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OCCUPATIONAL HEALTH

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HEALTH



“ The ultimate measure of a man is not where he stands in moments of comfort and convenience but where he stands in times of challenge and controversy.

- Dr. Martin Luther King ”



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MESSAGE FROM THE EDITOR

The past 16 months have been a challenging time for us all, physically and mentally. However, the pandemic has also allowed for many opportunities in the occupational health and safety space – for research collaboration, multi-stakeholder engagements and new partnerships - to empower workplaces with knowledge and practical tools to mitigate the further spread of the virus. Throughout the pandemic, occupational health has been paramount to the health and safety of workers across South Africa. Amidst the backdrop of a disrupted sense of normality, the NIOH has been able to also repurpose its strategic objectives and staff members to respond to the evolving needs of workplaces both in the formal and informal economy.

In our quest of keeping you up to date with the latest developments of the Institute, we share with you the various activities and projects, which the NIOH has been working on in the past quarter. In this first issue of volume 3 of OccuZone, we highlight our research activities - with a special focus on a study conducted to determine the effectiveness of decontamination methods for filtering facepiece respirators to address stock shortages during the COVID-19 pandemic. We also showcase the scientific publications produced by our researchers during this period. We then profile one of our emerging researchers, a Medical Scientist working in the NIOH's Ergonomics Unit, that resides within the Occupational Medicine Section.

An essential function of the NIOH is the surveillance of occupational exposures and health outcomes and in this edition we present a biannual summary of COVID-19 data for South African workplaces, based on

submissions made to the Occupational Health Surveillance System (OHSS).

We also profile a new accredited service offered by the Institute, namely the analysis of respirable crystalline silica. Lastly, we highlight various training sessions offered by the Institute including the COVID-19 related webinars in both the formal and informal economies.

Now, more than ever as infections continue to rise in our country during the 3rd wave, we all have a collective responsibility to ensure that workers are protected and workplaces are safe. The devastating effects of the virus can be felt closer to home and we wish to extend our condolences to those who have lost loved ones and colleagues during this difficult time. I urge you all to be guardians for OHS – championing the adherence to non-pharmaceutical interventions both within your workplace and in your respective communities. Get vaccinated when the opportunity becomes available – to protect yourselves, your families and colleagues. I would like to thank the editorial team for their valuable time and expertise in producing this publication, and the authors for their valued contribution to this issue.

On behalf of the editorial team, we hope you enjoy this issue.

- Shanaz Hampson



NEWSLETTER

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MESSAGE FROM THE RESEARCH COMMITTEE CHAIR



Fellow reader, we trust that you are well and safe during these challenging times.

Our condolences go out to those who have lost loved ones, and our prayers are with those who are recovering.

The value of occupational health and research within the discipline cannot be emphasised more. However, there is a lack of high-quality intervention studies that demonstrate a reduction in disease burden and the economic value of interventions. Thus, there is a need for strong leadership and coordination of occupational health research, strengthening capacity in the research workforce, employing new technologies, and harnessing existing pockets of data. May you continue to push innovation and be ambassadors of health promotion within your workplaces and social networks.

This edition focuses on a recent study conducted to determine the effectiveness of decontamination methods for filtering facepiece respirators to address stock shortages during the COVID-19 pandemic. We also reflect on recent publications and the impact of the respective research findings on occupational health or health in general. Staying on the topic, the impact of level five lockdown on the incidence of COVID-19 and lessons learned from South Africa was assessed. In addition, one of the studies investigated a novel nano therapeutic using convalescent plasma derived exosomal (CPExo) for

COVID-19 and found that the CPExo has a multi-potential effect for treatment efficacy by acting as an immunotherapeutic drug carrier, and diagnostic target with noncoding genetic materials as a biomarker. Another research group explored the green synthesis of nanoparticles and their antimicrobial efficacy against drug-resistant *Staphylococcus aureus*. We also highlight the findings of a systematic review and meta-analysis recently completed on the association between silica exposure, silicosis and tuberculosis. Researchers further evaluated the performance of the South African Mining Industry Code of Practice (SAMI CoP) approach for grouping and compliance testing against international standards. Lastly, we emphasize an under-researched group of workers i.e. pet groomers and the risk to occupational exposures in a growing pet-care industry.

May you be safe and enjoy the research summarised covered, and feel free to interact with our researchers.

- Dr Tanusha Singh



RESEARCH

A COMPARATIVE EMPIRICAL ANALYSIS OF LOW-COST DECONTAMINATION METHODS FOR FILTERING FACEPIECE RESPIRATORS TO ADDRESS STOCK SHORTAGES DURING THE COVID-19 PANDEMIC

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Introduction: Reprocessing and reuse practices of filtering facepiece respirators (FFRs) to extend the life of FFRs to address stock shortages during the COVID-19 pandemic have received much attention. However, empirical evidence of inactivation of SARS-CoV-2 by decontamination methods is limited, particularly in low resource settings. As the possibility of future airborne biological threats persist, the need for an adequate stock of quality FFRs will remain a priority to reduce the risk of exposure to protect frontline and essential workers.

Aim: Therefore, a comparative analysis of three inexpensive and readily available decontamination methods to determine its effectiveness at inactivating SARS-CoV-2 was conducted in ensuring respirator performance (filter efficiency and fit).

Methodology: Moist heat incubation (MHI), vapourised hydrogen peroxide (VHP) and ultraviolet germicidal irradiation (UVGI) were tested to determine the ability to decontaminate seven locally relevant FFR models (N95s: 3M 1860, VFlex 9105S, Halyard duckbill 46727, Makrite 9500; KN95: Wenzhou KN95 and FFP2s: Greenline 5200, 3M 8810SSA) respirators experimentally inoculated with SARS-CoV-2. *Geobacillus stearothermophilus* bio-indicator was used for each decontamination cycle. We also determined the structural and functional integrity, and user fit that each FFR model tolerated on repeated contamination cycles.

Results: Twenty-seven consenting participants were fit tested using the quantitative protocol over a maximum of 30

cycles. Fit testing appeared to be more affected by donning & doffing, as some passed with adjustment and repeat fit testing. The 3M™ 1860 and Halyard™ duckbill 46727 (formerly Kimberly Clark) models performed better on fit testing than other models for both pre-and-post decontaminations. Remarkably few participants (0.3 and 0.7%, respectively) completed the cycles for Makrite 9500 N95 and Greenline 5200 FFP2. Most participants failed fit testing for the KN95 irrespective of the decontamination method, except for two (11 %) who passed for UVGI. Most participants completed more cycles after UVGI decontamination compared to VHP. Of the six FFR models tested, only the KN95 failed filtration after MHI, VHP and UVGI decontamination. All three decontamination methods could achieve a 3 log reduction of SARS-CoV-2 inoculated on worn-in FFRs, however this varied with the type of FFR. Both UVGI and VHP methods achieved a 6 log reduction of *G.stearothermophilus* spores.

Conclusion: The study showed that the decontamination treatments could withstand 30 cycles of processing in a laboratory setting without diminishing filtration efficiency or fit. We found that UVGI and VHP decontamination performed better compared MHI. The caveat is that decontamination of FFRs requires careful consideration on the selection of FFRs and decontamination methods. It requires extensive testing to validate efficacy and thus is only considered in crisis-capacity settings. This study has not been published however it has been approved by the University of the Witwatersrand's ethics committee.



