The year 2020 has proven to be the most challenging year that we’ve ever experienced to date. The pandemic has really tested our determination, resilience, wits and creativity as an organisation, but I believe, just like the spring season, it also gave birth to some of the best work we’ve ever produced. We have seen growth in partnerships and work collaborations both internally and externally. This time has also reinforced what we’ve always believed, that through unity, collaborations, etc., a lot more can be achieved-common goals effortlessly attainable.

In this second issue of OccuZone, we recount the various activities and projects which the NIOH has been working on in the past three months. Firstly, we highlight our research activities with a special focus on the Integrated Exposure Uptake Biokinetic (IEUBK) model to conduct risk assessments for lead exposure in work settings. Moreover, we showcase eleven scientific publications covering a wide range of topics in occupational health and safety produced by our researchers which contribute to the body of knowledge in OHS. We also profile one of our emerging researchers, an Occupational Hygienist.

Secondly, we take a look at the Occupational Health Surveillance System (OHSS) for COVID-19, which has been developed following the numerous directives issued by various government departments mandating the reporting of COVID-19 data to the National Department of Health. We further showcase three unique specialized services- Agilent’s Cary Eclipse Fluorescence Spectrophotometer with Microplate Reader; the NIOH Occupational Medicine COVID-19 Hotline, which provides real time COVID-19 advisory support for workplaces and Adapting an Online Health and Safety Information System (OHASIS) for the new COVID-19 challenge. Lastly, we showcase our teaching and training activities which largely focused on workplace response to COVID-19.

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.

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Happy reading!

Editor in Chief
Angel Mzoneli
Research

Message from the Research Committee Chair

Spring brings us new hope, new beginnings and bright ideas and that’s exactly what NIOH researchers have for you in this edition. Incidentally one of our publications explores modern chromatographic methods coupled to mass spectrometric techniques to detect trace elements and the chemical composition in the leaf extracts of Kigelia Africana. The secondary metabolites identified can be used as anti-inflammatory, -microbial, -bacterial, -fungal, and -proliferative agents for industrial, therapeutic, and medicinal applications.

The effect of long-term exposure to Silver nanoparticles on blood coagulation in vivo has been investigated, however at this stage the results are still inconclusive and warrant further studies. Other research on nanoparticles focused on the interference within high throughput screening to ensure reliable data generation for predictive toxicology. This is fundamentally important as more and more researchers are exploring big data for health intelligence studies which is dependent on good quality and reliable information. Serious and persistent threats to health from exposures in the cottage industries has been reviewed with particular focus on lead waste production and neighborhood contamination. In South Africa, children are exposed to lead in their school, living and playing environment, and their parents’ work environments. South African epidemiological studies reveal that while blood lead distributions in children have started to decline following the introduction of unleaded petrol, certain groups continue to be exposed to environmental lead from multiple sources. Lead is widely used in both the formal and informal sectors. This includes cottage industries, jewellery making, spray painting, welding, hair dressing, mining, lead melting in fishing communities, Ayurvedic medicines, battery recycling and the manufacture of certain products.

As if exposure is not bad enough some workers like the informal waste recyclers also face numerous challenges in accessing health care. Specific to their informal trade, barriers to health care utilization are related to financial repercussions due to the informal nature of their work which can lead to more severe health outcomes. On the topic of health access another study looked at the implementation of HealthWISE to empowering health workers to protect their own health. A Study was conducted to determine the enabling factors and barriers to implementing the HealthWISE tool in Mozambique, South Africa, and Zimbabwe. The last study in this edition investigated an outbreak of cutaneous abscesses caused by Panton-Valentine leucocidin producing methicillin-susceptible Staphylococcus aureus among gold mine workers in South Africa. It was found that best practices were poorly implemented as some mine workers washed protective clothing with untreated water and hung them for drying at the underground surface. The summaries of the findings from these studies are provided here for your reading pleasure. As always NIOH continues to advocate for hazard reduction and health promotion within workplaces and we hope you will champion the call within your occupational spheres.

Dr Tanusha Singh
Lead exposure has severe effects on people, including workers and in particular, children and thus continues to be a public health and occupational health problem across the world. The Institute for Health Metrics and Evaluation (IHME) in 2016, has estimated that lead exposure accounted for 540 000 deaths and 13.9 million years lost to disability and death (disability-adjusted life years (DALYs)) worldwide due to the long term effects on health. High levels of lead exposure affects the brain and central nervous system and can cause convulsions, comas and even death. Children who survive lead poisoning may be left with neurological and behavioural disorders, which can be irreversible. In addition, lower levels of lead exposure are also harmful and can affect brain development and result in behavioural changes, anaemia, hypertension, renal impairment, immune-toxicity and toxicity to the reproductive organs. Ecological and epidemiological studies in developed nations have further linked lead exposure to antisocial and criminal activities in adolescents and adults. There is no known safe blood lead concentration level and when lead exposure increases, the severity of symptoms and effects also escalate. The study in this edition highlights the Integrated Exposure Uptake Biokinetic (IEUBK) model to conduct risk assessments for lead exposure in work settings.

Health Risk Assessment of Lead Exposure to Children in Blantyre, Malawi

Dr Utembe W

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Note: The study was conducted in fulfilment of Dr Utembe’s now completed PhD in the University of the Witwatersrand School of Public Health and was supervised by Prof Mary Gulumian.

The study focused on exposure to lead which causes many toxic effects, including, inter alia, neurological, haematological, reproductive, and cardiovascular effects. The aim of the study was to determine sources of exposure to lead among children in Blantyre, Malawi, as well as the assessment of the potential risks. This descriptive cross-sectional study was conducted within the paradigm of toxicological (health and environmental) risk assessment of chemicals, involving the following steps:

1. Measurement of the levels of lead present in different sources including children’s toys, domestic paints, foods, house dust, playground soil and water
2. Measurement of the levels of lead in the blood of participants.
3. Prediction of blood lead values resulting from exposure to lead from the identified sources using the Integrated Exposure Uptake Biokinetic (IEUBK) model
4. Evaluation of the applicability of the IEUBK model by assessing the agreement between the measured to predicted blood values.
5. The identification of potential risk factors using logistic regression.

Blood lead values ranged from 2.0 to 50.4 µg/dL, with a very high prevalence (71.7%) of high blood lead values (≥ 5 µg/dL), while 22.8% of these values were greater than 10 µg/dL. A comparison of average measured blood lead values against predicted blood lead values is presented in Figure 1.
From the identified risk factors, only areas of residence correlated significantly to high blood lead levels (p = 0.013). The study successfully evaluated and applied the IEUBK model, which was developed in the United States of America, for the first time in Africa. The Toxicology Department aims to use similar models to conduct risk assessment among workers and the general population, especially regarding exposure to lead, pesticides, nanomaterials and other substances. A number of proposals have been developed and submitted to potential funders, in this regard, and Dr Utembe is supervising a number of students in similar studies. There are no conflicts of interest in the study.

