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OccuZone

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MESSAGE FROM THE CHIEF EDITOR

I hope you are all keeping well and safe during this unprecedented and turbulent time of crisis that we as a nation are immersed in, an extraordinary degree of fluidity that needs to be exercised by all organisations as they endeavour, first and foremost, to keep their people as safe as possible, above all else. At a time like this, physical health and safety must stand above the rest. I encourage all of us to continue to remain alert to the call to be as responsibly flexible, as we are required to be, in order to protect and safeguard ourselves.

As we soldier on, we at the NIOH have been immersed in many activities to ensure the health and safety of workplaces. In this first issue of the 2nd volume of OccuZone, I would like to share with you what we at the National Institute for Occupational Health have been engrossed in, in the past three months, which mostly saw a continuation of our efforts in assisting workplaces in responding to the pandemic.

Firstly, we highlight our research activities with a special focus on airborne infection control in the workplace. Furthermore, we showcase a few scientific publications on various research topics produced by our researchers which contribute to the body of knowledge in OHS and profile one of our emerging researchers. Secondly, we take a look at one of the fundamental functions of the NIOH - surveillance of occupational exposures and health outcomes. In this issue the surveillance report focuses on Statistics SA mortality data on suicides over 20 years in the South African population.

We further showcase two unique specialized services- Aspire Laboratory service and Translation of exposure assessments and hazard identification on nanomaterial research in industrial settings into service delivery. Lastly, we showcase our teaching and training activities, which mainly focused on COVID-19 workplace preparedness and prevention as well as upcoming training events.

I would like to extend my gratitude to the authors for their valuable contribution to this issue and the editorial team for their valuable time and expertise in producing this publication.

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Happy reading & keep safe.

Editor in Chief
Angel Mzoneli

Research

Message from the Research Committee Chair

In this volume our focus is drawn to airborne infection control in the workplace. While COVID-19 transmission remains controversial as researchers across the globe remain conflicted about droplet and airborne modes of transmission - lest we forget the high burden of TB we still face in South Africa. In some workplaces airborne transmission of infectious agents like TB is a challenge due to inadequate ventilation and/or poor maintenance of existing control measures. Assessing the vulnerability of workers to different hazards is complex adding to the existing challenges on mitigating risk. Scientific evidence shows that this type of UVGI technology as a supplementary control is effective against a multitude of microorganisms in air, water and on visible surfaces, therefore more investment should be made for its roll out particularly in congregate settings. UVGI has also been shown to be effective against several species of the coronavirus family. Researchers at the NIOH have been investigating the effectiveness of UVGI in reducing airborne microbial levels. The research highlighted that the microbial levels were lower in areas where UVGI fixtures were installed. The findings of the study are presented below.

In the first half of the year we've had several interesting publications looking at various occupational health issues. From proposing safety methods for promoting rigorous nanomaterial innovation; integration of nanomaterial (NM) information sources with the latest nanoinformatics methods to our understanding of the clearance AgNPs through mechanisms other than dissolution such as mucociliary escalation, translocation to the lymphatic system or other organs. This is important so that regulatory agencies and industry can effectively and rapidly evaluate NM exposure and risk, enabling implementation of computational 'safe-by-design' approaches to facilitate NM commercialization.

Strengthening occupational health surveillance has always been a priority for the NIOH and one of the research teams has analysed data from the occupational health and safety information system (OHASIS) which showed that such functional occupational health surveillance systems can identify risk subgroups, programme successes as well as identifying areas that require strengthening. Collaborative investigations by our Ergonomics unit highlighted why some individuals are generally more prone to musculoskeletal pain which may point to useful opportunities for prevention in the workplace. Another study looked at gender based deaths among miners due to external causes and alluded to the development of targeted interventions to protect women miners. Also related to mining was a respiratory health study in a community living in close proximity to gold mine waste dumps in Johannesburg. This study showed that residents residing <500 m from mine dumps had elevated adverse respiratory health effects. Moving along to research in the informal economy, acute and chronic illnesses were associated with poor self-rated health among waste pickers and that the provision of mobile clinic services at the landfill sites could increase access to medical care. Another collaborative study investigated hypertension across multiple countries in Africa and found that obese Africans were more than twice as likely to be hypertensive and that the odds increased with age. Lastly, there was a short filler article emphasising the impact of lockdown and other containment measures in delaying the exponential curve of COVID-19 and highlighted the lack of occupational data to assess our triple epidemic of HIV infection, tuberculosis and COVID-19. With the array of research topics, I trust you will find this edition informative. Happy reading.