Title: A novel nano therapeutic using convalescent plasma derived exosomal (CPExo) for COVID-19: A combined hyperactive immune modulation and diagnostics

Author(s): K Anand, C Vadivalagan, **JS Joseph**, SK Singh, M Gulati, et al.

Source: Chemico-Biological Interactions 344 (2021) 109497

Abstract: Extracellular vesicles like exosomes are important therapeutic tactics for treating COVID-19. By utilizing convalescent plasma derived exosomes (CPExo) from COVID-19, recovered persistence could accelerate the treatment strategies in the current state of affairs. Adequate literature has shown that administering the exosome to the in vivo system could be beneficial and could target the pathogens in an effective and precise manner. In this hypothesis we highlight the CPExo instead of convalescent plasma (CP), perhaps to dispense of exosomes are gratified and it's more effectively acquired immune response conferral through antibodies. COVID-19 convalescent plasma has billions of exosomes and it has aptitudes to carry molecular constituents like proteins, lipids, RNA and DNA, etc. Moreover, exosomes are

capable of recognizing antigens with adequate sensitivity and specificity. Many of these derivatives could trigger an immune modulation into the cells and act as an epigenetic inheritor response to target pathogens through RNAs. COVID-19 resistance activated plasma-derived exosomes are either responsible for the effects of plasma beyond the contained immune antibodies or could be inhibitory. The proposed hypothesis suggests that preselecting the plasma-derived antibodies and RNAs merged exosomes would be an optimized therapeutic tactic for COVID-19 patients. We suggest that, the CPExo has a multi-potential effect for treatment efficacy by acting as immunotherapeutic, drug carrier, and diagnostic target with noncoding genetic materials as a biomarker.

Keywords: Exosomes; Convalescent plasma; Immunotherapy; COVID-19; Drug delivery; miRNAs; Diagnosis

Title: Green synthesis of nanoparticles and their anti-microbial efficacy against drug-resistant Staphylococcus aureus



Author(s): N Tlotleng, JM John, DW Nyembe and W Utembe

Source: Green synthesis of nanoparticles and their antimicrobial efficacy against drug resistant Staphylococcus aureus, in Glover RL, Nyanganyura D, Mufamadi MS, Mulaudzi RB, Eds. Green Synthesis in Nanomedicine and Human Health. CRC Press, CRC press, ISBN 9780367710811

Abstract: Nanomaterials are being increasingly utilised in numerous medical applications, including the fight against microbial drug

resistance that limits the effectiveness of current conventional treatments. Multi-drug resistant (MDR) Staphylococcus aureus (*S. aureus*) is among the antibiotic resistant pathogens that cause many hospital-acquired and community-acquired respiratory, gastrointestinal, cardiovascular and dermatological infections globally. The aim of this chapter is to provide a comprehensive review on the biological synthesis of

nanomaterials as well as their biocompatibility and efficacy against MDR *S. aureus*. In this regard, the chapter will provide different approaches of green synthesis of nanomaterials, which aims to implement sustainable processes using low-cost, environment-friendly, renewable and non-toxic

reagents. The synthetic routes, advantages and disadvantages of each method will be discussed. Most importantly, the chapter will present the use of various types of nanomaterials (metal and metal oxide nanomaterials, fullerenes, carbon nanotubes, liposomes and dendrimers) against *S. aureus*.



Title: The association between silica exposure, silicosis and tuberculosis: a systematic review and meta-analysis

Author(s): R Ehrlich,
P Akugizibwe, N Siegfried and D Rees

Source: GSource:
Ehrlich et al. BMC

Public Health (2021) 21:953

<https://doi.org/10.1186/s12889-021-10711-1>

Abstract: While the association between occupational inhalation of silica dust and pulmonary tuberculosis has been known for over a century, there has never been a published systematic review, particularly of experience in the current era of less severe silicosis and treatable tuberculosis. We undertook a systematic review of the evidence for the association between (1) silicosis and pulmonary tuberculosis, and (2) silica exposure and pulmonary tuberculosis controlling for silicosis, and their respective exposure-response gradients. We searched PUBMED and EMBASE and selected studies according to a priori inclusion criteria. We extracted, summarised and pooled the results of published case-control and cohort studies of silica exposure and/ or silicosis and incident active tuberculosis. Study quality was assessed on the Newcastle-Ottawa Scale. Where meta-analysis was possible, effect estimates were pooled using inverse-variance weighted random-effects models. Otherwise narrative and graphic synthesis was undertaken. Confidence regarding overall effect estimates was assessed using the GRADE schema. Nine

studies met the inclusion criteria. Meta-analysis of eight studies of silicosis and tuberculosis yielded a pooled relative risk of 4.01 (95% confidence interval (CI) 2.88, 5.58). Exposure-response gradients were strong with a low silicosis severity threshold for increased risk. Our GRADE assessment was high confidence in a strong association. Meta-analysis of five studies of silica exposure controlling for/or excluding silicosis yielded a pooled relative risk of 1.92 (95% CI 1.36, 2.73). Exposure-response gradients were observable in individual studies but not finely stratified enough to infer an exposure threshold. Our GRADE assessment was low confidence in the estimated effect owing to inconsistency and use of proxies for silica exposure. The evidence is robust for a strongly elevated risk of tuberculosis with radiological silicosis, with a low disease severity threshold. The effect estimate is more uncertain for silica exposure without radiological silicosis. Research is needed, particularly cohort studies measuring silica exposure in different settings, to characterise the effect more accurately as well as the silica exposure threshold that could be used to prevent excess tuberculosis risk.

Title: Pet groomer's occupational exposures: An under-researched group of workers in a growing pet-care industry



Author(s): M Muvhali and T Singh

Source: Current Allergy & Clinical Immunology; June 2021 Vol 34, No 2

Abstract: The increase in global pet ownership has led to the pet-care industry's growth, making pet grooming an occupation that has seen considerable growth. Yet, little is known about their occupational environment, exposures and the associated health effects. Veterinary workers may be the most closely comparable group, owing to their similar occupational exposures. This review explores both the comparable biological, chemical and other hazards identified in veterinary practices and their impact on the health of veterinary workers. It also considers how research findings among these workers may help determine the direction in which studies among pet groomers must focus. Studies reported on the following: veterinary workers have a high prevalence of sensitisation to animal allergens and latex, which lead to both respiratory and skin effects such as asthma and contact dermatitis. Zoonotic infections

among veterinary workers are also common. Research on respirable dust and bioaerosol exposure among veterinary workers is still limited, but current evidence from veterinary and pet-grooming establishments shows the need for further investigation. Other physical, ergonomic and noise hazards need to be investigated further in pet-grooming settings. Inadequate training on health and safety aspects and poor personal protective equipment use was observed in veterinary workers and pet groomers. The need for more research among pet groomers is necessary, as there seems to be little to no information on a variety of occupational exposures and their health effects. Future studies need to focus on the environmental conditions, hazards and also on worker health and prevention strategies.

