NATIONAL INSTITUTE FOR OCCUPATIONAL HEALTH
Division of the National Health Laboratory Service

OCCUZONE

VOLUME 4
ISSUE 2
NOV 2022

"Do the best you can until you know better.
Then when you know better, do better."

Maya Angelou

IN THIS ISSUE

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MESSAGE FROM THE EDITOR

Image by Freepik

If "change is the only constant in life" as Heraclitus once said (Greek Philosopher), no one can avoid it. We can either embrace it or resist it, but change will happen anyway. Change has inevitably come for this publication as well. Ms Shanaz Hampson, who was the Editor has emigrated to pursue other interests. Ms Hampson has been an integral part of the NIOH family for many years and we owe her a debt of gratitude for contribution to this organisation in particular and occupational health in general. The Editorial Team and I wish Ms Hampson all the best in her future endeavours.

In this edition, we pay homage to women in occupational health and safety. At the NIOH we are proud that many women have chosen our organisation as a place where they make their contribution towards promoting healthy, happy, safe and sustainable workplaces. Many women in this organisation have not just broken through the leadership ceiling, but are trailblazers in their respective fields. Since our organisation was formed over six decades ago, it has been predominately led by men, which was a microcosm of society at the time. However, that has changed and the number of women in our Research Committee attests to this. We salute women in occupational health and safety in all spheres of society.

In this issue, we also share measures on how to mitigate the risk of occupational health in the water sector. The NIOH Waterborne Pathogen Laboratory offers various services and conducts water-related risk assessments in workplaces and handles queries associated with water-related occupational health issues (see page 14).

Another interesting read in this issue, is the Pathology Division Surveillance (PATHAUT) 2020 report summary, which shares insights on the trends that have been noted regarding organs that are sent to the NIOH for examination. Miners and ex-miners send their cardio-respiratory organs for examination as provided for by the Occupational Diseases in Mines and Works Act (Act 78 of 1973). We urge miners and ex-miners to use the festive holidays with their families to discuss getting their lungs sent to NIOH Pathology unit when they are deceased to be assessed for compensable lung diseases.

In the Spotlight section, we chat to Immunology and Microbiology Section PhD student, Ms Evida Poopedi on what she enjoys the most about her chosen research area. This is our final edition for 2022. We wish to thank all our stakeholders for their unwavering commitment towards promoting healthy, happy, safe and sustainable workplaces. As we break for the festive season holidays, under the "new normal," to spend time with our families and friends and unwind, let us extend our generosity to those who are less fortunate in our midst.

From all of us at the NIOH, we wish you a joyous, a peaceful and safe Festive Season, Merry Christmas and a Happy New Year.

Mr Vuyo Sabani

MESSAGE FROM THE RESEARCH COMMITTEE CHAIR

Continuous training and development throughout your research career is vital to stay relevant in the field and maintain networks through active contributions. So it is important to note that NIOH contributed valuable insight regarding the theme of "Beyond the Pandemic: Building on Lessons Learned" (and NHLS experiences) at the 17th Centres for Disease Control and Prevention (CDC) International Symposium on Biosafety, which offered pre-conference training related to biosafety challenges and emergency preparedness strategies. Also, the global community celebrated the 45th anniversary of the NIOSH-funded Education and Research Centres (ERCs). The ERCs conduct research, translate scientific discoveries into practice through education, training, and outreach, in addition to offering graduate and postgraduate training, as well as continuing education (see www.cdc.gov/niosh/enews/enewsv20n6.html). A database of Occupational Health study programs that are available in the world has also been developed, which estimates that there are 48 Occupational Health study programs available at 29 schools and universities (see https://erudera.com/study-programs/occupational-health/).
This means there are opportunities for growth and advancement moving forward for researchers at any stage of their careers.

NIOH representatives, Mr David Jones and Dr Graham Chin, with Ms LouAnn Burnett (current President of the American Biological Safety Association and a member of the Global Chemical and Biological Security Program, Sandia National Laboratories) at the CDC International Symposium on Biosafety (27-31 August 2022).

Related to this idea of "Beyond the Pandemic", NIOSH researchers joined the National Academies of Medicine to create a new National Plan for Health Workforce Well-Being (please refer to (https://nam.edu/initiatives/clinician-resilience-and-well-being/national-plan-for-health-workforce-well-being/).
NIOSH encourages "Total Worker Health" (TWH) approaches that value a work-life balance and improve overall worker well-being. Many industries now face challenges around excess work hours, resulting from workers who are sick or vacant positions, due to pre-existing or new staffing pressures resulting from the pandemic (www.cdc.gov/niosh/topics/fatigue/default.html). This includes 24-hour public sector jobs (e.g. firefighters, police, corrections, transportation). Private sector jobs are not exempt (e.g. healthcare, construction, manufacturing, and warehouse work), since they also rely on overtime to cover sick leave, vacations, or higher demand. This growing crisis of mandatory overtime and long work hours may result in high levels of fatigue that can affect any worker in any occupation or industry, with serious consequences for worker safety and health. Employers and workers can make use of tools to help identify initial steps to improve workforce safety and health (www.cdc.gov/niosh/programs/hwd/default.html).

As we emerge from the pandemic, we are encouraged to refresh our skills, regroup our resources, re-establish our networks, refine our mission and reprioritise goals in the ever changing environment of Occupational Health.

Dr Natasha Sanabria

RESEARCH

In August, we celebrated the National Women's Day. Although the occupational health and safety (OHS) sector has been male-dominated in the past, currently high-achieving women constitute the majority of the Research Committee at the NIOH. The role that women play as researchers and scientists in occupational health, working towards advancing knowledge to promote healthy, safe and sustainable workplaces across South Africa, was highlighted in the latest edition of Occupational Health Southern Africa (Vol. 28 No. 5).

Previously, women who served on the NIOH COVID-19 Occupational Health Outbreak Response Task Team were profiled (https://www.nioh.ac.za/covid-19-these-are-the-women-who-make-up-the-nioh-covid-19-occupational-health-outbreak-response-task-team/), and four of the staff were described as extraordinary South African women providing COVID-19 training to several sectors of society (https://www.news24.com/health24/medical/infectious-diseases/coronavirus/meet-4-extraordinary-south-african-women-providing-covid-19-training-to-several-sectors-of-society-20200809-3).

In fact, the NIOH has a long standing history of women working in the OHS field, where their role in the mining industry was emphasised (https://www.nioh.ac.za/women-in-mining/), as well as general work conditions (https://www.nioh.ac.za/fact-sheets/gender/). Further abroad, women's involvement in the environmental movement has been significant in politicizing occupational health, where their efforts led to the passing of the U.S. Occupational Health and Safety Act (https://doi.org/10.2190/T30J-TULT-PY8R-0P).

To keep up-to-date with all the latest research developments at the Institute that are being produced by inspirational women, our readers are reminded of the upcoming NIOH Research Day to be held on 30 November 2022.