Dr Tanusha Singh

RESEARCH FOCUS

Bioaerosols and infectious patients in various departments within health facilities can be a risk of airborne infections. There is strong evidence that tuberculosis is an occupationally acquired disease amongst healthcare workers and the most common occupational acquired infection in South Africa. Poorly implemented and absent infection prevention control measures increase the risk of acquiring tuberculosis in healthcare facilities. Ultraviolet germicidal irradiation devices (UVGI), which are air cleaning devices, when tested in a controlled environment was shown to be up to 100% effective in killing airborne *M. tuberculosis*. However, its effectiveness in health facilities in South Africa is largely unknown.

Assessment of effectiveness of infection prevention control measures in preventing airborne transmission of bacterial pathogens in healthcare facilities in South Africa

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Note: This research is undergoing peer review process

Concentration profiles of airborne bacteria including *Mycobacterium tuberculosis* in hospitals have not been well characterised. This study assessed the levels of airborne bacteria including *M. tuberculosis* and evaluated whether carbon dioxide could be an indicator of airborne bacterial concentration and whether infection prevention control measures are effective in reducing airborne *M. tuberculosis* in healthcare facilities in South Africa.

A cross-sectional study was conducted at nine public sector healthcare facilities in South Africa, KwaZulu-Natal (2), Western Cape (3) and Gauteng (4). A total of 585 personal (4L/s) and stationary (20L/s) airborne TB samples were collected and quantified by qRT-PCR, 2.22% (n=13) were positive for *M. tuberculosis*. The positive samples were collected from the outpatient department; medical ward; TB ward / clinic and casualty. In addition, environmental parameters (temperature, relative humidity, air velocity and CO_2) were also measured and a healthcare facility inspection questionnaire was completed for each facility. In the Gauteng facilities, air samples (n=316) for the enumeration of total bacterial counts were also collected using the MAS-100 sampler. The average bacterial levels ranged from 20-1380 cfu/m^3. A meaningful correlation ($r=0.51$, $p<0.05$) was found between airborne microbial levels and CO_2 levels (401 – 2398 ppm). A unit increase in CO_2 led to 11% increase in the likelihood of the presence of airborne TB. Hospitals with UVGI had significantly ($p=0.0001$) lower airborne microbial loads (181 cfu/m^3) than those without (528 cfu/m^3) and nine of the thirteen *M. tuberculosis* positive samples were from areas that did not have UVGI.

Non-TB areas such as waiting areas pose a risk of exposure for health workers. The presence of airborne bacteria including *M. tuberculosis* in the environment despite the presence of infection prevention control measures imply that more efforts such as strengthened administrative controls and using more than one environmental control measure, need to be implemented in order to eliminate airborne transmission of pathogens.

