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"No research without action,
No action without research
- Kurt Lewin."

inside
THIS ISSUE

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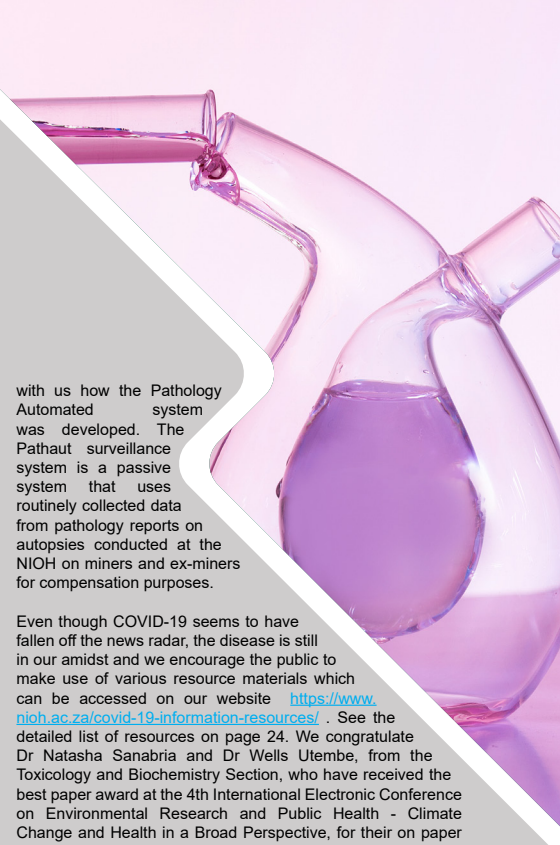


MESSAGE FROM THE EDITOR

We are excited to bring you our first issue for this calendar year. This issue is jam-packed with varied and exciting content reflecting activities that took place in the third quarter (October-December) of the current financial year. We have the usual – research focus, research publications, in the spotlight, service delivery and surveillance stories. In this issue, we cover our biennial Research Day, which is always a great occasion for our organisation. Read more on the NIOH Research Day in the Research Focus, on page 5. The Research Committee chairperson, Dr Natasha Sanabria unpacks what took place on the day and key achievements of the Research Committee to date.

In the Service Delivery Section, we explain the referral procedure to the NIOH Occupational Medicine Specialist Referral Clinic. The clinic provides specialist services in relation to diagnostic and advisory management of occupational conditions in the workplace. The activities of the clinic are predominantly secondary and tertiary occupational health services. To read more about the clinic, how to access its services and contact details, see page 17.

We also share more information about our Ergonomics Unit which is located in the Occupational Medicine Section. Ergonomics is known as the 'science of work' and is concerned with the relationship between the worker and their work. Essentially, the discipline aims at ensuring that there is a balanced synergy between job demands and the worker's capabilities and limitations. The NIOH Ergonomics Unit offers various services, which include conducting ergonomic risk assessments in accordance to the local and international occupational health and safety legislation (i.e. Occupational Health and Safety Act 85 of 1993 - Ergonomics Regulations - 2019). See page 18 for more details on the Ergonomics Unit.

In the surveillance section we Interview Professor Jill Murray and Doctor Zodwa Ndlovu, fomer NIOH staff members who share with us how the Pathology Automated system was developed. The Pathaut surveillance system is a passive system that uses routinely collected data from pathology reports on autopsies conducted at the NIOH on miners and ex-miners for compensation purposes.

Even though COVID-19 seems to have fallen off the news radar, the disease is still in our amidst and we encourage the public to make use of various resource materials which can be accessed on our website https://www.nioh.ac.za/covid-19-information-resources/ . See the detailed list of resources on page 24. We congratulate Dr Natasha Sanabria and Dr Wells Utembe, from the Toxicology and Biochemistry Section, who have received the best paper award at the 4th International Electronic Conference on Environmental Research and Public Health - Climate Change and Health in a Broad Perspective, for their on paper Occupational and Environmental Chemical Risk Assessment.

In this issue we bid farewell to our Research Committee Chairperson, Dr Sanabria, whose term has come to a close. The editorial team and I are grateful for her leadership, insight and patience during her time leading the Research Committee and part of the OccuZone editorial team. We wish her well on the new chapter in her life.

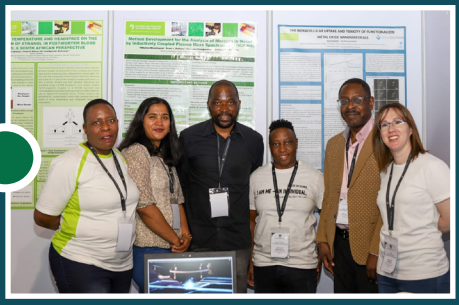
Vuyo Sabani

MESSAGE FROM THE RESEARCH COMMITTEE CHAIR

I would like to extend a warm welcome back to our Readers as they return from their holiday festivities and enter the new year of 2023. May the year ahead be prosperous in all your research endeavours!

Already, the year ahead looks bright, where the past quarter has focussed on celebrating the diverse and hard work being performed at the NIOH in all aspects of occupational health. Please refer to the Research Focus section herein, which summarises the best outputs from the NIOH Research Day. The research articles produced in this 2022 / 2023 financial year have also exceeded the set target, where some outputs have received international recognition. In addition, the researchers themselves have also been acknowledged for their scientific contributions by being appointed to various advisory roles, please refer to the Achievements section herein.

Locally, the NIOH supported and participated in the Mine Occupational Health and Safety Tripartite Summit at Gallagher Convention Centre (13-14 October 2022). The Summit enabled interactions with stakeholders, ranging from industry to academia, all with an invested interest to achieve a zero-harm target with regards to accidents and fatalities in the mining sector. These collaborations between pivotal entities in the sector are the backbone for new research and surveillance programs that, ultimately, inform policy. The upcoming PathRed 2023 congress hosted by NHLS is a similar opportunity and I invite you to investigate further (https://pathred.nhls.ac.za/registrationinformation).



The NIOH supported and participated in the Mine Health and Safety Tripartite Summit held in October in Midrand. From left to right: Dr Puleng Matatiele, Dr Jitcy Joseph, Simphiwe Yako, Millicent Magogotya, Dr Wells Utembe, Dr Charlene Andraos.

From left to right: Millicent Magogotya and Dr Jitcy Joseph answering questions from a delegate attending the summit.

Within the international arena, the World Health Organization (WHO) published key facts on the occupational health of healthcare workers in November 2022. These findings include data on safety and health concerns affecting health workers around the world, such as physical illnesses healthcare workers deal with as a result of the job (https://www.who.int/news-room/fact-sheets/detail/occupational-health--health-workers). In addition, the National Institute of Environmental Health Sciences (NIEHS) produces an online resource with its latest environmental health research, such as how air pollutant mixtures may affect autoimmune disorders, or, the link between air pollution and high blood pressure (https://factor.niehs.nih.gov/2023/1/papers/dir). These are valuable resources to stay up-to-date in the current fields related to occupational health and safety.