Title: Physical Behaviors and Their Association with Adiposity in Men and Women From a Low-Resourced African Setting

Author(s): Mendham, A.E., Goedecke, J.H., **Kufe, N.C.**, Soboyisi, M., Smith, A., Westgate, K., Brage, S., and Mickelsfield, L.K.
Source: Journal of Physical Activity and Health, 2022, 19, 548-557
https://doi.org/10.1123/jpah.2022-0032

Background: We first explored the associations between physical behaviors and total and regional adiposity. Second, we examined how reallocating time in different physical behaviors was associated with total body fat mass in men and women from a low-income South African setting.

Methods: This cross-sectional study included a sample of 692 participants (384 men and 308 women) aged 41–72 years. Physical behaviors were measured using integrated hip and thigh accelerometry to estimate total movement volume and time spent in sleeping, sitting/lying, standing, light physical activity, and moderate to vigorous physical activity (MVPA). Total body fat mass and regional adiposity were measured using dual-energy X-ray absorptiometry.

Results: The associations between total movement volume and measures of regional obesity were mediated by total body adiposity. In men, reallocating 30 minutes of sitting/lying to 30 minutes of MVPA was associated with 1.0% lower fat mass. In women, reallocation of 30 minutes of sitting/lying to MVPA and 30 minutes of standing to MVPA were associated with a 0.3% and 1.4% lower fat mass, respectively.

Conclusions: Although the association between physical behaviors and fat mass differed between men and women, the overall public health message is similar; reallocating sedentary time to MVPA is associated with a reduction in fat mass in both men and women.

Keywords: sedentary; moderate to vigorous physical activity; obesity, low- and middle-income countries

Title: Assessment of Anti-Bacterial Effectiveness of Hand Sanitizers Commonly Used in South Africa

Author(s): Muleba, L., Van Wyk, R., Pienaar, J., Ratshikhopha, E., and Singh, T.
Source: Int. J. Environ. Res. Public Health 2022, 19, 9245.
https://doi.org/10.3390/ijerph19159245

Abstract: Hand sanitizers are used as an alternative to hand washing to reduce the number of viable microorganisms when soap and water are not readily available. This study aimed to investigate the anti-bacterial effectiveness of commercially available hand sanitizers and those commonly used in healthcare and community settings. A mapping exercise was done to select and procure different hand sanitizers (n = 18) from retailers. Five microorganisms implicated in hospital-acquired infections were selected and tested against each hand sanitizer: Escherichia coli, Enterococcus faecalis, Klebsiella pneumoniae, Pseudomonas aeruginosa, and Staphylococcus aureus. Twenty-one volunteers were recruited to do a handprint before and after applying the hand sanitizer. Only four out of eighteen hand sanitizers (22%) were effective against all tested bacterial species, and an equal number (22%) were completely ineffective. Seven hand sanitizers with a label claim of 99.99% were only effective against E. coli. Only five hand sanitizers (27%) effectively reduced bacteria on participants' hands. This study showed that only a fifth of hand sanitizers were effective against selected microorganisms. The findings raise a concern about the effectiveness of hand sanitizers and their role in infection, prevention, and control if not well regulated.

Keywords: hand disinfectants; microorganisms; hospital-acquired infection; infection prevention and control; precautionary measures; hand hygiene

Title: Water quality challenges in buildings during prolonged low or no occupancy: a cause for concern during COVID-19 lockdowns and related building closures

Author(s): Gomba, L., Singh L., Singh T.
Source: Occupational Health Southern Afr. 2022; 28(4): 136-147

Introduction: In compliance with the COVID-19 lockdown restrictions, many nonessential workplaces and public spaces were closed or left sub-operational with no or low occupancy for several months. The abrupt and unprecedented long periods of building closures have raised concerns about the proliferation of opportunistic premise plumbing pathogens that may be a biohazard for returning occupants.

Objective: In this review paper, we discuss microbiological water quality concerns during periods of no or low occupancy, as experienced during the COVID-19 lockdowns.

Methods: PubMed and Google Scholar databases were searched for peer-reviewed articles using specific keywords. The literature search was extended to grey literature. The paper focuses on Legionella, as a pathogen of concern, in building water systems that are not well managed and the potential risks to workers and other occupants.

Results: Most articles suggest a positive relationship between stagnation or reduced water usage and compromised microbiological quality of building water systems, but the effects are site-specific and are associated with biofilm formation and disinfectant decline. Considerations for building water risk assessment are discussed as a decision-making framework for selecting appropriate responses to anticipated changes in water quality.

Conclusion: The unprecedented building closures due to COVID-19 lockdowns present a hazardous event likely to impact building water quality. Building owners and facility managers, especially in high-risk settings, should consider conducting risk assessments of water systems during low-occupancy periods to identify potential risks and apply appropriate corrective measures, where necessary.

Keywords:SARS-CoV-2; low-occupancy buildings; water stagnation; microbiome; Legionella

Title: Psychological Distress in South African Healthcare Workers Early in the COVID-19 Pandemic: An Analysis of Associations and Mitigating Factors

Author(s): Lee, S., **Wilson, K.S.**, Bernstein, C., Naicker, N., Yassi, A., and Spiegel J.M.
Source: Int. J. Environ. Res. Public Health 2022, 19, 9722. https://doi.org/10.3390/ijerph19159722

Abstract: While the global COVID-19 pandemic has been widely acknowledged to affect the mental health of health care workers (HCWs), attention to measures that protect those on the front lines of health outbreak response has been limited. In this cross-sectional study, we examine workplace contextual factors associated with how psychological distress was experienced in a South African setting where a severe first wave was being experienced with the objective of identifying factors that can protect against HCWs experiencing negative impacts. Consistent with mounting literature on mental health effects, we found a high degree of psychological distress (57.4% above the General Health Questionnaire cut-off value) and a strong association between perceived risks associated with the presence of COVID-19 in the healthcare workplace and psychological distress (adjusted OR = 2.35, $p < 0.01$). Our research indicates that both training (adjusted OR 0.41, 95% CI 0.21–0.81) and the reported presence of supportive workplace relationships (adjusted OR 0.52, 95% CI 0.27–0.97) were associated with positive outcomes. This evidence that workplace resilience can be reinforced to better prepare for the onset of similar outbreaks in the future suggests that pursuit of further research into specific interventions to improve resilience is well merited.

Keywords: psychological distress; COVID-19; health care workers; risk perception; workplace management; training; practice; job stress

Title: Physical behaviors and their association with type 2 diabetes mellitus risk markers in urban South African middle-aged adults: an isotemporal substitution approach

Author(s): Kufe, C.N., Goedecke, J.H., Masemola, M., Chilowore T., Soboyisi, M., Smith, A., Westgate K., Brage, S., Micklesfield L.K.
Source: BMJ Open Diab Res Care 2022;10:e002815. doi:10.1136/ bmjdrc-2022-002815

Introduction: To examine the associations between physical behaviors and type 2 diabetes mellitus (T2DM) risk markers in middle-aged South African men and women.

Research design and methods: This cross-sectional study included middle-aged men (n=403; age: median (IQR), 53.0 (47.8–58.8) years) and women (n=324; 53.4 (49.1–58.1) years) from Soweto, South Africa. Total movement volume (average movement in milli-g) and time (minutes/day) spent in different physical behaviors, including awake sitting/lying, standing, light intensity physical activity (LPA) and moderate to-vigorous intensity physical activity (MVPA), were determined by combining the signals from two triaxial accelerometers worn simultaneously on the hip and thigh. All participants completed an oral glucose tolerance test, from which indicators of diabetes risk were derived. Associations between physical behaviors and T2DM risk were adjusted for sociodemographic factors and body composition.