PUBLICATIONS

Title: Toward rigorous materials production: new approach methodologies have extensive potential to improve current safety assessment practices

Author(s): P Nymark, M Bakker, S Dekkers, Ry Franken, W Fransman, A García-Bilbao, D Greco, **M Gulumian**, N Hadrup, S Halappanavar, V Hongisto, KS Hougaard, KA Jensen, P Kohonen, AJ Koivisto, MD Maso, T Oosterwijk, M Poikkimäki, I Rodriguez-Llopis, R Stierum, JB Sørli, R Grafström

Source: *Small 2020, 1904749; DOI: 10.1002/small201904749*

Summary: Advanced material development, including at the nanoscale, comprises costly and complex challenges coupled to ensuring human and environmental safety. Government agencies regulating safety have announced interest toward acceptance of safety data generated under the collective term New Approach Methodologies (NAMs), and as such technologies/approaches offer marked potential to progress the integration of safety testing measures during innovation from idea to product launch of nanomaterials. Divided in overall eight main categories, searchable databases for grouping and read across purposes, exposure assessment and modelling, in silico modelling of physicochemical structure and hazard data, in vitro high-throughput and high-content screening assays, dose-response assessments and modelling, analyses of biological processes and toxicity pathways, kinetics and dose extrapolation, consideration of relevant exposure levels and biomarker endpoints typify such useful NAMs. Their application generally agrees with articulated stakeholder needs for improvement of safety testing procedures. They further fit for inclusion and add value in nanomaterials risk assessment tools. Overall 37 of 50 evaluated NAMs and tiered workflows applying NAMs are recommended for considering safer-by-design innovation, including guidance to the selection of specific NAMs in the eight categories. An innovation funnel enriched with safety methods is ultimately proposed under the central aim of promoting rigorous nanomaterials innovation.

Title: Occupational Tuberculosis among laboratory workers in South Africa: applying a surveillance system to strengthen prevention and control

Author(s): J Garnett, **D Jones**, G Chin, JM Spiegel and N Naicker

Source: *Int. J. Environ. Res. Public Health 2020, 17, 1462; doi:10.3390/ijerph17051462*

Summary: Tuberculosis (TB) is recognized as an important health risk for health workers, however, the absence of occupational health surveillance has created knowledge gaps regarding occupational infection rates and contributing factors. This study aimed to determine the rates and contributing factors of active TB cases in laboratory healthcare employees at the National Health Laboratory Service (NHLS) in South Africa, as identified from an occupational surveillance system. TB cases were reported on the Occupational Health and Safety Information System (OHASIS), which recorded data on occupation type and activities and factors leading to confirmed TB. Data collected from 2012 to 2019 were used to calculate and compare TB risks within NHLS occupational groups. During the study period, there were 92 cases of TB identified in the OHASIS database. General workers, rather than skilled and unskilled laboratory workers and medical staff, had the highest incidence rate (422 per 100,000 person-years). OHASIS data revealed subgroups that seemed to be well protected, while pointing to exposure situations that beckoned policy development, as well as identified subgroups of workers for whom better training is warranted. Functional occupational health surveillance systems can identify subgroups most at risk as well as areas of programme success and areas where increased support is needed, helping to target and monitor policy and procedure modification and training needs.

Title: Associations of sickness absence for pain in the low back, neck and shoulders with wider propensity to pain

Author(s): D Coggon, G Ntani, K Walker-Bone, VE Felli, R Harari, LH Barrero, SA Felknor, M Rojas, A Cattrell, C Serra, M Bonzini, E Solidaki, E Merisalu, RR Habib, F Sadeghian, MM Kadir, AR Wickremasinghe, K Matsudaira, **B Nyantumbu-Mkhize**, H L Kelsall, H Harcombe