As my term of service as the Chairperson draws to an end, I want to encourage all our emerging researchers to take a leap of faith and try new things. One of my favourite quotes is from Prof Paul Delos Boyer, who was an American biochemist, analytical chemist, and a professor of chemistry at University of California, Los Angeles. He is famous for his presentation explaining how ATP synthase works and he won the Nobel Prize in Chemistry in 1997. He said, “An unexpected benefit of my career in biochemistry has been travel”, which has also been true in my own experience. Research allowed me to present my findings in places I only dreamed of seeing, to receive training overseas and experience cultures I was always curious about, as well as, make new friends with people from all walks of life across the globe as I engaged with them at local and international scientific events. May you broaden your horizons, in knowledge and location, as you discover your path.

Dr Natasha Sanabria

RESEARCH FOCUS

Occupational health research is essential, but there are many challenges and opportunities for this kind of work in South Africa and the continent. The NIOH biennial Research Day was held on 30 November 2022. It was an opportunity to showcase the multidisciplinary work and highlight the research studies conducted by the occupational health practitioners and medical scientists at the NIOH. The aim of this event was not only to present the current research, but also encourage discussion around, and support for, preventive interventions in the workplace. In this way, the NIOH shared new knowledge that can support and provide opportunities to make a positive impact on occupational health and safety, in South Africa and internationally, in order to improve workers' health. Collectively, the NIOH research projects presented were a testimony to the many Occupational and Environmental Health and Safety (OEHS) issues that require new knowledge. Full details for the event are available on the NIOH website (https://www.nioh.ac.za/nioh-research-day-2022-presentations/).

A special word of thanks goes out to all the speakers for contributing. We were fortunate to have two distinguished keynote speakers share their expertise and experience of key research issues, i.e. Prof Koleka Mlisana and Prof Rajen Naidoo (please see link https://www.nioh.ac.za/wp-content/uploads/2022/11/Health-Surveillance-and-Health-Information-Systems.pdf). Their contributions were greatly appreciated because they are in the position to give valuable insight into research that has been conducted in the past, as well as what is current within the field. In other words, knowing where we have come from, within the scope of occupational health research, helps guide where we should go in the future. It should also be noted that the best speakers were recognised, where the NIOH Research Day Best Oral Presentation Award went to Ms Lerato Monatisa from the Analytical Services Section. The Best Poster Presentation Award went to Ms Evida Poopedi from the Immunology and Microbiology Section. We congratulate all those who have represented the institute well and inspired increased collaborative efforts and new research ideas.

Ms Lerato Monatisa: Best oral presentation Award winner

Research Committee Chairperson, Dr Natasha Sanabria, handing over the NIOH Research Day Best Oral Presentation Award to Dr Puleng Matatiele, who accepted the award on behalf of Ms Lerato Monatisa who was on leave at the time

There are many aspects behind the scenes required to drive a successful event, from sourcing content, review of abstracts, assessment of scientific integrity, logistics, IT support, administration, management liaison and general support. I want to thank the Research Day Sub-committee members for all their hard work, i.e. Dr Boitumelo Kgarebe, Dr Nonhlanhla Tlotleng, Dr Noncy Gomba, Mr Ashraf Ryklief, Ms Angel Mzoneli and the entire IT as well as Communication Department for support of this digital platform.

Research Day Sub-Committee members from left to right: Mr Ashraf Ryklief, Mr Thabane Zwane, Dr Boitumelo Kgarebe, Dr Natasha Sanabria, Mr Vongani Mashele, and Dr Olalekan Samuel.

PUBLICATIONS

Title: Ethical Considerations for Health Research Data Governance

Author(s): Maseme, M.

Source: https://dx.doi.org/10.5772/intechopen.106940

Abstract: Research involving humans often generates considerable data irrespective of the context in which the research is being conducted. This data must be protected from unauthorized access, use, and sharing as a means of safe-guarding research participants' rights.

Notwithstanding the fact that several jurisdictions globally have promulgated laws and regulations aimed at protecting individual citizens' personal information, violation of privacy and related rights occurs in some instances.

This could partly relate to a general lack of health research sector specific data governance policies and laws, which include data transfer agreements prevalent in most countries. The chapter therefore aims to cover the ethical aspects of health research data access, use, and sharing as a means of enabling health research institutions and policymakers to develop robust data governance structures and procedures.

The scope of the chapter covers health research data generated in empirical research as well as that which is produced within a medical laboratory research context, i.e., human sample associated data

Keywords: data access; data use; data sharing; data governance; privacy; confidentiality

Title: A Mixed-Methods Study of Risk Factors and Experiences of Health Care Workers Tested for the Novel Coronavirus in Canada

Author(s): Okpani, A.I., Barker, S., Lockhart, K. Grant, J., Delgado-Ron, J.A., **Zungu, M.**, et al.

Source: JOEM • Volume 64, Number 9, September 2022

Objective: The aims of this study were to investigate occupational and non-work-related risk factors of coronavirus disease 2019 among health care workers (HCWs) in Vancouver Coastal Health, British Columbia, Canada, and to examine how HCWs described their experiences.

Methods: This was a matched case-control study using data from online and phone questionnaires with optional open-ended questions completed by HCWs who sought severe acute respiratory syndrome coronavirus 2 testing between March 2020 and March 2021. Conditional logistic regression and thematic analysis were utilized.

Results: Providing direct care to coronavirus disease 2019 patients during the intermediate cohort period (adjusted odds ratio, 1.90; 95% confidence interval, 1.04 to 3.46) and community exposure to a known case in the late cohort period (adjusted odds ratio, 3.595%; confidence interval, 1.86 to 6.83) were associated with higher infection odds. Suboptimal communication, mental stress, and situations perceived as unsafe were common sources of dissatisfaction.

Conclusions: Varying levels of risk between occupational groups call for wider targeting of infection prevention measures. Strategies for mitigating community exposure and supporting HCW resilience are required.

Keywords: COVID-19; epidemiology; health personnel, infections; occupational health; workplace

Title: Targeted proteomics identifies potential biomarkers of dysglycaemia, beta cell function and insulin sensitivity in Black African men and women

Author(s): Mndham, A.E., Micklesfield, L.K., Karpe, F., Kengne A.P., Chikowore, T., **Kufe, C.N.**, et al.

Source: https://doi.org/10.1007/s00125-022-05788-1

Aims/hypothesis: Using a targeted proteomics approach, we aimed to identify and validate circulating proteins associated with impaired glucose metabolism (IGM) and type 2 diabetes in a Black South African cohort. In addition, we assessed sex-specific associations between the validated proteins and pathophysiological pathways of type 2 diabetes.