**Figure 1** Comparison of the geometric means of predicted and observed (measured) blood lead stratified by age
Title: Exploration of modern chromatographic methods coupled to mass spectrometric techniques for trace element and chemical composition analyses in the leaf extracts of Kigelia africana

Author(s): OF Fagbohun, JS Joseph, OA Salami, TAM Msagati

Source: Biological Trace Element Research. 2020, 8:1-6

Summary: The use of Kigelia africana (Lam.) Benth plant dates back to last century. The different parts of the plant exhibited various pharmacological activities. But literature search revealed scanty use of the leaf extract owing to few information regarding the various phytochemical constituents. The aim of this study is, therefore, to profile the chemical compounds through the use of omics-based approach. Ultrahigh-pressure liquid chromatography quadrupole-time-of-flight tandem mass spectrometry (qTOF-UPLC/MS) alongside gas chromatography quadrupole time-of-flight tandem mass spectrometry (qTOF-GC/MS) were used to profile these chemical compounds. Inductively coupled plasma optical emission spectrometry (ICP-OES) was used to determine the concentration of trace elements as well as limit of detection (LOD) and quantification (LOQ). For broader metabolite determination, a modified sample preparation was employed and to ascertain the cytoprotective potential of the leaf extract, MTT assay on A375 human melanoma cell lines was carried out. Sixty-eight peaks were characterized with the identification of 275 metabolites where 8 of these were confirmed. Of importance is the identification of eugenol; a polyphenolic compound at m/z 165.09 on fragments 1 19.09, 147.08, 109.10, 137.10, and 137.06. For qTOF-GC/MS analysis, 232 metabolites were identified consisting of terpenes, fatty acids, furans, amines, amides, and alkanes. The concentration of trace elements in the leaf extract ranged from 0.08 for Zn to 0.28 mg/kg for Fe with low concentrations of Cd according to the recommendation of European Legislation. The leaf showed higher inhibition of growth against A375 human melanoma cell lines in a dose-dependent manner. The results showed that K. africana leaf contained various pharmaceuticals, nutraceuticals, designer drugs, and phytochemicals, and these chemicals have minimal cytotoxic side effects. To the best of our knowledge, this is the first study providing information on the various secondary metabolites in the leaf extract through the use of omics-based approach. Therefore, the leaves of K. africana plant can be used as antiinflammatory, antimicrobial, antibacterial, antifungal, and antiproliferative agents for industrial, therapeutic, and medicinal applications.

Title: Lead exposure in the home environment: An overview of risks from cottage industries in Africa

Author(s): A Matheea, R Streeta, J Tearea, N Naicker

Source: Neurotoxicology, 2020; 81:34–39

Summary: In Africa, millions of employment opportunities arise from the informal economy. As a sub-category of the informal sector, cottage or home-based industries continue to play a prominent role. The aim of this paper is to describe the insidious risks of lead exposure associated with certain cottage industries. The limited available information on subsistence fishing, artisanal pot making, battery dismantling and artisanal gold mining in African countries is used to describe the role and prevalence of cottage industries, the nature of concomitant acute and chronic lead exposure (especially in vulnerable groups), lead waste production and neighborhood contamination. The paper highlights the serious and persistent threats to health and lack of regulatory protection for those associated with cottage industries and calls for scaled up attention and innovative responses to a form of work that is rooted in poverty and recognized to be challenging to address.
**Title:** Interference: A much-neglected aspect in high-throughput screening of nanoparticles
**Author(s):** C Andraos, IJ Yu and M Gulumian
**Source:** International Journal of Toxicology. 2020, 16:1091581820938335

**Summary:** Despite several studies addressing nanoparticle (NP) interference with conventional toxicity assay systems, it appears that researchers still rely heavily on these assays, particularly for high-throughput screening (HTS) applications in order to generate “big” data for predictive toxicity approaches. Moreover, researchers often overlook investigating the different types of interference mechanisms as the type is evidently dependent on the type of assay system implemented. The approaches implemented in the literature appear to be not adequate as it often addresses only one type of interference mechanism with the exclusion of others. For example, interference of NPs that have entered cells would require intracellular assessment of their interference with fluorescent dyes, which has so far been neglected. The present study investigated the mechanisms of interference of gold NPs and silver NPs in assay systems implemented in HTS including optical interference as well as adsorption or catalysis. The conventional assays selected cover all optical read-out systems, that is, absorbance (XTT toxicity assay), fluorescence (CytoTox-ONE Homogeneous membrane integrity assay), and luminescence (CellTiter Glo luminescent assay). Furthermore, this study demonstrated NP quenching of fluorescent dyes also used in HTS (2',7'-dichlorofluorescein, propidium iodide, and 5,5',6,6'-tetrachloro-1,1',3,3'-tetraethyl-benzamidazolocarbocyanin iodide). To conclude, NP interference is, as such, not a novel concept, however, ignoring this aspect in HTS may jeopardize attempts in predictive toxicology. It should be mandatory to report the assessment of all mechanisms of interference within HTS, as well as to confirm results with label-free methodologies to ensure reliable big data generation for predictive toxicology.

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**Title:** Effect of long-term exposure to Silver nanoparticles on blood coagulation in Vivo
**Author(s):** M Gulumian, B Kelman, JS Choi, CH Kim, IJ Yu
**Source:** Journal of Cardiology and Vascular Medicine, 2020; Vol 6: 204

**Summary:** Epidemiological studies suggest that air pollutants such as fine particulate matter (PM2.5) or ultrafine particles (UFP) (PM0.1) are responsible for cardiovascular and pulmonary adverse effects following both short-term and long-term exposures. One of the potential mechanisms may be adverse effects on blood coagulation. Because nanoparticles and ultrafine particles share a similar size range, nanoparticles may act as ultrafine particles. Silver nanoparticles (AgNPs) have been extensively used nanomaterials in consumer products and medical devices. Blood coagulation effects of long-term AgNP exposure via various routes have not been studied at all. We have analyzed our seven subacute to subchronic silver nanoparticle exposure studies conducted from 2008 to 2020 at various doses in healthy rats to investigate the effects of AgNP exposure on blood coagulation. Seven silver nanoparticle (AgNP) exposure studies including two subacute oral, one subchronic oral, one subacute inhalation, one subchronic inhalation, and two subacute intravenous injections, were analyzed. Among the seven studies, only one oral subacute study showed a significant effect on active partial thromboplastin time (aPTT) in the high dose female rats, and one subacute inhalation study showed significant effects on a PTT in all concentration groups in male rats compared to that for the control. Other studies did not show any nanoparticle exposure to relevant dose-dependent effects on blood coagulation. Therefore, the effect of subacute and subchronic exposure to AgNP on blood coagulation in the healthy rat is not clear yet.
Title: Dwelling characteristics influence indoor temperature and may pose health threats in LMICs  
Author(s): J Teare, A Mathee, N Naicker, C Swanepoel, T Kapwata, Y Balakrishna, DJ du Preez, DA Millar, CY Wright  