Source: *Occup Environ Med 2020; 1–8. doi:10.1136/oemed-2019-106193*

Summary: To explore the association of sickness absence ascribed to pain at specific anatomical sites with wider propensity to musculoskeletal pain. As part of the CUPID (Cultural and Psychosocial Influences on Disability) study, potential risk factors for sickness absence from musculoskeletal pain were determined for 11 922 participants from 45 occupational groups in 18 countries. After approximately 14 months, 9119 (78%) provided follow-up information about sickness in the past month because of musculoskeletal pain, including 8610 who were still in the same job. Associations with absence for pain at specific anatomical sites were assessed by logistic regression and summarised by ORs with 95% CIs. A total of 861 participants (10%) reported absence from work because of musculoskeletal pain during the month before follow-up. After allowance for potential confounders, risk of absence ascribed entirely to low back pain (n=235) increased with the number of anatomical sites other than low back that had been reported as painful in the year before baseline (ORs 1.6 to 1.7 for ≥4 vs 0 painful sites). Similarly, associations with wider propensity to pain were observed for absence attributed entirely to pain in the neck (ORs up to 2.0) and shoulders (ORs up to 3.4). Sickness absence for pain at specific anatomical sites is importantly associated with wider propensity to pain, the determinants of which extend beyond established risk factors such as somatising tendency and low mood. Better understanding of why some individuals are generally more prone to musculoskeletal pain might point to useful opportunities for prevention.

Title: Excess mortality due to external causes in women in the South African mining industry: 2013-2015

Author(s): **KS Wilson**, T Kootbodien and N Naicker

Source: *Int. J. Environ. Res. Public Health, 2020, 17, 1875; doi:10.3390/ijerph17061875*

Summary: Mining is a recognized high-risk industry with a relatively high occurrence of occupationalinjuries and disease. In this study, we looked at the differences in mortality between male and femaleminers in South Africa. Data from Statistics South Africa regarding occupation and cause of death in the combined years 2013–2015 were analyzed. Proportional mortality ratios (PMRs) were calculated to investigate excess mortality due to external causes of death by sex in miners and in manufacturing labourers. Results: Women miners died at a significantly younger age on average (44 years) than all women (60 years), women manufacturers (53 years), and male miners (55 years). There was a significantly increased proportion of deaths due to external causes in women miners (12.4%) compared to all women (4.8%) and women manufacturers (4.6%). Significantly increased PMRs were seen in car occupant accidents (467, 95% confidence interval (CI: 151–1447), firearm discharge (464, 95% CI: 220–974), and contact with blunt objects (2220 95% CI: 833–5915). Conclusion: This descriptive study showed excess deaths in women miners due to external causes. Road accidents, firearm discharge, and contact with blunt objects PMRs were significantly increased. Further research is required to confirm the underlying reasons for external causes of death and to develop recommendations to protect women miners.

Title: Mode of silver clearance following 28-day inhalation exposure to silver nanoparticles determined from lung burden assessment including post-exposure observation periods

Author(s): MS Jo, JK Kim, Y Kim, HP Kim, HS Kim, K Ahn, JH Lee, EM Faustman, **M Gulumian**, B Kelman, IJ Yu

Source: *Archives of Toxicology https://doi.org/10.1007/s00204-020-02660-2*

Summary: Recently revised OECD inhalation toxicity testing guidelines require measurements of lung burden immediately after and for periods following exposure for nanomaterials. Lung burden is a function of pulmonary deposition and retention of nanoparticles. Using lung burden studies as per OECD guidelines, it may be possible to assess clearance mechanisms of nanoparticles. In this study, male rats were exposed to silver nanoparticle (AgNP) aerosols (18.1–19.6 nm) generated from a spark generator. Exposure groups consisted of (1) control (fresh air), (2) low (31.2 ± 8.5 μg/m^3), (3) moderate (81.8 ± 11.4 μg/m^3), and (4) high concentrations (115.6 ± 30.5 μg/m^3). Rats were exposed for 6-h/day, 5-days/week for 4 weeks (28-days) based on the revised OECD test guideline 412. Bronchoalveolar lavage (BAL) fluids were collected on post-exposure observation (PEO)-1 and PEO-7 days and analyzed for inflammatory cells and inflammatory biomarkers. The lung burdens of Ag from AgNPs were measured on PEO-1, PEO-7, and PEO-28 days to obtain quantitative mass concentrations per lung. Differential counting of blood cells and inflammatory biomarkers in BAL fluid and histopathological evaluation of lung tissue indicated that exposure to the high concentrations of AgNP aerosol induced inflammation at PEO-1, slowly resolved at PEO-7 and completely resolved at PEO-28 days. Lung burden measurement suggested that Ag from AgNPs was cleared through two different modes; fast and slow clearance. The fast clearance component was concentration-dependent with half-times ranging from two to four days and clearance rates of 0.35–0.17/day–1 from low to high concentrations. The slow clearance had half-times of 100, 57, and 76 days and clearance rates of 0.009, 0.012, and 0.007/day–1 for the high, moderate and low concentration exposure. The exact mechanism of clearance is not known currently. The fast clearance component which was concentration-dependent could be dependent on the dissolution of AgNPs and the slow clearance would be due to slow clearance of the low dissolution AgNPs secondary particles originating from silver ions reacting with biogenic anions. These secondary AgNPs might be cleared by mechanisms other than dissolution such as mucociliary escalation, translocation to the lymphatic system or other organs.

