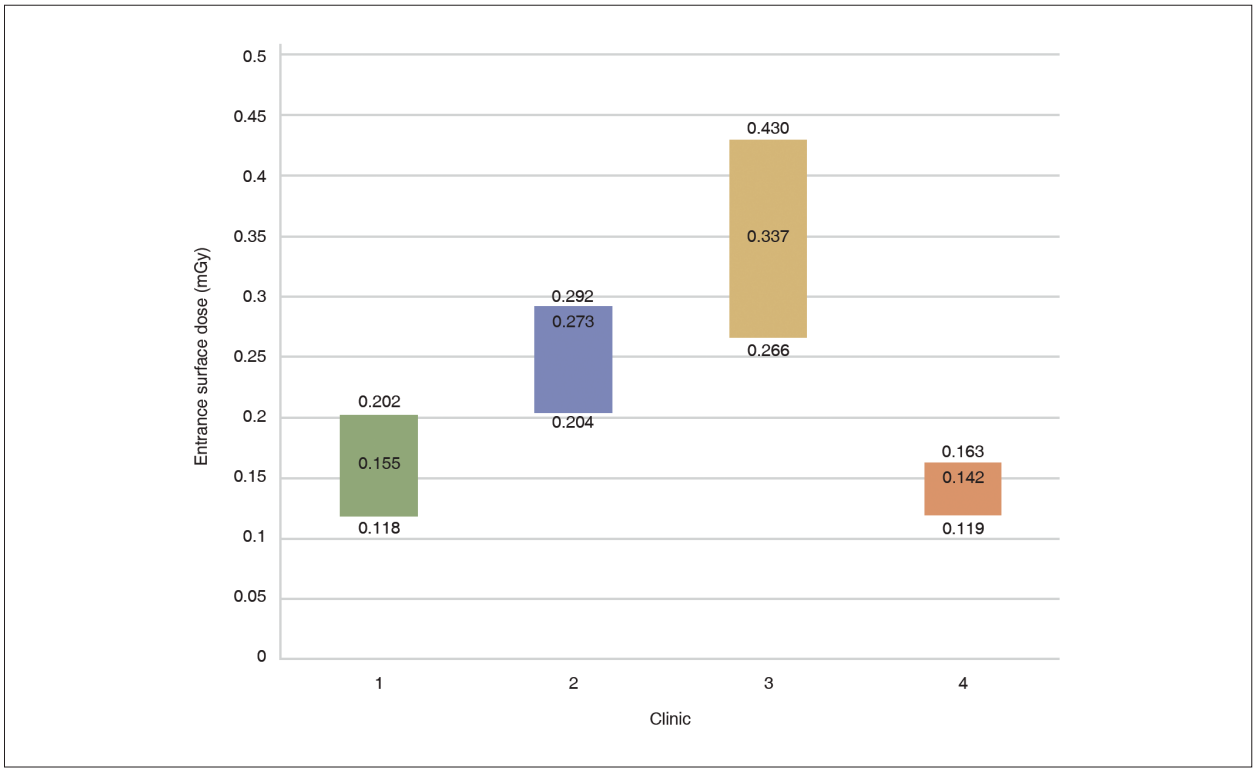

Figure 1. Median and interquartile ranges of entrance surface dose (ESD) for the postero-anterior chest X-rays at each clinic

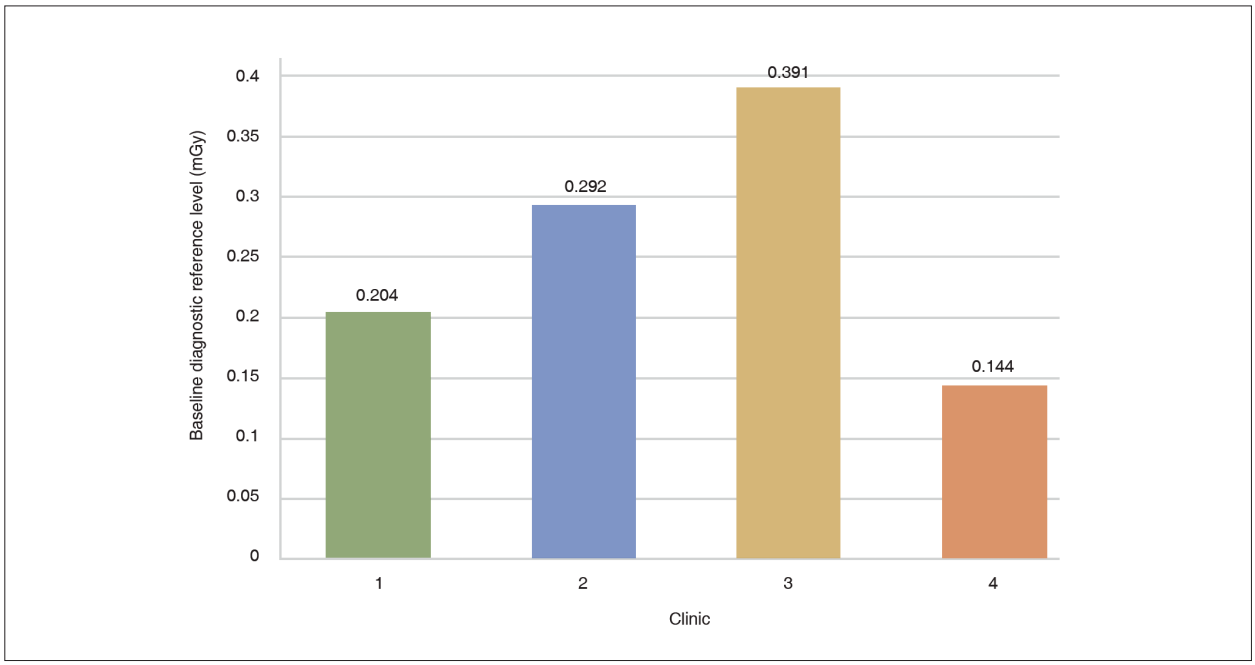

Figure 2. Diagnostic reference level (DRL) for postero-anterior chest X-rays for each clinic

Excessive radiation

Nearly half (n = 183, 45.8%) of contracted mine employees in the study had more than one CXR in the one-year study period. This excluded the repeated/rejected CXR and other examinations and/or X-rays for extremities or the abdomen, all of which added to the individuals' annual ionising radiation doses.

The rate of 5.1% for repeat PA CXRs is lower than the acceptable industry reject rate of 10%; thus, all four clinics were compliant regarding the CXR repeat rate, which should not exceed 10%.[4]

The study findings showed that contracted mine employees are at risk of receiving more CXR images than permanent employees, assuming that permanent employees receive only one PA CXR biannually, as required in term of the MHSA.[14,15] Based on this requirement, the entry and exit CXRs for contracted employees may not be justified for those whose contracts are shorter than two years. Additionally, CXRs must be limited to avoid unnecessary exposure to radiation.

Entrance surface doses

We calculated ESDs without the use of TLDs, unlike many other studies.[3,16,17] The TLD device is placed on the patient and the received radiation dose is stored in a crystal, which releases the radiation in the form of visible light when processed. The intensity of the light emitted is measured when the crystal is heated and is dependent on the radiation dose received and stored.[5] However, TLDs are not readily available at remote clinics or hospitals; nor are medical physicists who are qualified and responsible for the TLD devices and readings. In addition, specific equipment is required to read the data from the TLDs. In resource-scarce settings, it is possible to calculate the ESD without the use of TLDs, using technical and demographic data, as we have demonstrated. This has also been shown in a previous study.[3]

Diagnostic reference levels

DRLs cannot be used to optimise protection of the patient from radiation without considering image quality. The DRL value is not an individual radiation dose limit; any radiation dose is justified to make a diagnosis. Radiation doses that exceed the DRL should be investigated. DRLs should be continuously calculated to optimise radiation doses. A DRL is usually set at the 75th percentile of the ESD values; at the 95th percentile, image quality can be assessed.[5]

A DRL is an indication of a radiation dose quantity, meaning that the X-ray tube current (mAs) has an influence on the DRL since it is linearly proportional to the tube output at a certain SSD. Clinic 3 had the highest DRL because the X-ray tube current (mAs) used in this clinic was higher than that in the other three clinics, and the median chest thickness was less than that of participants at the other three clinics. Clinic 3 had the smallest patient chest thickness but the highest X-ray tube current (mAs), which resulted in the highest ESD and the higher DRL.

DRLs can be compared to local, regional or national values, and are an effective diagnostic tool for dose optimisation and radiation protection of patients.[5] In a recent study, DRLs for PA CXRs in the Northern Cape and Gauteng provinces were determined to be 0.3 mGy[18] and 0.1 mGy,[3] respectively. In other studies, DRLs for PA CXR examinations for adults were similar, i.e. 0.16 mGy (Ireland),[19] 0.26 mGy (Iran)[20] and 0.16 mGy (Slovenia).[7] The DRLs for Clinics 1, 2 and 4 in our study were similar, but the DRL for Clinic 3 was notably higher (0.391 mGy). However, the objective was not to compare the DRLs between the different clinics, but to provide baseline DRLs that could be used for future optimisation of patients' radiation doses in each clinic.

The ideal dose and image quality optimisation team consists of a radiologist, a radiographer, a medical physicist, and other related staff, but this is not possible in many resource-scarce facilities in South Africa, especially near mining areas, where only a radiographer is responsible for the imaging. Nevertheless, all healthcare professionals who provide a service to a patient, especially with reference to medical radiation exposure, should be aware of DRLs as an optimisation tool for protection.[5]

Recommendations

Based on the findings from this study, the following recommendations are proposed:

- Mining companies should be made aware of the potential duplication of routine PA CXRs for contracted mine employees and the implications of unnecessary additional exposure to ionising radiation.
- The occupational health clinics in the Northern Cape province should create a central database to access X-ray images of all mine workers. Radiographers and occupational health medical practitioners would then have access to previous CXR data, including the dates performed, to ultimately reduce exposure to radiation through unnecessary CXRs for mining employees.
- Clinic 3 should perform an internal investigation to determine how the DRL can be lowered, e.g. by reducing the X-ray tube current (mAs), without compromising diagnostic image quality.
- The DRLs should be refined by including lateral CXRs and imaging data of other areas of the body.
- Calculations of ESDs and DRLs should be extended to all occupational health clinics in the Northern Cape province.

CONCLUSION

The frequency of contract mine employees' imaging should be minimised to limit their exposure to ionising radiation. The clinic-specific DRLs provide a baseline level to which the radiographers can refer to monitor mine workers' exposure to ionising radiation. The radiographers at each clinic can continue to review and refine the DRLs, using the simple methods described in this paper. This will ensure that radiographers can optimise radiation doses and that the ALARA principle is honoured.

KEY MESSAGES

- Contracted mine employees are exposed to high cumulative doses of radiation through multiple annual CXRs.
- Entrance surface doses (ESDs) for mining employees can be calculated using data recorded by the radiographer, instead of using expensive dosimeters.
- The calculation of diagnostic reference levels (DRLs) requires constant updating if they are to be used as an effective tool for radiation dose optimisation and protection of mine employees.

FUNDING

Funding for this research was provided by the Central University of Technology, Free State province, South Africa.

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: LT
Data acquisition: LT
Data analysis: LT
Interpretation of the data: LT, BvdM, BvdL
Drafting of the paper: LT, BvdM
Critical revision of the paper: BvdM, BvdL

ACKNOWLEDGEMENTS

The project formed part of the Radiation Protection Improvement in South Africa (RAPISA) initiative. We acknowledge Dr Daleen Struwig, medical writer/editor, for technical and editorial input. Statistical analyses were performed under the guidance of Maryn Viljoen. The calculation of values was moderated by Ann Sweetlove, medical physicist.

REFERENCES

1. South Africa. Mine Health and Safety Act, 1996 (Act No. 29 of 1996) and Regulations. Available from: https://www.mhsc.org.za/sites/default/files/public/legislation_document/Mine%20Health%20and%20Safety%20Act%2029%20of%201996%20and%20Regulations%20Final%20Booklet.pdf (accessed 24 Jun 2021).
2. Guild R, Ehrlich RI, Johnston JR, Ross MH, editors. A Handbook on Occupational Health Practice in the South African Mining Industry. Johannesburg: Safety in Mines Research Advisory Committee; 2001. Available from: https://mhsc.org.za/sites/default/files/public/publications/OH%20Handbook.pdf (accessed 22 Jan 2022).
3. Institute of Physical Science in Medicine. National protocol for patient dose measurements in diagnostic radiology. Chilton: National Radiological Protection Board. 1992. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/337175/National_Protocol_for_Patient_Dose_Measurements_in_Diagnostic_Radiology_for_website.pdf (accessed 1 Feb 2022).
4. South Africa. Department of Health. Directorate: Radiation Control. Requirements for licence holders with respect to quality control tests for diagnostic x-ray imaging systems. Code: Diagnostic QC. Version 9; 2015. Available from: https://www.sahpra.org.za/wp-content/uploads/2020/01/DIAGNOSTIC-QC-modified-April-2015-Version-9-2.pdf (accessed 1 Feb 2022).
5. Vañó E, Miller DL, Martin CJ, Rehani MM, Kang K, Rosenstein M, et al; authors on behalf of ICRP. ICRP Publication 135: Diagnostic Reference Levels in Medical Imaging. Ann ICRP. 2017 Oct; 46(1):1-144. doi: 10.1177/0146645317717209.
6. McCollough CH. Diagnostic Reference Levels. Image Wisely; 2010. Available from: https://www.imagewisely.org/Imaging-Modalities/Computed-Tomography/Diagnostic-Reference-Levels (accessed 1 Nov 2021).
7. Balonov M, Shrimpton P. Effective dose and risks from medical X-ray procedures. In: Proceedings of the First International Symposium on the System of Radiology Protection. 24-26 October 2011, Bethesda. Maryland, USA. Available from: http://www.icrp.org/docs/Mikhail%20Balonov%20Risks%20from%20Medical%20X-Ray%20Procedures.pdf (accessed 24 Jun 2021).
8. Škrk D, Zdešar U, Žontar D. Diagnostic reference levels for X-ray examinations in Slovenia. Radiol Oncol 2006; 40(3):189-195.
9. Bushberg JT, Seibert JA, Leidholdt JR, Boone JM. The essential physics of medical imaging. 3rd ed. Philadelphia: Lippincott Williams & Wilkins; 2012.
10. The 2007 Recommendations of the International Commission on Radiological Protection. ICRP publication 103. Ann ICRP. 2007; 37(2-4): 1-332. doi: 10.1016/j.icrp.2007.10.003.
11. Murphy A, Bell DJ. Entrance skin dose. Radiopaedia; 2017. Available from: https://radiopaedia.org/articles/entrace-skin-dose (accessed 24 Jun 2021).
12. Bontrager KL, Lampignano JP. Textbook of Radiographic Positioning and Related Anatomy. 7th ed. St. Louis: Mosby; 2010.
13. International Atomic Energy Agency. About diagnostic reference levels (DRLs). FAQs for health professionals. IAEA; undated. Available from: https://rpop.iaea.org/RPOP/RPoP/Content/InformationFor/HealthProfessionals/1_Radiology/Optimization/diagnostic-reference-levels.htm (accessed 24 Jun 2021).
14. South Africa. Department of Mineral Resources. Guideline for the compilation of a mandatory code of practice on minimum standards of fitness to perform work at a mine. Pretoria: DMRE; 2003. Available from: https://www.dmr.gov.za/Portals/0/Resource%20Center/Guidelines%20for%20the%20Mandatory%20Codes%20of%20Practice/DMR%2016323%20Occupational%20Medicine/Minimum%20Standards%20of%20Fitness%20to%20Perform%20Work%20at%20a%20Mine_Distribute.pdf?ver=2018-03-13-014456-610 (accessed 24 Jun 2021).
15. South Africa. Department of Employment and Labour. The profile of occupational health and safety in South Africa. Pretoria: Department of Employment and Labour; 2020. Available from: http://www.labour.gov.za/DocumentCenter/Publications/Occupational%20Health%20and%20Safety/The%20Profile%20Occupational%20Health%20and%20Safety%20South%20Africa.pdf (accessed 8 Nov 2021).
16. Abdelhalim MAK. Patient dose levels for seven different radiographic examination types. Saudi Biol Sci. 2010; 17(2):1151-1158. doi: 10.1016/j.sjbs.2009.12.013.
17. Carlton RR, Adler AM. Principles of Radiographic Imaging: An Art and a Science. 4th ed. Clifton Park: Delmar Learning; 2006.
18. Junda M, Muller H, Friedrich-Nel H. Local diagnostic reference levels for routine chest X-ray examinations at a public sector hospital in central South Africa. Health SA. 2021; 26:1622. doi: 10.4102/hsag.v26i0.1622.
19. European Commission. Radiation Protection No. 180. Diagnostic reference levels in thirty-six European countries. 2014. Part 2/2. Available from: https://ec.europa.eu/energy/sites/ener/files/documents/RP180%20part2.pdf (accessed 8 Jul 2021).
20. Shandiz M, Toossi MTB, Farsi S, Yaghobi K. Local reference dose evaluation in conventional radiography examinations in Iran. J Appl Clin Med Phys. 2014; 15(2):303-310. doi: 10.1120/jacmp.v15i2.4550.