Keywords: pet groomers; pet allergy; biological hazards; infectious disease; allergens



Author(s): F. Made, NB Kandala, D. Brouwer

Source: Annals of Work Exposures and Health, 2021;

wxab030,

<https://doi.org/10.1093/annweh/wxab030>

Abstract:

Objectives: Globally, several strategies for compliance testing and within-group exposure variability have been suggested. This study aimed to evaluate the performance of the South African Mining Industry Code of Practice (SAMI CoP) approach for grouping and compliance testing against international standards.

Title: Compliance testing and homogenous exposure group assessment in the South African coal mining industry

Methods: A total of 28 homogenous exposure groups (HEGs) with 728 underground coal mine workers' eight-hour time-weighted average coal dust concentration data were obtained. Compliance testing was assessed using 10% exceedance above occupational exposure limit (OEL) for SAMI CoP, and the 95th percentile of the lognormal distribution was computed for the European Standardization Committee (CEN) and American Industrial Hygiene Association (AIHA). Comparison of the homogeneity of the HEGs was done

between SAMI CoP which mandates that both the arithmetic mean (AM) and 90th percentile must fall in the same exposure band to certify homogeneity and the global geometric standard deviation (GSD) and Rappaport ratio (R-ratio) with specific acceptability criteria. To test the homogeneity of exposure within job titles, eight non-homogenous HEGs that have two or more job titles with three measurements were investigated using GSD and the SAMI CoP criteria.

Results: A total of 21 HEGs out of 28 were non-compliant to the OEL across SAMI CoP, CEN, and AIHA criteria. Compliance to the OEL was observed for seven HEGs according to the SAMI CoP approach, whereas only one HEG was compliant according to both the SAMI CoP and CEN approaches. The GSD criterion and SAMI CoP revealed that 11 and 6 HEGs were homogenous, respectively, and only on 4 occasions, the 2 approaches agreed. The job titles of the majority of non-homogenous

HEGs in both SAMI CoP and GSD were actually homogenous. Five out of 10 sub-groups have their AM above that of HEG B. Other HEGs had at least one of their AM and 90th percentile values above that of their respective parent HEGs.

Conclusions: All three approaches mainly confirmed non-compliance of HEGs. SAMI CoP tended to show compliance of HEGs more than CEN. Non-homogenous HEGs had many job titles that were homogenous according to both SAMI CoP and GSD criteria. There was no perfect agreement of homogeneity by all the indicators. For both future constitutions of HEGs as well as a retrospective assessment of high exposure groups, homogeneity can be improved by using job titles.

Keywords: Code of Practice; exceedance criteria; indicators of homogeneity; occupational exposure limit

Title: Impact of level five lockdown on the incidence of COVID-19: lessons learned from South Africa

Author(s): F. Made,

W. Utembe, K. Wilson, N. Naicker, N. Tlotleng, et al.



Source: Pan African Medical Journal. 2021;39:144. [doi: [10.11604/pamj.2021.39.144.28201](https://doi.org/10.11604/pamj.2021.39.144.28201)]

Abstract:

Introduction: The level five (L5) lockdown was a very stringent social distancing measure taken to reduce the spread of COVID-19 infections. This study assessed the impact of the L5 lockdown and its association with the incidence of COVID-19 cases in South Africa (SA).

Methods: Data was obtained from the National Department of Health (NDoH) from the 5 March to the 30 April 2020. A basic reproductive number (R0) and a serial interval were used to calculate estimated cases (EC). A double exponential smoothing model was used to forecast the number of cases during the L5 lockdown period. A Poisson regression model was fitted to describe the association between L5 lockdown status and incident cases.

Results: A total of 5,742 laboratory-confirmed cases (LCC) were reported by 30 April 2020, 4,785 (83%) occurred during L5 lockdown. Our model forecasted 30,629 cases of COVID-19 assuming L5 lockdown was not imposed. High incidence rates of COVID-19 were recorded in KwaZulu-Natal and Mpumalanga provinces during the L5 lockdown compared to the other provinces. Nationally, the incident rate of COVID-19 was 68.00% higher in L5 lockdown than pre-lockdown for LCC.

Conclusion: The L5 lockdown was very effective in reducing the incidence of COVID-19 cases. However, the incident rates of LCC and EC were higher nationally, and in some provinces during the L5 lockdown.

Keywords: Basic reproductive number, laboratory confirmed cases, estimated cases, forecast cases.



Buyisiwe Nkosi

Medical Scientist in the Occupational
Medicine Section Ergonomics Unit

Why did you choose this career and research path?

I chose ergonomics because I found this discipline interesting and very practical. I then developed a passion and love for ergonomics.

What training and qualifications did you undergo and where?

I have an undergraduate degree in Medical Science and an honours in biochemistry at the University of Zululand. Since I joined the Occupational Medicine Section – Ergonomics Unit, I did my postgraduate ergonomics course with Rhodes University and I'm planning to continue with my Masters in ergonomics at Rhodes University.

What are the most enjoyable aspects of doing research?

Learning new information and innovation. It is also interesting to see through research the gap or differences between the developed and underdeveloped countries. It promotes that desire to do more research and implement the new found information.

What are your research highlights to date?

I have presented my research at the NIOH Research forum in 2017. I also did a poster presentation at the Pathred Congress in 2017 and at the NIOH Research day in 2018. I recently presented again at the NIOH research forum in 2021 and will also present an oral at the Pathred congress in 2021.

What are your career goals?

I want to do my Masters and PhD in ergonomics and become one of the prominent Ergonomists in South Africa.



Occupational health surveillance data provides vital information on the prevalence of occupational related diseases and injuries. It allows trends to be determined and prevention programmes to be monitored and evaluated. Thus surveillance of occupational exposures and health outcomes is an essential function of the NIOH. In this issue we present an update of Health Care worker admissions for COVID-19 related diseases.



OCCUPATIONAL HEALTH SURVEILLANCE SYSTEM:

A SUMMARY OF COVID-19 DATA FOR SOUTH AFRICAN WORKPLACES, 1 OCTOBER 2020 TO 31 MARCH 2021

The Occupational Health Surveillance System (OHSS) was developed to collect occupational health data related to COVID-19 during the National State of Disaster. The surveillance system relies on digital platforms and taps into existing platforms (e.g. those already used by private sector employers) to collect screening, vulnerability, testing, high risk workplace contacts, health outcomes and return to work data for the surveillance system of work-related COVID-19 infections in the private and public sector. Currently COVID-19 related data is reported from workplaces that employ more than 50 employees. The objective of the OHSS is to provide early identification of high risk industries and occupations. The system will also allow for understanding of interventions in workplaces and determining the impact of COVID-19 on industry. Finally, the surveillance system will allow for the Identification of key scientific questions requiring in-depth investigation.

The OHSS was developed by the National Department of Health, the National Institute of Occupational Health (NIOH), the National Institute for Communicable Diseases (NICD), Centre for Industrial Research (CSIR), Business for South Africa (B4SA) and occupational medicine specialists from University of Cape Town (UCT) and University of Kwa-Zulu Natal (UKZN), together with several major private sector corporations. The OHSS was piloted in August to September 2020 and officially commenced on the 1st October 2020 following the release of the Department of Employment and Labour Consolidated COVID-19 Directive on Health and Safety in the Workplace on 28 September 2020.