Summary: Shelter and safe housing is a basic human need that brings about a sense of ownership, self-sufficiency, and citizenship. Millions of people around the world live in inadequate dwellings in unhealthy areas, such as urban slums. These dwellings may experience indoor temperatures that impact inhabitants’ health. Indoor dwelling temperatures vary depending on many factors including geographic location, such as inland versus coastal. In an era of climate change, understanding how dwelling characteristics influence indoor temperature is important, especially in low- and middle-income countries, to protect health. To assess indoor temperature in low-cost dwellings located in a coastal setting in relation to dwelling characteristics. Indoor temperature and relative humidity loggers were installed from 1 June 2017 to 15 May 2018 in 50 dwellings in two settlements in a coastal town on the east coast of South Africa. Ambient outdoor temperature data were obtained from the national weather service, indoor temperature data were converted into apparent temperature, and heat index calculations were made to consider possible heat-health risks. A household questionnaire and dwelling observation assessment were administered. A mixed-effects linear regression model was constructed to consider the impact of dwelling characteristics on indoor apparent temperature. Among 17 dwellings with all data sets, indoor temperatures were consistently higher than, and well correlated (r = 0.92) with outdoor temperatures. Average differences in indoor and outdoor temperatures were about 4°C, with statistically significant differences in percentage difference of indoor/outdoor between seasons (p < 0.001). Heat indices for indoor temperatures were exceeded mostly in summer, thereby posing possible health risks. Dwellings with cement floors were statistically significantly cooler than any other floor type across all seasons. Low-cost dwellings experienced temperatures indoors higher than outdoor temperatures in part due to floor type. These results help inform interventions that consider housing and human health (n = 289).

Title: A Critical Review of the Status of Pesticide Exposure Management in Malawi  
Author(s): I Kosamu, C Kaonga and W Utembe  

Summary: Pesticides pose a significant risk to humans and the environment. This paper analyzes the measures used to manage pesticides in Malawi. Malawi’s regulatory authority of pesticides, the Pesticides Control Board (PCB), faces a number of challenges including lack of facilities for analyzing pesticides and inadequate personnel to conduct risk assessment of pesticides. The PCB needs to provide access to information and opportunities among the public to make contributions regarding requirements, processes and policies for assessing pesticide risk and efficacy. There is also a need to enhance the capacity of PCB to assess pesticide poisoning in workers, monitor pesticide residues in food and environmental contamination, as well as to control the illegal importation and sale of pesticides. Just like in other countries such as South Africa, India and Sri Lanka, Malawi urgently needs to implement measures that can restrict the importation, production, sale and use of very toxic pesticides. Malawi also needs to develop measures for the effective management of pesticide waste containers as well as obsolete pesticides, where potential solutions include reducing the purchase of (unneeded) pesticides, treatment of obsolete pesticides in high-temperature cement kilns, as well as requesting pesticide dealers to adopt life-cycle management of their products.
Title: Health care access of informal waste recyclers in Johannesburg, South Africa

Author(s): J Kistan, V Ntlebi, F Made, T Kootbodien, K Wilson, N Tlotleng, S Kgalamono, A Mathee and N Naicker

Source: Plos one. 2020, 1;15(7): e0235173

Summary: Informal waste recyclers contribute significantly to waste removal in South Africa. Waste recyclers face health hazards which are associated with handling and disposal of waste, a lack of personal protective wear and inaccessibility to occupational health care services. Consequently, accessing health care within the public health care sector is important for health outcomes in this population. This study assesses health care access of informal waste recyclers in South Africa to establish baseline information for health planning for potential inclusion of informal waste recyclers into occupational health services. This was a cross-sectional study of informal waste recyclers in two landfill sites in Johannesburg was conducted from March 2018. A standardized structured questionnaire was used to collect information on sociodemographic details, health care utilization, barriers to access and acceptability and affordability of health care. Factors associated with health care utilization were assessed using logistic regression. A total of 363 informal waste recyclers were included in the study. Less than half of informal waste recyclers (41.0%) used health care facilities in the last 12 months. Those who accessed services chose to use facilities close to where they live (87.0%). Barriers to accessing health care services included long waiting periods (36.6%), being unable to take time off work (26.3%) and transport problems (13%). In the univariate analysis, factors such as gender and being treated well at the clinic and location of the health care facility were associated with health care utilization (OR: 1.97, p = 0.05, OR: 1.94, p = 0.02, OR: 0.65, p = 0.04 respectively). In conclusion, informal waste recyclers face numerous challenges to accessing health care. Specific to their informal trade, barriers to health care utilization are related to financial repercussions due to the informal nature of their work.

Title: Empowering health workers to protect their own health: A Study of enabling factors and barriers to implementing HealthWISE in Mozambique, South Africa, and Zimbabwe

Author(s): ES Wilcox, IT Chimedza, S Mabhele, P Romao, JM Spiegel, M Zungu and A Yassi


Summary: Ways to address the increasing global health workforce shortage include improving the occupational health and safety of health workers, particularly those in high-risk, low-resource settings. The World Health Organization and International Labour Organization designed HealthWISE, a quality improvement tool to help health workers identify workplace hazards to find and apply low-cost solutions. However, its implementation had never been systematically evaluated. We, therefore, studied the implementation of HealthWISE in seven hospitals in three countries: Mozambique, South Africa, and Zimbabwe. Through a multiple-case study and thematic analysis of data collected primarily from focus group discussions and questionnaires, we examined the enabling factors and barriers to the implementation of HealthWISE by applying the integrated Promoting Action on Research Implementation in Health Services (i-PARIHS) framework. Enabling factors included the willingness of workers to engage in the implementation, diverse teams that championed the process, and supportive senior leadership. Barriers included lack of clarity about how to use HealthWISE, insufficient funds, stretched human resources, older buildings, and lack of incident reporting infrastructure. Overall, successful implementation of HealthWISE required dedicated local team members who helped facilitate the process by adapting HealthWISE to the workers’ occupational health and safety (OHS) knowledge and skill levels and the cultures and needs of their hospitals, cutting across all constructs of the i-PARIHS framework.
**Title:** An outbreak of cutaneous abscesses caused by Panton-Valentine leukocidin-producing methicillin-susceptible Staphylococcus aureus among gold mine workers, South Africa, November 2017 to March 2018