Perspectives on pandemics and infection prevention and control in the workplace

MH Ross[1,2,3], PA Leggat[1,2,3,4]

[1] School of Public Health, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa
[2] Working Group on Occupational Infectious Agents, International Commission for Occupational Health
[3] Task Group on Biological Hazards, International Labour Organization
[4] College of Public Health, Medical and Veterinary Sciences, James Cook University, Townsville, Australia

Prof. Mary Ross is an honorary life member of both SASOM and MMPA

Correspondence: Prof. Mary Ross, 5 Gale Road, Parktown West, Johannesburg, 2193, South Africa
e-mail: profmaryross@yahoo.com

Keywords: occupational infectious diseases, public health, pandemics

How to cite this paper: Ross MH, Leggat PA. Perspectives on pandemics and infection prevention and control in the workplace. Occup Health Southern Afr. 2022; 28(1):11-17.

ABSTRACT

This century, we have experienced pandemics of numerous novel and re-emerging infectious agents. Each of these pandemics has taught us, to a greater or lesser extent, that the public health threat becomes an occupational threat when health and other workers are exposed to infected people through contact or vectors. The first necessity for infection prevention and control in the workplace is a global and national political commitment. The hierarchy of control may be difficult to apply in infectious disease outbreaks, and prevention and control of workplace infection cannot be considered in isolation. Prevention is largely dependent on measures such as immunisation and chemoprophylaxis, when applicable, and personal protective equipment (PPE). A One Health model should also be considered in addressing pandemics.

INTRODUCTION

COVID-19 triggered *"the most severe crisis for the world of work, since the Great Depression of the 1930s",* with over 90% of global workers living in countries with some type of workplace closure measures in place in early 2021 and suffering massive loss of jobs, particularly in sectors such as tourism, entertainment and construction.[1] As the world adapts, the Pandemic has also led to changes in workplaces and a dramatic increase in working from home to prevent and control occupational transmission.

"The saddest aspect of life right now is that science gathers knowledge faster than society gathers wisdom."
Isaac Asimov 1920–1992

History reflects the longstanding awareness of the relationship between occupational activities, public health and infectious diseases in pandemics, epidemics, outbreaks or clusters. Occupationally associated epidemics and pandemics that resulted from invading or returning soldiers, who spread diseases to the community, are abundantly recorded, including: the Spartans invading Athens (probably bringing typhoid) in 430 BCE; the 165 CE Antonine plague (probably smallpox) when the Huns infected the Germans – who then infected the Romans whose returning troops led to a decimation of the Roman Empire, killing an estimated five million people; the cholera pandemic of the 19th century, transmitted from Russia by the British army and navy to India, Europe, Africa and America; and the so-called Spanish 'flu of 1918–1920 that affected an estimated 500 million people, or a third of the global population, and resulted in at least 50 million deaths.[2,3] The 1918 H1N1 influenza pandemic has been the most severe in modern history, with the deadly 'second wave' attributed to a mutated strain of the virus transmitted by the movement of wartime troops around the world, and the failure to impose quarantine during wartime.[4]

Commercial occupational travel has also contributed to pandemics such as the Black Death or bubonic plague of 1346–1353 that killed a third of the world's population, and the exploration of the Americas in the 16th to 17th centuries, which decimated the local populations through smallpox, measles and bubonic plague.[2,3] From the end of the 19th century to the early 21st century, British merchant seamen had a combined relative mortality risk from malaria, yellow fever, typhoid, cholera, dysentery and smallpox of more than three times that of seamen in the Royal Navy and more than 20 times that of the British population. It was speculated that the excess risks were due to both exposures at their destinations and the failure of viable preventive actions.[5] Movement or travel of infected individuals or vectors, followed by contact with susceptible individuals – be it in the workplace or community – has underlain the transmission of infectious diseases from time immemorial.

Since the International Labour Organization (ILO) issued its first recommendation related to occupational health, on the disinfection of wool infected with anthrax spores in 1919, there have been significant advances in the knowledge about biological hazards, their prevention, and the treatment of diseases they cause; but insufficient global application has been dedicated to infectious agents in the workplace. Thus, in spite of a vast array of evidence that infectious diseases can arise in or affect the workplace, biological hazards present a long-neglected focus for occupational health, compared with physical and chemical hazards. The World Health Organization (WHO) indicated that for those member states that had a National Policy Framework for Occupational Health, prevention of communicable diseases was one of the least-covered topics.[6] WHO estimated that in 2015, of the burden of disease globally attributable to occupation from death and disability, 8% was caused by infectious disease; however, this is likely

to be an underestimate because assessment of the global burden could be made for only a limited number of occupational infections.[7] In 2019, having recognised the need to address both infectious and non-infectious biological hazards, the ILO initiated a task group, on which the authors serve, to develop a guidance document but, ironically, progress was interrupted by the COVID-19 pandemic.

On the whole, the extent and nature of occupational infectious diseases are poorly understood or quantified. According to the 6th European Working Conditions Survey, 13% of European workers are exposed to infectious agents at work; women (15%) are more exposed than men (12%) to direct contact with materials, which can be infectious; and, in the health sector, 50% of workers handle or are in direct contact with infectious materials.[8] Similarly, it is estimated that 10% of workers in the United States of America are in occupations with at least weekly exposure to infection, while over 18% are exposed to disease or infection at least once per month: mainly in the health sector, but also in many other occupations.[9]

Apart from the control of infections of occupational origin, the workplace is well suited to public health interventions that can benefit both workers and the community, in the prevention and control of global health threats such as tuberculosis (TB), Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS), malaria and influenza.[6] One of the most pressing infectious diseases, be it occupationally or community acquired, is tuberculosis. Prior to the COVID-19 pandemic, it was one of the top 10 causes of death, in low-income and lower-middle-income countries, and the leading killer of people with HIV in 2019.[10]

By 11 March 2020, when the WHO announced that COVID-19 was officially a pandemic, the SARS-CoV-2 virus had affected 114 countries in three months and infected more than 118 000 people.[2] The Pandemic has had a severe impact on health services and the management of both communicable and non-communicable diseases. The WHO reports that, for tuberculosis alone, a drop in detection and notification may have led to 400 000 additional TB deaths in 2020.[10]

The deleterious effects of COVID-19 in the workplace extend far beyond physical health. As Dame Carol Black, former British Government advisor on the relationship between work and health from 2006 to 2016, stated, *"COVID-19 has exposed the very close relationship between economics and health control; control of the virus and controlling the economy; enabling workforce physical and mental health and wellbeing, if you can do that you improve productivity and the economy".*[11]

What have the COVID-19 pandemic and other evidence taught us, and what is relevant to workplace prevention and control of infections going forward?

WHAT WE HAVE LEARNED FROM RECENT HISTORY AND PANDEMICS

In this century, we have already experienced pandemics of new infectious agents, namely, Severe Acute Respiratory Syndrome-CoronaVirus-1 (SARS-COV-1), H1N1 influenza, Middle East Respiratory Syndrome (MERS), and, now, Severe Acute Respiratory Syndrome-CoronaVirus-2 (SARS-CoV-2). In addition, Ebola, Zika, dengue and yellow fever have re-emerged. These diseases have taught us, to a greater or lesser extent, that public health threats become occupational health threats when health and other workers are exposed to infected people through contact or vectors.

Although the HIV pandemic, which started more than 30 years ago, had implications as an occupational infection for fewer workplaces than COVID-19 now has, and a different mode of transmission, it contributed to a resurgence of occupational tuberculosis. There are many similar issues between the two diseases that are relevant to prevention and control of occupational transmission, including the perceived modes and ethical issues involved in transmission of infection. Thus, there is an emphasis on the role of environmental versus behavioural prevention and control.

The SARS-CoV-2 virus has shown that prevention and control of infections within and outside the workplace are fundamental to human wellbeing. Although health workers are the most severely affected occupational group, facing not only the greatest risk of infection, but also the heavy workload and emotional strain of caring for sick and dying patients, other essential workers, many in menial jobs, are also unable to avoid the risk of infection at work.[12]

COVID-19 has highlighted the ongoing lack of adequate workplace preparedness and protection for workers with regard to infectious agents. While global and national authorities have responded by providing guidance, these interventions have constantly evolved or changed, often with conflicting and inconsistent advice, causing confusion.[13] Although conventional wisdom dictates that all that can be done by employers to protect workers from infectious diseases must be done before relying on the workers' actions and personal protective equipment (PPE), the COVID-19 pandemic has taught us that even workers' health status can play an important role, thereby contributing to prevention, control and reduction of deleterious consequences of infection. Infectious and non-communicable diseases (NCDs) often compete for adequate health service resources and attention, particularly in poorly resourced communities. COVID-19 has demonstrated just how closely intertwined the two foci of healthcare are in workplace health. The risk factors for increased risk of severe disease and death from COVID-19 include not only many NCDs, such as obesity, diabetes and hypertension, but, potentially, other personal characteristics such as blood group A antigen, with which SARS-CoV-2 is able to directly interact.[14] In addition, the Pandemic and its social distancing control measures contribute to post-acute sequelae of COVID-19 (long COVID) and mental health problems, respectively, impacting on worker health and wellbeing.

As COVID-19 has affected the majority of global populations and workers, we must harness scientific learnings and apply the wisdom to future occupational prevention and control.

CHALLENGES FACING WORKPLACE INFECTION AND CONTROL

The persistent *"lack of knowledge and awareness of exposures to biological agents and related health problems, and the lack of a systematic approach to workplace prevention of these risk factors"* have been emphasised by The European Agency for Safety and Health at Work.[15] Until the COVID-19 pandemic, infectious diseases and their prevention and control were generally perceived to be a public health rather than an occupational health or workplace issue. All those involved in worker health need to seize the moment to promote workplace health in general, and to focus on infection prevention and control in *all* workplaces, whether infections be potentially occupationally or community acquired.

The designation of any infection, epitomised by influenza, as being community or work related, or both, is not always clear-cut and neither

are the relevant preventive and control measures. Tuberculosis – a ubiquitous occupational and public health infection – still can evade effective prevention of transmission within and outside the workplace. Aside from healthcare facilities, where prevention and control are recognised and managed, tuberculosis is important in many workplaces, such as mining. In spite of centuries of evidence of the association of mining dust exposure with tuberculosis, today exposure to silica dust continues in mining and other industries. Tuberculosis infection persists, and has been compounded by the synergistic effect of HIV contracted outside the workplace. HIV treatment and early diagnosis of tuberculosis at the workplace have decreased its transmission, morbidity and mortality, but much remains to be done.

Associated with occupational exposure to new tuberculosis infection or reactivation of dormant infection in the working environment itself, are domestic and other exposures. For example, researchers in Peru demonstrated that use of buses and minibuses to commute to work was associated with acquiring tuberculosis in a high-incidence urban population.[16] Thus, preventive measures need to be implemented by the workplace managers offsite, particularly when conditions provide an ideal environment for the exposure and transmission of infectious agents for a sizeable portion of the working population.

Not unexpectedly, since ongoing exposure to infectious patients is recognised, the emphasis of occupational infection research and intervention has been directed largely towards health workers, while non-health workers are generally overlooked. Nevertheless, many other occupational groups are exposed to a range of infectious agents through contact with infected people, vectors, fomites or the environment during their work.[9]

WORKPLACE INFECTION PREVENTION AND CONTROL

Healthcare workplaces

Even for health workers, who have the highest profile and are probably the best served in terms of infection prevention and control (IPC) standards, guidelines and quality assurance, there are problems and inconsistencies. The recent Cochrane review of barriers and facilitators to health workers' adherence with IPC guidelines for respiratory infectious diseases (SARS, H1N1 influenza, MERS, tuberculosis, or seasonal influenza) revealed that health workers, sourced from different continents, experienced doubt about adherence to guidelines where local, national and international guidelines differed or were constantly changing.[17] Another challenge they identified was that the guidelines led to additional work, use of PPE, and fatigue, along with a lack of training about infection and use of PPE. There were concerns about the lack and poor quality of PPE and insufficient attention paid to facilities, equipment, and patient management to minimise the risk of infection to staff. A glaring failure was the exclusion of some workers, such as cleaners, porters, kitchen staff and support workers, from the implementation of IPC guidelines.[17]

In sub-Saharan African countries, communicable diseases remain a major cause of morbidity and mortality and thus an occupational hazard in an environment with a relative paucity of facilities. In a review of IPC strategies for nurses in this region, it was concluded that, in spite of there being evidence-based practices to minimise transmission, the focus was on administrative precautions; the most frequent implementation strategies reported were education and quality management.[18] There has been insufficient acknowledgement of, and emphasis on, the aerosol mode of transmission of infections, in conjunction with implementing engineering and administrative strategies further up the hierarchy of control, such as ventilation, ultraviolet coverage, screening and cohorting of both patients and carers.

What is clear is that, apart from the provision of relevant facilities, equipment, PPE and potential vaccines, all health facilities, from emergency services to hospitals, require policies, guidelines, operational plans and training for early identification, triage, isolation, and management of patients with infectious diseases – particularly the very virulent communicable diseases.[19] A positive spin-off of the dramatic increase in the use of the internet during the COVID-19 pandemic is the relatively easy access to information, guidelines and online training,[20] although a drawback is the need to remain 'current' with the rapidly changing recommendations plus a multitude of unsubstantiated advice and misinformation.

Non-healthcare workplaces

A pre-COVID-19 review of the international literature on the effectiveness of infectious illness prevention and control methods in non-health workplaces revealed a focus on influenza immunisation, which demonstrated good evidence of effectiveness, and hand hygiene programmes, with moderate evidence for the use of alcohol-based hand sanitiser.[21] It was estimated that about 26 million employed Americans were infected with H1N1 during the three peak months of the pandemic in 2009, and that those who went to work while infectious were estimated to have transmitted H1N1 to as many as seven million co-workers.[22] A systematic review of hand-washing interventions to prevent infectious diseases among workers in office-based workplaces indicated that self-reported illness was reduced. The authors suggested that hand hygiene may be less effective in protecting against respiratory disease than gastrointestinal disease, although minimal interventions appear to be effective at decreasing the incidence of employee illness.[23] The interface between public health and occupational health, and the varying successes of measures introduced, have been amply demonstrated during the COVID-19 pandemic in which transmission by asymptomatic individuals, and even immunised individuals, has complicated workplace prevention and control.

Infections for specific occupations or workplaces

Haagsma and colleagues (2012) conducted a systematic review of work-related infectious diseases associated with occupational exposure.[24] They constructed a useful matrix of occupational groups and exposure pathways to facilitate the identification of exposure hazards for specific occupations. They recommended that in each workplace improved risk assessment is required, guided by surveillance and research findings on the increased risk of occupational infections in particular industries or specific work, in order to tailor measures to prevent work-related infectious diseases.[24] A subsequent systematic review of research on occupational exposure in non-healthcare workers identified new infectious disease risks in more occupational groups, with a wider range of infectious agents: the armed forces (n = 36 pathogens), livestock farm labourers (n = 31), livestock/dairy producers (n = 26), abattoir workers (n = 22), animal carers (n = 16), and forestry workers (n =1 6) appeared to have the highest risk.[25] Over 80% of the non-healthcare worker groups were exposed to respiratory tract pathogens, and the risks of occupational infections are both workplace and worker related.[25]

PRIORITY PREVENTION AND CONTROLS

Political commitment

The first necessity for infection prevention and control in the workplace is global and national political commitment. In the wake of the COVID-19 pandemic, the Collegium Ramazzini has called on *"governments at all levels to protect worker health by strengthening public health systems; maintaining comprehensive social insurance systems; establishing policies that presume all COVID-19 infections in high-risk workers are work-related; enforcing all occupational health standards; and developing pandemic preparedness plans"*. The Collegium also called on *"all employers – large and small, public and private – to protect the health of all workers by developing disease preparedness plans; implementing basic infection control measures; establishing disease identification and isolation policies; reducing hazardous exposures; supporting PPE programmes; and restricting unnecessary travel"*.[26] This call should be applied to all occupational infectious diseases as the majority of workers do not have access to occupational health services, and rely on public health services. Progress is being made towards global and national commitment. The United Nations (UN) General Assembly, at its first-ever high-level meeting on TB, reaffirmed the End TB Strategy and added an occupational component on *"implementing primary prevention in high-risk occupations by reducing silica dust exposure in mining, construction and other dusty workplaces, and worker tuberculosis surveillance and infection prevention and control in health-care settings"*.[27]

One Health approach

A broader public health approach to infectious diseases within and outside the workplace should be investigated to complement the journey towards the UN's Sustainable Development Goals. The One Health approach, for example, emphasises the linkages between human, animal and environmental health, and is particularly relevant to emerging and re-emerging infectious diseases, many of which are zoonoses.[28] A literature review of observational studies and case reports was conducted to identify associations between some emerging viruses with potential zoonotic transmission (West Nile, Crimean-Congo haemorrhagic fever and hepatitis E) and occupational diseases. The findings indicated that the main occupational groups at risk comprised farm and agricultural workers, veterinarians, slaughterers, animal handlers, healthcare workers and soldiers.[29] Wildlife workers, hunters and guides form another occupational grouping at risk for zoonotic infections, such as potentially fatal human African trypanosomiasis (Frean J, National Institute for Communicable Diseases, South Africa, personal communication), which highlights the need for education and occupational infection prevention.[30]

Surveillance

Commitment at various levels requires establishing and maintaining the monitoring of workplace infections. Surveillance at national, local and industry levels is vital to collect, collate and analyse relevant infectious disease data in both the community and workplaces in order to prioritise and evaluate national and industry-based prevention and control programmes. For example, in 2019, the incidence rate of tuberculosis for healthcare workers was more than double the notification rate in the general adult population.[10] This rate is one of the indicators recommended by the WHO for measuring the impact of interventions for tuberculosis infection prevention and control in healthcare facilities.[10]

A 10-year review of investigations into infectious diseases in workplaces in the United States indicated that reported cases tend to occur in specific workplaces and workers, *"especially the healthcare industry, laboratory workers, animal workers, and public service workers"*.[31] In contrast, an analysis of compensated cases of occupational infections in South Korea indicated that, in addition to health workers, it was those *"workers employed in forestry care in the public sectors who were most vulnerable to infections"*.[32] Thus, surveillance from a national level down to a workplace level is required to tailor appropriate preventive and control measures.