SURVEILLANCE

REGISTRATION DATA

During this six-month period (1 October 2020 to 31 March 2021) a total of 3 111 businesses had registered. This constituted data of 1,829,897 employees, representing 12% of all formal sector employees (Figure 1A& B). The Manufacturing sector for food, drinks and tobacco (9%) constituted the largest

proportion of businesses registered. Employees in elementary occupations (20.0%) comprise the largest proportion of jobs registered followed by Sales and Service workers (18.0%) and Clerical and Support workers (16.0%).

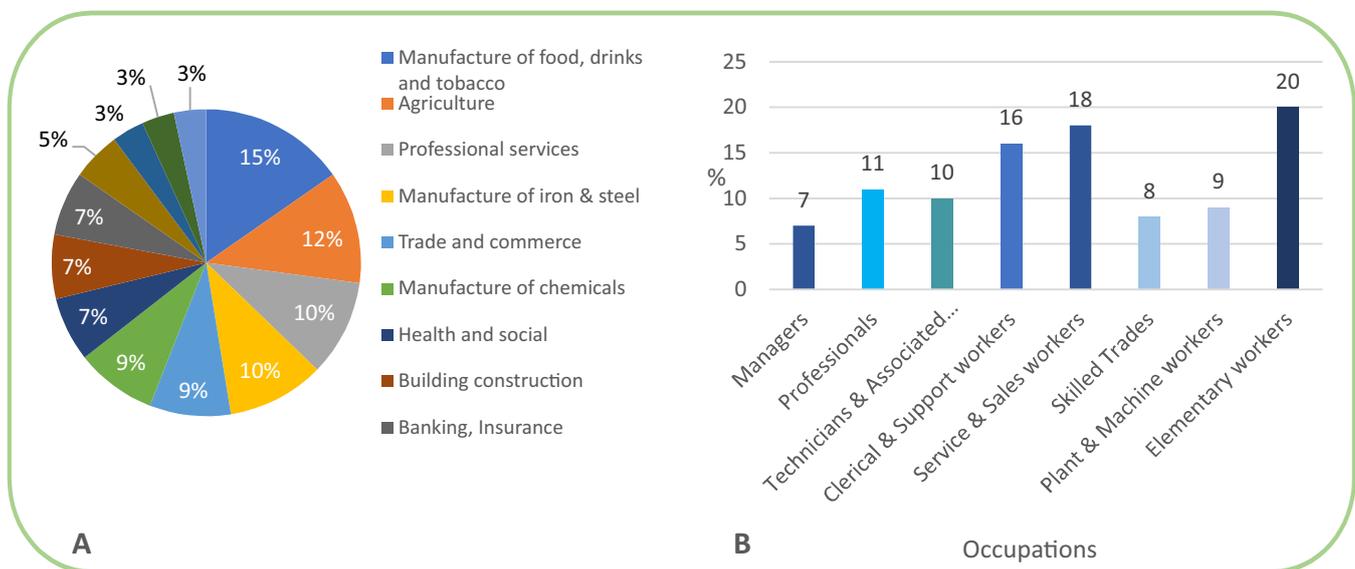


Figure 1A: Industry distribution of registered businesses (59.0% of all registrations, the remaining industries not shown in the graph were <1% each). 1B: Proportions of occupational groups registered in the OHSS.

COVID-19 POSITIVE CASES AND HEALTH OUTCOMES

During this reporting period 3 704 positive COVID-19 cases were reported to the OHSS system with the majority from Gauteng (48,2%), followed by Western Cape (18.6%) and Kwa-Zulu Natal (12.4%). These proportion are very similar to the proportion of businesses that registered from these provinces. Industrial sectors reporting the largest number of cases included the Banking and Insurance sector (57,0%) followed by the Health and Social sector (27,3%). The majority

of COVID-19 positive workers were employed as clerical support workers (n=1111, 30%) followed by managers (n=671, 18.0%) and health care workers (n=525, 14.0%). Eighty-nine percent (89%) of those that tested positive were symptomatic at the time of diagnosis. During this period, 38 (1.5%) deaths and 195 (7.5%) employees had been hospitalised. Among those with COVID-19, there were 2 617 (70.6%) employees that had returned to work.

SYMPTOM SCREENING IN WORKPLACES

Approximately 201 (6.5%) businesses submitted data on symptomatic employees during this period. The most common

symptoms included cough or sore throat (9.0% each), followed by anosmia or tiredness (7.0% each) (Figure 2)

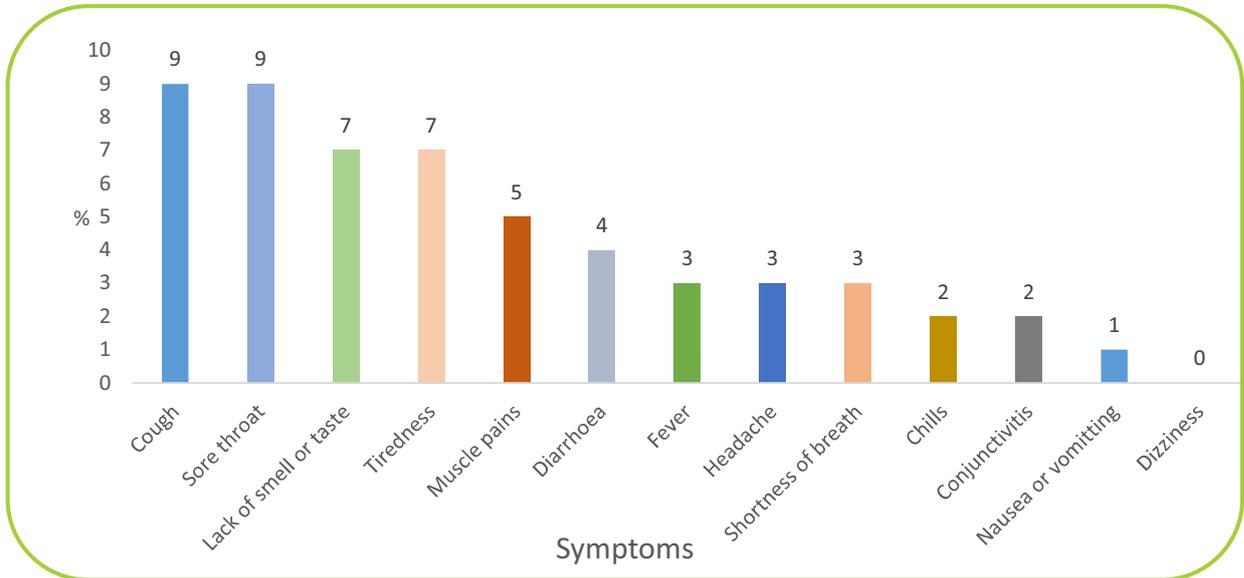


Figure 2. Prevalence of COVID-19 related symptoms reported by employees in routine symptom monitoring at workplaces.