Title: Trends in suicide mortality in South Africa, 1997 to 2016

Author(s): **T Kootbodien**, N Naicker, KS Wilson, R Ramesar and L London

Source: *Int. J. Environ. Res. Public Health, 2020, 17, 1850; doi:10.3390/ijerph17061850*

Summary: Suicide rates worldwide are declining; however, less is known about the patterns and trends in mortality from suicide in sub-Saharan Africa. This study evaluates trends in suicide rates and years of potential life lost from death registration data in South Africa from 1997 to 2016. Suicide (X60–X84 and Y87) was coded using the 10th Revision of the International Classification of Diseases (ICD-10). Changes in mortality rate trends were analysed using joinpoint regression analysis. The 20-year study examines 8573 suicides in South Africa, comprising 0.1% of all deaths involving persons 15 years and older. Rates of suicide per 100,000 population were 2.07 in men and 0.49 in women. Joinpoint regression analyses showed that, while the overall mortality rate for male suicides remained stable, mortality rates due to hanging and poisoning increased by 3.9% and 3.5% per year, respectively. Female suicide mortality rates increased by 12.6% from 1997 to 2004 before stabilising; while rates due to hanging increased by 3.0% per year. The average annual YPLL due to suicide was 9559 in men and 2612 in women. The results show that suicide contributes substantially to premature death and demonstrates the need for targeted interventions, especially among young men in South Africa.

Title: NanoSolveIT Project: driving nanoinformatics research to develop innovative and integrated tools for in silico nanosafety assessment

Author(s): A Afantitis, G Melagraki , P Isigonis , A Tsoumanis, DD Varsou, E Valsami-Jones, A Papadiamantis, L-JA Ellis, H Sarimveis, P Doganis, P Karatzas, P Tsiros, I Liampa, V Lobaskin, D Greco, A Serra, PAS Kinaret, LA Saarimäki, R Grafström, P Kohonen, P Nymark, E Willighagen, T Puzyn, A Rybinska-Fryca, A Lyubartsev, K Alstrup Jensen, J Gerit Brandenburg, S Lofts, C Svendsen, S Harrison, D Maier, K Tamm, J Jänes, L Sikk, M Dusinska, E Longhin, E Rundén-Pran, E Mariussen, NE Yamani, W Unger, J Radnik, A Tropsha, Y Cohen, J Leszczynski, CO Hendren, M Wiesner, D Winkler, N Suzuki, TH Yoon, J-S Choi, **N Sanabria**, M Gulumian, I Lynch