In 2017, the Working Group on Occupational Agents of the International Commission on Occupational Health (ICOH) conducted a survey with the ICOH country members' national secretaries, using a questionnaire on the recognition, notification, compensation and nature of occupational infections. The responding countries represented about 10% of the estimated global workforce; the data provided were of variable quality depending on the national surveillance systems, strategies and policies. For countries that did record them, infections comprised 3.6% of recorded occupational diseases, and varied in nature between countries, depending on the dominant industries (unpublished).

BUSINESS CASE FOR PREVENTION AND CONTROL OF INFECTIONS

The COVID-19 pandemic has reinforced the necessity for guidance on infectious disease prevention and control to promote not only workplace safety and health, but also business continuity.[13] Appropriate solutions may depend on characteristics of the specific infection. Analysis of the 2009 H1N1 pandemic data on transmissibility, age-stratified attack rates, and health outcomes suggested that *"the most cost-effective strategies involved treatment and household prophylaxis, using antiviral drugs combined with limited duration school closure"*, and that *"other social distancing strategies, such as reduced workplace attendance, were found to be costly due to productivity losses"*.[33] At the start of the COVID-19 pandemic in South Korea, the rapid introduction of early detection, with copious testing and social distancing, *"slowed the spread of infection without intensive containment, shut down, or mitigation interventions"*, allowing an opportunity to develop *"workplace guidelines consisting of social distancing, flexible working schedules, early identification of workers with suspected infections, and disinfection of workplaces"*.[34]

Prevention and control of workplace infection cannot be considered in isolation. As outlined in the ILO COVID-19 and World of Work report, there needs to be global collaboration and support, with vaccination and policy measures, while balancing the requirements of different sectors with risk-based targeting of measures, such as lockdown, particularly in developing countries.[1] For concurrent business continuity, the equilibrium between IPC measures and support for the workers and workplaces is vital to minimise the impact on the world of work.[1]

An example of using workplaces to enhance business continuity by addressing infectious diseases at work and in the community is the Tokyo Metropolitan Government's project, started in 2015, to prevent rubella and other infectious diseases in response to a rubella outbreak, mainly in men.[35] Participating companies selected various options, including training modules about infectious diseases, developing a business continuity plan for infectious diseases in the workplace, and, specifically for rubella, immunisation to increase antibody prevalence in employees to 90%.[35]

A NEW LOOK AT THE HIERARCHY OF PREVENTION AND CONTROL

The classic hierarchy of controls approach to workplace hazards is not as easily applied in its entirety to infectious agents as it is to physical and chemical hazards. Elimination or substitution controls are not usually possible, although engineering controls such as ventilation and barriers may reduce exposure. Hence, prevention is often largely dependent on administrative measures such as immunisation and chemoprophylaxis, when applicable, and PPE. One of the challenges presented by the COVID-19 pandemic, while vaccines were being sought, was the lack of recognition of aerosol transmission, accompanied by the expanded need for diagnostic tests, and the lack of affordable PPE, particularly in developing countries.

For the future prevention and control of workplace infections, there is a dire need for innovation and implementation of cost-effective measures to assess and manage the risk of transmission, particularly in developing countries, small business enterprises, and the informal sector, where access to occupational health professionals is limited. The risk of an infectious organism, akin to the toxicity of a chemical, is classified by its pathogenicity, the severity of the resulting disease, and the availability of vaccines or other preventive measures and/or treatment. In general, respirable transmission is the most challenging mode of exposure.

An interesting approach to risk assessment and reducing the use of PPE is the control banding model described by Brosseau and colleagues for aerosol-transmissible infectious diseases.[36] Their model is based on source, pathway and receptor controls, and the assumption that aerosol-transmissible organisms present a dose-response effect such that longer contact times and higher air concentrations result in greater exposure. The underlying goal is that source and pathway controls could eliminate or reduce the requirement for receptor controls. The exposure level and the risk rating of the infectious agent are collectively used to assess the 'control band' for a particular job and appropriate control.[36]

- Source controls: eliminate or modify in-person interactions, screen employees and customers entering the workplace, sanitise workplace surfaces, form worker cohorts, and restructure layout of communal areas;
- Pathway controls: install exhaust high-flow ventilation and air filters, erect screens between sources and receptors, and mark queue places with adequate distancing; and
- Receptor controls: effect change in behaviour such as social distancing, frequent handwashing, and mask and face-screen wearing. The use and grade of PPE should be prioritised for workers in the highest risk group, where exposure may not be eliminated by the source and pathway controls, or when workers have comorbid conditions that increase their susceptibility to severe disease.

Administrative controls span source, pathway and receptor controls. They may create different workplace problems such that prevention leads to increased absenteeism and hardship for workers. For example, the issue of paid sick leave needs to be addressed, particularly for periods of isolation or quarantine, both of which have been an important mode of preventing transmission in the COVID-19 pandemic. Ill workers have a monetary incentive to go to work and potentially transmit infectious diseases to co-workers if they do not have paid leave. Data from the United States for the 2009 H1N1 pandemic indicate that over 90% of workers in the public sector, but only 66% of workers in the private sector, took time off work when they were ill with H1N1 influenza; the difference was attributed to access to paid sick leave.[22] The social distancing and hand sanitisation measures globally adopted in conjunction with masks are an important bastion of preventing transmission of COVID-19 and other airborne infectious diseases. However, it is wise not to assume that preventive measures that rely on worker compliance will be effective – they need to be monitored and enforced. Prior to the COVID-19 pandemic, researchers investigated person-to-person contacts (face-to-face and proximity contacts) and hand hygiene in office sites, using different sensors.[37] They found that face-to-face contacts were of shorter mean duration than proximity contacts, while self-reported hand washing was considerably more frequent than the sensor-collected data on hand washing, the duration of which was short (median 9 seconds, range 2.5–33 seconds).[37]

The large number of people in occupational risk groups for COVID-19 exposure highlights the importance for all employers to develop appropriate policies, IPC measures, and risk response plans in workplaces – not only for COVID-19, but also for infectious diseases in general, and for future pandemics. The role of workers in preventing and controlling infection in the workplace should not be underestimated, contrary to the prevention of physical and chemical hazards. There are ethical obligations for every worker not to communicate diseases, particularly those infections for which there is no, or only partial, protection from immunisation or treatment. In the workplace, that obligation needs to be matched by adequate human resources support for affected workers.

Even as the world rolled out COVID-19 vaccinations in 2021 and the post-COVID era appeared on the horizon, the WHO was notified of a further occupationally linked emerging infection: seven poultry farm workers in the Russian Federation infected with the A(H5N8) strain of avian influenza, reported for the first time in humans.[38] Since then, COVID-19 has also continued to surprise us with its variants and reverse zoonotic transmission in different species. Recently, captive lions at both Singapore Wildlife Park and Pretoria Zoo were found to have been infected with SARS-CoV-2 by asymptomatic keepers.[39] This highlights the One Health approach to infectious diseases with the need for precautions to be taken by staff tending captive animals, and the potential for new variants that emerge in animal reservoirs being transmitted back to humans.

CONCLUSION

As existing, emerging and re-emerging infectious diseases, whatever their origin, remain a challenge in all workplaces, employers, workers and health personnel need to anticipate them and implement relevant prevention and control strategies. COVID-19 has demonstrated that infectious disease prevention in the workplace affects all workers and crosses the occupational-community divide.

The one inevitability in a world of future uncertainty is that infectious diseases, be they existing, novel or re-emerging, will continue to challenge both public health and occupational health practitioners. We need to harness our collective global scientific knowledge to prevent and control their impact within the workplace and the community. It is vital that we use this opportunity to maintain and raise awareness of all infectious diseases in workplaces, and to promote ongoing preparation for future pandemics, in order to avoid the economic and human devastation caused by COVID-19. In future, IPC will be faced with the simultaneous changing world of work, with the fourth industrial revolution facilitating working from home, alongside different challenges for those working in the underserved informal sector in developing countries, and the growing burden of non-communicable diseases increasing worker vulnerability.

FUNDING

No funding was received for this article.

DECLARATION

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

AUTHOR CONTRIBUTIONS

Conception and design: MHR, PAL
Drafting of the paper: MHR
Critical revisions of the paper: PAL, MHR

REFERENCES

1. International Labour Organization. ILO Monitor: COVID-19 and the world of work. 7th ed. Updated estimates and analysis. Available from: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/briefingnote/wcms_767028.pdf (accessed 24 Jan 2022).
2. Pandemics that changed history. History.com; 2021 Dec 21. Available from: http://history.com/topics/middle-ages/pandemics-timeline (accessed 24 Jan 2022).
3. Jarus O. 20 of the worst epidemics and pandemics in history. LiveScience, in cooperation with All about History; 2021 Nov 15. Available from: https://www.livescience.com/worst-epidemics-and-pandemics-in-history.html (accessed 24 Jan 2022).
4. Roos D. Why the second wave of the 1918 flu pandemic was so deadly. History.com; 2020 Dec 22. Available from: https://www.history.com/news/spanish-flu-second-wave-resurgence (accessed 24 Jan 2022).
5. Roberts SE, Carter T. British merchant seafarers 1900–2010: a history of extreme risks of mortality from infectious disease. Travel Med Infect Dis. 2016; 14:499-504. doi: 10.1016/j.tmaid.2016.06.009.
6. World Health Organization. WHO global plan of action on workers' health (2008–2017): Baseline for implementation. Global Country Survey 2008/2009. Geneva: WHO; 2013. Available from: https://www.who.int/occupational_health/who_workers_health_web.pdf (accessed 29 January 2022).
7. Wolf J, Prüss-Ustün A, Ivanov I, Mudgal S, Corvalán C, Bos R, et al. Preventing disease through a healthier and safer workplace. Geneva: WHO; 2018. Available from: https://www.who.int/publications/i/item/9789241513777 (accessed 29 January 2022).
8. Eurofound. Sixth European working conditions survey – Overview report (2017 update). Luxembourg: Publications Office of the European Union; 2017. Available from: https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef1634en.pdf (accessed 25 Jan 2022).
9. Baker MG, Peckham TK, Seixas NS. Estimating the burden of United States workers exposed to infection or disease: a key factor in containing risk of COVID-19 infection. PLoS One. 2020; 15(4):e0232452. doi: 10.1371/journal.pone.0232452.
10. Global tuberculosis report 2020. Geneva: WHO; 2020. Available from: https://www.who.int/publications/i/item/9789240013131 (accessed 25 Jan 2022).
11. Paton N. Dame Carol Black – OH must 'seize the moment' to raise its profile post pandemic. Occupational Health & Wellbeing Workplace; 2020 Dec 17. Available from: https://www.personneltoday.com/hr/dame-carol-black-oh-must-seize-the-moment-to-raise-its-profile-post-pandemic/ (accessed 25 Jan 2022).
12. De Bloom J. How to recover during and from a pandemic. Ind Health. 2020; 58(3):197-199. doi: 10.2486/indhealth.58_300.
13. Boles C, Parker J, Hallett L, Henshaw J. Current understanding and future directions for an occupational infectious disease standard. Toxicol Ind Health. 2020; 36(9):703-710. doi: 10.1177/0748233720964646.
14. Wu S-C, Arthur CM, Wang J, Verkerke H, Josephson CD, Kalman D, et al. The SARS-CoV-2 receptor-binding domain preferentially recognizes blood group A. Blood Adv. 2021; 5:1305-1309. doi: 10.1182/bloodadvances.2020003259.
15. Jedynska A, Kuijpers E, Van den Berg C, Kruizinga A, Meima M, Spaan S. Biological agents and work-related diseases: results of a literature review, expert survey and analysis of monitoring systems. Luxembourg: European Agency for Safety and Health at Work; 2019. Available from: https://osha.europa.eu/en/publications/summary-biological-agents-and-work-related-diseases-results-literature-review-expert/view (accessed 25 Jan 2022).
16. Zamudio C, Krapp F, Choi HW, Shah L, Ciampi A, Gotuzzo E, et al. Public transportation and tuberculosis transmission in a high incidence setting. PLoS One. 2015; 10(2):e0115230. doi: 10.1371/journal.pone.0115230.
17. Houghton C, Meskell P, Delaney H, Smalle M, Glenton C, Booth A, et al. Barriers and facilitators to healthcare workers' adherence with infection prevention and control (IPC) guidelines for respiratory infectious diseases: a rapid qualitative evidence synthesis. Cochrane Database Syst Rev. 2020; 4:CD013582. doi: 10.1002/14651858.CD013582.
18. Barrera-Cancedda AE, Riman KA, Shinnick JE, Buttenheim AM. Implementation strategies for infection prevention and control promotion for nurses in Sub-Saharan Africa: a systematic review. Implementation Sci. 2019; 14:111. https://doi.org/10.1186/s13012-019-0958-3.
19. Weber DJ, Rutala WA, Fischer WA, Kanamori H, Sickbert-Bennett EE. Emerging infectious diseases: focus on infection control issues for novel coronaviruses (Severe Acute Respiratory Syndrome-CoV and Middle East Respiratory Syndrome-CoV), hemorrhagic fever viruses (Lassa and Ebola), and highly pathogenic avian influenza viruses, A(H5N1) and A(H7N9). Am J Infect Control. 2016; 44(5 Suppl):e91-e100. doi: 10.1016/j.ajic.2015.11.018.
20. Learn infection control for the post COVID-19 workplace. Australian online courses; 2020. Available from: https://www.australianonlinecourses.com.au/2020/06/05/learn-infection-control-for-the-post-covid-19-workplace/ (accessed 25 Jan 2022).
21. Hansen S, Zimmerman P-A, Van de Mortel TF. Infectious illness prevention and control methods and their effectiveness in non-health workplaces: an integrated literature review. J Infect Prev. 2018; 19(5):212-218. doi: 10.1177/1757177418772184.
22. Drago R, Miller K. Sick at work: infected employees in the workplace during the H1N1 Pandemic. Briefing Paper. Institution for Women's Policy Research; 2010. Available from: https://iwpr.org/wp-content/uploads/2020/11/B284.pdf (accessed 30 Jan 2022).
23. Zivich PN, Gancz AS, Aiello AE. Effect of hand hygiene on infectious diseases in the office workplace: a systematic review. Am J Infect Control. 2018; 46(4):448-455. doi: 10.1016/j.ajic.2017.10.006.
24. Haagsma JA, Tariq L, Heederik DJ, Havelaar AH. Infectious disease risks associated with occupational exposure: a systematic review of the literature. Occup Environ Med. 2012; 69(2):140-146. doi: 10.1136/oemed-2011-100068.
25. Acke S, Couvreur S, Bramer WM, Schmickler M-N, De Schryver A, Haagsma JA. Global infectious disease risks associated with occupational exposure among non-healthcare workers: a systematic review of the literature. Occup Environ Med. 2022; 79(1):63-71. doi:10.1136/oemed-2020-107164.
26. Fellows of the Collegium Ramazzini. 24th Collegium Ramazzini Statement: Prevention of work-related infection in the COVID-19 pandemic. Ann Glob Health.2020; 86(1):79. doi: 10.5334/aogh.2929.
27. United Nations. Political declaration of the UN General Assembly high-level meeting on the fight against tuberculosis; 2019 Mar 1. Available from: https://www.who.int/publications/m/item/political-declaration-of-the-un-general-assembly-high-level-meeting-on-the-fight-against-tuberculosis (accessed 25 Jan 2022).

28. Rabinowitz PM, Natterson-Horowitz BJ, Kahn LH, Kock R, Pappaioanou M. Incorporating one health into medical education. BMC Med Educ. 2017; 17(1):45. doi: 10.1186/s12909-017-0883-6.
29. Vonesch N, Binazzi A, Bonafede M, Melis P, Ruggieri A, Iavicoli S, et al. Emerging zoonotic viral infections of occupational health importance. Pathog Dis. 2019; 77(2):ftz018. doi: 10.1093/femspd/ftz018.
30. Garland-Lewis G, Whittier C, Murray S, Trufan S, Rabinowitz PM. Occupational risks and exposures among wildlife health professionals. Ecohealth. 2017; 14(1):20-28. doi: 10.1007/s10393-017-1208-2.
31. Su C-P, De Perio MA, Cummings KJ, McCague A-B, Luckhaupt SE, Sweeney MH. Case investigations of infectious diseases occurring in workplaces, United States, 2006 –2015. Emerg Infect Dis. 2019; 25(3):397-405. doi: 10.3201/eid2503.180708.
32. Myong JP, Ahn YS, Kim HR, Kim YJ, Park CY, Koo JW. Work-related infectious diseases among Korean workers compensated under the Industrial Accident Compensation Insurance Law, 2006–2011. Int J Occup Environ Health. 2013; 19(4):344-351. doi: 10.1179/2049396713Y.0000000042.
33. Halder N, Kelso JK, Milne GJ. Cost-effective strategies for mitigating a future influenza pandemic with H1N1 2009 characteristics. PLoS One. 2011; 6:e22087. doi: 10.1371/journal.pone.0022087.
34. Kim EA. Social distancing and public health guidelines at workplaces in Korea: responses to Coronavirus Disease-19. Saf Health Work. 2020; 11(3):275-283. doi: 10.1016/j.shaw.2020.07.006.
35. Sugishita Y, Soejima K, Kayebeta A, Yauchi M. Enhancing preparedness against rubella at the workplace: proactive prevention efforts by the Tokyo Metropolitan Government. Jpn J Infect Dis. 2019; 72:250-255. doi: 10.7883/yoken.JJID.2018.167.
36. Brosseau LM, Rosen J, Harrison R. Selecting controls for minimizing SARS-CoV-2 aerosol transmission in workplaces and conserving respiratory protective equipment supplies. Ann Work Expo Health. 2021; 65:53-62.
37. Zivich PN, Huang W, Walsh A, Dutta P, Eisenberg M, Aiello AE. Measuring office workplace interactions and hand hygiene behaviors through electronic sensors: a feasibility study. PLoS One. 2021; 16(1):e0243358. doi: 10.1371/journal.pone.0243358.
38. World Health Organization. Avian influenza A(H5N8) infects humans in Russian Federation. Geneva: WHO; 2021. Available from: WHO/Europe Environment and health – Avian influenza A(H5N8) infects humans in Russian Federation (accessed 29 January 2022).
39. Head T. Zoo lions in Pretoria may hold key to SA's next COVID-19 variant… The South African; 2022 Jan 18. Available from: https://www.msn.com/en-za/news/other/zoo-lions-in-pretoria-may-hold-key-to-sa-s-next-covid-19-variant/ar-AASTHuH?ocid=msedgdhp&pc=U531 (accessed 19 January 2022).