**Author(s):** H Ismail, NP Govender, A Singh-Moodley, E Van Schalkwyk, L Shuping, I Moema, G Feller, R Mogokotleng, W Strasheim, M Lowe, R Mphembe, S Naicker, TG Maphanga, C De Abreu, N Ismail, M Allam, A Ismail, T Singh, O Matuka, T Duba & O Perovic

**Source:** BMC Infectious Diseases. 2020; 20(1):1-3.

**Summary:** We aimed to describe an outbreak of cutaneous abscesses caused by Panton-Valentine leukocidin (PVL)-producing methicillin-susceptible Staphylococcus aureus (MSSA) among gold mine workers. In February 2018, we retrospectively reviewed a random sample of 50 medical records from 243 cases and conducted face-to-face interviews using a structured questionnaire. Pus aspirates were sent to the National Institute for Communicable Diseases from prospectively identified cases (November 2017–March 2018). Nasopharyngeal swabs were collected during a colonisation survey in February 2018. Staphylococcus aureus isolates were screened with a conventional PCR for lukS/F-PV. Pulsed-field gel electrophoresis (PFGE) was performed to determine the genetic relatedness among the isolates. A sample of isolates were selected for whole genome sequencing (WGS). We conducted an assessment on biological risks associated with mining activities.

From January 2017 to February 2018, 10% (350/3582) of mine workers sought care for cutaneous abscesses. Forty-seven medical files were available for review, 96% were male (n=45) with a mean age of 43 years (SD=7). About 52% (24/46) were involved in stoping and 28% (13/47) worked on a particular level. We cultured S. aureus from 79% (30/38) of cases with a submitted specimen and 14% (12/83) from colonisation swabs. All isolates were susceptible to cloxacillin. Seventy-one percent of S. aureus isolates (30/42) were PVL-PCR-positive. Six PFGE clusters were identified, 57% (21/37) were closely related. WGS analysis found nine different sequence types. PFGE and WGS analysis showed more than one cluster of S. aureus infections involving closely related isolates. Test reports for feed and product water of the mine showed that total plate counts were above the limits of 1000 cfu/mL, coliform counts >10 cfu/100 mL, and presence of faecal coliforms. Best practices were poorly implemented as some mine workers washed protective clothing with untreated water and hung them for drying at the underground surface.

**Title:** An investigation of maternal anaemia among HIV infected pregnant women on antiretroviral treatment in Johannesburg, South Africa

**Author(s):** J Methazia, EL Ngamasana, W Utambwe, M Ogunrombi, P Niasulu

**Source:** Pan African Medical Journal, 2020; 37: 93.

**Summary:** Maternal anaemia is a major public health problem in developing countries. Data suggests that anaemia contributes to progression of HIV-infection. The aim of this study was to investigate if pregnancy was an aggravating factor for anaemia among HIV-positive women on anti-retroviral treatment (ART). We analyzed data of all HIV-positive women aged 18–49 years receiving ART atThemba Lethu Clinic, Helen Joseph Hospital, Johannesburg, South Africa, from 1st April 2004- 30th April 2011. HIV-positive pregnant women were matched with non-pregnant women using the year of initiation of treatment. The outcome of interest ‘anaemia’ was defined as “no anaemia”, “anaemia” and “moderate/severe anaemia”. We fitted an ordered logistic regression model to predict the likelihood of having severe/moderate anaemia versus no anaemia. We included pregnancy status as a predictor of the outcome and controlled the effect of other covariates in the analysis. The study included 236 HIV positive patients, of which half (n=118, 50%) were pregnant. At baseline, about (n=143, 60%) of patients were anemic. The proportion of pregnant women classified as anemic (anaemia, moderate/severe) differed significantly (p=0.02) from that of non-pregnant women. The following characteristics were significantly associated with anaemia at baseline: BMI category (p=0.01); WHO stage (p=0.001) and CD4 count (p=0.001). Seven months after initiation of treatment, the proportion of HIV positive women with anaemia decreased significantly. Anaemia is a significant risk factor for untoward health outcomes, especially among HIV-positive pregnant women. Early ART access might result in a significant decrease in anaemia in pregnancy.
Title: Unspoken victims: A national study of male rape incidents and police investigations in South Africa

Author(s): R Jina, M. Machisa, G Labuschagne, L Vetten, L Loots, R Jewkes


Summary: The burden of sexual violence has been well described in children of both sexes and in women, but there is minimal literature on adult male rape victims. Studies of adult male rape victims have mainly been conducted among incarcerated males or military personnel, and in high-income countries. To describe the epidemiology, occurrence and reporting of rape cases involving male victims, both child (<18 years old) and adult, in South Africa (SA). The study consisted of a nationally representative sample of case docketes maintained by the SA Police Service of rape incidents reported in 2012. A retrospective review of the docketes provided sociodemographic information on the victim and suspect, the circumstances of the rape and the medicolegal services provided to the victim. Data on male victims were analysed using Stata 13 to test for significant differences between child and adult male victims. The study comprised 209 male victims, including 120 (57.4%) children and 89 (42.6%) adults. The findings showed that there were significant differences in the occurrence and reporting of rape of male victims by age. Adult males experienced more violent rapes, perpetrators were more likely to be armed and often humiliated the victim, and rapes were more likely to occur in institutional settings. Adult males reported incidents of rape earlier and therefore had visible non-genital injuries during the medical examination. In contrast, more child rapes involved known perpetrators, occurred in a home and perpetrators were more likely to act kindly to the victim after the incident. This parallels the patterns in rape circumstances seen in female adult and child victims. While there is political commitment to understanding sexual violence against women as a societal problem, work on such violence against men lags behind and is little understood. Rape of males needs to be acknowledged, and their vulnerabilities to sexual abuse and rape need to be addressed. Prevention efforts to end violence against women and girls, especially in relation to children, can be used to address violence against men and boys.
Why did you choose this career and research path?
I chose this career because of my desire in making a professional contribution in the occupational health and safety space, with the ultimate goal of protecting workers by controlling hazardous workplace exposures and preventing occupational diseases.