Source: *Computational and Structural Biotechnology Journal 18 (2020) 583–602*

Summary: Nanotechnology has enabled the discovery of a multitude of novel materials exhibiting unique physicochemical (PChem) properties compared to their bulk analogues. These properties have led to a rapidly increasing range of commercial applications; this, however, may come at a cost, if an association to long-term health and environmental risks is discovered or even just perceived. Many nanomaterials (NMs) have not yet had their potential adverse biological effects fully assessed, due to costs and time constraints associated with the experimental assessment, frequently involving animals. Here, the available NM libraries are analyzed for their suitability for integration with novel nanoinformatics approaches and for the development of NM specific Integrated Approaches to Testing and Assessment (IATA) for human and environmental risk assessment, all within the NanoSolveIT cloud-platform. These established and well-characterized NM libraries (e.g. NanoMILE, NanoSolutions, NANoREG, NanoFASE, caLIBRAte, NanoTEST and the Nanomaterial Registry (>2000 NMs)) contain physicochemical characterization data as well as data for several relevant biological endpoints, assessed in part using harmonized Organisation for Economic Co-operation and Development (OECD) methods and test guidelines. Integration of such extensive NM information sources with the latest nanoinformatics methods will allow NanoSolveIT to model the relationships between NM structure (morphology), properties and their adverse effects and to predict the effects of other NMs for which less data is available. The project specifically addresses the needs of regulatory agencies and industry to effectively and rapidly evaluate the exposure, NM hazard and risk from nanomaterials and nano-enabled products, enabling implementation of computational 'safe-by-design' approaches to facilitate NM commercialization.

Title: Illness, Self-Rated Health and Access to Medical Care Among Waste Pickers in Landfill Sites in Johannesburg, South Africa

Author(s): **F Made,** V Ntlebi, T Kootbodien, K Wilson, N Tlotleng et al.

Source: *Int. J. Environ. Res. Public Health, 2020, 17, 2252; doi:10.3390/ijerph17072252*

Summary: Waste pickers are exposed to various environmental health hazards, and self-rated health(SRH) could influence their medical care access. This study investigated the association between illness, clinic visits and SRH, and assessed if SRH can increase clinic visits. A cross-sectional study was conducted. SRH was defined as "very good", "good", "fair", and "poor". The illnesses were mental health, infectious, and chronic diseases. Medical care access included clinic visits in the previous 12 months. An ordinal logistic regression model was fitted to assess the association. There were 361 participants, 265 (73.41%) were males. Median age was 31 years, (interquartile range (IQR): 27–39). SRH: poor (29.89%), fair (15.92%), good (43.30%) very good (10.89%). Ever smoked (adjusted odds ratio (AOR): 1.72; 95% confidence interval (CI): 1.11–2.66), mental health (AOR: 1.87; 95% CI: 1.22–2.84), chronic (AOR: 2.34; 95% CI:1.47–3.68) and infectious (AOR: 2.07; 95% CI: 1.77–3.63) diseases were significantly associated with increased odds of reporting poor health. Clinic visit was not associated with SRH. From 99 (31%) individuals who rated their health as poor and ill, 40% visited a clinic ($p = 0.0606$). Acute and chronic illnesses were associated with poor SRH but this did not increase clinic visits. Provision of mobile clinic services at the landfill sites could increase access to medical care.in South Africa.

Title: Respiratory health in a community living in close proximity to gold mine waste dumps, Johannesburg, South Africa

Author(s): S Iyaloo, T. Kootbodien, N. Naicker, S. Kgalamono, KS Wilson and D Rees

Source: *Int. J. Environ. Res. Public Health, 2020, 17, 2240; doi:10.3390/ijerph17072240*

Summary: The effects on respiratory health in populations living close to silica-rich gold mine dumps are unknown. This pilot study related respiratory health and exposure to mine dump dust using two measures of exposure: exposure group, based on distance lived from the mine dump— high (n = 93) (home <500 m from a mine dump), moderate (n = 133) (500–1.5 km), and low (n = 84) (>15 km, control group); and cumulative exposure index (CEI) derived from exposure group and number of years of residence in each exposure group. Participants were interviewed about respiratory symptoms and had chest X-rays and spirometry. We adjusted for key respiratory confounders. No subject had radiological features of silicosis. The high relative to low exposure group had significantly elevated adjusted odds ratios (ORs) for upper respiratory symptoms (AOR: 2.76, 95% CI: 1.28–5.97), chest wheezing (AOR: 3.78; 95% CI: 1.60–8.96), and spirometry diagnosed chronic obstructive pulmonary disease (COPD) (AOR: 8.17; 95%CI: 1.01–65.85). These findings were similar for the high relative to medium exposure group, but no significant associations were found for the medium versus low exposure group. Chronic bronchitis and tuberculosis risks did not differ significantly among groups. CEI and exposure group produced similar results. In conclusion, residents residing <500 m from mine dumps had elevated adverse respiratory health effects.