Must an occupational medicine practitioner share an occupational health record with a Department of Employment and Labour inspector when so requested?

JNR Lapere[1], G Kew[2], F Fox[3], D Kocks[4]

[1] Occupational safety, health and medicine consultant, Gqeberha, South Africa
[2] Occupational medicine consultant, independent private practice, Cape Town, South Africa
[3] Occupational medicine specialist, Johannesburg, South Africa
[4] Occupational medicine specialist, Public Health Medicine Department, Steve Biko Academic Hospital, Pretoria, South Africa

Drs Jan Lapere, Greg Kew and Frank Fox, and Prof. Daniel Kocks are SASOM members

Correspondence: Dr Jan Lapere, Kabega Medical Centre,
597 Cape Rd, Kabega Park, Gqeberha, 6025, South Africa
e-mail: Jan Lapere jan@lapere.co.za

How to cite this paper: Lapere JNR, Kew G, Fox F, Kocks D. Must an occupational medicine practitioner share an occupational health record with a Department of Employment and Labour inspector when so requested? Occup Health Southern Afr. 2022; 28(1):18-20.

INTRODUCTION

Employers must take all necessary measures to ensure that all requirements of the Occupational Health and Safety Act (OHSA) are complied with on all premises under the employer's control.[1] This duty includes the keeping of occupational health records, prescribed in terms of the Regulations.[2] Employee's occupational health records may therefore offer, amongst others, the evidence that an employer complies with the legislated occupational health duties.

An employee's health records are, besides the governance defined in the OHSA, also regulated by the National Health Act,[3] the Protection of Personal Information (POPI) Act[4] and the Health Professions Act.[5] Department of Employment and Labour inspectors (hereafter referred to as 'inspectors') are designated by the Minister[6] and may, for the purpose of the OHSA, perform inspections and audits on the workplace.[7]

We analyse whether, and under which conditions, the occupational medicine practitioner (OMP), appointed by an employer, is required to share an occupational health record with an inspector.

NATIONAL HEALTH ACT NO. 61 OF 2003

The National Health Act (NHA) provides a framework for a structured uniform health system in South Africa, taking into account the obligations of all other laws with regard to health services.

The NHA defines an occupational health service, whether inside an employers 'workplace or at the consulting room of an OMP, as a 'health establishment'.[8*] Every health establishment has a dedicated person in charge, who must ensure that, for every patient, a health record is created and maintained,[9] and that control measures are in place to prevent unauthorised access to those records.[10]

Section 14 of the NHA[11] is the foremost statute regulating confidentiality of medical records and legislates the basic principles, namely:

- All occupational health information of an employee is confidential; and
- An OMP must not disclose any health information unless (1) the employee consents in writing, or (2) a court orders the disclosure, or (3) there is a law that requires the disclosure, or (4) the non-disclosure represents a serious threat to public health.

The OHSA is a law that requires conditional disclosure of occupational medical records to inspectors.

REGULATIONS IN THE OHSA, PROVIDING CONDITIONAL ACCESS TO HEALTH RECORDS

Some OHSA Regulations requiring occupational health testing (often referred to as 'medical surveillance' in the legal texts) define document control measures, which include conditional access to health records:

- Under the Regulations for Hazardous Biological Agents[12] and the Regulations for Hazardous Chemical Agents,[13] medical surveillance records for employees exposed to hazardous biological- and/or chemical agents, may only be made available to an inspector who is an occupational health practitioner (OHP).
- Under the Noise-Induced Hearing Loss Regulations[14] and the Ergonomic Regulations,[15] formal written consent is required from the employee for the inspector to access the relevant medical records.

The Diving Regulations, Environmental Regulations for Workplaces, Construction Regulations, and Driven Machinery Regulations are silent with respect to access to medical records.

De-identification of the occupational health record prior to issuing it to does not change the above requirements.

* Health establishment: this means the whole or part of a public or private institution, facility, building or place, whether for profit or not, that is operated or designed to provide inpatient or outpatient treatment, diagnostic or therapeutic interventions, nursing, rehabilitative, palliative, convalescent, preventative or other health services

RIGHTS OF INSPECTORS UNDER THE OHSA

The OHSA bestows inspectors with remarkable rights inside premises occupied or used by an employer, or where employees perform work.[16] An inspector may enter a workplace, question the OMP (present at that workplace) on any matter relating to the OHSA, require that the OMP, who has control over a record, produces the record, and may examine the record or make a copy. It is a criminal offence to refuse to or fail to comply with a request made by an inspector in the performance of his/her functions.[17]

Inspectors must conform to the OHSA Regulations and, where these regulate access to medical records, the inspector must abide by this. Importantly, medical records held at a private occupational medical practice, which is not part of the employer's workplace, cannot be so accessed and no inspector has direct access to such records. For an inspector to access occupational health records at the OMP's practice, a Promotion of Access to Information Act (PAIA)[18] request can be made to the OMP's practice. Alternatively, a court order can be obtained.

Indirectly, the inspector can require evidence from the employer that 'medical surveillance' or 'fitness for work' examinations and certification take place, and the employer would probably request evidence from the OMP in this regard. But, whilst sometimes even owning the medical records, the employer has no access to the confidential health information other than (1) by an express agreement in the service level agreement with the OMP, or (2) via a PAIA request to the OMP, or (3) via a court order. Except in the instance of a court order, the OMP would still have to obtain the informed written consent from the employee prior to releasing the information.

PROTECTION OF PERSONAL INFORMATION ACT NO. 4 OF 2013 (POPIA)

The POPI Act defines who the responsible party (for occupational health records) is and regulates how this party acquires, processes and further-processes health information. When collecting personal information for the occupational health record, the OMP has a duty to notify the employee (as a health data subject)[19] of the possibility that the record may be requested and accessed by inspectors. Strictly speaking, the POPI Act permits an OMP to further-process personal information without employee consent, where the information is made available to Department of Employment and Labour with the aim of maintaining the law.[20] However, special personal information, such as health information, may only be made available to an inspector if (a) the employee consents, or (b) there is an obligation in law. [21]

If an inspector who is an occupational health practitioner (OHP) accesses an employee's health information, such OHP inspector must conform to the obligation of confidentiality by virtue of profession.[22] If non-OHP inspectors would access medical records, then they must treat the information as confidential.[23]

The POPIA does not apply to the processing of personal information that has been de-identified to the extent that it cannot be re-identified again.[24]

When dealing with a request from an inspector, the OMP must ascertain what the OMP's own legal status is, in terms of the POPI Act,[25] and how this may affect the authority to release information to an inspector:

- In the event that the OMP is the (sole) responsible party (RP) (i.e. when it is the OMP who determines the purpose of, and means for, processing personal information) all the duties of the RP vest with the OMP.[26] This would, for instance, be the case at a private OMP practice.
- Where the agreement with the employer† designates the OMP as operator or as a person acting under authority, the OMP must only process occupational health information with the employer's knowledge or authorisation, must treat this personal information confidentially, and must not disclose it unless required by law or in the course of the proper performance of the OMP's duties.[27]

HEALTH PROFESSIONS COUNCIL OF SOUTH AFRICA (HPCSA)

The HPCSA is established in terms of the Health Professions Act and regulates the profession of the OMP. The ethical rules applicable to occupational medical records, confidentiality, how an OMP must protect occupational medical records, and the conditions under which an OMP may provide information to a third party, are defined in Booklet 5 of the HPCSA *Guidelines for Good Practice in the Health Care Professions.*[28‡]

Except in special and specific circumstances,[28] an OMP should not disclose personal information to a third party without the patient's express consent. An OMP must disclose information if ordered to do so by a judge or presiding officer of a court.

De-identification of the occupational health record prior to issuing it to the inspector does not remove the duty to obtain the patient's express consent.

In all cases, whenever an OMP discloses confidential information he or she must be prepared to explain and justify that decision.

CONCLUSION

When an OMP receives a request from an inspector for access to an occupational health record, the following modus operandi is proposed:

i. Only entertain a request for a specific record (the inspector must know what he/she wants and in respect of which individual employee(s)).
ii. The OMP must always first obtain express and written consent from the employee; without this consent, the record should not be made available to anyone. This applies equally to de-identified records.
iii. The OMP must verify the request with the employer and its information officer, as there are specific POPI Act duties with respect to giving access to health information of an employee, held by the employer in its capacity as RP.
iv. Where the record of the questionnaire, clinical examination and special tests (such as X-ray, spirometry, and biological tests) relate to chemical- or biological occupational hazards, the inspector must be a registered OHP to be permitted access.
v. Where the record of the questionnaire, clinical examination, audiometric and other tests relate to the hearing conservation- or the ergonomic health programmes, the inspector must obtain formal consent from the employee to access these records.
vi. Where the record of the questionnaire, clinical examination and special tests does not relate to chemical-, biological-, ergonomic- or noise hazards (e.g. return to work, primary healthcare

† Contract of employment for the OMP who is an employee of the employer and the employer is the RP; or service level agreement between the OMP and the employer, who is the RP
‡ Disclosures to protect the patient or others; disclosure of personal information without consent may be justified where failure to do so may expose the patient or others to risk or death or serious harm; children and other patients who may lack competence to give consent if healthcare practitioners believe a child or other legally incompetent patient to be a victim of neglect or physical, sexual or emotional abuse and that the patient cannot give or withhold consent to disclosure; disclosure after a patient's death

onsite, safety-related fitness testing in construction or in driven machinery, diving, and thermal exposure), the OHSA seems to allow unfettered access, but the POPI Act requires that the employer (in his/her capacity as the RP for the personal information) obtains consent prior to sharing this personal information with anyone.

vii. Where occupational health records are integrated to address all occupational health and safety hazards in one record, the most onerous requirements apply.

viii. Medical records held at a private occupational medical practice, which is not part of the employer's workplace, cannot so be accessed and no inspector has direct access to such records; the OMP could be requested access to the record via a Promotion of Access to Information Act request or, alternatively, via a court order.

ix. It is good practice that an OMP, when collecting personal information for the occupational health record, notifies the employee of the possibility that the record may be accessed by Department of Employment and Labour inspectors.

ACKNOWLEDGEMENTS

We thank all the SASOM ExCo members who supported this article.

REFERENCES

1. South Africa. Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). Section 8(2)(g). General duties of employers to their employees.
2. South Africa. Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). Regulations for Hazardous Biological Agents, 2001; Regulations for Hazardous Chemical Agents, 2021; Noise-Induced Hearing Loss Regulations, 2003; Diving Regulations, 2009; Thermal Regulations in the Environmental Regulations for Workplaces, 1987; Ergonomic Regulations, 2019; Construction Regulations, 2014; Driven Machinery Regulations; 2015.
3. South Africa. National Health Act, 2003 (Act No. 61 of 2003).
4. South Africa. Protection of Personal Information Act, 2013 (Act No. 4 of 2013).
5. South Africa. Health Professions Act, 1974 (Act No. 56 of 1974).
6. South Africa. Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). Section 28.
7. South Africa. Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). Section 29.
8. South Africa. National Health Act, 2003 (Act No. 61 of 2003). Section 1.
9. South Africa. National Health Act, 2003 (Act No. 61 of 2003). Section 13. Obligation to keep record.
10. South Africa. National Health Act, 2003 (Act No. 61 of 2003). Section 17. Protection of health records.
11. South Africa. National Health Act, 2003 (Act No. 61 of 2003). Section14. Confidentiality.
12. South Africa. Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). Regulations for Hazardous Biological Agents. Regulation 9(1)(a).
13. South Africa. Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). Regulations for Hazardous Chemical Agents. Regulation 9(a).
14. South Africa. Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). Noise-Induced Hearing Loss Regulations. Regulation 11(c).
15. South Africa. Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). Ergonomic Regulations 2019. Regulation 10(1)(c)(ii).
16. South Africa. Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). Section 29.
17. South Africa. Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). Section 38(1)(f).
18. South Africa. Promotion of Access to Information Act, 2000 (Act No. 2 of 2000).
19. South Africa. Protection of Personal Information Act, 2013 (Act No. 4 of 2013). Section 18.
20. South Africa. Protection of Personal Information Act, 2013 (Act No. 4 of 2013). Section 15(3)(c)(i).
21. South Africa. Protection of Personal Information Act, 2013 (Act No. 4 of 2013). Section 27(1).
22. South Africa. Protection of Personal Information Act, 2013 (Act No. 4 of 2013). Section 32(2).
23. South Africa. Protection of Personal Information Act, 2013 (Act No. 4 of 2013). Section 32(3).
24. South Africa. Protection of Personal Information Act, 2013 (Act No. 4 of 2013). Section 6(1)(b).
25. South African Society of Occupational Medicine. Training material 'Health Information-NHA-POPI-PAIA September 2021'.
26. South Africa. Protection of Personal Information Act, 2013 (Act No. 4 of 2013). Section 8.
27. South Africa. Protection of Personal Information Act, 2013 (Act No. 4 of 2013). Section 20.
28. Health Professions Council of South Africa. Guidelines for Good Practice in The Health Care Professions. Confidentiality: Protecting and Providing Information. Booklet 5. Pretoria: HPCSA; 2016. Available from: https://www.hpcsa.co.za/Uploads/Professional_Practice/Conduct%20%26%20Ethics/Booklet%205%20Confidentiality%20Protecting%20and%20Providing%20Information%20September%202016.pdf (accessed 31 Jan 2022).

ADCO HYGIENE

EFFECTIVE GERM PREVENTION[1] FOR YOUR FAMILY

Choose from an extensive range of pack sizes for home, office, school and airline travel

99,99 %** EFFECTIVE IN ELIMINATING GERMS INCLUDING THE COVID-19 VIRUS[1,2]

EFFECTIVE AGAINST 99,9 %* OF GERMS[1]

**ADCO HYGIENE 70 % ALCOHOL SURFACE TYPE 1 DISINFECTANT & ADCO HYGIENE MULTI-PURPOSE SURFACE SANITISER ARE 99,99 % EFFECTIVE IN ELIMINATING GERMS INCLUDING THE COVID-19 VIRUS.

Available from your nearest pharmacy and selected retail stores

*under test conditions

References: 1. Adcock Ingram Critical Care Data on file. **2.** Adcock Ingram Critical Care Data on file. 13 January 2021.

Please read the complete Directions for Use on the product label before use. 2021072610140113

Adcock Ingram Critical Care (Pty) Ltd. Reg No. 2000/004208/07. 1 Sabax Road, Aeroton, 2013, South Africa. Tel +27 11 494 8000. www.adcock.com

adcock ingram critical care

Transforming occupational health services provision in southern Africa through capacity building

Norman Khoza: African Union Development Agency (AUDA-NEPAD); SAIOH Immediate Past-President, 2021–2022
e-mail: normank@nepad.org
Chimwemwe Chamdimba: African Union Development Agency (AUDA-NEPAD)
e-mail: chimwemwec@nepad.org
Dr Dingani Moyo: Baines Occupational Health Services, Zimbabwe; Faculty of Health Sciences, University of the Witwatersrand, South Africa; Midlands State University, Zimbabwe; National University of Science and Technology, Zimbabwe
e-mail: moyod@iwayafrica.co.zw

INTRODUCTION

Africa boasts an expanse of diverse natural resources, notably miner-als and agriculture. Almost every country is endowed with a specific natural resource that provides livelihoods to many. In tandem with the vast diversity of activities to tap these resources, a multiplicity of occupational exposures, some with far-reaching consequences, characterise the working environment across Africa. Most occupational diseases are under-reported due to poor diagnostic and management skills.[1,2] Africa lags significantly in occupational health knowledge capi-tal and institutional memory. Access to occupational health services, human capital in occupational health, and institutional memory at country levels is grossly deficient across most African countries.[3,4] In most countries with near-absent specialists, occupational medicine expertise is very constrained; South Africa is the exception.[1,3,5] Best practice standards in occupational health, including competency in the International Labour Office (ILO) International Classification of Radiographs of Pneumoconioses (ICRP), are lacking.

In recent years, the African Union Development Agency (AUDA-NEPAD), through the Southern African Tuberculosis and Health Systems Support (SATBHSS) project, birthed an innovative strategic approach to cover human capital deficits through capacity building in occupa-tional health across southern Africa.[5] This includes a firm focus across the entire spectrum of occupational lung diseases (OLDs) in response to the triple epidemic of the human immunodeficiency virus (HIV), tuberculosis, and silicosis in southern Africa.[6] The interventions include training of physicians, safety and health practitioners, occupational safety and health (OSH) inspectors, and many other cadres involved in occupational health.