Methods: This cross-sectional study included Black South African men (n=380) and women (n=375) who were part of the Middle-Aged Soweto Cohort (MASC). Dual-energy x-ray absorptiometry was used to determine fat mass and visceral adipose tissue, and fasting venous blood samples were collected for analysis of glucose, insulin and C-peptide and for targeted proteomics, measuring a total of 184 pre-selected protein biomarkers. An OGTT was performed on participants without diabetes, and peripheral insulin sensitivity (Matsuda index), HOMA-IR, basal insulin clearance, insulin secretion (C-peptide index) and beta cell function (disposition index) were estimated. Participants were classified as having normal glucose tolerance (NGT; n=546), IGM (n=116) or type 2 diabetes (n=93). Proteins associated with dysglycaemia (IGM or type 2 diabetes) in the MASC were validated in the Swedish EpiHealth cohort (NGT, n=1706; impaired fasting glucose, n=550; type 2 diabetes, n=210).

Results: We identified 73 proteins associated with dysglycaemia in the MASC, of which 34 were validated in the EpiHealth cohort. Among these validated proteins, 11 were associated with various measures of insulin dynamics, with the largest number of proteins being associated with HOMA-IR. In sex-specific analyses, IGF-binding protein 2 (IGFBP2) was associated with lower HOMA-IR in women (coefficient –0.35; 95% CI –0.44, –0.25) and men (coefficient –0.09; 95% CI –0.15, –0.03). Metalloproteinase inhibitor 4 (TIMP4) was associated with higher insulin secretion (coefficient 0.05; 95% CI 0.001, 0.11; p for interaction=0.025) and beta cell function (coefficient 0.06; 95% CI 0.02, 0.09; p for interaction=0.013) in women only. In contrast, a stronger positive association between IGFBP2 and insulin sensitivity determined using an OGTT (coefficient 0.38; 95% CI 0.27, 0.49) was observed in men (p for interaction=0.004). A posteriori analysis showed that the associations between TIMP4 and insulin dynamics were not mediated by adiposity. In contrast, most of the associations between IGFBP2 and insulin dynamics, except for insulin secretion, were mediated by either fat mass index or visceral adipose tissue in men and women. Fat mass index was the strongest mediator between IGFBP2 and insulin sensitivity (total effect mediated 40.7%; 95% CI 37.0, 43.6) and IGFBP2 and HOMA-IR (total effect mediated 39.1%; 95% CI 31.1, 43.5) in men.

Conclusions/interpretation: We validated 34 proteins that were associated with type 2 diabetes, of which 11 were associated with measures of type 2 diabetes pathophysiology such as peripheral insulin sensitivity and beta cell function. This study highlights biomarkers that are similar between cohorts of different ancestry, with different lifestyles and sociodemographic profiles. The African-specific biomarkers identified require validation in African cohorts to identify risk markers and increase our understanding of the pathophysiology of type 2 diabetes in African populations.

Keywords: Adiposity; Beta cell function; Ethnicity; IGFBP2; Impaired glucose metabolism; Insulin clearance; Insulin secretion; Insulin sensitivity; Obesity; TIMP4; Type 2 diabetes

Title: Impacts of economic inequality on healthcare worker safety at the onset of the COVID-19 pandemic: cross-sectional analysis of a global survey

Author(s): Harrigan, S.P.; Tsang, V.W.L., Yassi, A., **Zungu, M.**, Spiegel, J.M.

Source: BMJ Open 2022;12:e064804. doi:10.1136/bmjopen-2022-064804

Objectives: To assess the extent to which protection of healthcare workers (HCWs) as COVID-19 emerged was associated with economic inequality among and within countries.

Design: Cross-sectional analysis of associations of perceptions of workplace risk acceptability and mitigation measure adequacy with indicators of respondents' respective country's economic income level (World Bank assessment) and degree of within-country inequality (Gini index).

Setting: A global self-administered online survey.
Participants: 4977 HCWs and healthcare delivery stakeholders from 161 countries responded to health and safety risk questions and a subset of 4076 (81.2%) answered mitigation measure questions. The majority (65%) of study participants were female.

Results: While the levels of risk being experienced at the pandemic's onset were consistently deemed as unacceptable across all groupings, participants from countries with less income inequality were somewhat less likely to report unacceptable levels of risk to HCWs regarding both workplace environment (OR=0.92, p=0.012) and workplace organisational factors (OR=0.93, p=0.017) compared with counterparts in more unequal national settings. In contrast, considerable variation existed in the degree to which mitigation measures were considered adequate. Adjusting for other influences through a logistic regression analysis, respondents from lower middle-income and low-income countries were comparatively much more likely to assess both occupational health and safety (OR=10.91, p≤0.001) and infection prevention and control (IPC) (OR=6.61, p=0.001) protection measures as inadequate, despite much higher COVID-19 rates in wealthier countries at the time of the survey. Greater within-country income inequality was also associated with perceptions of less adequate IPC measures (OR=0.94, p=0.025). These associations remained significant when accounting for country-level differences in occupational and gender composition of respondents, including specifically when only female care providers, our study's largest and most at-risk subpopulation, were examined.

Conclusions: Economic inequality threatens resilience of health systems that rely on health workers working safely to provide needed care during emerging pandemics.

Title: *In vitro* toxicity and internalization of gold nanoparticles (AuNPs) in human epithelial colorectal adenocarcinoma (Caco-2) cells and the human skin keratinocyte (HaCaT) cells

Author(s): Magogotya, M., Vetten, M., Roux-van derMerwe, M.P., Badenhorst, J., Gulumian, M.

Source: Mutation Research - Genetic Toxicology and Environmental Mutagenesis 883–884 (2022) 503556

Abstract: Ingestion and transdermal delivery are two common routes of nanoparticle (NP) exposure. In this study, the intracellular uptake, cytotoxicity and genotoxicity of 14 nm and 20 nm citrate-stabilized gold nanoparticles (AuNPs), 14 nm polyethylene glycol (PEG)-liganded carboxyl AuNPs, 14 nm PEG-liganded hydroxyl AuNPs and 14 nm PEG-liganded amine AuNPs were assessed on human epithelial colorectal adenocarcinoma (Caco-2) cells and the human skin keratinocyte (HaCaT) cells. The uptake of AuNPs in the cells was confirmed through darkfield microscopy and hyperspectral imaging followed by spectral angle mapping (SAM). A high level of citrate AuNPs was found in both cell lines whilst uptake of PEGylated AuNPs was low, irrespective of their functional groups. Cytotoxicity assessed by cell impedance was only observed for the 14 nm citrate-stabilized AuNPs. Enhanced cell proliferation was also observed in 14 nm PEG-liganded hydroxyl and 14 nm PEGliganded amine AuNP-treated Caco-2 and HaCaT cells. For the assessment of genotoxicity, the in vitro micronucleus assay was used. Dose-dependent genotoxicity was observed in both Caco-2 and HaCaT cells, with all the AuNPs inducing genotoxicity. In conclusion, the entry of NPs into the cells as well as toxicity was dependent on their physicochemical properties such as surface coating and different chemical functional groups.