What training and qualifications did you undergo and where?
I have a Bachelor of Technology degree in Environmental Health obtained from Tshwane University of Technology (TUT). I am registered with the Southern African Institute for Occupational Hygiene (SAIOH) as an Occupational Hygienist. I have a Legal Knowledge Certificate in Occupational Health and Safety Act obtained from North-West University, Potchefstroom Campus and a practical certificate in Mine Environmental Control obtained from Chamber of Mines. I have 10 years of experience practicing in the field of occupational and environmental health, ranging from consulting, mining and petrochemical industries.

What are the most enjoyable aspects of doing research?
The most enjoyable aspects of doing research is discovering new information and contribution of new knowledge in the field of research, which helps in improving the world we live in and its people.

What are your research highlights to date?
I chose this field of research because occupational diseases such as hearing loss, cause huge suffering and loss in the world of work and exposure to noise is a public health problem and can cause a range of health issues. My research highlight is my contribution to workers in SMEs whom are more vulnerable to occupational health hazards such as noise and there is limited research on occupational health and safety conducted in this sector. My current research will focus on ground keepers in a public university in Gauteng, South Africa.

What are your career goals?
My career goal is to grow in the field of occupational and environmental hygiene and become an occupational noise expert by furthering my studies through to PhD.
Surveillance

Occupational health surveillance data provides vital information on the prevalence of occupationally-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 describe the Occupational Health Surveillance System (OHSS) for South African workplaces in relation to COVID-19.

THE OCCUPATIONAL HEALTH SURVEILLANCE SYSTEM (OHSS) FOR COVID-19

In an effort to ensure workplace COVID-19 disease surveillance, various directives issued by Government departments including the Department of Public Service and Administration (DPSA), Department of Employment and Labour (DEL), Department of Cooperative Governance and Traditional Affairs (COGTA) and the Department of Mineral Resources and Energy (DMRE), have mandated the reporting of COVID-19 related data to the National Department of Health (NDoH).

However, despite these various efforts and initiatives by the private and public sectors to support the government to achieve the prescripts set-out in the directives, the data collection and reporting process is currently not coordinated nor fully implemented. This creates a gap in terms of using this data to monitor the current and future trends, and subsequently manage the spread of COVID-19-related infection in the workplace through developing effective interventions across and within the different sectors. It is especially important since the country has moved to lockdown level 1 and there is a need to prevent subsequent infection surges.

To enable efficient sharing of data and subsequent processing and insights, the Occupational Health Surveillance System (OHSS) Project has been initiated. Partners in this initiative include the National Institute for Occupational Health (NIOH), the National Institute for Communicable Diseases (NICD), Centre for Industrial Research (CSIR), National Department of Health, Business for South Africa (B4SA), and occupational medicine specialists from several higher education institutions. The process of its establishment has included consultation with NEDLAC and other government agencies to ensure this meets all legal requirements.

This project aims to design and implement COVID-19 surveillance digital platforms and/or tap into existing platforms (e.g. those already used by employers) to collect symptom screening, testing, contact tracing, vulnerability data and return to work data through a surveillance system for all workers in the private and public sector. The operational requirements of the OHSS has also been subjected to scrutiny to ensure that it upholds all aspects in terms of confidentiality and ethical standards as determined by South African Regulations in relation to COVID-19.
The objectives of the OHSS in relation to COVID-19 for South African workplaces are to:

- Provide strategic insights through data analytics and visualization into all phases (i.e. screening, testing, contact tracing, vulnerable employees, clinical management and health outcomes) of the COVID-19 infection spectrum in the South African workforce.
- Enable early identification of industries/companies and occupational groups at high risk of infection so as to inform appropriate interventions (e.g. policy, programmatic, resources).
- Understand the impact of the COVID-19 interventions in the workplaces.
- Develop a framework for a COVID-19 surveillance model for monitoring workers in general (and health workers in particular), that includes both public and private sectors.
- Determine the human resource and economic impact of COVID-19 on the various industrial sectors.
- Identify key scientific questions requiring in-depth further investigations

Types of data collected:

- Symptom screening data of all employees collected daily but submitted weekly;
- Vulnerability data is a once of submission, updated for new employees or if a current employees’ status changes;
- Relevant details of employees that have tested positive for Covid-19 submitted weekly when there is a new case;
- Workplace contacts. The number of workplace contacts of the COVID-19 positive employee is submitted when details of the employee is submitted.
- Return to work data- submitted only once the employee has returned to work.

Data submission process:
A business registers into the OHSS via https://ohss.nioh.ac.za/. There are three ways in which data can be submitted (Figure 1):

1. Using CSV files. The CSV files must match the templates provided in the website.
2. Application programming interface (API) integration. If a business has been using their own APP to collect the required data. This APP can be integrated into the system via the API.
3. Cmore is a mobile and web based APP. The OHSS application has been configured in Cmore. Data collected via Cmore will be exported to the NIOH data lake.

All data received will go into the NIOH OHSS data lake. Data will be anonymised and confidentiality will be strictly maintained.
Data security:
All systems used for data collection, storage, and processes will be assessed on regular basis (every month) for any security vulnerabilities. Full details can be obtained from the OHSS charter document (https://www.nioh.ac.za/wp-content/uploads/2020/10/OHSS_CHARTER_DOCUMENT_version_7.pdf).

Data analyses:
The OHSS has been piloted with a few businesses since 21st September for a three-week period. Data received thus far has been analysed and presented via a dashboard on the NIOH website. The dashboard will be updated weekly as new data is received.

Conclusion:
This COVID 19 OH surveillance system (OHSS) has the potential to create an updated, reliable and highly dynamic picture of SARS-COV-2 spread in workplaces and its impact on South African workers and workplaces. It has the potential to provide important data to inform the sectoral, national, and local occupational health and public health responses to COVID-19, and to inform strategies to develop and monitor workplace interventions (policy, technical, programmatic) in responding to the pandemic. For data reporting or technical queries, the OHSS support desk can be contacted via email: OHSworkplace@nioh.ac.za.

For more information on Occupational Health Surveillance at the NIOH please contact the Epidemiology and Surveillance Section at: NishaN@nioh.ac.za | 011 712 6472
Specialized Service Delivery

The NIOH provides specialised, cost effective occupational health and safety services to national and provincial government departments, various industries and trade unions as well as support for occupational health and safety within the NHLS. In this issue, our service delivery input profiles three new services: Agilent’s Cary Eclipse Fluorescence Spectrophotometer with Microplate Reader, NIOH Occupational medicine COVID-19 hotline and Adapting an online health and safety information system for the new COVID-19 challenge.