Results: Total movement volume was inversely associated with measures of fasting and 2-hour glucose and directly associated with insulin sensitivity, basal insulin clearance, and beta-cell function, but these associations were not independent of fat mass, except for basal insulin clearance in women. In men, replacing 30min of sitting/lying, standing or LPA with the same amount of MVPA time was associated with 1.2– 1.4mmol/L lower fasting glucose and 12.3–13.4mgl2 /mUmin higher insulin sensitivity. In women, substituting sitting/lying with the same amount of standing time or LPA was associated with 0.5–0.8mmol/L lower fasting glucose. Substituting 30min sitting/lying with the same amount of standing time was also associated with 3.2mgl2 /mUmin higher insulin sensitivity, and substituting 30min of sitting/lying, standing or LPA with the same amount of MVPA time was associated with 0.25–0.29ng/ mIU higher basal insulin clearance in women.

Conclusion: MVPA is important in reducing T2DM risk in men and women, but LPA appears to be important in women only. Longitudinal and intervention studies warranted to provide more specific PA recommendations.

Title: Editorial: Occupational exposure to nanomaterials

Author(s): Andraos, C., Gulumian, M., Ichihara, G., Boowook, K., Yu, I.J
Source: Front. Toxicol. 4:1014600. doi: 10.3389/ftox.2022.1014600

Abstract: Dr Andraos served as Topic Editor for the Research Topic entitled “Occupational Exposure to Nanomaterials” for the journal, Frontiers in Toxicology. The exposure assessment of nanomaterials (NMs) in occupational settings is challenging due to several factors, some of which include, the lack of quantitative information about NM characteristics in occupational environments, a lack of consensus regarding the correct methods and equipment to use, possible ineffectiveness of current NM-based occupational exposure limits (OELs) and, lastly, a lack of sensitive and specific biomarkers for NM exposure. In total, four high quality articles were approved to be published under this Research Topic as each addressed at least one of these challenges. For example, Mariano et al. (2021) addressed the challenges faced with detection of micro/nano plastics and also introduced novel detection techniques. Kim et al. (2022a) showed the successful mitigation of 3D printer emissions whilst Kim et al. (2022b) addressed the lack of biomarkers by introducing an in vitro ALI-based biomonitoring device. Lastly, Masekameni et al. (2022) stressed the need to incorporate additional computational approaches that may improve current NM-based OELs.

Keywords: nanomaterial; occupational; exposure; nanoparticle; toxicology

Title: Physical Activity Behaviours of a Middle-aged South African Cohort as Determined by Integrated Hip and Thigh Accelerometry

Author(s): Micklesfield, L.K., Westgate, K., Smith, A., **Kufe, C.**, Mendham A.E., et al.
Source: Medicine & Science in Sports & Exercise, Publish Ahead of Print DOI: 10.1249/MSS.0000000000002940

Purpose: Descriptive studies of objectively measured physical activity behaviours in African populations are rare. We developed a method of combining hip and thigh accelerometery signals to quantify and describe physical behaviours in middle-aged South African men and women.

Methods: We integrated signals from two triaxial accelerometers worn simultaneously during free-living, in a subsample of the Middle-aged Soweto Cohort (MASC) (n=794;mean (SD) age:53.7(6.3) years). Acceleration time-series from the accelerometers were combined and movement-related acceleration derived using Euclidean Norm Minus One (ENMO, milli-g), to determine total movement volume (mean ENMO) and non-movement time (85 mg); thigh pitch angle and a sleep diary were used to divide non-movement time (min/day) into sleep, awake sitting/lying, and standing. Socio-demographic factors were self-reported, and weight and height were measured.

Results: Mean (SD) wear time was 128 (48) hours. Movement volume was 15.0 (6.5) mg for men and 12.2 (3.4) mg for women. Men spent more time in MVPA and sitting/lying, while women spent more time standing. Age was inversely associated with movement volume, MVPA and LPA. When compared to their normal weight counterparts, men who were overweight or obese spent less time in MVPA, while women who were overweight or obese spent less time in LPA and more time sitting/lying. Socio-economic status was inversely associated with total movement volume, MVPA and time spent sleeping, and positively associated with time spent sitting/lying, in both men and women.

Conclusions: Integrating signals from hip and thigh accelerometers enables characterisation of physical behaviours that can be applied in an African population.

Keywords: physical activity, socio-economic status, accelerometry, urban

Title: Lung Dosimetry Modelling in Nanotoxicology: A Critical Analysis of the State of the Art

Author(s): Utembe, W., and Sanabria, N.
Source: Environ. Sci. Proc. 2022, 19, 2. https://doi.org/10.3390/ecas2022-12801

Abstract: The estimation of the dose of inhaled nanomaterials is of fundamental importance in occupational and environmental health. Indeed, the toxicology and risk assessment of inhaled NMs depends on deposition rates in various parts of the lung, coupled with clearance/retention rates that depend on processes such as physical removal by ciliary clearance, macrophage-mediated clearance and lymphatic clearance, together with dissolution and disintegration. A number of lung dosimetry models have been designed to estimate the deposition and retention of inhaled particles, including empirical models, deterministic models, stochastic statistical models and mechanistic multiple-path models. Various assumptions are used in these models, including use of a symmetrical or asymmetrical lung, which affects the performance of these models. This study presents the most recent developments of in vivo dosimetry in nanotoxicology, with a focus on the design and modelling approach, and the required input data used, together with verification and validation status of the model. Widely implemented models in nanotoxicology were identified and analyzed, i.e., the Multiple Path Particle Dosimetry (MPPD) model, International Commission on Radiological Protection (ICRP) models, the National Council on Radiation Protection and Measurement (NCRP) model, the Exposure Dose Model (ExDoM) and the Integrated Exposure and Dose Modelling and Analysis System (EDMAS).

Keywords: lung dosimetry; modelling; inhalation; nanomaterials; nanotoxicology

Title: COVID-19 hospital admissions and mortality among healthcare workers in South Africa, 2020-2021

Author(s): Tlotleng, N., Cohen, C., Made, F., Kootbodien T., Masha, M., et al.
Source: IJID Regions (2022), doi: https://doi.org/10.1016/j.ijregi.2022.08.014

Objectives: This study describes characteristics of admitted HCWs reported to the DATCOV surveillance system and factors associated with in-hospital mortality in South African HCW.

Methods: Data from 5 March 2020 to 30 April 2021 were obtained from DATCOV, a national hospital surveillance monitoring COVID-19 admissions in South Africa. Characteristics of HCWs were compared to non-HCWs. Furthermore, a logistic regression model was used to assess factors associated with in-hospital mortality among HCWs.

Results: There were a total of 169,678 confirmed COVID-19 admissions, of which 6,364 (3.8%) were HCWs. HCW admissions were high in wave 1 (48.6%; n=3,095) than in wave 2 (32.0%; n=2,036). Admitted HCWs were less likely to be male (28.2%; n=1,791) [(aOR 0.3; 95% CI (0.3-0.4)], in the age group 50-59 (33.1%; n=2,103) [(aOR 1.4; 95%CI (1.1-1.8)], accessing private health sectors (63.3%; n=4,030) [(aOR 1.3; 95%CI (1.1-1.5)]. Age, comorbidities, race, wave, province and sector were significant risk factors for COVID-19 related mortality.