Keywords: Gold nanoparticles; Cytotoxicity; Intracellular uptake; Genotoxicity

Title: Phenotypic and genotypic profiling reveals a high prevalence of methicillin-resistant *Staphylococcus aureus* isolated from hospitals, houseflies and adjacent informal food retailers in Botswana

Author(s): Seetswane, E., Loeto, D., Muzila, M., Tshekiso, K., **Gomba, A.**, et al

Source: Microbiology 2022;168:001213 DOI 10.1099/mic.0.001213

Abstract: The increasing occurrence of methicillin-resistant Staphylococcus aureus (MRSA) in the environment, food and healthcare systems is a global public health concern. MRSA is reported to cause food poisoning, osteomyelitis and pyogenic infections of the skin, and consequently has been categorized as a high-priority pathogen by the World Health Organization. Here, we determined the presence of MRSA in clinical (n=56), food (n=150) and housefly samples (n=970) collected from two hospitals in Botswana. Characterization based on phenotypic (antimicrobial resistance, biofilm production) and genotypic (antimicrobial resistance genes and integrons) profiles were performed on all isolates. Of the total samples tested, 64 were positive for MRSA following conventional culture methods and PCR amplification of the *mecA* and *mecC* genes for confirmation of presumptive MRSA isolates. The confirmed isolates included 71% (95% CI 83.2–59.6) from clinical, 9% (95% CI 14–4.8) from food, and 1% (95% CI 1.6–0.4) collected from housefly samples. In total 89% (n=57) isolates in the current study showed a multidrug resistance phenotype, among these, resistance to β-lactams and glycoside antibiotic classes were predominant. Genotypic characterization showed the domination of the blatem gene (95%) followed by fox (63%) and tetO (19%) whilst *vanA* was only reported in 13% of the isolates. Integrons were detected in 50% (32/64) of the total MRSA isolates, and we report a high prevalence of etd gene, detected in 67% (43/64) of the isolates followed by eta 38% (24/64) whilst tsst-1 (3%) was the least detected genetic determinant. The genes etb and PVL were not detected in all the tested MRSA isolates. We provide the first report on the prevalence of MRSA isolated from the clinical-food-vector nexus harbouring biofilm and blatem genes, and antibiotic resistance profiles in Botswana. These results are significant for risk-assessment analysis and the development of improved MRSA infection prevention and control strategies.

Title: Effectiveness of low-cost UVGI chamber for decontaminating filtering facepiece respirators to extend reuse

Author(s): Singh, T., Duba, T., Muleba, L., Matuka, D.O., Glaser, D., et al.

Source: Journal of Occupational and Environmental Hygiene, DOI: 10.1080/15459624.2022.2137299

Abstract: In emergencies like the COVID-19 pandemic, reuse or reprocessing of filtering facepiece respirators (FFRs) may be required to mitigate exposure risk. Research gap: Only a few studies evaluated decontamination effectiveness against SARS-CoV-2 that are practical for low-resource settings. This study aimed to determine the effectiveness of a relatively inexpensive ultraviolet germicidal irradiation chamber to decontaminate FFRs contaminated with SARS-CoV-2. A custom design UVGI chamber was constructed to determine the ability to decontaminate seven FFR models including N95s, KN95 and FFP2s inoculated with SARS-CoV-2. Vflex was excluded due to design folds/pleats and UVGI shadowing inside the chamber. Structural and functional integrity tolerated by each FFR model on repeated decontamination cycles was assessed. Twenty-seven participants were fit tested over 30 cycles for each model and passed if the fit factor was ≥100. Of the FFR models included for testing, only the KN95 model failed filtration. The 3M™ 3M 1860 and Halyard™ duckbill 46727 (formerly Kimberly Clark) models performed better on fit testing than other models for both pre-and-post decontaminations. Fewer participants (0.3 and 0.7%, respectively) passed fit testing for Makrite 9500 N95 and Greenline 5200 FFP2 and only two for the KN95 model post decontamination. Fit testing appeared to be more affected by donning & doffing, as some passed with adjustment and repeat fit testing. A ≥ 3 log reduction of SARS-CoV-2 was achieved for worn-in FFRs namely Greenline 5200 FFP2. Conclusion: The study showed that not all FFRs tested could withstand 30 cycles of UVGI decontamination without diminishing filtration efficiency or facial fit. In addition, SARS-CoV-2 log reduction varied across the FFRs, implying that the decontamination efficacy largely depends on the decontamination protocol and selection of FFRs. We demonstrated the effectiveness of a lowcost and scalable decontamination method for SARS-CoV-2 and the effect on fit testing using people instead of manikins. It is recognised that extensive experimental evidence for the Accepted Manuscript reuse of decontaminated FFRs is lacking, and thus this study would be relevant and of interest in crisis-capacity settings, particularly in low-resource facilities.

Title: Understanding chirality and its role in drug discovery research

Author(s): Utembe, W.

Source: In Duncan T (Ed), Advances in Health and disease, Vol 59. Nova Medicine and Health, New York pp111-132

Abstract: Over 50% of medicines consist of chiral molecules that are not non-superimposable on their mirror images because of the presence of an asymmetric point. The two molecules (or enantiomers) are distinguishable in biological systems, often resulting in different pharmacological and toxicological profiles of the two enantiomers. The development of new chiral drugs is very complex and expensive, involving laborious enantioselective synthesis methods such as the use of chiral pools, optical resolution of racemates, asymmetric synthesis and enatioselective catalysis. Furthermore, the study and quality of these drugs require chiroptical analytical methods that include circular dichroism spectroscopy, polarimetry and optical rotary dispersion, together with chiral separation techniques such as chiral chromatography. Chiral medicines are often sold as racemates or equimolar mixtures of the enantiomers. However, by performing chiral switches form the racemate to a single enantiomer, pharmaceutical companies can prolong the patent periods for their drugs, contingent on meeting statutory and TRIPs (Trade-Related Aspects of Intellectual Property Rights) conditions of novelty, non-obviousness and usefulness for the single enantiomer. Studies have shown that chiral switches to single-enantiomer drugs infrequently improve efficacy or safety, despite the greater costs. A few countries have set up specific policies, regulations and guidelines on chiral drugs, while most countries adopted the ICH Technical Requirements. Generally, the guidelines demand the enantiomer-specific methods as well as pharmacological toxicological profiles of each enantiomer and racemates in order to guide decisions on whether to proceed with developing the racemate or a single enantiomer. This chapter discusses the effects of chirality on medicinal drugs as well as its impacts on drug research and development processes in the context of national and international guidelines.

Keywords: chirality; toxicity; efficacy; drugs; racemate; optical; enantiomer

Title: Occupational health and safety

Author(s): Kistnasamy, B., **Kgalamono, S.**, Zungu, M., Jeebhay, M., Naidoo, R., Hayes Badenhorst T.

Source: In Matsoso, M.P., Chikte, U., Makubalo, L., Pillay, Y., Fryatt, R. eds. 2022, The South African Health Reforms: 2015-2020 – the road ahead chapter 11: pp201-222.