AGILENT’S CARY ECLIPSE FLUORESCENCE SPECTROPHOTOMETER WITH MICROPLATE READER

In order to improve the laboratory analysis capabilities, Analytical Services has acquired the Agilent’s Cary Eclipse Fluorescence Spectrophotometer with Microplate Reader. This is a high throughput instrument that provides full wavelength scanning (fluorescence, phosphorescence, bio-/chemi-luminescence and time resolved delayed fluorescence modes) with excellent sensitivity and selectivity. Therefore, whether the scientist is undertaking cutting-edge research, performing routine analysis, or needs fast accurate on-the-spot measurements, this spectrophotometer offers powerful and reliable solutions for a diverse range of molecular applications spanning the ultra violet to the visible light spectral range. This will greatly assist in increasing even further, the scope of tests offered by the laboratory. The test that will currently be offered (and most frequently is requested) is trichloroacetic acid in urine, which is the biomarker for trichloroethylene exposure.

As Analytical Services, we are always striving to improve our existing practices by introducing innovations in order to provide better and reliable testing services in support of health and safety in the workplace.

Author: Dr Puleng Matatiele

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The NIOH introduced a hotline advisory service in April 2020, to provide a real-time advisory support for workplaces in line with COVID-19. The hotline provides a connection between the callers from workplaces to an occupational medicine specialist based at the NIOH for immediate advice, service or consultation, seeking clarity on COVID-19 related issues encountered in workplaces.

The hotline is a toll-free service, channelled through a dedicated line in the occupational medicine section to one of the four dedicated cellular phones. Each cell phone handset is allocated to one doctor, and switched on per day according to the roster. At the beginning of this service, the hotline was initially manned by all the medical practitioners employed at the NIOH, including pathologists, public health medicine specialists, and registrars, over a 24-hour period. The receiving doctor would take the enquiry, synthesize the nature of the call and respond accordingly. The response would be in the form of providing immediate advice, or taking down contact details to provide feedback after further consultation and discussion with other team members and specialists within and beyond the NIOH. This service is now provided by the four occupational medicine specialists since July 2020, limited to office hours, 8am to 5pm.

During the early months of COVID-19 outbreak in South Africa, the NIOH provided awareness sessions on COVID-19 in general and specifically to assist different workplaces to prepare for this. The NIOH occupational medicine section received an enormous amount of enquiries, on how workplaces could develop guidelines, interpret directives; procure services and resources to be better equipped for COVID-19. Most of the enquiries were around workplace guidelines and what workplaces could do to be better prepared for the outbreak, continued conduct of occupational health services, specifically spirometry, and biometrics. While the enquiries were genuinely valid and urgent, there was no synchronized manner of generating advice from practitioners on time and ensuring that responses were provided within at least 24 hours. It was also important that the service offered credible and good quality researched advice and information from reputable resources.

As the outbreak in South Africa progressed from initial pre-lockdown stages, through lockdown and return to work phases for different sectors, the hotline has handled different queries that could be classified in thematic areas as shown below in Figure 1. Classification by thematic areas was important to ensure that there was an appropriate response from the NIOH COVID-19 task team on prioritising and addressing areas of concern. The task team provided responses through commissioning new topics for training sessions, development of posters, sourcing relevant guidelines for uploading on the NIOH website as well as developing of short videos with messages for dissemination through the twitter platform.
An analysis of common themes of the hotline calls during this period showed a marked decline in hotline enquiries during the month of August 2020 compared to the previous two months. However, enquiries around leave requirements, reporting of workplaces that are not complying with COVID-19 regulations and what workplaces should do when an employee has tested positive remained prominent. The month of August 2020 showed a unique response and increase in enquiries relating to the data submission requirement for companies for surveillance. This response was also unique in that, all callers were willing and keen to start reporting but also would happily share their details, position in the company and contact details. It is noteworthy that callers would often have multiple queries that needed addressing during a single call.

The Occupational Medicine Section is considering taking on this service, beyond COVID-19, as means to engage with stakeholders in different workplaces. This will be presented to the NIOH management for consideration, as the human resource and other components of the service will require special considerations.

Contact the NIOH Occupational Medicine Workplace COVID-19 Hotline on: 0800 2121 75
ADAPTING AN ONLINE HEALTH AND SAFETY INFORMATION SYSTEM FOR THE NEW COVID-19 CHALLENGE

Many already know about the online occupational health and safety information system, OHASIS, used in the National Health Laboratory Service (NHLS).

What may be less known is that OHASIS has been updated to cater for the new pandemic COVID-19. OHASIS is a comprehensive online health and safety information system that was initially developed by the University of British Columbia (UBC) in Canada. After being piloted in various parts of the world it was installed in the NHLS where it has been in use since 2011. At the same time, the NHLS through the National Institute for Occupational Health (NIOH) took OHASIS and “customised” it to ensure its suitability for the in house requirements. The introduction of a more stringent capturing of personal information further prompted a complete new version of OHASIS, which aimed to improve personal information security.

In response to COVID-19 outbreak in March 2020, the need to use updated OHASIS to keep relevant information continued to be critical to enable management have adequate information in order to make management decisions.

A brief summary of the COVID-19 additions includes:

- The addition of a daily screening tool for COVID-19 that complies with the requirements of local legislation. This screening tool asks for the user to complete the nine screening questions and where appropriate provide additional information. Where a positive response to a screening question is given, an email is sent by the system to an appropriate person who can then respond.
- The addition of COVID-19 disease as a specific outcome in the incident module, this will highlight the outcome as COVID-19 thus enabling an immediate response to the notification and a clear highlighting of the outcome in any reports.
- The function of reporting symptoms by sending an email to a designated occupational medical professional should any person indicate a yes answer in the screening tool or if a positive disease outcome, including COVID-19, is indicated in the incident notification module.
- The addition of SARS-CoV-2 as a specific agent in the biological exposure section of the incident module. To enable an easy reference and report of people who are contacts of a positive case but who did not get sick.
- A COVID-19 “Sub-Module” in the “Employee Health Module” where all the screening information is stored against the relevant employees profile as well as a section where all details of any COVID-19 tests done can be stored including:
  - date of test,
  - type of test
  - and results of the test
- COVID-19 related reports that are generated as PDF documents have also been developed.
All incident reporting and investigation data can be exported from the OHASIS health information system into an Excel spreadsheet. This information can then be used to report on, amongst others, the number of cases, the number of exposures that did not test positive, the outcome of the ill workers and to do in depth research. In 2019 the NIOH / NHLS was given the opportunity to buy the software from the UBC. The offer was taken up and the NIOH is currently in discussions with various neighbouring countries as well as other local provincial departments to explore the introduction of OHASIS for them.