Conclusion: The trends in cases show a decline in HCW admissions in wave 2 compared to wave 1. Acquired SARS-COV-2 immunity from prior infection may be a reason for reduced admissions and mortality of HCWs despite the more transmissible and more severe Beta variant in wave 2.

Keywords: SARS-CoV-2; hospital surveillance; healthcare workers; hospital admissions; in-hospital mortality

Title: Impact of the macro-environment on the reporting of occupational injuries and illnesses by low-income workers compared to middle-income workers in South Africa: a mixed-methods study protocol

Author(s): Mudenha, W.F., **Naicker N.**, Singh T.
Source: BMJ Open 2022;12:e063384. http://dx.doi.org/10.1136/bmjopen-2022-063384

Introduction: Construction workers, mineworkers and manufacturing employees in South Africa must report occupational injuries and illnesses to their employer as stipulated in section 14 of the Occupational Health and Safety Act and section 22 of the Mine Health and Safety Act. However, under-reporting of workplace injuries and illnesses is common globally. This protocol seeks to ascertain if macro-environment factors impact reporting of workplace injuries and illnesses and compare reporting between low-income and middle-income workers.

Methods and analysis: To achieve the objectives of the study, a sequential mixed-methods research design will be adopted. A questionnaire will be distributed among low-income and middle-income workers from nine companies in Gauteng from the construction, mining and manufacturing sectors to establish macro-environment factors that impact their reporting. In addition, a data extraction sheet will be submitted to compensation fund administrators who receive and process workers' compensation claims to determine reporting patterns by low-income and middle-income workers. In-depth interviews will be conducted with occupational health and safety subject matter experts in South Africa to ascertain their opinion regarding factors that impact reporting. Data will be analysed using SPSS V.27.

Ethics and dissemination: Prior to the commencement of the study, ethical approval and permission will be obtained from the University of Johannesburg Faculty of Health Sciences Research Ethics Committee. The researcher intends to publish the results of the study in peer-reviewed journals and present research papers at scientific conferences and provide feedback to employers and employees across all three industries. The study shall determine associations in reporting between the manufacturing, mining and construction sectors and establish interventions employers can implement for workers to report injuries and illnesses.

Title: Environmental Toxicology of nanomaterials: advances and challenges

Author(s): Utembe, W.

Source: In Thomas S, Thomas MT and Pothen LA. (Eds), Nanotechnology for Environmental Remediation, Wiley VCH, Germany, ISBN 9783527349272

Abstract: Due to many unique biological and physicochemical properties, which are only exhibited at the nanoscale, nanomaterials (NMs) have found many applications, including inter alia, in medicines, cosmetics, food, pesticides, textiles, electronics, and construction materials. However, there are concerns over risks posed by NMs to workers and consumers, as well as the environment. The risks emanate from the ability of NMs to translocate from dermal, respiratory, and gastro-intestinal epithelia into the circulatory and lymphatic systems, and ultimately to body tissues and organs, where they can elicit many adverse effects. The adverse effects caused by NMs have been at the center of many studies in environmental toxicology, a field of study that focuses on the effects of toxic agents in humans, the environment, and natural ecosystems. The toxicity of NMs depends on many factors, including size, shape, functional groups, chirality, solubility, reduction–oxidation properties, surface charge, and composition, among others. Therefore, accurate assessment of these physicochemical properties is an absolute imperative. This chapter presents advances, issues, and challenges in the toxicity testing of NMs, including the physicochemical characterization of NMs in both in vitro and in vivo systems as well as in the environment. Moreover, the chapter presents the challenges and recent advances in in vitro, in vivo, and in silico toxicity assessment of NMs.

Keywords: environmental toxicology; nanomaterials; adverse effects; dose-response assessment; in vitro; in vivo; modelling

Ms Evida Poopedi

PhD Student, Immunology and Microbiology Section

Why did you choose this career and research path?

Science is one of the few fields that encourages creative thinking and allows people to ask questions about real-world problems they are passionate about. The field is always changing and pushing the limits of knowledge and discoveries. I wanted to be part of a profession that is constantly striving to improve the quality of human life. I knew from a young age that I wanted to study microbiology. This may sound cliché, but I was fascinated by the fact that we are surrounded by microorganisms but cannot see them with our naked eyes. Later, I learned that not all microorganisms are harmless or beneficial, some are deadly, stubborn and thus pose a global health threat.

What training and qualifications did you undergo and where?

I obtained a BSc in Molecular and Life Sciences from the University of Limpopo, then a BSc Hons in Medical Microbiology from Sefako Makgatho Health Sciences University, followed by an MSc Medicine (Clinical Microbiology and Infectious Diseases) from University of the Witwatersrand.d

What are the most enjoyable aspects of doing research?

The best part of doing research is knowing, for a moment something that no one else in the world knows and you just cannot wait to share it, whether through presentations or articles.

What are your research highlights to date?

I was able to publish my MSc work. I also presented a poster on some of my PhD work earlier this year at the International Congress on Occupational Health 2022 and received a runner-up award.

What are your career goals?

My main goal at the moment is to complete my PhD.

Occupational health surveillance data provides vital information on the prevalence of occupational related diseases and injuries. It allows trends to be determined and prevention programmes to be monitored and evaluated. Thus surveillance of occupational exposures and health outcomes is an essential function of the NIOH. In this issue we present a summary of the latest Pathology Division Surveillance (PATHAUT) 2020 report.

PATHOLOGY DIVISION SURVEILLANCE REPORT 2020

Pathaut is a long running surveillance database (from 1975) that records the autopsy findings at the NIOH from mineworkers who worked on controlled mines and works in South Africa. The Occupational Division in Mines and Works Act (Act 78 of 1973) provides for the autopsy of miners cardio-respiratory organs for compensation at the cost of the state. The autopsy is conducted by specialist pathologists at the NIOH. The Pathaut system has been in continuous operation since 1975 and provides good quality data on miners' health for surveillance and research. This summary describes the findings for 2020. The full annual Pathaut Report for 2020 was released on the NIOH website https://www.nioh.ac.za/wp-content/uploads/2022/09/Pathaut_Report_2020..pdf

The NIOH examined the organs of 557 deceased individuals in 2020, a decrease of 26% from 2019, a change attributed to the COVID-19 pandemic. The decrease in numbers was consistent across commodities. In 2020 the organs submitted represented 54.6% Black Africans, 45.1% Whites, and 0.4% were Coloured South Africans. The majority (62.5%) were received as expected from ex-miners, followed by current miners 33.6% and a small percentage 4.0% of cases could not be classified. The overall occupational respiratory disease rates (per 1000 autopsies) for 2020 are shown in Figure 1. Decreases were seen in TB, Emphysema, and Silicosis rates compared to 2019, but increases were seen in lung cancer, asbestosis and massive fibrosis.