Abstract: Occupational health in South Africa, still has a fragmented policy, legal, administrative, and service delivery framework. Occupational health services (OHS) are under-developed in many sectors of the economy coupled with the lack of trained occupational health personnel in the public sector and no uniform funding model for occupational health, the surveillance system for occupational injuries and diseases is non-existent there is no uniform reporting system across the Departments of Mineral Resources and Energy, Employment and Labour and Health. Where data on occupational injuries and diseases is provided, it is mainly numerator data and thus difficult to interpret, compare and assess trends across sectors. Migrant labour persists both within South Africa and cross-border with some progress on tracking and tracing workers with occupational lung diseases and ensuring their compensation payments. Informal sector workers face multiple barriers including the low wage, subsistence economy and no access to OHS and services in general. Class action compensation settlements for silicosis and TB in the gold mining sector were welcome developments notwithstanding the need for preventive interventions. Some gains were made with OHS provision with specialist referral services in occupational medicine in the major metropolitan areas; expansion of the occupational health information system (OHIS) in some Provincial Departments of Health; provision of One Stop Services for ex-mineworkers and limited health services to informal traders; use of the HealthWise tool (ILO / WHO) and incorporation of domestic workers into the compensation system. The COVID-19 pandemic, while galvanising partnerships across public and private sectors, highlighted the gaps in OHS provision especially in public sector health facilities. The Department of Employment and Labour (DEL) took the lead on workplace interventions in COVID-19 as well as incorporated COVID-19 infection in workplaces as a compensable disease. South Africa's many academic institutions and professional societies play a significant role in capacity building initiatives of the different disciplines within Occupational Health and Safety, they assist with technical advice to government, employers and trade unions and serve on multiple governance structures. Of note is their participation in Occupational Health and Safety initiatives across the continent and other international bodies.

Title: Occupational skin disease associated with personal protective equipment: A case series

Author(s): Fourie, A., Muvhali, M., Carman, H., Singh, T..

Source: Current Allergy & Clinical Immunology, December 2022; Vol 35, No 4

Abstract: Personal protective equipment (PPE) should be the last-used, hazard-control measure in the workplace; however, it is still the first consideration as a protective measure in many workplaces. The conundrum is that despite its crucial role in protecting workers from various exposures, adverse skin conditions can present in some individuals. As the skin condition may progress to a chronic course with an unfavourable prognosis, this case series highlights the importance of diagnosing occupational dermatitis associated with various types of PPE. This is in order to inform risk-based preventative management to protect the worker and sustain work activity. A retrospective review of patients who visited the occupational dermatology clinic from September 2005 to May 2022 was performed. Patients who used PPE were further assessed to determine the type of adverse reactions and causative agents. A total of 36 records of interest were retrieved and analysed further. Allergic (16/36, 44%) and irritant contact dermatitis (13/36, 36%) were the most common diagnoses made. Adverse reactions to gloves (various types) were the most prevalent (25/36, 69%), followed by shoes at 17% (6/36). The majority of cases were from the healthcare industry (24/36, 66%), followed by manufacturing (5/36, 14%) and mining (4/36, 11%). The data for provinces were skewed, with most patients from Gauteng (30/36, 83%), Mpumalanga (4/36, 11%) and Limpopo (2/36, 6%). This study highlights the importance of recognising and diagnosing skin conditions attributed to PPE and emphasises the value of patch-testing to identify putative agents. This informs the process of identifying appropriate alternative PPE for sensitised workers in ensuring their continued safety while on duty.

Keywords: contact dermatitis; skin rash; prevention and control; health and safety; extended use

Title: Access to HIV healthcare services by farm workers in sub-Saharan Africa (SSA): a systematic review protocol

Author(s): Mlangeni, N., Adetokunboh, O., Lembani, M., Malotle, M., Nyasulu, P.w

Source: BMJ Open 2022;12:e059806. doi:10.1136/bmjopen-2021-059806

Introduction: Sub-Saharan Africa (SSA) region harbours the highest burden of HIV infections in the world. Agricultural work has been reported as one of the occupations with a high prevalence of HIV. Farm workers generally have poor access to health services, which prevents them from receiving proper HIV prevention and care. Furthermore, poor policies and policy implementation, and lack of workplace programmes increases farm workers' vulnerability to HIV infection. Thus, the aim of this study is to conduct a systematic review to assess HIV prevention and treatment services and national policies governing access to healthcare services by farm workers in SSA.

Methods and analysis: Our systematic review will include studies published from January 1990 to December 2021 within SSA countries. We will use a sensitive search strategy for electronic bibliographic databases and grey literature sources. Databases will include PubMed, CINAHL, Cochrane library, African Index Medicus and Scopus. The main outcomes to be reported will be HIV policy for farmworkers, availability of HIV prevention service(s), availability of treatment and support to farmworkers who are living with HIV, presence of referral structures for farmworkers through the health system and follow-up services for farmworkers who are on antiretroviral therapy. We will synthesise the main characteristics of included studies and use summary measures to describe study characteristics. In a situation where data are not sufficiently homogeneous to perform a quantitative synthesis, we will conduct a narrative synthesis. We will explore themes and relationships between included studies for qualitative data.

Ethics and dissemination: The study will use publicly available data and ethics exemption has been obtained from Human Research Ethics Committees, Faculty of Medicine & Health Sciences, Stellenbosch University. The results of this study will be disseminated through peer-reviewed journals, conference presentations and seminars.

Title: The association between the histological subtypes of mesothelioma and asbestos exposure characteristics

Author(s): Vorster, T., Mthombeni, J., teWaterNaude, J., Phillips, J.I.

Source: Int. J. Environ. Res. Public Health 2022, 19, 14520. https://doi.org/10.3390/ijerph192114520

Abstract: Asbestos mining operations have left South Africa with a legacy of asbestos contamination and asbestos-related diseases continue to be a problem. The large-scale mining of three types of asbestos presents a unique opportunity to study malignant mesothelioma of the pleura (mesothelioma) in South Africa. This study aimed to describe the demographics of deceased individuals diagnosed with mesothelioma and explore any associations between the histological morphology of mesothelioma and asbestos characteristics. We reviewed the records of all deceased miners and ex-miners from the Pathology Automation System (PATHAUT) database of the National Institute of Occupational Health (NIOH) that were histologically diagnosed with mesothelioma in the period from January 2006–December 2016 (11 years). The study population does not include all cases of mesothelioma in South Africa but rather those that reached the compensation system. Crocidolite asbestos fibres were identified in the majority of mesothelioma cases (n = 140; 53.4%). The epithelioid subtype was most commonly present in both occupational and environmental cases. Cases with the sarcomatous subtype were older at death and fewer female cases were diagnosed with this subtype. No relationship between mesothelioma subtype and asbestos type or asbestos burden or fibre size was established.

Keywords: mesothelioma; subtypes; PATHAUT; asbestos type; asbestos burden

Title: Occupational and Environmental Chemical Risk Assessment in a Changing Climate: A Critical Analysis of the Current Discourse and Future Perspectives †

Author(s): Utembe, W., Sanabria, N.M.