LIMITATIONS AND CURRENT CHALLENGES ON THE OHSS

The data presented here is dependent on employers reporting the legally required information, which currently stands at 12.2% of all businesses. The data presented does not represent the true disease burden experienced by workers in the country, however it does give some insight into patterns of distribution of the pandemic among industries affected. The absence of

reliable denominator data to calculate infection rates per sector prevents optimal utilisation of the data.

Further data from the OHSS is available on the on-line dynamic dashboard: <https://datastudio.google.com/embed/u/0/reporting/bd5b8307-e349-418d-af3b-39b34bff6607/page/jfi1B>.

Acknowledgements: Dr N Naicker, Prof M Jeebhay, Prof R Naidoo, Dr N Tlotleng, Dr S Kgalamono, Dr B Kistnasamy, Dr N Mayat, NIOH Epidemiology, Occupational Medicine Department, IT team, CSIR IT and Ford funding.

For more information on Occupational Health Surveillance at the NIOH please contact the Epidemiology and Surveillance Section at 011 712 6472 or info@nioh.ac.za

The NIOH continues to provide specialised, cost effective occupational health and safety services to national and provincial government departments as well as various industries including the private sector. In this issue, we profile a new accredited service which contributed to the expansion of service delivery at the Occupational Hygiene Section.



NEW ACCREDITED SERVICE

ANALYSIS OF RESPIRABLE CRYSTALLINE SILICA

The NIOH Occupational Hygiene Section manages two laboratories, including the X-ray Diffraction (XRD)/Fourier Transmission Infrared Spectroscopy (FTIR) laboratory that operates under direct supervision of the Head of Section. The XRD/FTIR laboratory provides analytical services that complement the function of the Section's SANAS accredited scope of work in exposure assessment conducted as a Department of Employment and Labour Approved Inspection Authority. The laboratory analyses non-medical samples, which aim to estimate potential exposure to hazardous chemical agents in workplace air.



The three analytical methods performed by the XRD/FTIR laboratory are gravimetric weighing of filters and direct-on-filter analysis for respirable crystalline silica (RCS) following the MDHS 101/2 using either XRD or FTIR instrumentation.

These methods have recently been assessed and recommended for accreditation (April 2021) by the South African National Accreditation System (SANAS) according to ISO/IEC 17025:2017. The service turnaround time is 10 working days from the date of receiving samples. All accredited services are indicated in the table below.

Table 1: Scope of accreditation – XRD / FTIR laboratory

Analysis	Method	Instrument	Accreditation Standard
Gravimetric Weighing	MDHS 14/4	Ultra-Micro balance	SANS ISO 17025:2018 ISO/IEC 17025:2017
Respirable Crystalline Silica Analysis	MDHS 101/2	XRD	SANS ISO 17025:2018 ISO/IEC 17025:2017
Respirable Crystalline Silica Analysis	MDHS 101/2	FTIR	SANS ISO 17025:2018 ISO/IEC 17025:2017

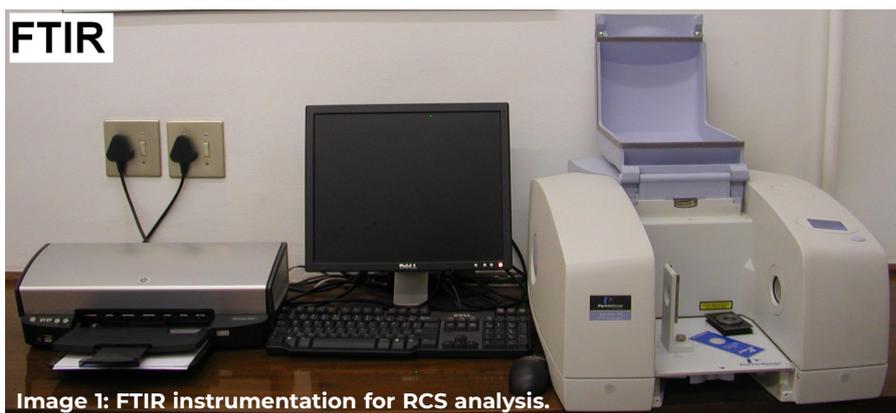


Image 1: FTIR instrumentation for RCS analysis.

SPECIALISED SERVICE DELIVERY

In addition to the SANAS accreditation, the XRD/FTIR laboratory continues to participate in the Air and Stack Emissions Proficiency Testing Scheme run by the Health and Safety Laboratory in the UK and administered by the LGC group. The laboratory has maintained a Z-score of ± 1 for all three methods, which is regarded as a satisfactory

performance. The XRD/ FTIR laboratory prides itself on maintaining high quality technical standards, enabled by experienced professional staff and recently enhanced further by the renovations of the Balance Room. All these reinforce the world-class quality of the analytical services provided to our clients.

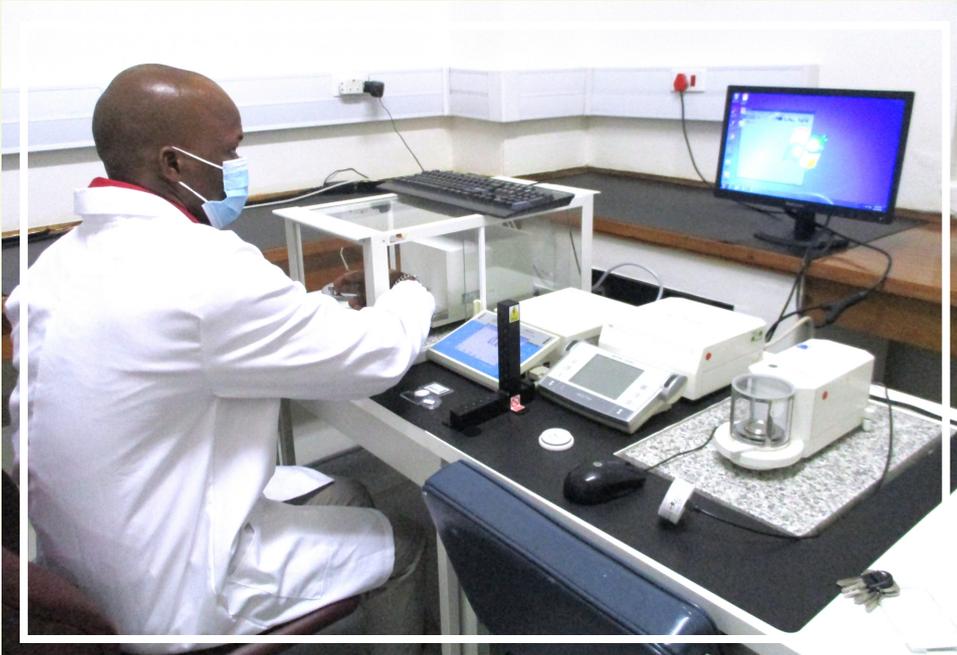


Image 2: Gravimetric weighing of filters in the Balance Room



Image 3: Illustration of an XRD instrumentation for RCS analysis

For more information and request for analysis quotation, please contact:
Jonas Shai (Scientific Analyst) 011 712 6421/ 6547 | jonassh@nioh.ac.za
Jeanneth Manganyi (Head of Occupational Hygiene Section) 011 712 6406 | JeannethM@nioh.ac.za