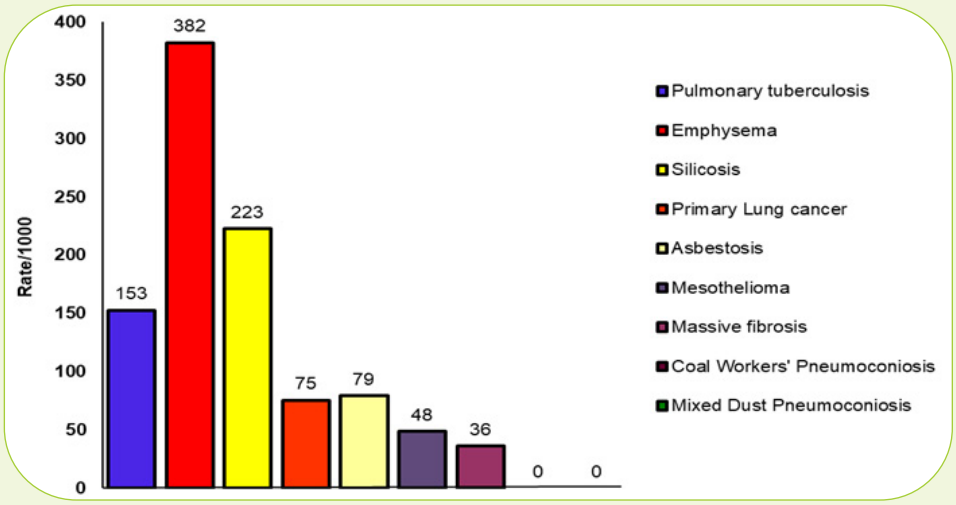


Figure 1 Overall disease rates found at autopsy for 2020

The increasing employment of women in the mining industry is seen in Pathaut with women accounting for 3.4% of autopsies in 2019 and 5.2% in 2020. The majority of women were diagnosed with Mesothelioma (27.6%) followed by asbestosis and emphysema (24% each).

The overall rate of pulmonary tuberculosis (PTB) decreased from 192/1000 in 2019 to 153/1000 in 2020 although this rate is still increased from 2018. The rate decreased substantially in black gold miners 290/1000 in 2019 to 228/1000 in 2020 (Fig 2). A decrease was also seen in white miners. This situation will require further monitoring to determine the impact of COVID-19. Black African men accounted for 65% of the TB cases and had a noticeably higher rate of TB diagnosis compared to White men. Gold and Platinum mining accounted for the majority of TB cases (73%).

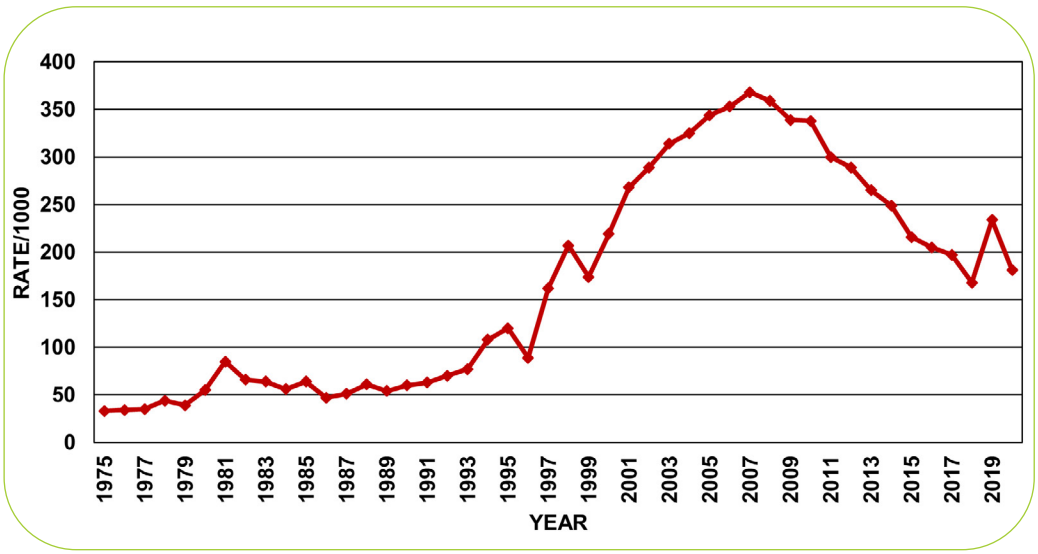
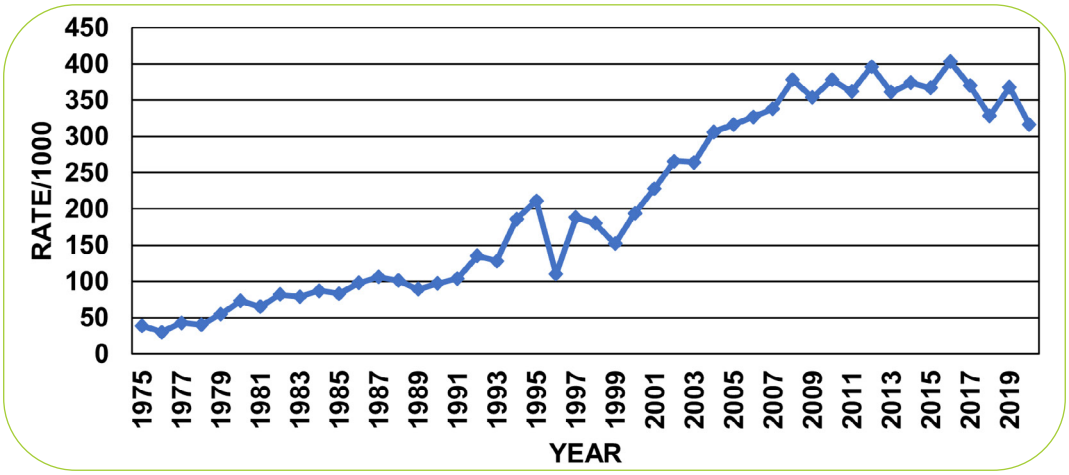


Figure 2 Active PTB rates in Black Miners at autopsy (1975-2020)

The overall rate of silicosis also decreased from 246/1000 in 2019 to 223/1000 in 2020. The rate in gold miners decreased from 338/1000 in 2019 compared to 322/1000 in 2020. In black gold miners, the rate decreased from 368/1000 in 2019 to 316/1000 in 2019, having fluctuated between 378/1000 in 2008 and 368/1000 in 2019 (figure 2). The rate in white gold miners increased from 309/1000 in 2019 to 328/1000 in 2020. A total of 87% of the silicosis cases were employed in the gold mining industry.



The other less prevalent diseases are lung cancer where 66% came from gold miners and 20% from asbestos exposure; Mesothelioma with 59% from asbestos exposure; and Asbestosis with 68% from asbestos exposure.

The findings in this summary must be interpreted while taking into account the referral bias. There is a low autopsy rate for black men who have left employment at the mines, but the majority of retired white miners are autopsied. The number of autopsies have decreased steadily over the years, probably reflecting the associated decrease in the number of miners employed in the industry.

The NIOH consists of a multidisciplinary cohort that provides specialized and cost-effective occupational health and safety services to government departments (both national and provincial) as well as various other industries. In this issue, our service delivery component sheds light on the service offerings of the Waterborne Pathogen Unit of the NIOH.