Source: Environ. Sci. Proc. 2022, 24, 2. https://doi.org/10.3390/ECERPH-4-13105

Abstract: Global climate change (GCC) models predict direct changes in region-specific rainfall patterns, floods, sea levels, infectious and heat-related disease patterns. The indirect effects of GCC on chemical risk assessment (CRA) have not received adequate attention. This study presents a synopsis of the implications of GCC on CRA, which forms the basis for both occupational and environmental health. GCC can make organisms more sensitive to chemical stressors, and chemical exposures can make organisms more sensitive to GCC. Consequently, occupational and environmental chemical RA will need mechanistic understanding and analytical tools to predict outcomes of multiple stressors and their combined effects.

Keywords: climate change; greenhouse gases; toxicology; risk assessment; adverse outcome pathways

IN THE SPOTLIGHT

Tshephang Moswete

Intern Medical Scientist, Analytical Services

Why did you choose this career and research path?

I have a very active imagination, which allows me to fondly visualize things that are not seen by the naked eye; whether they are drugs, cells, or small organisms they are all related by biochemistry. I chose this field of research because it was challenging and intimidated me. So I challenged myself to try it and see what happens…

What training and qualifications did you undergo and where?

I have obtained a B.Sc. Honours degree in Biochemistry and cell biology.

What are the most enjoyable aspects of doing research?

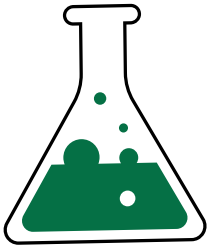
I enjoy being a part of a legion of individuals solely dedicated to advancing mankind as a civilization. Researchers are agents of evolution!

What are your research highlights to date?

My research highlights include my honours degree thesis, which was focused on HIV research.

What are your career goals?

My main goal at the moment is to become a medical doctor in the next phase of my career.



Occcupational 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 interview **Professor Jill Murray** and **Doctor Zodwa Ndlovu** about the PATHAUT Database and Surveillance System establishment.

Professor Jill Murray

Doctor Zodwa Ndlovu

Pathaut is the Pathology Automation system. The Pathaut surveillance system is a passive system which uses routinely collected data from pathology reports on autopsies conducted at the NIOH on miners and ex-miners for compensation purposes. The lungs are removed locally, at the place of death, and are submitted to the National Institute for Occupational Health (NIOH), where a team of pathologists conducts autopsy examination. This system forms a valuable research database and the basis for ongoing surveillance of occupational respiratory diseases in mine workers. The Pathaut system forms the longest-running surveillance system in the NIOH.

The first worker's compensation in South Africa was promulgated in 1911 (Miners' Phthsis Allowances Act (No. 34 of 1911). This was the beginning of the use of autopsies for compensation purposes. In 1916 autopsies for silicosis were specifically added to the legislation. Autopsy findings were stored in hard copies and punch cards. In 1956 standardised methods for compensation autopsies were legislated. By the early 1970s, approximately 3000 autopsies were being conducted per year. Colin Soskolne recognised that introducing an automated system would improve administrative efficiency and that such a system would also act as a database for research and facilitate management reports. The PATHAUT database was developed and introduced in 1975. In addition to the findings, PATHAUT captures demographic and occupational data submitted with the lungs. The introduction of the database standardised the information recorded for each autopsy along with standardised diagnostic criteria for the pathology findings. This system made the stored information easily accessible.

The increased data accessibility led to the utilisation of PATHAUT for research into lung cancer and tuberculosis in miners. However, it was not until Pat Hessel published a call for increased utilisation of the database that research took off. In 1995/1996 the Mine Health and Safety Council (MHSC) was approached for funding to establish regular reporting from the database in order to add surveillance to the functions of Pathaut. The concept was sold to stakeholders and funders. The MHSC was chosen as a platform to create awareness and elicit input from the tripartite structure of government, mining and unions. The establishment of the surveillance function required a significant commitment and resources. The National Department of Health (under which the NIOH fell at that time) and subsequently, the National Health Laboratory Services (NHLS) supported this endeavour. There were continuous engagements with the Department of Mineral Resources (DMR) (now Department of Mineral Resources and Energy), MHSC, mines and unions to maintain the relevance and create awareness of the service.

Subsequently, with the improvements in technology, the database was moved to a more stable platform and uniformity in diagnoses was emphasised. SAS at this time was the most robust data analysis package to handle the large dataset containing roughly 200 variables and thousands of records, which increased annually as more autopsies were added. Hence, resources were provided to develop analysis programs to ensure data was analysed identically for each year of reporting.

The first standardised surveillance report was produced in 1999, with the reports initially distributed as hard copies via the post, and in later years via email. Recently, Dr Zodwa Ndlovu used the same SAS programs to generate information and write annual reports from 1975 to 1995 retrospectively to

create a complete set of reports. All PATHAUT reports are presented in an identical, standardised format that allows for easy comparisons between the various years and for trend analysis. The Pathaut surveillance reports are now available on the NIOH website. https://www.nioh.ac.za/pathology-division-surveillance-reports/ Notifications are sent to all stakeholders as each new surveillance report is released.

Surveillance requires ongoing data collection and analysis. The success of PATHAUT is linked to the institutionalisation of the system within the NIOH, with dedicated staff to maintain the autopsy service, data collection and awareness. Having a team to trace missing data supports the utility of the surveillance information by increasing the representativity and quality of the data. Resources are required to maintain an effective surveillance system and not just at the establishment of the system.

The autopsy compensation legislation provides for both current and ex-miners, including those who are citizens of other countries. At the beginning of the autopsy service, it was difficult to encourage service uptake among all miners when during apartheid, the systems and logistics preferentially benefited the white miners. Currently, the most challenging aspects of maintaining PATHAUT Surveillance are the creation of awareness of autopsy compensation among miners and their families and the logistics associated with organ removal and transportation to the NIOH. Endeavours to increase the uptake of autopsies are ongoing and the lack of facilities in rural areas remains a problem. Transporting the organs of deceased migrant workers from surrounding Southern African countries is a challenge requiring engagement with the Department of Health.

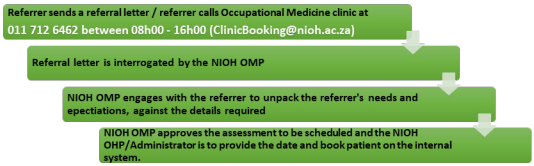
SPECIALIZED SERVICE DELIVERY

The NIOH provides specialized services in occupational health and safety to government departments (provincial and national) and various other industries. The Occupational Medicine section of the NIOH offers services to the public through two primary functions, namely; the **Occupational Medicine Specialist referral clinic** and the **Ergonomics Unit**. In this issue, the two functions of the section are profiled.

Occupational Medicine referral clinic

The Occupational Medicine Specialist referral clinic of the NIOH continues to provide specialist services in relation to diagnostic and advisory management of occupational conditions in the workplace. The services of the clinic are predominantly secondary and tertiary occupational health services. Referral of cases to the clinic may be done by occupational medical practitioners and other medical professionals; compensation adjudicators; organized labour, ex-employees or self-referrals pertaining to the work relatedness of their conditions. With the approach of a new financial year, the Occupational Medicine referral clinic has to introduce two major changes that all stakeholders should note. These changes involve getting up to date with the costs of services and processes that will improve turnaround times of the referral clinic, in line with the quality management policy of the NIOH.