There are many other exciting plans for OHASIS as we move into the future and as these unfold, so the information will be shared.

Should you wish to learn more about OHASIS please visit:  
www.ohasis.co.za or ohasis.support@nhls.ac.za
Teaching & Training

The NIOH has continued to carry out numerous COVID-19 themed training sessions for various industries in both the formal and informal sectors. These training sessions were developed in modules based on topics and specific to sectors.

In keeping with social distancing, these interactive training sessions were held online via Zoom conferencing where stakeholders across the country could log in and watch. Videos, audio and presentations for these sessions were subsequently uploaded onto the NIOH website and sent out to all relevant stakeholders. Due to high demand these Zoom sessions were live-streamed also via our YouTube channel. In terms of 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

Vulnerable Employees Risk Assessment – COVID-19
The NIOH hosted the above mentioned training session, in collaboration with WHC, on 07 July that focused on COVID-19 and vulnerable employees. The training covered topics related to the status of co-morbidities within the South African context, looking at data from hospital surveillance; and the vulnerable worker assessment, looking at the rationale and what needs to be taken into consideration. This complex and sensitive topic was presented together with the practical application of case studies. Watch it here: https://youtu.be/wtmfgBwzhnc

Workplace health risk assessment & PPE effectiveness
The above session was hosted on 10 July and covered topics related to risk assessments including: the principles of health risk assessment (focusing on Hazardous Biological Agents); the presentation of a BioRisk Assessment tool for COVID-19; Testing of Respiratory Protection Equipment; the role of SAH-PRA and the licensing process for PPE as well as the importance of respirator fit testing. This training session was done in collaboration with WHC. Watch it here: https://youtu.be/sPbcrb39oA

Return to Work Post COVID-19 Illness/Lockdown
This session looked at return-to-work post COVID-19 illness/lockdown taking into consideration the control of workplace high risk areas, guidelines for ensuring the effective cleaning and disinfection of workplaces, ending in a session detailing the practical and tangible experiences of an Occupational Medical Practitioner (OMP). The above training was held on 14 July, in collaboration with WHC. Watch it here: https://youtu.be/2tdybi90V_A
Discussion on COVID-19 Health Care Worker (HCW) Surveillance for NEHAWU (16 July)
The above training seminar was held on 16 July for the National Education, Health, and Allied Workers Trade Union (NEHAWU). Topics covered included the purpose for conducting sentinel hospital surveillance for COVID-19; data collection processes and analysis; and a discussion around the benefits and limitations of surveillance conducted through the DATCOV Surveillance System. An in-depth presentation was made also on the results of surveillance conducted to date on Health Care Workers (HCW) explaining the importance & impact of surveillance for HCWs.

Watch it here: [https://youtu.be/vDE05axFHll](https://youtu.be/vDE05axFHll)

Management of Persons Under Investigation (PUIs) for COVID-19: Experiences across sectors
This important training webinar, which was held on 17 July, looked at the management of persons under investigation (PUIs) for COVID-19 across sectors of the economy. Topics covered included the experiences in the construction industry; those of an occupational health nurse; the banking sector as well as the mining industry. Each of the external presenters spoke about their own experiences and challenges related to the management of PUIs and suspected cases; the identification of vulnerable employees; discussions around quarantine and isolation facilities; and supporting the return-to-work post illness including the flexibility of working from home. The session also touched on the risk stratification process and options for primary, secondary and tertiary prevention. This training was conducted in collaboration with WHC.

Watch it here: [https://youtu.be/mezKxA1Yeys](https://youtu.be/mezKxA1Yeys)

Medical screening and testing for COVID-19 in different workplaces (30 July & 6 August)
This important webinar covered topics related to the rationale and process for medical screening and testing for COVID-19. It included topics related to contact tracing, reporting and notification; quarantine and isolation; business continuity plans; as well as discussions around remuneration for COVID-19 related employee absence from work. Two sessions were held on this topic on 30 July and 06 August, and hosted in collaboration with WHC.

Watch it here: [https://youtu.be/NUVXSyDrwWC](https://youtu.be/NUVXSyDrwWC)

Management of PUIs for COVID-19: Experiences across sectors
This training webinar was held on 04 August. It covered sector specific experiences related to the management of persons under investigation (PUIs) for COVID-19. Topics covered in this session included experiences in the mining industry; the aviation industry; South African local government and that of an Occupational Health Nurses in a hospital. Each of the external speakers spoke about their own experiences and challenges related to the identification and management of PUIs and/or suspected cases. This included aspects of clinical preparedness; employer readiness, response and accountability; contact tracing procedures; aspects related to psychosocial stressors and support; hazard identification and the importance of Risk Assessment; infection prevention and control (IPC) measures in public places; decontamination and incident investigation.

Watch it here: [https://youtu.be/uitXyr_Ailw](https://youtu.be/uitXyr_Ailw)

The impact of COVID-19 on mental health
This webinar was held on 13 August and covered topics related to mental health during the COVID-19 pandemic. Aspects of mental health discussed related to the importance of positive communication during difficult times; stigma and trauma related to COVID-19; coping with stress; and practical approaches to being empathetic – as an antidote to stigma. Participants were provided practical advice and guides for employers and employees to obtain the very necessary and often times critical support required during difficult times, including the factors and management related to stigma in workplace. The webinar also served as an opportunity for participants to reflect on current practices, procedures and policies in an effort to understand the impact of the pandemic on mental health. The session also mentioned that a dedicated Health Care Worker (HCW) support service has been established entitled: HCW care network, which consists of a 24-hour helpline to assist with stigma and trauma associated with COVID-19.