MITIGATING THE RISK IN OCCUPATIONAL HEALTH IN THE WATER SECTOR – WATERBORNE PATHOGENS UNIT

Contaminated water is associated with the spread of several waterborne diseases, such as diarrhoea, cholera, dysentery, typhoid, and hepatitis A, among others. The NIOH Waterborne Pathogens Unit has in the past, worked on pathogens present in water such as amoeba and amoeba-resistant bacteria (specifically Legionella) that have evolved in such a way that they can use amoeba as hosts to evade water treatment technologies commonly used in industry. This allows them to multiply and spread to new environments including workplaces. Yet, the workplace is rarely considered a source of infection in outbreak response for waterborne diseases such as Legionellosis where Legionella infections are categorised as being community, travel or nosocomial but never occupational. However, the risk of exposure to waterborne pathogens in various South African industries such as wastewater, agriculture, mining, and other commercial sectors is gaining interest, especially with the increased use of reclaimed water. According to the Regulations for Hazardous Biological Agents, it is a legal requirement for the employer to conduct and document a risk assessment to determine if any person at the workplace could be at risk of exposure to hazardous biological agent(s) and take appropriate action to mitigate such risks. This is accomplished by identifying the hazard (pathogen) of concern, understanding the route of exposure, and recommending appropriate control measures to minimise worker exposure risk to potential pathogens.

THE NIOH WATERBORNE PATHOGEN LABORATORY OFFERS THE FOLLOWING SERVICES:

Testing of potable water (drinking water e.g. tap and borehole water) and non-potable water (e.g. domestic and industrial wastewaters and their treated effluents, roof harvested rainwater, river/dam/storm/spring and other sources) for the following: to minimise worker exposure risk to potential pathogens:

- Total coliforms and E. coli (Colilert-18 Quanti-tray/2000 method)
- Legionella pneumophila (Legiolert method)
- Enterococcus spp. (Enterolert method)
- SARS-CoV-2 in wastewater and sludge using RT-PCR

The laboratory also conducts water-related risk assessments in workplaces and handles queries associated with water-related occupational health issues.

The laboratory has a rigorous quality management system including internal quality assurance and participation in a SANAS accredited water microbiology proficiency testing scheme for total coliforms and E. coli.

CURRENT RESEARCH PROJECTS RELATED TO WATERBORNE PATHOGEN EXPOSURE INCLUDE:

Our Unit actively participates in waterborne pathogen-related research in collaboration with other institutions both locally and regionally. This allows us to learn more about the biohazard exposure profiles in water and the risk of transmission to workers. Some of our current projects include:

1. **Evaluation of health risks associated with exposure to biological and chemical contaminants at wastewater treatment plants and recycled water use sites.**
   Wastewater naturally contains microbial and chemical contaminants, which may result in adverse health effects to workers when inhaled, ingested or absorbed through the skin especially if appropriate personal protective equipment (PPE) is not used. This study aims to identify the contaminants of concern and potential health risks to workers at wastewater treatment plants and workplaces that use treated municipal effluents (also known as recycled water) for non-potable purposes. This is a -six-year (2019-2025) project funded by the Water Research Commission (WRC) with a student capacity of one PhD and three MSc students.

2. **Detection in wastewaters, genotypic analysis and microbiome interactions of SARS-CoV-2 in Botswana and South Africa.**
   This is a two-year (2021-2022) collaborative project with the University of Botswana academics. This work aims to provide a sub-regional perspective on SARS-CoV-2 evolution in Botswana and South Africa and how this may be shaped by sewage microbiomes. The project is funded by the COVID-19 Africa Rapid Grant Fund and has a student capacity of one MSc and one BSc Honours student.

3. **Characterisation of bioaerosols, volatile organic compounds, odour emissions in wastewater treatment plants and assessment of the associated emerging epidemiological, occupational, and public health risks.**
   This WRC funded project started in 2022 and will run until 2024 in collaboration with the University of Witwatersrand's School of Public Health. The project aims to characterise bioaerosol, volatile organic compounds, and odour emissions in wastewater treatment plants and to assess their contribution to emerging epidemiological, occupational, and public health risks for plant workers and surrounding communities since the pathogens can travel for long distances. The student capacity comprises one PhD, two MSc, and one MPH student.

4. **Health risk assessment in occupational settings during non-potable use of roof harvested rainwater.**
   This project aims to investigate the quality of roof-harvested rainwater (RHRW) for non-potable use in occupational settings and the potential health risks to workers handling and using RHRW. With the increasing demand for freshwater resources, research focusing on the human health risks of RHRW is critical to inform guidelines and ensure the safe use of non-potable purposes in occupational settings. This project is running over three years (2021-2023) with a student capacity of one intern student registered for submission of a portfolio as a medical scientist and one MSc student.

5. **Establishment of a National COVID-19 Wastewater Surveillance Pilot Project.**
   Since February 2021, our Unit has been participating in the national COVID-19 Wastewater Surveillance project funded by the Centre for Vaccines and Immunology of the National Institute for Communicable Diseases in partnership with the WRC. COVID-19 wastewater-based epidemiology determines the presence of SARS-CoV-2 genetic material in sewage/wastewater and the results are used to provide surveillance data on the prevalence and distribution of COVID-19 in South Africa. Water utilities, municipalities, suppliers of water treatment technologies, health facilities and various food production and mining companies interested in using these specialised services are invited to contact the laboratory manager Dr Annancietar Gomba (contact details below).

For more information regarding the collaborative research with the Waterborne Pathogen Unit, Immunology & Microbiology Section at NIOH, please also contact:

Dr Annancietar Gomba | E-mail: NoncyG@nioh.ac.za | Phone: +27(0)11-712-6404

Ms Larissa Singh | E-mail: LarissaS@nioh.ac.za | Phone: +27(0)11-712-6504

TRAINING CONDUCTED - JULY TO SEPTEMBER 2022

Global stats: 102 webinars 56'177 attendees (March 2020 – Sep. 2022)

Find us on YouTube

OHS Webinar: Ergonomics Awareness Training for the Gauteng Infrastructure Financing Agency (GIFA) – Thu. 21st July 2022.
The Ergonomics Unit of the NIOH's Occupational Medicine Section prepared and delivered the training session for the Gauteng Infrastructure Financing Agency staff. Mr Ashraf Ryklief, National OHS Training Manager, chaired/facilitated the session.

Ms Zandile Hoyi, (Principal Medical Scientist - Ergonomics Unit) and Ms Buyisiwe Nkosi (Medical Scientist - Ergonomics Unit) presented on the following topics:

- What is Ergonomics and why is it important
- Principles of Ergonomics
- What are Ergonomic Risks
- What is an Ergonomics Risk Assessment?
- Hazard identification
- Practical exercise: Identification of Ergonomic risks
- Occupational Medicine/Health

60 participants attended this training webinar.

OHS Training Presentation: Study Tour of the Occupational Safety and Health (OSH) Division of the National Social Security Authority (NSSA) of Zimbabwe. (Fri. 22nd July 2022)
The NIOH National OHS Training Manager, Mr Ashraf Ryklief, presented to the Zimbabwean delegation and their South African hosts, on the activities of the NIOH's OHS Training Unit.