Title: Regional Patterns and Association Between Obesity and Hypertension in Africa: Evidence from the H3Africa CHAIR Study

Author(s): OM Akpa, **F Made**, A Ojo, B Ovbiagele, D Adu et al

Source: *Hypertension. 2020; 75:00-00. DOI:10.1161/HYPERTENSIONAHA.119.14147*

Summary: Hypertension and obesity are the most important modifiable risk factors for cardiovascular diseases, but their association is not well characterized in Africa. We investigated regional patterns and association of obesity with hypertension among 30 044 continental Africans. We harmonized data on hypertension (defined as previous diagnosis/ use of antihypertensive drugs or blood pressure [BP]≥140/90 mmHg/BP≥130/80 mmHg) and obesity from 30 044 individuals in the Cardiovascular H3Africa Innovation Resource across 13 African countries. We analyzed data from population-based controls and the Entire Harmonized Dataset. Age-adjusted and crude proportions of hypertension were compared regionally, across sex, and between hypertension definitions. Logit generalized estimating equation was used to determine the independent association of obesity with hypertension (P value <5%). Participants were 56% women; with mean age 48.5±12.0 years. Crude proportions of hypertension (at BP≥140/90 mmHg) were 47.9% (95% CI, 47.4–48.5) for Entire Harmonized Dataset and 42.0% (41.1–42.7) for population-based controls and were significantly higher for the 130/80 mm Hg threshold at 59.3% (58.7–59.9) in population-based controls. The age-adjusted proportion of hypertension at BP≥140/90 mmHg was the highest among men (33.8% [32.1–35.6]), in western Africa (34.7% [33.3–36.2]), and in obese individuals (43.6%; 40.3–47.2). Obesity was independently associated with hypertension in population-based controls (adjusted odds ratio, 2.5 [2.3–2.7]) and odds of hypertension in obesity increased with increasing age from 2.0 (1.7–2.3) in younger age to 8.8 (7.4–10.3) in older age. Hypertension is common across multiple countries in Africa with 11.9% to 51.7% having BP≥140/90 mmHg and 39.5% to 69.4% with BP≥130/80 mmHg. Obese Africans were more than twice as likely to be hypertensive and the odds increased with increasing age.

Title: COVID-19: an occupational health view from South Africa

Author(s): Ross M and **Singh T**

Source: *Occupational Medicine, doi:10.1093/occmed/kqaa081 (2020)*

Summary: Following the declaration of the national state of disaster, guidance for employers on COVID19, workplace preparedness planning, regulations on quarantine, restriction of gatherings, closure of public places and schools, and a travel ban were successively introduced, culminating in a nationwide lockdown from 27 March 2020. Health personnel are the major occupational focus, but many essential workers from retail to security personnel require appropriate protection and guidance. On 20 March 2020, occupationally acquired COVID-19 was recognized for compensation in workers arising from exposure during employment, including work travel to high-risk countries. Our first four occupational fatalities were an insurance industry employee, a teacher, a driver and a renowned medical scientist following travel to a lecture in Europe. There is major difficulty in distinguishing occupational from community-acquired infectious diseases, particularly in non-health workers, and occupational COVID-19 transmission risk is amplified by the socio-economic circumstances of many South Africans. The perils of lockdown include an exacerbation of unemployment coupled with increased levels of anxiety, stress and depression among workers. Changing evidence-based recommendations cause confusion on interventions ranging from safe social distancing, asymptomatic transmission, droplet versus aerosolization, through to the rational use of personal protective equipment (PPE). The NIOH is playing an important role in online training, following current epidemiology and evidence based best practice, providing an advisory hotline for occupational health practitioners, and initiating local databases and research to protect workers' within and beyond our borders. Lockdown with other containment measures have limited both spread of SARS-CoV-2 and community transmission to date by delaying the exponential curve until South Africa is better prepared; however, as yet, insufficient data are available to assess our triple epidemic of HIV infection, tuberculosis and COVID-19 [5]. And, in the midst of the challenges that COVID-19 presents, the rights of workers must be upheld according to our health and safety legislation.