The NIOH has continued to carry out various COVID-19 and discipline specific training sessions for various industries and related professions, in both the formal and informal sectors, over the past quarter. These training sessions were developed in modules based on topics and specific to sectors and the needs of the NIOH stakeholders. In terms of continuous professional development (CPD) accreditation, the following professional bodies have approved our training sessions for COVID19: HPCSA medical and dental board approved | SADA approved | SAIOH approved | SAIOSH approved | StellMed/SANC approved (Occupational Nurse Practitioners)



TRAINING CONDUCTED

Global stats: 79 webinars 47'455 attendees



Post Acute Sequelae of SARS-CoV-2 Infection (PASC) Formally Long COVID

Thursday, 22 April 2021

Dr Murray Dryden, Ms Caroline Mudara
Ms Caroline Vika, Dr Waasila Jassat, Prof Lucille Blumberg

COVID-19: “Long Covid” and the Workplace (22nd April 2021)

<https://youtu.be/9ZvIwbyF7kM>

This is the first webinar addressing “Long Covid”, organised by the NIOH's Occupational Medicine Section. It was targeted at Occupational Medical and Occupational Nursing Practitioners and the broader OHS community. The NIOH

invited the National Institute for Communicable Diseases' (NICD) Dr Murray Dryden and Dr Waasila Jassat to provide input on “Post-Acute Sequelae of SARS-CoV-2 Infection (PASC)”, formally known as Long COVID. Dr Neil van Tonder contributed on “The Impact on the workplace and considerations for 'Fit for Work' certification”. Dr William Kleynhans covered the topic “Management of COVID-19 in the workplace - Designing a workplace programme”. 797 participants attended the 69th NIOH COVID-19 webinar.



TRAINING PROGRAMME

Training Issue:

COVID-19: Workplace Risk Assessment, Cleaning, Decontamination, Storage and transportation

Occupational Medical & Nursing Practitioners, Occupational Health & Safety (OHS) Professionals & Advisors, OHS Practitioners, Employers & Management Representatives, Trade Union Representatives, SHE

COVID-19: Workplace Risk Assessment, Cleaning, Decontamination, Storage and Transportation (29th April 2021)

<https://youtu.be/-6SpAOJd-cY>

The NIOH delivered this Covid-19 webinar on Thursday 29th April 2021. The webinar was opened by Dr Tanusha Singh, the chairperson of

the NIOH's COVID-19 Outbreak Response Team (OHORT). The topic included in the webinar series at the request of the chemical and construction sectors. The programme covered the “Principles of workplace health risk assessment” presented by Mr Gabriel Mizan (NIOH Occupational Hygiene Section), “Risk assessment tools” presented by Ms Dikeledi Matuka (NIOH Immunology and Microbiology Section), and “Cleaning and disinfecting in different workplace settings” presented by Dr Charlene Andraos (NIOH Toxicology and Biochemistry Section). 705 webinar attendees attended the 2-hour webinar.

TEACHING AND TRAINING



COVID-19: Mental health resilience for Health Care Workers

(4th May 2021) <https://youtu.be/AHXuF-csIQQ>

The NIOH convened the 72nd webinar in the COVID-19 series on the Thursday 4th May 2021 to strengthen the employee health and wellness component of workplace preparedness and prevention capacity in South African workplaces. This webinar followed-on the 13th August 2020 webinar on the addressing the impact of COVID-19 on mental health. This follow-up focussed significantly on the importance of resilience. The topic was introduced by Prof Annatjie van der Wath (University of Pretoria), Dr Marion Borchers (Transnet) and Ms Radhi Vandayar (Healthy Living Consultancy) covered the combined topic of “Resilience in a time of crisis”. The session was attended by 347 attendees.



Guidance on routine and deep cleaning of workplaces when COVID-19 positive cases have been identified (12th May 2021)

The NIOH Occupational Medicine Section organised the contribution and input for the Department of Mineral Resources and Energy (DMRE) COVID-19 Steering Committee webinar. On the 12th May 2021 Dr Charlene Andraos (NIOH Toxicology and Biochemistry Section)

Guidance on routine and deep cleaning of workplaces when COVID-19 positive cases have been identified

Dr Charlene Andraos

presented on the topic “Guidance on routine and deep cleaning of workplaces when COVID-19 positive cases have been identified”. 20 members of the committee attended this briefing.



TRAINING PROGRAMME

Training Issue:

Workers’ rights in the era of COVID-19 and the workplace

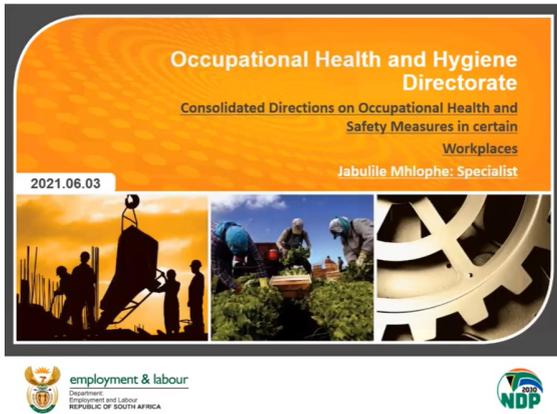
Occupational Medical & Nursing Practitioners, Occupational Health & Safety (OHS) Professionals & Advisors, OHS Practitioners, Employers & Management Representatives, Trade Union Representatives, SHE Representatives, Wellness Coordinators, HR Practitioners.

Workers' rights in the era of COVID-19 and the workplace (18th May 2021)

https://youtu.be/j_ndlSzwNzg

The NIOH convened this webinar on Tuesday 18th May 2021. The session was targeted at the labour and employer stakeholders including employees and employers, workplace representatives / shop stewards, H&S representatives, trade union office-bearers and officials, educators, COVID-19 Compliance Officers and

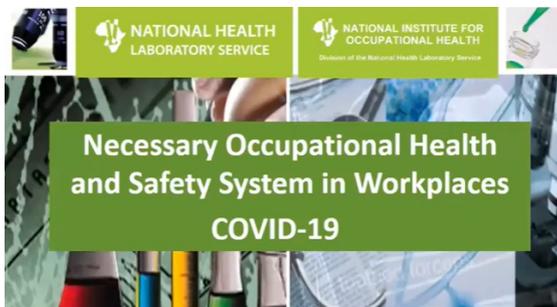
OHS practitioners. The programme focussed on the “Compensation for COVID-19 and the workplace” presented by Ms Nokuthula Sihlangu (Compensation Fund, Department of Employment and Labour), “Medico-legal aspects of COVID-19 in the workplace” presented by Dr Jan Lapere (Occupational Medicine Doctor / OHS Consultant) and “COVID-19 Rights and Duties – toward a better understanding of law” by Mr George Kahn with the support of his colleagues of Richard Spoor Incorporated Attorneys. 672 attendees joined the webinar. The speakers made very useful additional resources available that were shared with the attendees post-webinar.