8 Zimbabwean delegates and **2** members from the Africa and Middle East Relations Directorate of the South African National Department of Health (NDoH), participated in the international study tour.

IS Section Webinar: University of Limpopo (U.L.) Postgraduate Information Studies Department Tour of the three NHLS Libraries. (Thu. 28th July 2022)
The NIOH Information Services Section hosted the post-graduate student delegation for a physical tour of the three NHLS Libraries. This was the first of two study tours conducted for the U.L. Information Studies Department in 2022. The first was a physical study tour and the second was an online virtual visit.

The physical tour project was coordinated by Mr Simphiwe Yako on behalf of the IS Section team. The IS Section team comprised of Ms Angel Mzoneli, Ms Winkie Siebane, Ms Ntomboxolo Ndubandubane Manunga, Mr Ashraf Ryklief, Mr Bongani Nkuna, Mr Lwando Matomane, Ms Babalwa Jekwa and Ms Suzan Mothiba.

The study tour programme covered the following items:

- Welcome and introductions
- NHLS Libraries and Cataloguing
- Archiving and Institutional Repository (IR)
- Query Handling and OHS Training
- A walk-through tour of NHLS Libraries

20 U.L post-graduate students and academics participated in the physical study tour.

COVID-19 Centenary Webinar: Nedlac and NIOH Online Launch of the "Management of OHS Covid-19 Workplace Training Programme" (Tue. 16th August 2022)

https://www.youtube.com/watch?v=Xa9_z-qdnGc

On 16 August 2022, the NIOH and National Economic Development and Labour Council (Nedlac) jointly launched the "Management of OHS Covid-19 Workplace Training Programme". The training programme is a collaboration between Nedlac and NIOH to deliver a series of webinars and to undertake the development of related information resources focusing on how to manage Covid-19 and contribute to building occupational health and safety (OHS) capacity in the workplace. The programme is planned to run over a 12-month period.

Dr Thuthula Balfour, the Head of Health at the Minerals Council South Africa, chaired the 2-hour online launch. The Nedlac Executive Director, Ms Lisa Seftel, conducted the welcome. The two keynote speakers were the Deputy Minister of Employment and Labour, Ms Boitumelo Moloi, who presented on "Charting a new way forward for workplace health and safety" and the Director of CAPRISA, Prof Salim Abdool Karim who presented on "Combating the illusive and illustrious Covid-19 virus".

Dr Balfour moderated the panel discussion on "The lessons of Covid-19 for workplace health and safety" that included Dr Barry Kistnasamy (Department of Health), Prof Mohamed Jeebhay (UCT) and Prof Rajen Naidoo (UKZN). Dr Spo Kgalamono, the Executive Director of the NIOH, presented the "Introduction to the workplace occupational health and safety Covid-19 legacy programme".

Mr Vuyo Mafata, the Compensation Commissioner under the Department of Employment and Labour (DoEL), spoke on behalf of the Compensation Fund. Ms Siobhan Leyden (Business representative) and Ms Lebogang Mulaisi (Labour representative) delivered the other messages from partners.

966 of the Nedlac constituencies' workplace representatives, OHS professionals and stakeholders joined the webinar.

IS Section Online Webinar: Virtual Tour of National Health Laboratory Service (NHLS) Libraries for the students of the University of Limpopo (U.L.) Information Studies Department (Thursday, 22nd September 2022).

The NIOH OHS Training Unit supported the Information Services Section's preparation and delivery of virtual tour of the three libraries and the specialised services provided. This visit is part of the formal academic programme of the University of Limpopo's Information Studies Department. The virtual tour project was coordinated by Ms Ntomboxolo Ndubandubane Manunga on behalf of the IS Section team.

The IS Section staff was supported in the production of an introductory video (including a welcome by Dr Spo Kgalamono, NIOH Executive Director) for the virtual tour session attended by the U.L. student delegation and academics. Mr Ashraf Ryklief, National OHS Training Manager, facilitated the online session on the Blackboard platform.

57 U.L post-graduate students and academics participated in the online virtual study tour.

Nedlac/NIOH OHS COVID-19 Webinar: "COVID-19 Policy Updates: The Code of Practice" (Thursday, 6th October 2022)

https://www.youtube.com/watch?v=syiOghVCYM0

The NIOH OHS Training Unit delivered the online ZOOM webinar (i.e. a "live" panel discussion) as part of the Nedlac and NIOH "Management of OHS COVID-19 Workplace Training Programme". The target audience included the Nedlac constituencies' workplace representatives and the NIOH's OHS stakeholder community.

Dr Graham Chin (SHE Department) opened the session on behalf of the NIOH Executive Director (Dr Spo Kgalamono). The panel discussion included two panellists – 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.

The panel discussion addressed a wide range of questions related to the broader regulatory framework for occupational health and safety (OHS) and COVID-19 in the workplace, and practical application of the "Code of Practice: Managing Exposure to SARS-COV-2 in the Workplace, 2022" in the workplace.

751 participants attended this training webinar.

Click the following link to download the "Code of Practice: Managing Exposure to SARS-COV-2 in the Workplace, 2022" https://www.nioh.ac.za/wp-content/uploads/2022/05/NO.R.1876-Code-of-Practice-Managing-Exposure-to-SARS-COV-2-in-Workplace.pdf

YouTube SUBSCRIBE **Follow us on YouTube**
https://www.youtube.com/channel/UCA24Q1QQmshRuX-pKzVWtWA/videos

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

ACHIEVEMENTS

Dr Spo Kgalamono was recently nominated to serve as a member of the Trustees Committee of the International Commission on Occupational Health (ICOH) 2024 Congress. Dr Kgalamano is the Executive Director of the NIOH. She is a registered Occupational Medicine Specialist, and she has been practising Occupational Health since 2000. In addition to that, Dr Kgalamono is the Chair of Occupational Health and Senior Lecturer at the School of Public Health at the University of the Witwatersrand, where she has been involved in the training of occupational medicine doctors since 2002 at a diploma and specialist level. Furthermore, Dr Kgalamomo serve in various organisations in different positions. She is an executive member of South African Society of Occupational Medicine (SASOM), member of the OHSA Editorial Board, member of the World Health Organisation Mental Health (WHO) in the workplace Global Guidelines Committee, member of Department of Employment and Labour Technical Committees, amongst others.

Dr Tanusha Singh was recently appointed secretary of the International Commission on Occupational Health (ICOH) scientific committee for Biohazards and Occupational Health for the current triennium (2022-2024). Dr Singh is the Head of the NIOH Immunology and Microbiology Section, with over 21 years' experience in occupational health. Her major research interests are hazardous biological agents (occupational allergens, bioaerosols and waterborne pathogens); and their measurement and effects on worker health. Dr Singh sits on several committees including the International Commission of Occupational Health; the International Labour Organisation; and the WHO. Dr Singh holds a joint appointment with the Department of Clinical Microbiology and Infectious Diseases at Wits University and actively contributes to undergraduate and postgraduate teaching and supervision. She holds a Phd in Clinical Microbiology and Infectious Disease and is the recipient of a number of research grants. Occupational Health; the International Labour Organisation; and the WHO.