The consultation rates for the referral clinic have been revised and will increase yearly, as guided by the NHLS financial policy, with alignment to the Public Financial Management Act 1 of 1999. The referral process has also been reviewed to ensure that a reduced turnaround time is achieved, from patient referral to issuing of medical reports. The newly implemented referral process will involve engagement between the NIOH occupational medicine practitioners (OMPs) and referrers. This is to ensure that all necessary referral documents are reviewed upfront. Once approval is received from the NIOH OMPs, an appointment date will be issued. This process is illustrated Above:



At the end of the clinic visit, the patient will receive a preliminary report to take back to the referrer. Following further investigation, a more detailed report will be provided to the referrer by email. It is hoped that the new processes will improve turn-around times and avoid delays that have been experienced of late.

For more information, please contact:
Occupational Medicine Specialist referral clinic
Sister Goitsimang Buffel / Mr Jacob Senamolela
GoitsimangB@nioh.ac.za / JacobSe@nioh.ac.za
Tel: 011 712 6462

Ergonomics Unit

The Ergonomics Unit of the Occupational Medicine section brings awareness to the discipline of Ergonomics. Ergonomics is known as the 'science of work' and is concerned about the relationship between the worker and their work. Essentially, the discipline aims at ensuring that there is a balanced synergy between job demands and the worker's capabilities and limitations. A mismatch between these two elements (work demands and worker capability) may lead to the outcome of poor productivity, burnout experienced by employees or the development of musculoskeletal disorders (MSDs – which are conditions that affect the biomaterial such as muscles and joints). It is through a systematic approach using the ergo-system (Figure 1), that ergonomic factors in the design of work processes, workstations and tools, are considered to ensure effective ergonomic solutions.

Figure 1: Ergo-system typically used to understand the interaction of the human worker and other elements of the work system

The discipline investigates the worker in their work environment across three critical domains, namely: Cognitive (mental processes), Organizational (psychosocial factors) and Physical ergonomics. The premise of ergonomics is to achieve optimal worker performance whilst maintaining the health, safety and well-being of the worker, while performing their duties. The Ergonomics Unit of the NIOH thus provides specialized and advisory services to the NHLS as well as other organizations within Southern Africa. The unit's service offerings include conducting ergonomic risk assessments in accordance to the local and international occupational health and safety legislation (i.e. Occupational Health and Safety Act 85 of 1993 - Ergonomics Regulations - 2019). Moreover, the unit also provides services of assessing manual handling tasks at various workplaces, assessing muscle strength capabilities using hand-held dynamometers, conducting job task analysis which assesses the demands of the job/task (both for physical and mental demands) as well as workstation assessment and evaluation. Furthermore, the unit conducts standardized laboratory testing of patients to assist in the diagnosis of workplace related ergonomic conditions, such as musculoskeletal disorders which include Hand-Arm Vibration Syndrome (HAVS).

2A

2B

2C

Figure 2A: Image of a sit-stand workstation

Figure 2B: Image of hand-held dynamometer used to assess grip strength of worker

Figure 2C: Image of vascular assessment of Hand-Arm Vibration Syndrome (HAVS) during standardized testing

Additionally, the Ergonomics Unit offers teaching and training, ranging from awareness training provided to the general workforce, to in-depth training provided to occupational health and safety (OHS) practitioners. This training does not only bring awareness to the discipline of ergonomics in terms of unpacking what the ergonomics principles of work are but also empowers the workforce and the OHS practitioners by enabling them to identify various ergonomic hazards and risk factors which include, but are not limited to, vibration, excessive force, repetitive movements, attention and memory demanding tasks, time-pressured tasks, unsuitable work-rest cycles and awkward working postures. The unit also partakes in specialized research projects in collaboration with various sections within the NIOH.

The unit also partakes in specialised research projects in collaboration with various sections within the NIOH.
When it comes to ergonomics, always remember that the work is to fit the worker and not the other way around. Take regular physical and mental breaks between bouts of work; use your time effectively and avoid time pressures around work deadlines; move your body frequently and minimize overexertion of the musculoskeletal system (your body).

For more information, please contact:

Ergonomics Unit
Ms Zandile Hoyi
Tel: 011 712 6479
ZandileH@nioh.ac.za

TRAINING CONDUCTED – OCTOBER TO DECEMBER 2022

Global stats:

103 OHS/COVID-19 training webinars; **56'225** attendees (October 2022 – December 2022)

OHS Webinar: "Workplace stressors impacting on work performance and psychological well-being" Workshop – Department of Employment & Labour (DoEL) Gauteng Provincial Management Committee (PMC) – November 2022.

The Day 1 programme was convened the workshop in Lanseria and it was opened by Mr Tshepo Mokomatsidi, Chief Director: Provincial Operations for Gauteng. Speakers from Department of Employment and Labour (DoEL); National Institute for Occupational Health (NIOH); CDPO; Department of Health (DoH); Department of Women, Youth and Persons with Disabilities (DWYPD) and the University of Pretoria and the provided the inputs. The programme was structured to generate "resolutions" as outputs from the range of presentation inputs.

An interdisciplinary NIOH team from the Occupational Hygiene Section, the Ergonomics Unit and the Occupational Medicine Section prepared and delivered key components of the Gauteng Provincial Department's PMC workshop. The NIOH team included Mr Gabriel Mizan (Occupational Hygienist) who presented on "Occupational Hygiene, impact on health and productivity"; Ms Zandile Hoyi (Principal Medical Scientist) who presented on "Ergonomics and workplace stress"; and Dr Edward Sepirwa (Occupational Medicine Registrar) who presented on "Occupational Medical Surveillance: Workplace Mental Health Programme".

48 management participants attended this workshop.

URL: [Note: This webinar was a dedicated session for the DoEL staff and there is no URL as the webinar recordings are not on the open/public NIOH webpages.]

Occupational Medicine Trainings workshops for 2023

The exact date and venue for the workshops will be shared on our website and Twitter page monthly.

MONTH	COURSE
23 - 24 May 2023	Work-related Upper Limb Disorders
June 2023	Occupational Allergies and Asthma
July 2023	ILO - X-ray
August 2023	Work-related Upper Limb Disorders
October 2023	ILO - X-ray
November 2023	Work-related Upper Limb Disorders

NEDLAC & NIOH COVID-19 LEGACY TRAINING PROGRAMME

Launch

The online launch of the National Economic Development and Labour Council (Nedlac) and National Institute for Occupational Health (NIOH) "Management of OHS and Covid-19 Legacy Workplace Training Programme" on 16th August 2022. 966 of the Nedlac constituencies' workplace representatives, OHS professionals and stakeholders joined the webinar.