Basic ventilation requirements: COVID-19 directions and Nat. Building Regulations & other guidelines (3rd June 2021) [▶ https://youtu.be/O2FTUB7Mu18](https://youtu.be/O2FTUB7Mu18)

This is the 76th COVID-19 session implemented in the NIOH's webinar series. The webinar was opened by Dr Tanusha Singh, the chairperson of the NIOH's COVID-19 Outbreak Response Team (OHORT). The webinar was very timely, keeping in mind the impact on workplace ventilation during the winter months. The Department of Employment and Labour's (DoEL) Ms Jabulile Mhlophe presented on "COVID-19 directions & basic ventilation requirements", the CSIR's Mr Tobias van Reenen

presented on "Ventilation guidance for COVID-19", and the NIOH Occupational Hygiene Section's Mr Moses Mokone presented on "Ventilation during COVID-19 pandemic: Occupational; Hygiene perspective". 712 attendees joined this popular online session.



Occupational Health & Safety, Workplace Systems and COVID-19 (27th May 2021)

[▶ https://youtu.be/GDsWMMNk6uY](https://youtu.be/GDsWMMNk6uY)

The Occupational Medicine Section organised this webinar, conducted on Thursday 27th May, is a logical extension of earlier COVID-19 "Return-to-Work" topics covered in previous webinars. The webinar provided an overview of "COVID-19 update and workplace preparedness" presented by Dr Nompumelelo Ndaba

(NIOH Occupational Medicine Specialist) and covered the topics on "Necessary Occupational Health and Safety System in workplaces" presented by Dr Edward Sepirwa (NIOH Occupational Medicine Registrar), "Additional workplace systems during the time of COVID-19" presented by Dr Mazvita Mberi (NIOH-Wits Public Health Medicine Registrar), "Occupational Health Surveillance System (OHSS)" presented by Dr Hloniphile Maso (NIOH Occupational Medicine Registrar), and the last topic on "What every manager should know and do" presented by Ms Michelle Morgan (NHLS National SHE Deputy Manager). 763 attendees joined this popular online session.



Working from home:

OHS policy and reasonable accommodation during COVID-19 (1st July 2021) [▶ https://youtu.be/ODOGzDSvaNo](https://youtu.be/ODOGzDSvaNo)

The context of the COVID-19 3rd wave and the Level 4 lockdown restrictions had placed new emphasis on and increased interest in this topic. In this webinar the legal, medico-legal and compensation aspects were covered. Mr George Kahn of Richard Spoor Inc. Attorneys, with the support of his colleague PhD-candidate Mr G. Mudimu, presented on "Introduction to the working-from-home (WFH) – regulatory framework and case law", Mr Tibor Szana (Chief Inspector, Department of Employment & Labour) and Ms Milly Ruiters (Chief Director: Medical Services, Compensation Fund) presented on "Compensation – Injury on duty when working-form-home", and Dr Jan Lapere (Occupational medicine Doctor/OHS Consultant) presented on "Employer/employee duties with regard to OHS in working-form-home".

776 attendees joined this popular online session.



“Long Covid” and the workplace – an update (8th July 2021)

<https://youtu.be/kOURZE-jBZc>

This “Long Covid” webinar conducted on Thursday 8th July 2021 as an update session augmenting the previous webinar on the same topic done on 22nd April 2021. It was targeted at Occupational Medical and Occupational Nursing Practitioners and the broader OHS community. Dr Murray Dryden (NICD Medical officer, Emergency

Outbreak Response Unit & member of DATCOV Hospital Surveillance Team) presented on behalf of the NICD research team on “*Post COVID-19 Condition - Early findings from a longitudinal cohort of hospitalized COVID-19 patients in South Africa*”. Dr Rubeshan Perumal (Pulmonologist and Post-COVID-19 Lung Disease service and research lead, Groote Schuur Hospital and UCT) presented on “*Long COVID-19 –The Tsunami after the waves*”. Associate Prof. Shahieda Adams (Occupational Medicine Specialist; Division of Occupational Medicine, School of Public Health and Family Medicine at UCT) presented on “*Long COVID and the occupational health implications*”. And Prof Romy Parker (Director: Pain Management, Department of Anaesthesia and Perioperative Medicine, UCT) presented on “*Rehabilitation for Long Covid*”. 628 attendees joined this popular online session.



The NIOH will continue to provide training on COVID-19 and for further info check the website for training updates at <http://www.nioh.ac.za/covid-19-presentations/>. If there is any specific training that the readers feel is important and should be done they can send a request to info@nioh.ac.za.

NON COVID-19 RELATED TRAINING



Department of Employment & Labour's (DoEL) virtual Launch of "Regulations for Hazardous Chemical Agents" (15th April 2021)"

<https://youtu.be/g83lexsu8GU>

The DoEL conducted the virtual launch of the new Regulations for Hazardous Chemical Agents on Tuesday 20th April 2021 with the support of the NIOH. The NIOH Training Unit facilitated the event on the online ZOOM platform together with colleagues from the Information Services Section,

Marketing and Communications and IT Departments. The NIOH Executive Director, Dr Spo Kgalamono, opened the event with the Welcome address. The DoEL speaker included Mr Tibor Szana (Chief Inspector), Ms Bulelwa Huna (Senior OHS Specialist) and Ms Elize Lourens (OHS Specialist). Dr Greg Kew contributed as a member of the Technical Committee 7 (TC7) and Ms Deidre Penfold contributed as the representative of the chemical industry. 1'394 attendees were recorded for the 4-hour webinar.



Standardization of Spirometry update 2019 - Evaluation of Spirometry regarding repeatability, acceptability, usability and grading (20th May 2021)

The Occupational Medicine Section of the NIOH organised this webinar on COVID-19 and Travel Medicine convened on Thursday 20th May 2021. Dr Spo Kgalamono (NIOH Executive Director) opened the webinar introduced the NIOH and its services. The presentations covered the topics "Introduction to the Course including Standardisation of spirometry 2005 - how we were practicing?" presented by Dr Odette Volmink (NIOH Occupational Medicine Specialist), the topic "What's changed in the standardisation of Spirometry update 2019 - Repeatability, acceptability, usability and grading." presented by

Sr Lindsay Zurba, the topic "Evaluation of Spirometry using the 2019 update" presented by Prof David Rees (NIOH), and the topic "The Global Lung Function Initiative: Reference values (GLI)" by Dr Nompumelelo (NIOH Occupational Medicine Specialist). The update webinar was targeted at Occupational Medical practitioners, Respiratory physicians and medical practitioners who commonly interpret spirometry in practice. 68 selected participants attended the training session.

YouTube



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<https://www.youtube.com/channel/UCA24QIQmshRuX-pKzVWtWA/videos>



Quality Council for Trades and Occupations (QCTO)

Accredited the NIOH as a training facility for the Biorisk officer qualification.

The Quality Council for Trades and Occupations (QCTO) accredited the NIOH as a training facility for the Biorisk officer qualification.

This is in addition to the two COVID-19 related skills programmes reported in the previous issue, namely:

- **Workplace Preparedness and Risk Control Assistant:** Communicable and other Occupational Diseases | NQF Level 3 | Credits 3
- **Workplace Preparedness and Risk Control Officer:** Communicable and other Occupational Diseases | NQF Level 4 | Credits 5

This formal QCTO accreditation provides the NIOH the basis to apply its Occupational Health and general Occupational Health and Safety (OHS) capacity and skills base to reach the South African formal and informal sector workplaces through these registered/ approved skills programmes. This strengthens the NIOH's ability to align its existing knowledge base and training materials to further its mandate to address strategic OHS training needs and capacity-building interventions through

the registered/ approved skills programmes. Subject to resource-allocation, the national focus on occupational diseases will be sharper and should have direct implications for meaningful interventions to promote healthy, safe and sustainable workplaces.