ACHIEVEMENTS

Dr Clement Kufe was recently appointed as Extraordinary Lecturer within the School of Health Systems and Public Health, Division of Environmental and Occupational Health Sciences (EOHS), Faculty of Health Sciences, University of Pretoria. Dr Kufe is a Biostatistician at the Epidemiology and Surveillance Section of the NIOH. He has a wealth of experience in developing data masks for various study designs using Epi-Info, Epi Data and REDCap. He specialises in data analysis and modelling of epidemiologic studies. He holds an MSc in Biostatistics and Epidemiology and PhD from the University of the Witwatersrand, Johannesburg, South Africa.

Dr Natasha Sanabria was recently appointed as an extraordinary lecturer within the School of Health Systems and Public Health at the University of Pretoria. Dr Natasha Sanabria is the Head of Toxicology and Biochemistry section at the NIOH and has a wealth of experience specialising in biochemical investigations and genetic analyses of disease-related states. She is currently the Chairperson of the Research Committee, an advisory board member of the Institute for Nanotechnology and Water Sustainability (iNanoWS), associate member of the American College of Toxicology and a member of the international NanoSolveIT Consortium for in silico Integrated Approach to Testing and Assessment for the environmental health and safety of Nanomaterials. Dr Sanabria holds both an MSc degree (Cum Laude) and a PhD in Biochemistry, as well as an MSc in Bioinformatics and Computational Molecular Biology (Cum Laude). She is the recipient of the NRF Prestigious award for discovering a new gene (GenBank accession number GU196248) and she received the NRF Innovation Fellowship to complete Postdoctoral studies with training at Cold Spring Harbour Laboratory in New York.

ACHIEVEMENTS

Dr Nonhlanhla Tlotleng was recently appointed as Extraordinary Lecturer within the School of Health Systems and Public Health, Division of Environmental and Occupational Health Sciences (EOHS), Faculty of Health Sciences, University of Pretoria. Dr Tlotleng is a Senior Epidemiologist and is involved in research and surveillance activities within the Epidemiology and Surveillance Section. Her area of interest and focus is on respiratory health effects of workers, environmental exposure to hazardous chemicals, occupation related cancers and surveillance of workplace related diseases. Dr Tlotleng is the deputy chair of the NIOH Research Committee and Surveillance lead in the Occupational Health Outbreak Response Task Team (OHORT) within the NIOH. She serves as a member on the OHSS steering committee and scientific committee. She holds an undergraduate degree and an MSc degree in Biotechnology from the University of Johannesburg, as well as a PhD from the School of Pathology, Department of Molecular Medicine from the University of Witwatersrand. In addition, Dr Tlotleng holds an MSc degree in Epidemiology and Biostatistics from the University of Witwatersrand.

TOXICOLOGY AND BIOCHEMISTRY PRESENTATIONS

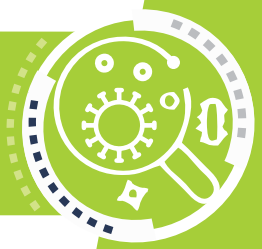
Dr Charlene Andraos presenting at the XVIth International Congress of Toxicology, Maastricht, the Netherlands

Dr Charlene Andraos attended the XVIth International Congress of Toxicology, Maastricht, the Netherlands from 18 – 21 September 2022. Dr Andraos gave an oral presentation as an Invited Speaker on 19 September in the Session entitled "Opportunities and limitations on SbD approaches for nanomaterials". The title of her presentation was "Safe materials and products by design: Designing nanomaterials through hazard assessment early in the development stage".

In addition, Dr Andraos's PhD student, Mr Kailen Boodhia, currently registered with the North-West University, presented his poster entitled "Distribution and Uptake of Gold Nanoparticles under Air-Liquid Interface and Submerged Conditions, investigated using the Conventional Inverted microscopy and CytoViva 3D Technology at the XVIth International Congress of Toxicology, Maastricht, the Netherlands.

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

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

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

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

1.COVID-19: Know the 3 C's and 3 W's – Prevention during the Winter Season
https://www.nioh.ac.za/wp-content/uploads/2021/06/The-Three-Cs-and-Ws.mp4

2.COVID-19: What employers need to consider for vulnerable workers
https://www.nioh.ac.za/wp-content/uploads/2020/08/Vulnerable-workersUpload.mp4

3.What every employer should do during COVID-19
https://www.nioh.ac.za/wp-content/uploads/2020/06/Twitter_03_What-every-workplace-needs-FINAL.mp4

4.What employers need to know about risk assessment
https://www.nioh.ac.za/wp-content/uploads/2020/06/Twitter_05_Risk-Assessment.FINAL-2-mp4.mp4

5.Steps employers can take when a worker is symptomatic or tests positive for Covid-19 at work
https://www.nioh.ac.za/wp-content/uploads/2020/07/When-an-employee-tests-positive.mp4

6.The importance of Medical Screening in the Workplace
https://www.nioh.ac.za/wp-content/uploads/2020/08/The-importance-of-medical-screening-FINAL.mp4

7.Working during lockdown? How to stay safe
https://www.nioh.ac.za/wp-content/uploads/2020/06/Twitter_01_Lockdown-workers-FINAL-3.mp4

8.What you need to know about donning & doffing surgical masks
https://www.nioh.ac.za/wp-content/uploads/2020/07/Donning-and-doffing-surgical-mask.FINAL-2-mp4.mp4

9.What you need to know about surgical masks
https://www.nioh.ac.za/wpontent/uploads/2020/06/Twitter_04_Surgical-masks-FINAL-2-.mp4

10.Step-by-step guide on donning and doffing of a Vflex N95 respirator
https://www.nioh.ac.za/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

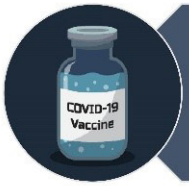
16.A guide on how to doff gloves using the beak method
https://www.nioh.ac.za/wp-content/uploads/2020/07/Doffing-gloves-beak-method-FINAL.mp4

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

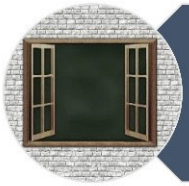
Below is a link to posters as well as various factsheets that have been developed. These can be utilised in your respective workplaces and are print-ready (A3 size).
NIOH Factsheets & Posters http://www.nioh.ac.za/covid-19/

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.



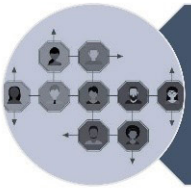
Consider taking the vaccine. It provides an added layer of protection.



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 & SUSTAINABLE WORKPLACES

Workplace Hotline: 0800 2121 75

Occupational Health Surveilance System [OHSS]
General queries for data submision:
0723215503 | 0713981169 | OHSWorkplace@nioh.ac.za

www.nioh.ac.za | info@nioh.ac.za | twitter: @nioh_sa

NATIONAL HEALTH LABORATORY SERVICE

NATIONAL INSTITUTE FOR OCCUPATIONAL HEALTH
Division of the National Health Laboratory Service

COVID-19
Workplace Preparedness & Prevention

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

"Healthy, Safe, Happy & Sustainable Workplaces"

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PLEASE CONSIDER THE ENVIRONMENT BEFORE PRINTING.