KEY LANDMARK INITIATIVES

Occupational health is a multidisciplinary domain that requires an interface of various disciplines to safeguard employee health and wellness. The project focuses on policy reforms, adoption of best practices, and capacity building of occupational hygienists, medical practitioners, and nurses involved in occupational health practice in the four countries: Malawi, Lesotho, Mozambique and Zambia. The key initiatives include: 1) the roll out of the code of practice (COP) for OLDs, 2) training of doctors on the ILO's ICRP, 3) occupational health training for nurses, and 4) training of occupational hygiene profession-als. Furthermore, AUDA-NEPAD, in collaboration with the Centre of Excellence on Occupational Health and Safety in Zambia, is developing a training/mentorship curriculum on the ILO ICRP to ensure a stepwise sustainable approach to capacity building.

Code of practice for occupational lung diseases

In 2021, the SATBHSS project developed a COP for OLDs to guide the management of OLDs. This was in response to the lack of diagnostic and management skills with regard to OLDs. The COP covers silicosis, asbestosis, coal workers' pneumoconiosis, and chronic obstructive pulmonary disease, among many others. It gives insight and guidance to occupational health practitioners on the diagnosis and management of OLDs, and linkage to local and regional compensation systems. The COP was developed in a generic format, which countries can adapt to their specific needs. Adaptations to the COP are currently being made by technical in-country task teams in Malawi, Zambia, Mozambique and Lesotho.

Countries are encouraged to adopt and adapt the COP to improve the surveillance of OLDs. This is particularly important in the face of human capital deficits and a paucity of published guidance documents on OLDs in the region.

ILO classification of radiographs of pneumoconiosis capacity enhancement

The ILO ICRP is used internationally for epidemiological research, screening and surveillance of workers in dusty occupations, and for clinical purposes.[7] It is used for systematically describing and recording radiographic abnormalities in the chest caused by dust inhalation. There is a dearth of expertise and competency in the use of the ILO classification of radiographs. This is further compounded by inadequate intellectual capital and institutional memory regarding occupational health in most public health institutions across most countries.

In addition to developing capacity on OLD diagnostics and management, AUDA-NEPAD took a further step to focus on capacity building on the ILO ICRP. In 2021, two capacity-building workshops for doctors were conducted in Zambia at the Centre of Excellence in Kitwe, where 28 medical doctors and radiologists from Malawi and Zambia were trained on the ILO classification.

There is a significant deficit of knowledge in the use of the ILO classification, as evidenced by a mean knowledge gain of 68% in one of the training workshops. To further improve understanding of the ILO classification, AUDA-NEPAD embarked on a stepwise approach to develop a regional curriculum for training/mentorship of medical doctors on the ILO ICRP. Zambia trained doctors from districts to support the decentralisation of occupational health services.

The curriculum is modelled on the ILO classification syllabus with modifications to incorporate a foundational body of knowledge in occupational health, and OLD diagnosis and management. Although

the ILO classification neither defines pathological entities nor considers working capacity, the curriculum incorporates knowledge on the diagnostic principles of OLDs – an area in which most clinicians lack the requisite knowledge and experience. The high burden of tuberculosis in most African countries complicates the diagnosis of OLDs, especially for clinicians without occupational medicine training.

Occupational health training

In 2021, AUDA-NEPAD conducted three training sessions for occupational health nurses in South Africa, Mozambique and Lesotho, with the aim of equipping nurses with basic occupational health knowledge and skills. Forty-five nurses from Lesotho, Malawi and Mozambique underwent training on the fundamentals of occupational health, with an emphasis on spirometry, audiometry, lung functioning testing, visual testing, and fitness for duty.

These capacity-building sessions for nurses resulted in the following outcomes:

1. Malawi set up occupational health teams to establish and support occupational health service centers in seven districts.
2. The Lesotho and Mozambique teams that provide services at the occupational health centres are focusing on improving these services.

Occupational hygiene and inspectors training

Occupational hygiene is an exceptionally limited discipline in Africa, with only a few occupational hygienists in most southern African countries. This further limits the linkage of medical surveillance with occupational risk exposure profiles. During 2021, AUDA-NEPAD pursued a growth strategy within this discipline and trained a record 36 occupational hygiene professionals, who then sat for an international examination recognised by the International Occupational Hygiene Association (IOHA). In Malawi, a team was trained to use occupational hygiene equipment. Seventy-one occupational health and safety inspectors from Malawi, Zambia, Lesotho and Mozambique were trained on risk assessment. These activities demonstrate quantum leaps in developing occupational health capacity in southern Africa. Following the training in occupational hygiene, 20 workplace risk assessments were conducted, and the countries submitted reports. Eleven workplaces were visited, and further workplace-specific training was provided to 50 participants across the project countries.

CONCLUSION

The SATBHSS project has played a pivotal role in capacity building in southern Africa since it was initiated in 2016. AUDA-NEPAD, through the project, aims to continue the capacity development initiative in 2022, with a focus on sustainability by all project countries. It is hoped that more occupational health practitioners and OSH inspectors will be trained to ensure sustainability beyond the project's lifespan as governments take control of these initiatives.

ACKNOWLEDGMENTS

The World Bank funds the SATBHSS project: P155658 and P173228. For more information, visit www.satbhss.org and www.nepad.org. AUDA-NEPAD would also like to acknowledge the Regional Centre of Excellence on Occupational Health and Safety, Zambia; the Occupational Health Division, Wits School of Public Health; University of Cape Town; National Institute for Occupational Health (NIOH); Baines Occupational Health Services; SeniNhle Occupational Health Services; Infinity SHE; and individual and internal project countries' experts for their contributions to building the Africa we want.

REFERENCES

1. Moyo D, Zungu M, Erick E, Tumoyagae T, Mwansa C, Muteti S, et al. Occupational health and safety in the Southern African Development Community. Occup Med (Lond). 2017; 67(8):590-592. doi:10.1093/occmed/kqx071.
2. Moyo D. An overview of occupational medicine and health services and associated challenges in southern Africa. Occup Health Southern Afr. 2021; 27(2):51-54.
3. Naidoo R, Kessy F, Mlingi L, Petersson N, Mirembo J. Occupational health and safety in the informal sector in southern Africa: the WAHSA project in Tanzania and Mozambique. Occup Health Southern Afr. 2009; 15:46-50.
4. Masekameni MD, Moyo D, Khoza N, Chamdimba C. Accessing occupational health services in the Southern African Development Community Region. Int J Environ Res Public Health. 2020; 17(18):6767. doi:10.3390/ijerph17186767.
5. AUDA-NEPAD. Human capital and institutions development; 2021. Available from: https://www.nepad.org/areas-of-work/human-capital-and-institutions-development (accessed 16 Jan 2022).
6. Srivastava S. Silicosis, tuberculosis (TB) and HIV/AIDS: the triple epidemic among gold mineworkers in South Africa (literature review and policy analysis) (MPH dissertation). New Haven: Yale University; 2013. Available from: http://elischolar.library.yale.edu/ysphtdl/1277 (accessed 16 Jan 2022).
7. International Labour Organization. Guidelines for the use of the ILO International Classification of Radiographs of Pneumoconioses (revised edition 2011). Occupational Safety and Health Series No. 22 (Rev. 2011). Geneva: ILO; 2011. Available from: https://www.ilo.org/safework/info/publications/WCMS_168260/lang--en/index.htm (accessed 16 Jan 2022).

13th IOHA International Scientific Conference

Dublin, Ireland
June 2024

The Occupational Hygiene Society of Ireland (OHSI) and the British Occupational Hygiene Society (BOHS) are privileged to jointly host this conference and to contribute to its successful outcome.

The conference theme has been confirmed as - 'Protecting workers from health hazards: Advancing in this changing world'.

The conference aims to promote occupational hygiene and worker health protection by the minimisation of worker exposure to hazardous agents globally through plenary sessions, keynote lectures, parallel talks, workshops, poster presentations and professional development as well as networking opportunities and social functions.

A strong Global media campaign will publicise the main causes of occupational disease throughout the conference.

More information including venue, dates and abstract submission arrangements will be announced very soon. Please mark your diaries for June 2024 in Dublin, Ireland!

Edited by **Dr Thomas P Fuller:** IOHA President
e-mail: tpfuller1@gmail.com

Promoting the contribution of women to occupational hygiene

Alison Margary
e-mail: president@bohs.org
Kevin Bampton
e-mail: kevin.bampton@bohs.org

There is an increasing global understanding that women's contributions to all workplaces have been underestimated and undermined by prejudicial attitudes. As occupational hygienists, we are concerned that this is also the case in our profession and within our professional organisations. Considering the global need for additional capacity in occupational hygiene, minimising the numbers or influence of women in our profession can be assumed to negatively affect the health and safety of workers everywhere. This is especially true for working women who tend to be impacted in a variety of ways, including a) less emphasis on workplace exposure assessment for women, b) poor availability of proper personal protective equipment, and c) lack of focused research regarding hazards and controls specific to female workers, such as musculoskeletal, psychosocial, and reproductive research.

The British Occupational Hygiene Society (BOHS) recently conducted an informal and anonymous survey of members, and a series of webinars, panels and workshops, to identify and report their female gender-oriented experiences while working in the profession. The results of the survey and other activities were used by the BOHS to find ways to improve activities and practices that might influence the numbers and roles that female occupational hygienists may play in the profession in the future. The study may also be a model for other occupational hygiene organisations within the International Occupational Hygiene Association (IOHA), and it may identify areas of collaboration on this important topic.

The basic results of the online member survey are shown in Figure 1 and indicate that the current Society membership is approximately 18% female.

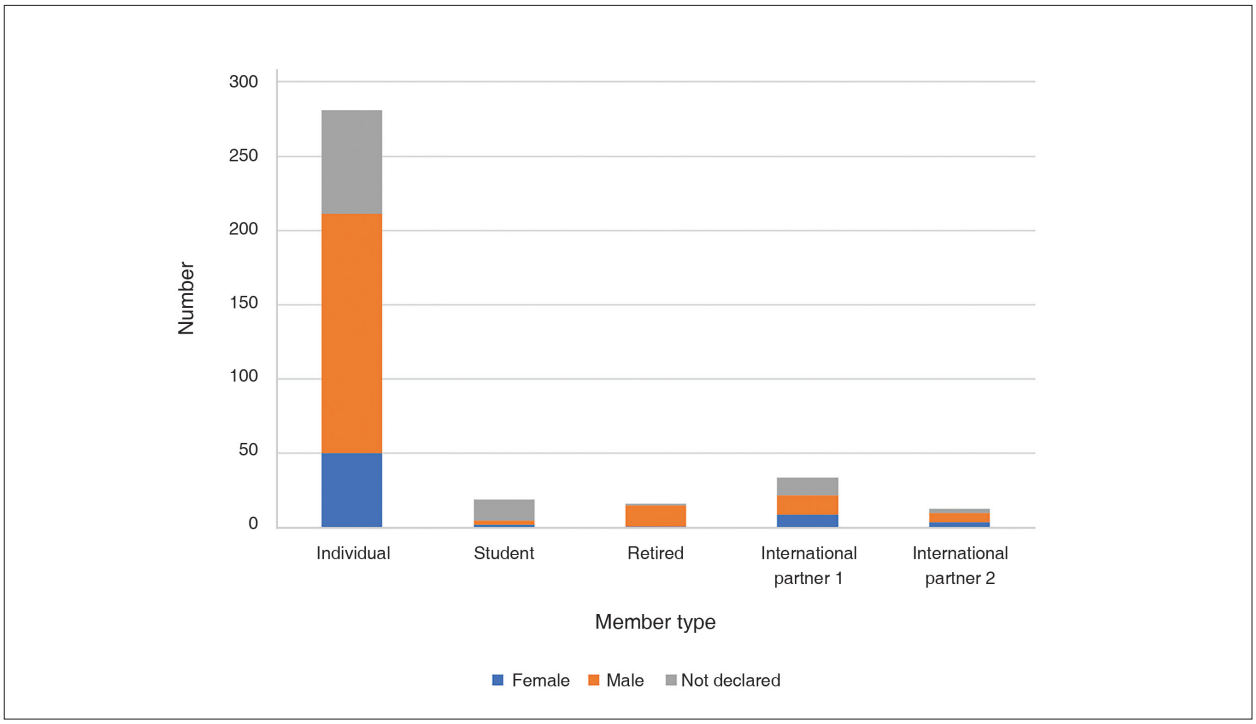

Figure 1. BOHS membership by gender, 2021

The survey included focused and open-ended questions. Some of the responses by our BOHS members were surprising, as shown by the following example:

> *"As a woman, when you find yourself in a situation where you are clearly being treated as a lesser person, with a lack of respect or in a sexist way, how do you recommend that situation is dealt with? As often, being assertive leads to you being tarnished as 'difficult' or 'emotional' but keeping quiet can make things worse and act as an enabler for that person to continue to treat you in a derogatory way with a complete lack of respect."*

The responses also highlighted the importance of women to the Society and the profession, and the qualities that they bring to occupational hygiene. The survey highlighted that BOHS improvements in gender representation on the Board have had a positive impact on female members' perceptions of the organisation.

> *"It's great to see so many women in the profession now, especially the younger generation too! I remember coming to conferences 20 years ago and it was all grey-haired men in suits predominantly... it really has changed... I've seen the Board go to [a] 50% split [on] gender! We have seen more female presidents in the last six years than we have in the previous 65 years!"*

As we seek to attract the brightest and the best into occupational hygiene, the BOHS has set out to identify obstacles to engaging with all potential future hygienists. If there are obstacles to the progression and retention of female hygienists, then it is worthy of focus. Women comprise a significant proportion of BOHS members, but the Society could do more to encourage women into the profession and provide pathways to increase the organisation's membership numbers.

On 2 November 2021, the BOHS held a webinar where Ms Tina Attenborough, an expert in discrimination in the workplace, and Prof. Dulini Fernando, an academic expert in the field of equality practice, joined Alison Margary to discuss opportunities for tackling common challenges faced by female occupational hygienists. The webinar was open to all BOHS members and was advertised via e-mail and the various BOHS social media channels. Approximately 70 BOHS members attended the webinar.

The webinar was followed, a week later, by the President's Session at the 2021 BOHS Conference, which brought together a panel of female hygienists and our Honorary Secretary to further explore the matter in open discussion with members of the Society. In addition, a focused session took place at the BOHS Asbestos Conference, held virtually on 18 November 2021, which poignantly highlighted the painful experiences of some female occupational hygienists working in the field of asbestos management and control.

As well as highlighting and raising awareness of an overlooked issue, these sessions contributed to persuading the Board of the BOHS of the need to take positive action to promote the contribution of women in the profession, and to address the inequalities in treatment and opportunities that they experienced. The Society is now committing resources to an action plan to address these issues. The benchmark that we are aiming for is a female membership of 35%, which reflects the proportion of female science, technology, and engineering graduates in the UK.

The following initiatives will be included in the scope of the activities to be considered and developed:

1. A network of female occupational hygienists (potentially with other IOHA members and/or other UK safety professionals/ health professionals)
2. A leadership development programme aimed at developing leadership skills, with priority for those from less represented or disadvantaged groups, and for those whose careers have been interrupted for health or family reasons
3. More systematic analysis and development of equality, diversity and inclusion through all our volunteer activities
4. Equality impact assessment of all policies, roles and practices of the Society, ranging from role commitment to design and focus of qualifications
5. Campaigns to recruit women and other less represented groups into the profession to ensure that they see occupational hygiene as their natural home as a profession
6. Continued monitoring, scrutiny, awareness-raising and regular central inclusion in the Society's main conferences, to highlight women and occupational hygiene, until gender parity has been achieved

The steps outlined above will not address all the societal issues that cause gender discrimination in the workplace. However, we hope that, as a Society, we can contribute positively to promoting the enormous contribution that women already make to occupational hygiene.

We would very much welcome developing these approaches in partnership with IOHA and other IOHA members. We are sure that there is much we can learn from the practices of other organisations and that, through global engagement, we can achieve more.

Pilot OHTA module on industrial hygiene in the pharmaceutical industry

Frédérique Parrot
e-mail: frederique.parrot@orange.fr
Nathalie Argentin
e-mail: presidence@sofhyt.fr

The French Society of Occupational Hygienists (SOFHYT) is proud to have been able to provide the new Occupational Hygiene Training Association (OHTA) module on the pharmaceutical industry for the first time in the world. The module was translated into French and then adapted to an online training format. The online training was conducted once a week, for four weeks, from 19 November to 10 December 2021.

The decision was made to not have too many participants in the course since it was a pilot module; thus, only seven trainees were selected. The training was offered to members of the Swiss Society of Occupational Hygiene (SSHT) and SOFHYT. The participants came from many different backgrounds and included a certified occupational hygienist not working in the pharmaceutical industry, a consultant who was more focused on the chemical industry but had some customers in the pharmaceutical industry, a technical director of an analytical laboratory, a global environmental health and safety (EHS) manager from a pharmaceutical company, a certified occupational hygienist working for a few months for a pharmaceutical group, and two experienced EHS professionals working for a pharmaceutical group. The training was provided by five certified occupational hygienists, all of whom were working for pharmaceutical companies. Frédérique Parrot, the former president of SOFHYT, oversaw the management of this pilot project.