Prof M Gulumian was selected to receive the 2021 International Union of Toxicology (IUTOX) Lifetime Achievement Award (28th April 2021)

The IUTOX Executive Committee created this award to honour "a distinguished scientist who has made lasting contributions to toxicology in countries where toxicology is under-represented."



COVID-19 RELATED INFORMATION AND EDUCATION MATERIALS

The National Institute of Occupational Health (NIOH) and its Outbreak Response Task Team has been actively involved in COVID-19 training sessions and public dissemination of information and educational material since early March, when news of the first Coronavirus case was announced.

The NIOH has been utilising several platforms to reach South Africans including Twitter, YouTube and its website **(which has been zero-rated*)** to raise awareness on its training sessions, educational videos and audio, as well as presentations and posters.

This has so far been a resounding success and as Occupational Health and safety champions and ambassadors, we should all be utilising these training sessions and minute-long videos for our own health and safety and that of our colleagues, families and friends.

***The NIOH website is zero-rated by Vodacom, Telkom, MTN, Rain, MWeb & Internet Solutions. No data charges will therefore apply for users of these mobile network providers. All content and resources on this website can be downloaded and browsed for free, excluding YouTube viewing and downloading.**

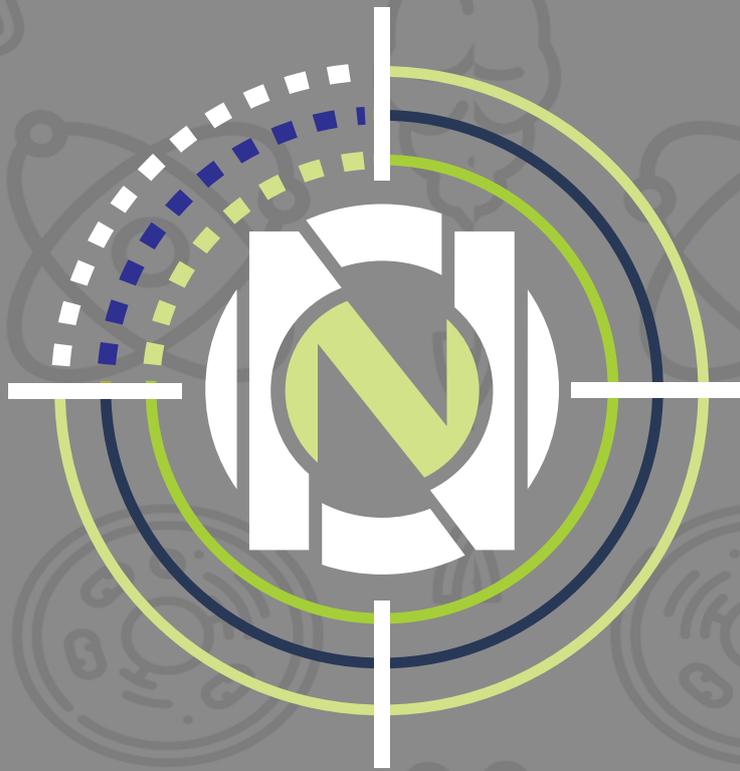
PLEASE SEE BELOW LINKS TO THE TWITTER VIDEOS ONLINE THUS FAR:

- 1.COVID-19: Know the 3 C's and 3 W's – Prevention during the Winter Season
<https://www.nioh.ac.za/wp-content/uploads/2021/06/The-Three-Cs-and-Ws.mp4>
- 2.COVID-19: What employers need to consider for vulnerable workers
<https://www.nioh.ac.za/wp-content/uploads/2020/08/Vulnerable-workersUpload.mp4>
- 3.What every employer should do during COVID-19
https://www.nioh.ac.za/wp-content/uploads/2020/06/Twitter_03_What-every-workplace-needs-FINAL.mp4
- 4.What employers need to know about risk assessment
https://www.nioh.ac.za/wp-content/uploads/2020/06/Twitter_05_Risk-Assessment.FINAL-2-mp4.mp4
- 5.Steps employers can take when a worker is symptomatic or tests positive for Covid-19 at work
<https://www.nioh.ac.za/wp-content/uploads/2020/07/When-an-employee-tests-positive.mp4>
- 6.The importance of Medical Screening in the Workplace
<https://www.nioh.ac.za/wp-content/uploads/2020/08/The-importance-of-medical-screening-FINAL.mp4>
- 7.Working during lockdown? How to stay safe
https://www.nioh.ac.za/wp-content/uploads/2020/06/Twitter_01_Lockdown-workers-FINAL-3.mp4
- 8.What you need to know about donning & doffing surgical masks
<https://www.nioh.ac.za/wp-content/uploads/2020/07/Donning-and-doffing-surgical-mask.FINAL-2-mp4.mp4>
9. What you need to know about surgical masks
https://www.nioh.ac.za/wp-content/uploads/2020/06/Twitter_04_Surgical-masks-FINAL-2-mp4
10. Step-by-step guide on donning and doffing of a Vflex N95 respirator
<https://www.nioh.ac.za/wp-content/uploads/2020/07/Vflex-N95-respirator-FINAL.mp4>
11. Donning and doffing of cup shaped N95 respirator
<https://www.nioh.ac.za/wp-content/uploads/2020/07/Donning-and-doffing-of-cup-shaped-N95-respirator.mp4>
12. What you need to know when donning and doffing a Kimberly Clark respirator
<https://www.nioh.ac.za/wp-content/uploads/2020/08/Donning-and-doffing-a-Kimberly-Clark-respirator-FINAL-mp4>
13. The steps you need to know for donning gloves
<https://www.nioh.ac.za/wp-content/uploads/2020/06/Donning-of-gloves.FINAL-3-mp4-1.mp4>
14. The steps you need to know for doffing gloves
https://www.nioh.ac.za/wp-content/uploads/2020/07/Doffing-of-gloves-2_FINAL.mp4
15. Which workers require medical N95 respirators?
https://www.nioh.ac.za/wp-content/uploads/2020/06/Twitter_02_The-use-of-N95-respirators_final.mp4
16. A guide on how to doff gloves using the beak method
<https://www.nioh.ac.za/wp-content/uploads/2020/07/Doffing-gloves-beak-method-FINAL.mp4>


Follow us on Twitter
https://twitter.com/nioh_sa

Below is a link to posters as well as various factsheets that have been developed. These can be utilised in your respective workplaces and are print-ready (A3 size).

NIOH Factsheets & Posters <http://www.nioh.ac.za/covid-19/>



**COVID-19
Workplace Preparedness & Prevention**

**Workplace Hotline: 0800 2121 75
OHSS queries: OHSWorkplace@nioh.ac.za
OHSS hotline: 072 321 5503 | 071 398 1169**

"Healthy, Safe, Happy & Sustainable Workplaces"

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PLEASE CONSIDER THE ENVIRONMENT BEFORE PRINTING.