Watch it here: [https://youtu.be/aiDtVgZFWGg](https://youtu.be/aiDtVgZFWGg)
Compensation for workplace acquired COVID-19: A practical approach
This NIOH hosted seminar was held on 20 August detailing a practical approach to compensation for workplace acquired COVID-19. Speakers and panellists included colleagues from the COID Compensation fund who detailed the directives related to the diagnosis and work-relatedness of COVID-19 disease; legal aspects of compensation (case adjudication); the process for claiming under COIDA; the employers’ responsibility around incident reporting and investigation; as well as a basic approach to investigate COVID specific incidents in the workplace.
Watch it here: https://youtu.be/I2uMz7VNEQ

OHS in Urban Public Workspaces – for Workers in the Informal Economy
On 27 August the NIOH hosted a session in collaboration with Women in Informal Employment Globalizing and Organizing (WIEGO) that covered topics related to Occupational Health and Safety in Urban Public Workplaces – targeted to workers in the informal economy. The programme covered an introduction to informal workers; considerations for OHS interventions in public spaces; the role of local government in terms of capacity building, education, support and advice to informal workers; and ending in a discussion around innovative approaches to addressing local needs through collaboration and partnerships – as evidenced by the University of KwaZulu Natal and Asiye eTafileni.
Watch it here: https://youtu.be/60POJm2q0wU

Ethical considerations of H&S personnel in workplaces – COVID-19
This topical seminar was held on 10 September and covered topics related to ethical considerations for H&S personnel during COVID-19; the foundations and principals of ethics for public health; ethical dilemmas that can be experienced, including the allocations of scarce resources, roles and responsibilities; the role of occupational health ethics during a crisis; as well as medico legal challenges that could be faced. Ethics pertaining to the broad field of occupational health remains an ongoing interaction between many partners, and a subject with no clear boundaries and many dilemmas, requiring multi-disciplinary cooperation, consultation and participation.
Watch it here: https://youtu.be/cloTV1D3dB4

Ask the Expert: The use of fabric masks and masks with vents
This interactive seminar was hosted on 18 September and was hosted in partnership with the Southern African Society for Occupational Hygienists (SAIOH). The session focused on the implication of using fabric masks or masks with vents, in terms of efficacy and safety. The session provided an opportunity for participants to ask our expert Professor David Rees questions related to the topic of the use of fabric masks during COVID-19 & ended with the recommended guidelines for the use of a fabric mask in South Arica from a representative from the Department of Trade and Industry (DTI).
Watch it here: https://www.youtube.com/watch?v=r4LdX6nbjIA#action=share

Fitness for Work post COVID-19 infection (01 October)
The NIOH hosted the above webinar on 1 October that brought together many esteemed presenters. Topics covered included: principles of fitness for work and how it relates to COVID-19; how to go about work capacity, rehabilitation and functional assessments; a discussion around disability assessments in the insurance industry; and the medical assessment of an employee returning to work post illness. Presentations were also made on the long term cardio respiratory sequelae of COVID-19 as well as neuropsychiatric sequelae and considerations post COVID-19 illness.
Watch it here: https://youtu.be/kd0ZV6Ftfw
COVID-19 and the Built Environment (06 October)
This session was hosted by NIOH on 06 October 2020. Topics covered included ventilation as a key control for COVID-19 and the limits of ventilation of airborne infection control in high risk settings. Presenters included Mr Garth Hunter from SAIOH and Mr Tobias van Reenen from the CSIR. A robust panel discussion ensued on the importance of ventilation in infection control towards the end of the session. This webinar was held in collaboration with the Southern African Institute for Occupational Hygiene – SAIOH.
Watch it here: https://youtu.be/iR4TrK8nwD0

COVID-19 Legionella and COVID-19: Building water safety during pandemics and beyond
The NIOH hosted this session on 08 October and covered topics related to Legionella risk in premise plumbing during and post COVID-19 lockdown as well as discussions around appropriate disinfection solutions for the effective control of Legionella. This session was targeted to building owners, facility managers, business operators, travel and tourism/hospitality industry, plumbing industry, built environment engineers as well as architects, infection control practitioners, water microbiologists, researchers and government departments.
Watch it here: https://youtu.be/aMwd421zCnA

We wish to acknowledge and thank the Wits Health Consortium (WHC) for partnering with us on a series of 16 COVID-19 on-line training sessions. These sessions covered a range of topics related to various aspects of the pandemic to workplace preparedness. We wish to also acknowledge and thank the support and funding from the Health and Welfare Sector Education and Training Authority (HWSETA).
UPCOMING EVENTS

THE BELOW TRAINING IS SCHEDULED AND PLANNED FOR THE DATES AS LISTED. PLEASE NOTE, HOWEVER, THAT THESE DATES ARE SUBJECT TO CHANGE. WE WILL KEEP STAKEHOLDERS UP TO DATE WITH THE LATEST TRAINING WEBINARS BEING HELD.

Managing the triple epidemic in the workplace: COVID-19, TB & HIV
Planned Date: 27 October | Time: 10h30-12h30

How to strengthen occupational health and safety resilience to outbreaks
Planned Date: 29 October | Time: 10h30-12h30 | Target audience: Employers Trade Unions Regulators, Policy makers OSH practitioners

COVID-19 RELATED INFORMATION & 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.

*The NIOH website is zero-rated by Vodacom, Telkom, MTN, Rain, MWeb, Cell C & 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.

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.

PLEASE SEE BELOW LINKS TO THE TWITTER VIDEOS ONLINE THUS FAR:
1. COVID-19: What employers need to consider for vulnerable workers
   https://twitter.com/i/status/1291267764536082432
2. Steps employers can take when a worker is symptomatic or tests positive for Covid-19 at work
   https://twitter.com/i/status/1284069083156287489
3. The importance of Medical Screening
   https://twitter.com/i/status/13004636361826721792
4. The steps you need to know when donning gloves
   https://twitter.com/nioh_sa/status/1270640765467754497
5. Doffing of gloves is crucial in safeguarding yourself and these are some simple steps you can follow
   https://twitter.com/i/status/1272567041736626176
6. What employers need to know about risk assessment
   https://twitter.com/nioh_sa/status/12673501680068777185
7. This is how to doff gloves correctly using the Beak method
   https://twitter.com/i/status/1276140184753627138
8. Who should be wearing medical N95 respirators during the Covid-19 pandemic
   https://twitter.com/nioh_sa/status/1253266050264809472
9. What you need to know about surgical masks to promote health and safety in the workplace
   https://twitter.com/nioh_sa/status/1263741273359421440
10. As employers welcome staff back at work, follow these simple guidelines to ensure health and safety in the workplace
    http://www.nioh.ac.za/covid-19
11. Are you working during lockdown? This is how you can stay safe
    https://twitter.com/nioh_sa/status/124774605990752256
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).


Please see below links to more useful training material

- [NIOH Training videos and presentations](http://www.nioh.ac.za/covid-19-presentations/)
- [NIOH Training per presenter videos (compressed for mobile use)](http://www.nioh.ac.za/covid-19/covid-19-training-per-presenter/)
- [COVID-19 National Resources: Directives and guidelines](https://www.nioh.ac.za/home/national-resources-directives-guidelines/)
- [Ethics Guidance for Occupational Health Practice](https://www.nioh.ac.za/covid-19-presentations/ethics-in-occupational-health-safety/)
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