At the end of the four-day course, the students provided feedback. One of the aspects most appreciated was the sharing of experiences and advice by the trainers throughout the course. Facilitator discussions of practical situations were considered to be *"…very enriching"* and *"certainly one of the most interesting elements of the training"*. Videos and practical cases used to illustrate working conditions were also mentioned by the participants as being especially effective.

Overall, course feedback was very positive. Some of the comments were:

> *"This was a very enriching training on occupational hygiene in the pharmaceutical industry. I appreciated the excellent technical knowledge and experience of the trainers in addition to the high-quality course manual and supporting training material. The four days go by so quickly that I am already looking forward to a next session".*

> *"Thank you for adapting this course in French. With trainers who have good experience, I was captivated all the time and I learned a lot."*

Other OHTA trainings (or trainings using OHTA documents as a basis, but in French and with a French exam) may be conducted in the future. A Zoom photograph of the course instructors and participants is shown in Figure 2, with Nathalie Argentin at the bottom right.

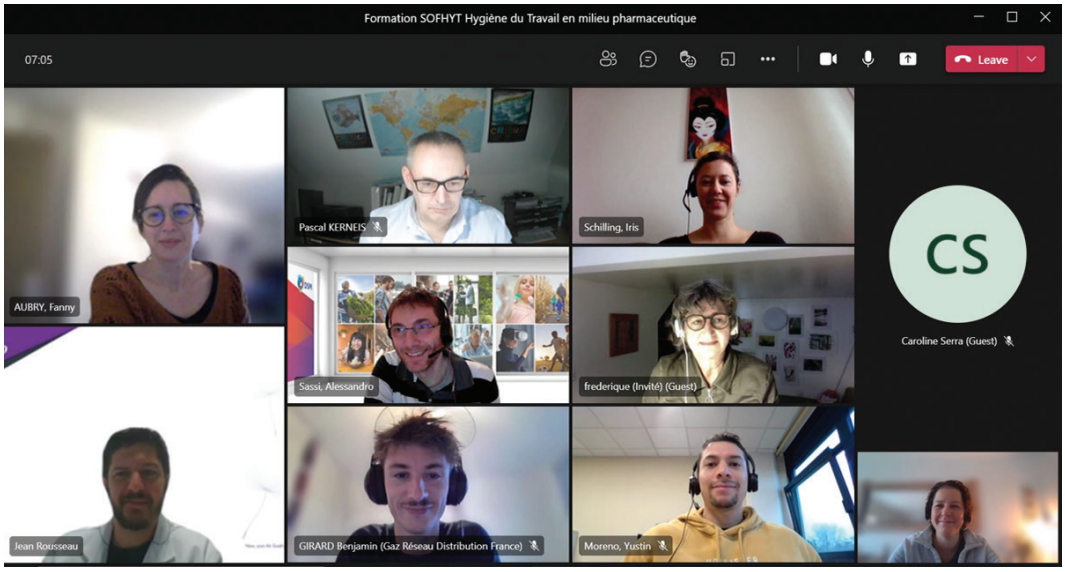

Figure 2. SOFHYT OHTA course instructors and participants with Nathalie Argentin (bottom right) *Photograph: courtesy of SOFHYT*

Occupational hygiene in Argentina

Armando Chamorro
e-mail: achamorro@me.com

Argentina is located at the tip of South America, and borders Chile, Bolivia, Paraguay, Brazil and Uruguay. It has a population of 45 million people with 13 million living in its main city of Buenos Aires. The national language of Argentina is 'South American' Spanish but is often supplemented with Italian, English and German words.

The Argentinian workforce includes a continuous influx of migrant workers. Many of these workers speak a variety of native languages and Spanish dialects, while a large number speak Portuguese as their native tongue. This presents a challenge to occupational health specialists when conducting training and gathering information regarding workers' activities and exposures.

Occupational hygiene began in Argentina in the 1940s and 1950s with a period of heavy industrial production as a result of post-World War II Europe's needs for goods, machinery and food. Today, Argentina has between 10 000 and 20 000 health and safety professionals, many of whom hold an equivalent of an associate degree. Others have bachelor's degrees or postgraduate degrees with various undergraduate backgrounds, including chemistry, biology, engineering, architecture and physics.

Approximately 20 institutions are registered at the federal level as tertiary educational institutions (primarily public universities or the equivalent of community colleges) that provide degrees in occupational safety and health in Argentina. There are also some private colleges that offer programmes in health and safety. Most of these institutions are in or around Buenos Aires; several others are located throughout the country. Currently, there is only one certificate diploma offered by the Mechanical and Electrical Engineering Council (COPIME) for an occupational health programme. The COPIME offers a 'diplomatura', defined by the federal education legislation as a series of courses with a minimum number of credits, generally more than 100 credit hours (120 contact hours in this case). Occupational hygiene is included in the health and safety programmes that these institutions offer but, currently, no designated graduate or undergraduate degree in occupational hygiene is offered.

Internet links to some of the Argentinian institutions that offer degrees in occupational health and safety are provided in the following list:

1. https://ahra.org.ar/diplomatura-en-higiene-ocupacional/
2. https://www.copime.org.ar/pages/detail/1110
3. https://exactas.uba.ar/ensenanza/carreras-de-posgrado/seguridad-e-higiene-en-el-ambito-laboral/
4. http://www.fadu.uba.ar/post/64-68-seguridad-e-higiene-en-la-industria-de-la-construccin

With regard to the professional organisations that promote occupational health in Argentina, there are two non-profit institutions: the Argentine Republic Association of Hygienists (AHRA) and the Argentine Society of Occupational and Industrial Hygiene (SAHIO). These two organisations have more than 400 registered members, and both have yearly events where local professionals meet. As a result of the COVID-19 pandemic, the meetings have taken place virtually in the past two years, but in-person events are being planned for 2022.

There are two industrial hygienists, residing in Argentina, who are certified by the Board of Global Credentialling (BGC). Although there are no official statistics regarding occupational safety and health professional salaries, informal inquiries and experiences of practising professionals indicate that the average salary for a health and safety professional in Argentina ranges from US$ 400 to US$1 500 per month, with higher salaries of more than US$ 4 000 for upper-managerial positions at international corporations.

SASOM 2021 conference and annual general meeting

Claudina Nogueira: Occupational health consultant/project manager, University of Pretoria (South Africa); SASOM ExCo member; ICOH Vice President: Scientific Committees (2022–2024); WHWB Board member
e-mail: claudinanogueira@hotmail.com
Daan Kocks: SASOM Chair and ICOH National Secretary for South Africa
e-mail: info@sasom.org
Claudia Frost: SASOM National Office Co-ordinator
e-mail: info@sasom.org

SASOM CONFERENCE 2021

The South African Society of Occupational Medicine (SASOM) Western Cape Chapter hosted the SASOM annual general meeting (AGM) and associated conference on 27 November 2021. Due to the impacts of the ongoing Pandemic, these events were held in a fully virtual format, using the SASOM Zoom platform.

Conference programme

The 2021 SASOM conference was themed *Occupational Health in a Changing World of Work*, and was accredited for seven continuing education units (CEUs – 6 clinical, 1 ethics) by the South African Medical Association (SAMA). The last SASOM Executive Committee (ExCo) meeting of the year was held on Friday 26 November; the AGM followed the closure of the conference, on Saturday 27 November.

Prof. Daan Kocks, Chair of SASOM, officially opened the conference and welcomed all participants, presenters and organisers. The morning session was chaired by Dr Itumeleng Ntatamala (Chair of the SASOM Western Cape Chapter and occupational medicine specialist at the University of Cape Town (UCT)), who introduced the first four presenters.

Prof. Mohamed Jeebhay (head: Division of Occupational Medicine, UCT), gave the opening presentation titled 'COVID-19 over a year later: reflections from occupational medicine'. He stressed that the Pandemic has affected social groups in different ways and that, although COVID-19 deaths have affected mainly the elderly and those with comorbidities, certain industries and jobs also contributed to the risk of infection, hospitalisation and mortality. Apart from health workers, many sectors involved face-to-face contact and congregate settings, resulting in high risks for SARS-CoV-2 transmission. Prof. Jeebhay drew on various studies to illustrate learnings and their implications for occupational health. The data suggest that, while transmission of the virus risks in high-risk healthcare environments may have been mitigated by effective precautions, insufficient focus persisted on effective preventive measures in workplace contexts with low perceptions of risk.

The second presentation, titled 'Mandatory COVID-19 vaccination in workplaces: unpacking the legal and ethical implications', was delivered by Prof. Leslie London (head: Division of Public Health Medicine, UCT). He reviewed the legal, ethical and human rights bases for considering a policy that limits the rights of employees to refuse vaccination. Irrespective of whether a risk assessment identifies that a mandate is needed, we need to be constantly aware that mandatory vaccination is not a substitute for a comprehensive prevention approach that includes non-pharmacological interventions. Prof. London concluded that, if workplaces rely on vaccine mandates to 'solve' the problem of workplace transmission, given the limits of vaccines to prevent mild illness, then mandates are likely to be discredited.

Dale Kennedy, a certified professional ergonomist at Ergomax Holdings (Pty Ltd), followed with a presentation titled 'COVID-19 impact on workplace ergonomics and beyond'. He discussed the key challenges that businesses will face as a direct result of the impacts of COVID-19, and shared the key messages from a report published by McKinsey & Company (2021) titled 'What employees are saying about the future of remote work'. His parting message was that businesses will need to challenge long-held beliefs and master new models of working.

Tobias van Reenen, senior engineering researcher at the Council for Scientific and Industrial Research (CSIR), gave the next presentation, titled 'Ventilation in the context of COVID-19'. With COVID-19 being recognised as an airborne disease, appropriate infection control strategies are essential. COVID-19 is understood to be spread via both droplet and airborne mechanisms; however, the relative risk of each mode remains unknown. Ventilation is more effective against long-range airborne transmission than against shorter-range droplet transmission. In this context, it is important to determine how much ventilation is required to offer minimum protection per scenario. Van Reenen concluded that the ventilation rate required to reduce airborne transmission to acceptable levels is unfeasible with extended exposure, hence, including community prevalence levels in a model of 'far-field probability of infection' does not offer sufficient personal protection in real-world scenarios.

The afternoon session was chaired by Dr Geoffrey Tafaune (Deputy Chair of the SASOM Western Cape Chapter, and occupational medicine specialist at Stellenbosch University). He introduced Dr Jan Lapere, private practitioner in occupational medicine, medico-legal and social labour law. In his presentation titled 'Working from home: employer/employee legal responsibilities towards occupational health and safety', Dr Lapere discussed how the COVID-19 pandemic has acutely expanded the working-from-home (WFH) employee cohort to become a substantial occupational group exposed to specific and alternative occupational health and safety (OHS) hazards, and that WFH requires the application of new or complementary risk containment measures. He added that our current labour legislation does not fully cater for a WFH labour relations regime, and neither do our OHS laws. Besides the physical, ergonomic and mechanical OHS risks, WFH employees may be exposed to psychosocial hazards. Assistance may be required for risks such as isolation, blurred boundaries between work and home, and domestic violence. He concluded that specific support, education and planned inspections are important tools to ensure optimal engineering and administrative OHS controls in the 'home workplace'.

The session titled 'Fitness to work assessment of vulnerable employees, post-vaccination: a discussion' was delivered by Dr WAJ (Jack) Meintjes, occupational medicine senior specialist and head: Unit for Infection Prevention and Control, Tygerberg Academic Hospital and Stellenbosch University, Cape Town. His presentation reviewed vulnerability assessments of individuals as a component of the fitness-for-work evaluation. He discussed how this was practically implemented in the context of the COVID-19 pandemic, with reasonable accommodation, including the provision of individuals working from home, and/or providing them with special leave during peaks of the Pandemic. He also reviewed the hierarchy of controls, with specific reference to the impact of COVID-19 vaccination on the vulnerability assessments of individuals. Dr Meintjes ended by providing some practical guidance on how to manage vulnerability assessments in individuals who have been vaccinated.

Prof. Stoffel Grobler, a medical doctor, psychiatrist, and head: Clinical Unit, Elizabeth Donkin Hospital, Gqeberha (Port Elizabeth), discussed 'The mental health consequences for healthcare workers during the COVID-19 pandemic'. He briefly reviewed the statistics around the incidence of mental illness amongst healthcare workers during the COVID-19 pandemic. He also examined factors associated with severe psychiatric symptoms and disorders amongst healthcare workers, as well as those associated with lower-level psychiatric symptoms. Prof. Grobler discussed disclosure, impairment, impairment assessment, disability, and return to work after being booked off for mental health-related issues. Last, he made the case for adding 'healthcare staff mental health support' as an ongoing agenda item to high-level management planning meetings.

Dr Itumeleng Ntatamala officially closed the conference and thanked all delegates, presenters and organisers for their valuable contributions to the virtual event.

SASOM AGM 2021 – a review of another challenging year

At the AGM, Prof. Daan Kocks (SASOM Chair) read the 2021 annual report prepared by the SASOM 2021 National Secretary, Dr Carmen Whyte, and highlighted the following activities and outcomes for 2021 – another challenging year due to the ongoing Pandemic:

- Due to the COVID-19 situation, SASOM did not hold its annual congress or its AGM in 2020, and the tenure of SASOM's office bearers and ExCo members was extended until the end of 2021.
- The SASOM office bearers for 2022 were elected at the AGM: Prof. Daan Kocks (Chair), Dr André Kotzé (Vice Chair), Dr Frank Fox (Secretary), and Dr Carmen Whyte (Treasurer).
- Jaco Botha resigned as SASOM National Office Co-ordinator, to relocate to New Zealand at the end of March 2021; Claudia Frost started formally in the post on 1 April 2021.
- As at 31 October 2021, SASOM had 427 paid-up members in good standing. This number includes 79 new members, 28 student members (including 17 new student members recruited during the promotional months July-September 2021, when SASOM offered all Postgraduate Diploma in Occupational Health/Occupational Medicine (DOH/DOM) students 50% off SASOM student membership fees as a promotion, to highlight the benefits of membership), 10 honorary life members, and five corporate memberships.
- Formal communication with organisations engaged in the enhancement of occupational medicine continued with SASOM ExCo members (co-opted) from the National Institute for Occupational Health (NIOH), the Compensation Commissioner (CC), the International Commission on Occupational Health (ICOH), the South African Society of Travel Medicine (SASTM), and the Mine Medical Professionals Association (MMPA).
- SASOM liaison with other organisations continued at both national and international levels, e.g. the South African Department of Employment and Labour (with SASOM being an active participant in, and contributor to, the Occupational Health Forum); *Occupational Health Southern Africa* (OHSA); the Council for Health Service Accreditation of Southern Africa (COHSASA); the International Occupational Medicine Society Collaborative (IOMSC); the American College of Occupational and Environmental Medicine (ACOEM); and the International Scientific Association Focusing on Occupational and Environmental Health in the Production and Handling of Chemicals (MEDICHEM).

  A memorandum of understanding (MoU) was signed between SASOM and the Compensation Fund of the Department of Employment and Labour for mutual benefit to both institutions, in terms of research and teaching activities, and raising the profiles of each entity. The MoU was approved by both parties, and it is envisaged that it will be finalised and implemented during 2022. MEDICHEM extended its MoU with SASOM for the rendering of services related to the MEDICHEM Secretariat until the end of 2022.
- SASOM Guidelines are provided free of charge to members in good standing, as a membership benefit. The Guidelines are continuously revised to ensure that they remain relevant for good practice in occupational health/medicine. The new/revised SASOM Guideline 15, titled 'Spirometry in the Workplace', was finalised and endorsed by the South African Thoracic Society (SATS); it is now available as a SASOM membership benefit.
- SASOM contributed to a paper titled 'Work-related injuries and diseases, and COVID-19', authored by the ICOH management, at the invitation of the International Labour Organization (ILO). The paper was published in the *International Journal of Labour Research* (IJLR) on 2 July 2021. SASOM ExCo members, Prof. Daan Kocks and Claudina Nogueira, contributed sections titled 'Experiences of COVID-19: South Africa' and 'Some lessons learned from the COVID-19 pandemic'. The paper is available online: https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---actrav/documents/publication/wcms_810045.pdf.
- SASOM's communication system improved through the facilitation of member access to the digital publication of *Occupational Health Southern Africa* (OHSA) via a link on the SASOM website (www.sasom.org). SASOM would like to thank Claudina Nogueira for her facilitation of the publication of SASOM's pages in OHSA and Prof. Mary Ross for drafting the CEU questionnaires. Since April 2021, members have been able to complete an electronic version of the CEU questionnaire for each issue, which replaces the previous hardcopy version that was distributed via bulk mailing when OHSA was published in a printed format. Once questionnaires are submitted, the results are returned immediately and a CEU certificate is issued automatically if a mark of more than 70% is achieved. Members can earn three CEU/CPD points per questionnaire, potentially earning up to 18 CEU points per annum.
- SASOM webinars are free to all members. A series of four CPD-accredited training webinars on spirometry was held for SASOM members in August 2021. The webinars were presented by Sr Lindsay Zurba (respiratory nurse practitioner and director and training manager of Education for Health Africa (www.educationforhealth.africa), and SASOM member).

Through a SASOM collaboration, Sr Zurba is offering mentoring and training in spirometry to occupational health practitioners in Zambia. In September 2021, SASOM offered its members a series of three CPD-accredited training webinars on the management of occupational health information under the Protection of Personal Information Act, 2013 (POPIA) and the Promotion of Access to Information Act, 2000 (PAIA). The webinars were facilitated by Dr Jan Lapere.