Dr Thuthula Balfour, the Head of Health - Minerals Council South Africa (MCSA), chaired the launch. The speakers included:

- Ms Lisa Seftel, Nedlac Executive Director
- Ms Boitumelo Moloi, Deputy Minister of Employment and Labour
- Prof Salim Abdool Karim, Director of CAPRISA
- Dr Spo Kgalamono, Executive Director of the NIOH

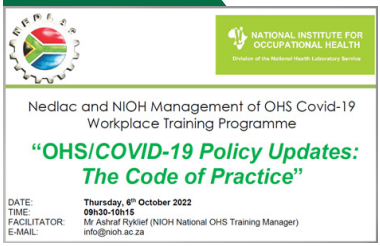
The members of the panel discussion were:

- Dr Barry Kistnasamy (Department of Health)
- Prof Mohamed Jeebhay (UCT)
- Prof Rajen Naidoo (UKZN)

Moderated by Dr Thuthula Balfour.

Launch video recording URL: https://www.youtube.com/watch?v=Xa9_z-qdnGc

Pilot Webinar



Following the launch and the first-phase programme planning, the first pilot training webinar was conducted on the 6th October 2022. The topic of the pilot webinar was "COVID-19 Policy Updates: The Code of Practice". The pilot employed a moderated "live" panel discussion format that included Ms Bulelwa Huna, Senior Specialist: Occupational Health and Hygiene, Department of Employment & Labour (DoEL), and Dr Jan Lapere, Occupational Medicine Doctor (OMP) and Independent OH&S Consultant with specialisation in Social Labour Law. 751 participants attended this webinar.

Webinar video recording URL:

ZOOM link-to-register: https://zoom.us/webinar/register/WN__TPSKhycQmmimRiQonba-Q

March 2023 Webinars

Upcoming NEDLAC-NIOH Webinars

The next two Nedlac and NIOH Covid-19 Legacy Programme webinars are scheduled for the month of March 2023.

a) Webinar #2: "Minimum Occupational Health & Safety (OHS) service for a workplace"
Date: Thursday, 9th March 2023
Time: 09h30 – 10h10

ZOOM link-to-register: https://zoom.us/webinar/register/WN__TPSKhycQmmimRiQonba-Q

b) Webinar #3: "What are the remedies for OHS non-compliances in the workplace?" (for all OHS role-players in the workplace)
Date: Thursday, 30th March 2023
Time: 09h30 – 10h10

The webinar invitation and programme, including the ZOOM link-to-register, will be circulated with the in due course.

Disclaimer: The webinar topic and date may be subject to change.

AWARDS AND RECOGNITION

Dr Charlene Andraos was appointed as Extraordinary Senior Lecturer in the Unit for Environmental Sciences and Management (UESM), Faculty of Natural and Agricultural Sciences, North West University.

Dr Wells Utembe has been invited to join the International Commission On Radiological Protection (ICRP) task group on Ecosystem Services in Environmental Radiological Protection. The ICRP is an independent Registered Charity, that provides recommendations and guidance on all aspects of protection against ionising radiation.

Dr Jitcy Joseph has been appointed as an Academic Associate with the College of Agriculture and Environmental Sciences at UNISA.

Dr Wells Utembe and Dr Natasha Sanabria received the best paper award at the 4th International Electronic Conference on Environmental Research and Public Health - Climate Change and Health in a Broad Perspective, for the paper, “Occupational and Environmental Chemical Risk Assessment in a Changing Climate: A Critical Analysis of the Current Discourse and Future Perspectives”.

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 2020, when news of the first Coronavirus case was announced.

The NIOH has been utilising several platforms to reach South Af ricans 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/wpontent/uploads/2020/06/T witter_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/wpcontent/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/wpcontent/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/wpcontent/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 Ventilation & Vaccination Vital for workplace safety

In addition to the known non-pharmaceutical COVID-19 control measures, here are some other crucial precautions that can help.

Consider taking the vaccine. It provides an added layer of protection.

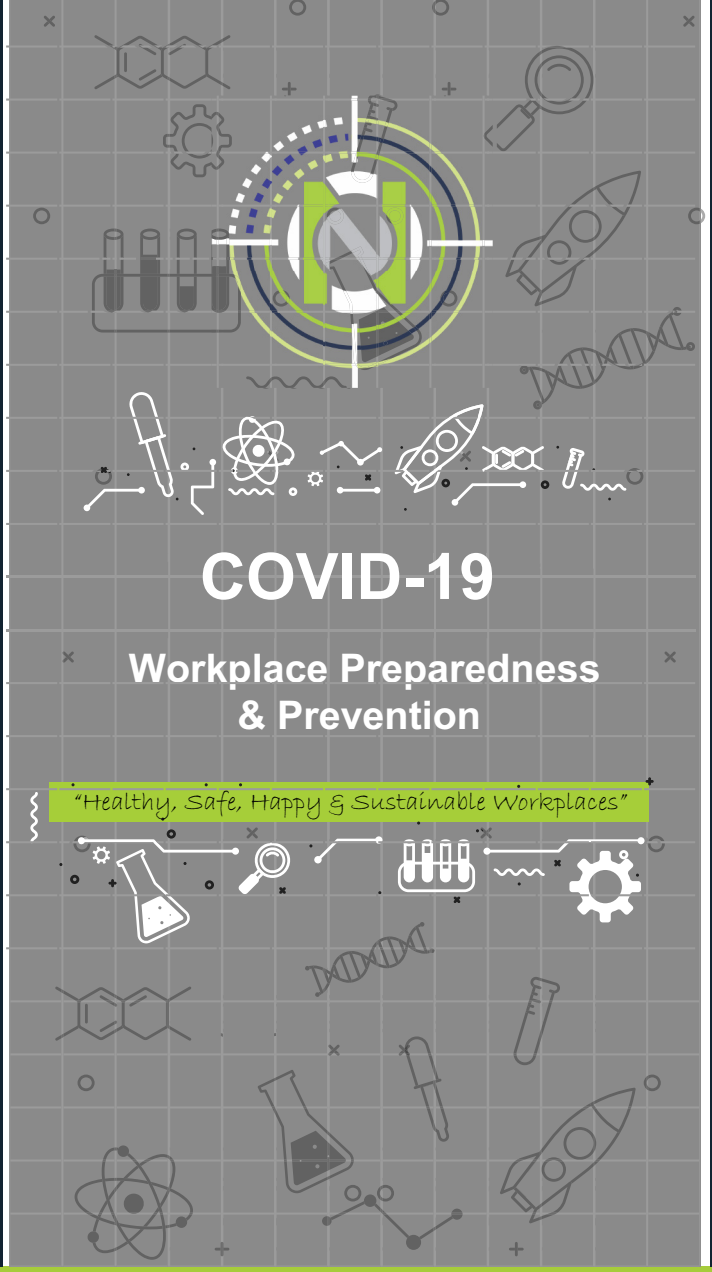
Natural and artificial ventilation is important. Always allow fresh outdoor air in indoor spaces.

Utilise outdoor spaces wherever possible.

Opt for online meetings. Avoid face to face contact if you can.

Don't listen to social media hype. Listen to medical experts.

Try to avoid crowds and limit gatherings.



COVID-19

Workplace Preparedness & Prevention

"Healthy, Safe, Happy & Sustainable Workplaces"

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PLEASE CONSIDER THE ENVIRONMENT BEFORE PRINTING.