Table 1. SASOM website visits, Nov 2020–Oct 2021

Month	Unique visitors	No. of visits	Page views
November 2020	1 959	2 858	12 723
December 2020	1 636	2 243	9 488
January 2021	2 348	3 260	13 484
February 2021	2 241	3 404	12 706
March 2021	1 792	2 433	10 328
April 2021	1 618	2 251	11 754
May 2021	1 766	2 269	12 846
June 2021	1 794	2 517	18 366
July 2021	1 871	2 397	23 509
August 2021	1 741	2 177	14 922
September 2021	1 468	1 873	33 523
October 2021	1 437	1 929	34 583
Total	21 671	29 611	208 232

Unique visitors: the no. of visitors, excluding repeat visits; No. of visits: unique visitors, including repeat visits; Page views: no. of pages opened and viewed by visitors

All the SASOM webinar recordings are available on the SASOM website in the 'Members Only' area.

- The SASOM website remains interactive and is continuously updated. Due to ongoing development and increased demand to access the website, hosting was moved, in September 2021, from Afrihost to Domains.co.za. The website statistics indicate that the COVID-19 pandemic has contributed significantly to the uptick in website visits (Table 1); the platform is used for sharing information with SASOM members and the general public.

  A new geo-map of available occupational medicine practitioner (OMP) services is being developed as a SASOM member benefit, to increase the visibility and communication potential of the SASOM network. As at 31 October 2021, 82 members had opted in to the OMP services directory.

  Improvements and developments related to the SASOM website include the following:
  - o A facility for ordering SASOM Guidelines online and making payment (in the case of non-members)
  - o A facility for application for new or renewed SASOM membership, and making payment online
  - o Functionality for SASOM members to manage their own profiles, print their membership cards, and opt in or out of the OMP services directory
- The SASOM Medal of Excellence, Fellowship of the College of Public Health Medicine of South Africa – Division Occupational Medicine: FCPHM(SA) OccMed, was not awarded in 2020 or 2021.

Throwback to the SASOM AGM 2019 and associated conference – the events were hosted by the SASOM Eastern Cape Chapter at the Protea Hotel Port Elizabeth Marine, Summerstrand, Gqeberha (Port Elizabeth)

Photograph: Marissa Muller, SASOM member

SASOHN

SOUTH AFRICAN SOCIETY OF OCCUPATIONAL HEALTH NURSING PRACTITIONERS

SASOHN KZN COASTAL

SASOHN 40TH CONFERENCE & AGM 2021

The Great Expedition

NAME OF THE REPORT	**40th Conference Report**
AUTHOR	Khanyoh ZUMA
REGION	KZN COASTAL

SASOHN news

Khanyoh Zuma: Educational Representative, SASOHN
e-mail: khanyoh.zuma@occ-care.co.za

INTRODUCTION

In 2021, the South African Society of Occupational Health Nursing Practitioners (SASOHN) celebrated the holding of its 40th Annual Conference, from 24 to 26 November. This special event, hosted by the KZN Coastal region, took place in the beautiful warm city of Durban at Mt Edgecombe Country Club, tucked away near Umhlanga Rocks in the rolling hills of the KwaZulu-Natal north coast.

The Regional Executive Committee wanted delegates to enjoy a unique conference experience with a broad and diverse approach to health perspectives. The presentations were aligned to meet the SASOHN goals. The theme for the Annual Conference was *The Great Expedition*, with the aim being to explore the excursion and journey, specific to health professionals, through education, experience, innovative leadership, research, technology, ethics, and law – sealed with the psychological component of 'care for the carer'. Selection of the workshop and conference topics was guided by the developments in our profession, focusing on the newly developed curriculum, continuous professional development for the nursing profession, and technology. This was a hybrid conference event – the first of its kind in the history of SASOHN.

CONFERENCE PRESENTATIONS

The conference venue was filled to COVID-compliant capacity, with a host of powerful and inspiring speakers. It was liberating to meet our colleagues face to face after not seeing them for nearly two years due to the Pandemic.

Day 1

The Conference commenced with three workshops, two of which were face-to-face events and one that was a hybrid event. These were presented by experts in the fields of safety, law and psychology. Sean Chester, technical director of Apex Environmental, took us through risk assessment in the era of COVID-19, highlighting the mode of transmission and the importance of monitoring CO_2 levels, as high levels increase the likelihood of airborne transmission of the virus. He demonstrated two monitoring devices: one to measure the amount of CO_2 in the room, and the other to show the direction of the airflow. He emphasised the importance of ventilation to minimise the spread of the virus, together with all other recommended precautionary measures as prescribed by the Department of Health.

Dr Ruwayda Petrus, a lecturer at the University of KwaZulu-Natal (UKZN), presented a second workshop on working from home and its impact on our mental health. During the COVID-19 pandemic, many employees had to work from home and were not prepared for this change. This impacted the biological, psychological and social aspects of most individuals' lives. To overcome the effects of the mental impact, we were required to change the way we think and feel, which, in turn, resulted in behavioural change(s). Dr Petrus provided recommendations on how to promote employees' mental health while they work from home.

The third workshop was presented by Thula Ngubane, who holds an LLB degree and works as a compliance analyst at Ithala Development Finance Corporation. He spoke about the Protection of Personal Information Act (POPIA), which was promulgated in 2013 and came into effect in July 2021. The purpose of this Act is to protect individuals' rights to privacy as stipulated in the Constitution of South Africa. Ngubane provided an overview of the POPI Act and the importance of compliance whilst implementing and maintaining the lawful processing and protection of information. He highlighted the eight conditions under which personal information may be legally gathered and processed. Failure to comply with the Act may result in penalties.

A cocktail party event, themed: *In the Jungle*, was held on the evening of the first day. Participants enjoyed an evening of laughter and relaxation, while enjoying the exquisite view of the golf course. Dr Suhayl Essa, a medical doctor and a comedian, hosted the festivities. Delegates had a night of networking and prize giving, and ended the evening with delectable cocktails.

The second day of the Conference was opened by the SASOHN President, Denise Minnie, who encouraged members to move with the times and start treating our organisation as a business. She also thanked members for their efforts and contributions to making the day a success in the midst of the era of COVID-19.

Day 2

The second day comprised three sessions, sub-themed *Leading the pack, Enforcing the laws of the pack,* and *Embracing and rewarding the pack*. KZN Coastal Committee member, Fiona Ward, directed the first session of the day. The first presenter was Safia Joseph, a counselling psychologist employed as a wellness training leader and clinical consultant by Life Health Solutions. Joseph spoke about initiatives to promote the development of future leaders. She touched on how to embrace change in a positive manner, defining life as an odyssey – a long journey full of adventures with a series of experiences that provide knowledge and understanding to an individual. She elaborated on some of the attributes necessary for future leaders, namely, a flexible mind and the willingness to share information, using innovative ways to communicate and collaborate, and showing willingness to learn and teach others. Dr Makhosazane Dube, project manager at KwaZulu-Natal College of Nursing, addressed the delegates about innovative learning and teaching in nursing, focusing on the new nursing curriculum and different approaches applicable to this change.

The value of effective mentorship in healthcare was the topic presented by Dr Dudu Sokhela, senior lecturer at Durban University of Technology (DUT). She emphasised the importance of mentorship in the field of nursing, encouraging senior nurses to never underestimate the wealth of knowledge acquired through their experience. She further encouraged the sharing of this knowledge and experience with the newly qualified generation in order to both empower them and ensure a legacy of excellence.

The second session of the day was chaired by KZN Coastal Committee member, Thresia Pather. Kerry Fritzelle, a lecturer at UKZN, opened the session with a presentation on occupational health. She explained the role of a healthcare professional and how to address gender diversity in the workplace. She advised us to look beyond

Box 1. Award winners, 2021

Ian Webster Gold Award:
Bella Sepalamelo
Louwna Pretorius
Natalie Copeling

Ian Webster Silver Award:
Kirsten Murrish

Region of the Year:
KZN Coastal

EXCO representative of the year:
Natalie Copeling

Honorary life membership:
Angela Butkovic
Catherine van Niekerk
Michelle Bester

President's Award:
Angela Butkovic

Poster competition winner:
Valencia Benjamin

the physical attributes of a person and to assess and manage everyone with kindness and compassion. The second speaker was Bella Sepalamelo, who presented the findings of her master's degree research, titled 'Exploring the practices of the occupational health nursing practitioner when implementing a hearing conservation programme'. She highlighted the importance of choosing the correct hearing conservation programme and the role of the occupational health nursing practitioner (OHNP) in maintaining a healthy workforce.

Prof. Rajen Naidoo, head: Discipline of Occupational and Environmental Health, at UKZN, discussed the recent changes to the Occupational Health and Safety Amendment Bill and the implications for the workplace, highlighting the protection of third parties as a new addition to the Bill.

The third and final session of the day was chaired by KZN Coastal Committee member, Busi Ngcobo. The session began with the Conference exhibitors sharing a short message about their products, announcing the winners of the lucky draws and, in keeping with the theme of the third session of the day, handing out gifts. This was followed by a presentation facilitated by Prof. Nokuthula Sibiya, deputy vice chancellor: Teaching and Learning, at Durban University of Technology, on diversity initiatives that address the health and well-being of healthcare professionals. This interactive session focused on our diversity in the way that we view and see things differently, and the importance of respecting each other's views and decisions. Prof. Sibiya encouraged the delegates to have open and flexible minds, and to be accommodating of others to foster a socially acceptable approach to life.

The final speaker of the day was Philani Maphanga, partner and director at PricewaterhouseCoopers. He presented a motivational discourse titled 'Power of perseverance in the midst of adversity'. He shared the story of his own childhood and how, rising from poverty with unemployed parents, through determination and purpose and the assistance of the community and his school teachers, he attained success. He had a dream to become the first chartered accountant in his community, which he achieved; he now pays his success forward by initiating and managing projects to uplift his community.

GALA DINNER AND AWARDS CEREMONY

The extravagant event, with the theme *A Night at the Oscars*, saw the delegates wearing red with a touch of black. The evening began with rewarding the exceptional achievers of our profession as SASOHN members. Award winners are listed in Box 1.

The awards evening was concluded with the announcement of the newly elected SASOHN President for the term 2022–2023, Michelle Bester, and the Educational Representative for the term, Khanyoh Zuma.

The annual general meeting (AGM) was held on the final day of the Conference, and was well attended by SASOHN members, representing all regions, who joined both in person and online.

CONCLUSION

The 2021 Annual Conference was well attended despite the challenges of the Pandemic. SASOHN members expressed their gratitude and appreciation to the organising team for a successful event. The KZN Coastal Executive Committee members extend their sincere thanks to all members, exhibitors and sponsors for their support in making the Conference the success that it was.

AKNOWLEDGEMENT

Thanks go to Natalie Copeling for editing this report.

SAIOH newsletter

SAIOH PRESIDENT'S ADDRESS

Hennie van der Westhuizen: SAIOH President
e-mail: president@saioh.co.za

The aspiration of occupational hygiene, as part of the occupational health and safety fraternity, is to uphold and promote health and safety of workers in all occupations. At times, our actions are so focused that we tend to forget that we, ourselves, are exposed to stressors – in some cases, more so than the communities that we serve. We are well versed in reducing physical, chemical, biological and ergonomic stressors. This knowledge is applied in helping others and ourselves in the workplace. However, we are also exposed to psychological stressors of varying degrees, daily. Dealing with these stressors is not easy as individual coping mechanisms vary, as do solutions. Regrettably, when defence mechanisms fail, prolonged stress can lead to mental fatigue. We had our fair share of challenges in 2021, which placed a premium on our physical and mental health. The extended effect of COVID-19 added to frustrations and exacerbated psychological stressors in the workplace. One of the coping mechanisms to deal with stress is to take a break, and I know that all my colleagues were looking forward to a break at the end of the year. We, as the Southern African Institute for Occupational Hygiene (SAIOH) National Council, trust that the December holiday season offered the much-needed break and an opportunity to relax and revitalise. We wish you a successful and blessed 2022.

Dunning-Kruger effect and SAIOH

The Dunning-Kruger effect is a concept that has been receiving vigorous attention in the electronic media. The *Encyclopaedia Britannica* defines the Dunning-Kruger effect as *"a cognitive bias whereby people with limited knowledge or competence in a given intellectual or social domain greatly overestimate their own knowledge or competence in that domain, relative to objective criteria or to the performance of their peers or of people in general"*.[1] Kendra Cherry, an educational consultant, neatly translates this definition into understandable English by stating that the Dunning-Kruger effect is a type of cognitive bias in which people believe that they are smarter and more capable than they really are.[2] She further states that this frame of mind leads to under-performance in certain areas and to the inability to recognise mistakes that are made. From a professional perspective two questions arise:

1. To what extent does this effect prevail in a professional group with high-quality and ethical values, such as SAIOH?
2. How does one counter this effect within SAIOH?

Recognising my limited knowledge of the effect and being wary of falling into the trap of becoming a victim of the Dunning-Kruger effect, I wish to venture an opinion on these questions. Members are welcome to ponder these remarks and form an opinion for themselves. The question as to what extent it manifests itself within our profession, or poses a risk to our quality, is difficult to answer without thorough research. What we do know is that structures are in place in SAIOH that dictate the levels of knowledge, skills, competency, and ethics of individual members. The Professional Certification Committee (PCC) safeguards the occupational hygiene sector and provides basic qualifying criteria for the various levels of certification and ensures continued development of members by way of the continuous professional development (CPD) system. In addition, the PCC has developed a technical self-evaluation tool, available to members on the SAIOH website. As SAIOH realigns itself, along with its strategic objectives, mechanisms are revised or added to ensure quality. Knowledge of ethics has been identified as a point of focus. As a result, a certificate, as proof of successful participation in ethics modules, will be a requirement for professional certification every two years. Opportunities to achieve ethics certificates will be made available to members on the SAIOH website. Apart from the above mechanisms, there are external influences that will assist members to assess exactly where they are regarding knowledge and skills. These influences can be found in occupational health and safety legislation and the related South African National Standards (SANS) codes, as well the South African National Accreditation System (SANAS) assessment system.

In summary, without being complacent, I wish to state that the systems in place should, to a great extent, reduce the risk of the Dunning-Kruger effect. I conclude by suggesting to prospective master's students or doctoral candidates, in search of a research topic, that they consider investigating the statement that the system that has been put in place by SAIOH reduces the risk of a negative Dunning-Kruger effect, as well as the questions that were posed.

Members who wish to read more on the topic can find information on the following websites:
https://www.britannica.com/science/Dunning-Kruger-effect. (Accessed 17 January 2022)
https://www.verywellmind.com/an-overview-of-the-dunning-kruger-effect-4160740. (Accessed 17 January 2022)

In this newsletter

COUNCIL ACTIVITIES

Hennie van der Westhuizen: SAIOH President
e-mail: president@saioh.co.za
Deon Jansen van Vuuren: SAIOH General Manager
e-mail: deon.jvvuuren@gmail.com
Kate Smart: SAIOH Chief Administrative Officer
e-mail: info@saioh.co.za

We have come through a year that was filled with challenges and achievements. On behalf of SAIOH, we extend our genuine appreciation to each one of you for your valuable contributions and continued dedication to our organisation. Working with you during 2021 was a pleasure and we are proud to have all of you with us on our 2022 journey.

It is that time of the year again where members are required to submit their continuous professional development (CPD) points, sign their code of ethics (COE) and pay their annual membership fees. Please read the information below and ensure your profile and membership information is up to date. Your annual membership invoice was sent to you via e-mail on 3 January 2022. Please verify your SAIOH profile and download a copy of your invoice. Please note that:

- Annual membership fees have increased by 7%.
- It is each member's responsibility to ensure that personal and billing information is correct and current. This will ensure that the correct information is reflected when invoices are generated. Failure to update your SAIOH profile will cause unnecessary delays in the processing of payments and the issuing of certificates.
- Annual membership fees must be paid by 28 February 2022; late payments will incur interest.
- Continuous professional development (CPD) points (with supporting documentation) must be uploaded by 31 January 2022.
- Registration fees and assessment dates are available on the SAIOH website: https://www.saioh.co.za.

2022 MEMBERSHIP CERTIFICATES WILL NOT BE RELEASED WITHOUT YOUR SUBMISSION OF PROOF OF PAYMENT, SIGNED CODE OF ETHICS, AND CPD POINTS

1. National Council 2022/23 – Announcement of new SAIOH Council members

During the SAIOH annual general meeting (AGM), held virtually on 5 November 2021, the below-mentioned nominees were elected to the SAIOH National Council. We would like to wish them each heartfelt congratulations and a warm welcome to the SAIOH Council. We look forward to working together for the betterment of SAIOH.

Wessel van Wyk

Wessel van Wyk
Photograph: courtesy of SAIOH

Wessel is a University of Stellenbosch graduate, holding an Honours in Conservation Ecology degree. He started his career as an occupational hygiene assistant in 2009, but soon progressed to the level of occupational hygienist. He also has a certificate in Intermediate Mine Environmental Control from the Chamber of Mines.

Recently, Wessel was elected as the Chairperson of SAIOH Western Cape branch, after serving as Vice Chairperson and a member for 12 years. Wessel also served as a member of the COVID-19 Risk Assessment Task Force set up by the Department of Health in early 2020 to perform emergency risk assessments at quarantine sites.

Wessel's passion is improving the lives of people who may not be aware that they have the legal right to a clean, healthy and safe work environment. Wessels is also passionate about inspiring people to make positive changes in their lives and to have a positive outlook on all situations that arise.

Tebogo Mpshe

Tebogo Mpshe
Photograph: courtesy of SAIOH

Tebogo has a BSc degree in Human Physiology and Genetics, an Honours in Occupational Hygiene/Health degree from the University of Pretoria, and is currently registered for a National Diploma in Safety Management. He started his career in occupational hygiene as a consultant for various approved inspection authorities (AIAs) in North West and Gauteng provinces, later joining Sasol SA (Pty) Ltd as a safety, health and environment (SHE) principal practitioner.

Having worked with and/or under the leadership of some of the great hygienists in the industry, such as Deon Jansen van Vuuren, Jaco van Rensburg, Tatjana Radojevic-Rogowski and Oscar Rikhotso, he has been exposed to a vast and deep pool of knowledge and experience for which he will be forever grateful. His past experiences have prepared him for the role he now has: assistant director – Occupational Hygiene Risk Management, in the Gauteng Department of Health. He plans to use and share his knowledge and experience to change how occupational hygiene is perceived in the healthcare sector.

Moses Mokone

Moses Mokone
Photograph: courtesy of SAIOH

Moses Mokone is a SAIOH-registered occupational hygienist and holds a Bachelor of Technology degree in Environmental Health. Currently, he is studying for a Master of Public Health (MPH) degree, in the field of occupational hygiene, at the University of the Witwatersrand. He is employed at the National Institute for Occupational Health (NIOH) as an occupational hygienist/technical manager.

Moses has more than 10 years of work experience in the field of occupational and environmental health, having worked as an occupational hygiene consultant, and occupational hygiene specialist in various sectors, including consultancies (mining and industries), the petrochemical industry, and government. He previously served as a SAIOH Council member; his portfolio was to manage/coordinate all activities of the SAIOH national branches. His hobbies include reading, singing, listening to music, playing football, and running marathons.

Corlia Peens

Corlia Peens
Photograph: courtesy of SAIOH

Corlia Peens is a senior manager in occupational health at Sasol in Sasolburg, and at Ekandustria Operations. She is a long-standing member of SAIOH and the PCC. She started her occupational hygiene career in the metal products sector before joining the petrochemical industry. Nowadays, she mainly provides technical knowledge, guidance and coordinating services with regard to planning, synchronising, sustaining, and improving the broad spectrum of occupational medicine and hygiene, in managing health risk impacts. As the newly elected PCC Chair, Corlia is on the PCC Executive Committee and, consequentially, has a seat on the SAIOH Council. Corlia is also a director on the SAIOH Management Board.

Dr Ivan Niranjan

Dr Ivan Niranjan
Photograph: courtesy of SAIOH

Dr Ivan Niranjan is a senior lecturer in the Department of Community Health Studies at the Durban University of Technology. He lectures in occupational hygiene/health and safety. His focus is the four-year professional degree in environmental health, and the supervising of Master of Environmental Health students' research.

Ivan is a long-standing member of SAIOH and the PCC, and is a Past Chairperson of the SAIOH KZN branch. He has worked at the Department of Employment and Labour, in three provinces (Gauteng, KwaZulu-Natal and the Eastern Cape), in the capacity of occupational health and safety inspector. He is a South African National Accreditation System (SANAS) technical assessor for SANS 17020. As the newly elected PCC Vice Chair, he is a member of the PCC Executive Committee and, consequentially, has a seat on the SAIOH Council. Ivan is also a director on the SAIOH Management Board.

2. Annual national conference

The SAIOH Annual Scientific Conference will take place in Gauteng this year. Provisional dates are 24–28 October 2022. Please diarise these dates.

FROM THE PROFESSIONAL CERTIFICATION COMMITTEE (PCC)

Lee Doolan: SAIOH PCC Administrator
e-mail: lee@saioh.co.za
Deon Jansen van Vuuren: SAIOH General Manager
e-mail: deon.jvvuuren@gmail.com
Corlia Peens: PCC Chairperson
e-mail: corlia.peens@sasol.com

We welcome our new PCC Chair, Corlia Peens and Vice Chair, Ivan Niranjan, and look forward to this new chapter.

Deon Jansen van Vuuren also stepped down as the PCC Chief Examiner, and was replaced by Maryke van der Wolt with effect from 1 January 2022. Thanks Deon and welcome Maryke.

The SAIOH PCC ended 2021 on a high note, welcoming 20 new hygienists into the fold. It has been a challenging five-plus years for these new registered occupational hygienists (ROHs) but, excitingly, their hard work paid off. Unfortunately, our technologists did not fare as well, with only 25, out of the 47 assessed, passing their oral assessment (Table 1). They now have some tough decisions to make, but we look forward to reassessing them in 2022. Our occupational hygiene assistants continue to amaze us and delivered a 92% pass rate for 2021. We welcome these new members to SAIOH and look forward to watching their progress in the field of occupational hygiene.

Assessment dates and fees for 2022 (Table 2) have been published on our website (www.saioh.co.za); we encourage you to familiarise yourself with these new details.

Note: Certificates issued during the year to new members (occupational hygiene assistants) are calculated on a pro-rata basis. This will ensure that certificates are only valid for the current year. Re-assessment fees are based on the assessment fees in the table.

Towards the end of 2021, we met to discuss the **new SAIOH website** and are happy to report that, although we are running behind schedule, you will soon enjoy the new tailored layout, designed with ease of access in mind.

Table 1. SAIOH PCC certification assessment results for 2021 (March to December 2021)

	Written assessments (Mar–Dec 2021)				Oral assessments (Mar–Dec 2021)			
	Assessed	Passed	Failed	Pass rate	Assessed	Passed	Failed	Pass rate
Certification category	**n**	**n**	**n**	**%**	**n**	**n**	**n**	**%**
OH assistant	120	113	7	94.2	120	113	7	94.2
W201 – assistant	36	31	5	86.1	36	31	5	86.1
OH technologist	57	31	26	54.4	47	25	22	53.2
Occupational hygienist	41	26	15	63.4	34	20	14	58.8
Total	**254**	**201**	**53**	**79.1**	**237**	**189**	**48**	**79.7**

Table 2. SAIOH PCC assessment and membership fees, 2022

Assessment type	Fee (Rands)*
Application and evaluation fees	472.40
Assessment fees	
OH assistant	676.78
OH technologist	1 292.27
Occupational hygienist	1 292.27
University student	1 149.17
Remark/review of assessment paper	864.13
Annual certification fees	2 254.64
Pro-rata – 6 months	1 127.32
Pro-rata – 2 months	375.79
Non-certified member – annual	1 352.79

*VAT included

REFERENCES

1. Duignan B. Dunning-Kruger effect. Britannica; 2019. Available from: https://www.britannica.com/science/Dunning-Kruger-effect (accessed 23 Jan 2022).
2. Cherry K. The Dunning-Kruger Effect. Verywellmind; 2021 Aug 6. Available from: https://www.verywellmind.com/an-overview-of-the-dunning-kruger-effect-4160740 (accessed 23 Jan 2022).

The 5th Occupational Health Dialogue for the South African mining industry

Florence Magampa: Occupational health programme manager, MHSC
e-mail: Fmagampa@mhsc.org.za

INTRODUCTION

The Mine Health and Safety Council (MHSC), whose main task is to advise the Minister of Mineral Resources and Energy (DMRE) on health and safety in South African mines, held a very successful 5th Occupational Health (OH) Dialogue for the South African mining industry (SAMI). The two-day virtual event took place on 11 and 12 November 2021, under the theme *Reprioritising and reimagining occupational health to promote the health of mine employees in the era of COVID-19*. The event was held in collaboration with the Minerals Council's Masoyise Health Programme, and was attended by more than 200 participants on both days.

BACKGROUND

The SAMI continues to make significant progress in the management of health hazards in the workplace, through limiting progression to disease, and managing diseases that develop. This is work in progress. The first OH Dialogue was held in 2016 with the intention of conscientising the SAMI to increase its focus on occupational health-related matters. It was concerning that the mining sector continued to report relatively high numbers of occupational diseases compared to other industrial sectors. The long latency period from exposure to disease manifestation was also contributing significantly to the SAMI's response time. The Dialogue would be a proactive initiative to foster critical discussions on existing and emerging health challenges, as well as existing and future interventions to combat these challenges.

The OH Dialogues have since served as platforms on which to promote health education, share learnings, conduct robust health discussions, and collaborate with multi-sectoral stakeholders to work towards one common goal – health for all mine employees.

PROCEEDINGS OF THE OH DIALOGUE

The two-day event consisted of the opening session (including a keynote address), four themed sessions, and the closing session.

The themes of the four sessions were:

1. *Putting the brakes on occupational lung diseases (OLDs) through prevention:* led by the Masoyise Health Programme and facilitated by Dr Nkateko Mkhondo (national professional officer of TB, World Health Organization)
2. *Fires, explosions and emergency preparedness:* facilitated by Jonny White, (operational manager, Minerals Council Division, UASA), Marco Biffi (consultant and BBE group and technical advisor to the Mining Industry Occupational Health Advisory Committee (MOHAC) Tripartite Technical Committee (TTC), MHSC), and Mannas Fourie (chief executive officer, Mine Rescue Services)
3. *COVID-19 insights:* facilitated by Dr Tumi Legobye (health executive, Harmony Gold Mining Company Limited)
4. *Developments on TB and HIV:* facilitated by Dr Khutjo Mothapo (group wellness manager, Anglo American Platinum)

Attendees participated by means of attendee-generated questions and comments.

DAY 1

The programme was directed by Dr Thuthula Balfour (head: Health Department, Minerals Council South Africa). The acting chief executive officer (ACEO) of the MHSC, Dumisani Dlamini, officially opened the OH Dialogue and thanked local and international attendees and speakers for prioritising the 1st virtual OH Dialogue, despite COVID-19 and loadshedding challenges.

Dr Lindiwe Ndelu (chief director for occupational health, DMRE, and chairperson of health committees, MHSC) – the driving force behind the conceptualisation and running of the OH Dialogue – highlighted the background of the Dialogue as well its purpose. She further highlighted the focus of the 5th OH Dialogue as well as the impact of the OH Dialogues over the years.

The impact of the OH Dialogue

- Transferring knowledge and technology
- Encouraging research development (as recommended by stakeholders or derived from challenges and/opportunities raised)
- Informing/encouraging health policy development and review
- Continuing to strengthen implementation of the Occupational Health Summit Milestones: 2014 OHS Summit Milestones
- Continuing to strengthen collaborations and networks within the health sector

Day 1 presentations included 10-year health trends in occupational hygiene and occupational diseases, non-communicable diseases, and COVID-19. In line with the impact of the COVID-19 pandemic on the SAMI, a separate session was held on Day 2 for a detailed discussion.

Keynote address

In the opening plenary of the Dialogue, the keynote address was delivered by Xolile Mbonambi (on behalf of the Chief Inspector of Mines, David Msiza). The SAMI's immense contributions to the global and national economy and livelihoods were highlighted. The progress that has been made in improving health, when compared to the state of mining health before the Leon Commission, and the improvement post the Commission, were also highlighted. Although the goal remains as ZERO HARM, the sector was commended, in the keynote address, for efforts made to save lives and livelihoods of mine employees through improved health. The resilience that the SAMI has shown in dealing with COVID-19 was further commended, and the sector was requested to keep records of COVID-19 lessons to manage further epidemics and pandemics.

Theme 1: *Putting the brakes on occupational lung diseases (OLDs) through prevention*

In light of challenges in implementing the Airborne Pollutants Guideline in the SAMI, a presentation was delivered by Brian Mongoma from the DMRE, on common audit findings and recommendations to assist the SAMI. This presentation also served as an opening to the OLD session.

The session focused on understanding the epidemiology of exposures and associated outcomes, existing exposure limits and their impact on mining employees' health, and industry initiatives to eliminate exposure (including research and leading practices adopted in the industry). A moderated panel discussion followed, in which the audience participated by asking questions and addressing comments to the panelists. At the end of the session, definitive actions were recommended, which SAMI stakeholders could adopt with expediency towards the principal objective of ZERO HARM.

Theme 2: *Fires, explosions and emergency preparedness*

The focus was on matters relating to Chapters 5 and 16 of the Mine Health and Safety Act's (No. 29 of 1996, as amended) regulations. Common audit findings and recommendations were presented by the DMRE in as far as incidents and accidents regarding fires, explosions and gassing are concerned. Audit findings were also presented on the emergency preparedness of audited South African mines. The Mine Rescue Services (MRS) presented fire statistics and body-worn self-contained self-rescuers (SCSRs) in the South African mines, including recorded fatalities and gaps (such as training, and travel distances to refuge bays for various postures and body weights).

Findings of the 2020 SCSR monitoring programme, conducted by the Council for Scientific and Industrial Research (CSIR), were also presented. The SCSR original equipment manufacturers (OEMs) were afforded an opportunity to present their perspectives on the findings of the 2020 SCSR monitoring programme. Participants were given an opportunity to comment and ask questions, which will be considered by the TTC.

DAY 2

The second-day programme, directed by Pearl Nkosi (occupational hygiene consultant, Bluegrey), consisted of a recap of the first day, and two themed sessions.

Theme 3: *COVID-19 insights*

In the overview of COVID-19, global and national COVID-19 statistics were presented, as well as progress made with regard to COVID-19 vaccinations, a case study of the impact of the implementation of a mandatory vaccination policy, and recommendations for preparing for future resurgence and COVID-19 waves. COVID-19 has affected the implementation of health programmes and reporting thereof; however, is it encouraging to see that some mines adjusted to, and were able to perform well in the midst of, the Pandemic. Case studies of these mines, including their successes, were presented.

There were two presentations on mental health during this session. The first centred around developing and maintaining resilience amid COVID-19, while the second delved into mental health in the workplace, beyond COVID-19. In both presentations, drivers of unhealthy lifestyles were presented; workplace, and personal and societal interventions were shared. The mental health of healthcare professionals was also emphasised in these two presentations.

Theme 4: *Developments on TB and HIV*

The final theme for the 5th OH Dialogue was on tuberculosis (TB) and HIV, and centred around disease prevention and infection control. Statistics on TB and HIV in the SAMI were presented, followed by two presentations: developments regarding TB vaccines; and preventing TB transmission in healthcare facilities. This session afforded attendees an opportunity to be updated on research developments and findings that could improve indoor air quality practices and human behaviour in as far as transmission control is concerned (while leveraging on control measures and learnings of COVID-19 for TB).

CONCLUSION

The 5th OH Dialogue, which was the first to be hosted virtually by the MHSC, in collaboration with the Minerals Council's Masoyise programme, was a great success, thanks to the organisers, programme directors, facilitators, presenters and all involved parties. The OH Dialogues continue to be crucial platforms for engagements that help transform health responses in the SAMI.

All presentations can be accessed on the MHSC website (as well as other health-related material): https://mhsc.org.za/presentations/. For collaborations and queries on the 5th OH Dilogue, contact the MHSC at: TMelamane@mhsc.org.za.

Waste pickers deserve more recognition for their contribution to the environment

Rosa-Mari le Roux
e-mail: rosa-mari@thatpoint.co.za

They're at work before the crack of dawn until long after most other citizens have gone to bed. And yet waste pickers are viewed as an irritation by many who see them going through their rubbish bins. *"Instead of getting annoyed, people should be thankful for the difference these pickers make in our environment and economy",* says Mpendulo Ginindza, Vice President of the Institute of Waste Management of Southern Africa (IWMSA). *"According to the CSIR, in 2014 alone, the informal pickers saved municipalities R309 million to R748 million in landfill airspace. This, by simply diverting recyclables away from landfills."*

According to the South African Waste Pickers Association, South Africa has more than 90 000 waste pickers, and Ginindza says that it is estimated that a single picker can divert 16 to 24 tons each year. *"Plastics SA reported, in 2018, that the majority of recyclable plastic collected was sourced from formal collectors. Formal collectors typically source their recyclables from waste pickers and buy-and-drop centres."*

A day in the life of a waste picker

A waste picker is defined as someone who collects reusable and recyclable materials from residential and commercial waste bins, landfill sites and open spaces in order to revalue them and generate an income. Ginindza says she interviewed a female waste picker from Limpopo about her typical day. *"She told me competition is rife, and she has to wake up at 4 am to be on site by 5 am. When she arrives, she sorts the waste and weighs the materials. When there is enough, she transports it to the drop-off centre for formal collection."*

Whether waste pickers work in a rural or urban environment, the fact remains that this is no easy job. *"They are the first people on the road early in the morning. They sort through bins and carry the heavy waste on their trollies. Often, they don't have the proper equipment, and environmental conditions are not safe. Not to mention what they come across in the bins."*

How can you help?

Although the industry itself is regulated, Ginindza points out that many waste pickers are informal workers. *"A number of municipalities have attempted to integrate informal workers, but with mixed success rates."* She also points to the Waste Pickers Integration Guideline for South Africa, produced by the Department of Environment, Forestry and Fisheries in 2020. *"It provides guidance to municipalities and industry on measures to improve their working conditions."*

Legislation also plays a role. *"In May 2021, the Extended Producer Responsibility Regulations came into effect. [Their] purpose is support, recognition and compensation for the work that is done by pickers along the waste value chain"*, Ginindza says. But individuals can also assist by making life easier for waste pickers, she adds. *"Start by separating your waste at home and at work. Avoid putting dangerous or hazardous items that they may come across when looking for recyclables in your bins. And, of course, be more tolerant and patient on the road or on the street the next time you meet a waste picker at work",* she concludes.

For more information on IWMSA please visit:
Website: http://www.iwmsa.co.za/
Twitter: @IWMSA
LinkedIn: Institute of Waste Management of Southern Africa
Facebook: Institute of Waste Management of Southern Africa

OCCUPATIONALhealth
SOUTHERN AFRICA

Vol. 28, No. 1 January/February 2022

Contents