Title: Current Approaches and Techniques in Physiologically Based Pharmacokinetic (PBPK) Modelling of Nanomaterials

Author(s): **W. Utembe**, HJ Clewell, N. Sanabria, P. Doganis and M. Gulumian

Source: *Nanomaterials 2020, 10, 1267*

Summary: There have been efforts to develop physiologically based pharmacokinetic (PBPK) models for nanomaterials (NMs). Since NMs have quite different kinetic behaviors, the applicability of the approaches and techniques that are utilized in current PBPK models for NMs is warranted. Most PBPK models simulate a size-independent endocytosis from tissues or blood. In the lungs, dosimetry and the air-liquid interface (ALI) models have sometimes been used to estimate NM deposition and translocation into the circulatory system. In the gastrointestinal (GI) tract, kinetics data are needed for mechanistic understanding of NM behavior as well as their absorption through GI mucus and their subsequent hepatobiliary excretion into feces. Following absorption, permeability (Pt) and partition coefficients (PCs) are needed to simulate partitioning from the circulatory system into various organs. Furthermore, mechanistic modelling of organ- and speciesspecific NM corona formation is in its infancy. More recently, some PBPK models have included the mononuclear phagocyte system (MPS). Most notably, dissolution, a key elimination process for NMs, is only empirically added in some PBPK models. Nevertheless, despite the many challenges still present, there have been great advances in the development and application of PBPK models for hazard assessment and risk assessment of NMs.

Keywords: nanomaterial; PBPK; absorption; distribution; metabolism; elimination; hazard; risk

Title: Prevalence of hookah pipe smoking in high-school learners in Johannesburg, South Africa

Author(s): **N. Naicker**, J. Teare, P. Albers, A. Mathee
Source: *S Afr Med J 2020;110(6):546-551*

Abstract:

Background: Hookah pipe (HP) smoking has become popular globally, especially among young adults and adolescents. There are misperceptions regarding the safety of HP smoking, relative to cigarettes.

Objectives: To assess the prevalence of HP use in grade 8 and 12 students and the factors associated with use in the different age groups.

Methods: A cross-sectional study was conducted in grade 8 and 12 high-school students from six randomly selected public schools in Johannesburg, South Africa. A self-administered structured questionnaire was completed by students after consent had been obtained from parents and students. The questionnaire focused on knowledge and awareness of HP smoking. Data were analysed using Stata/SE version 15. A p-value <0.05 was considered significant.

Results: A total of 347 grade 8 and 232 grade 12 students participated in the study. Of the sample, 26% in grade 8 and 70% in grade 12 had ever smoked an HP. In both grades a higher proportion of males smoked. Eleven percent of students in grade 8 and 37% in grade 12 were currently smoking the HP. Approximately 47% and 51% of grade 8 and grade 12 students, respectively, first started smoking at parties. The mean age of initiation was 8 and 12 years in grade 8 and 12, respectively. Grade 12 students had greater awareness of the risks of HP smoking. Having a family member who smoked an HP was significantly related to HP use in grade 8 students. Overall, factors associated with increased odds of smoking the HP were being in grade 12, not being aware of health effects, and seeing the health warnings on hookah tobacco package labels. Conclusions. HP smoking increased significantly between grades 8 and 12. Increasing knowledge and awareness of the risks involved in HP smoking in children at an early age is recommended. One of the factors influencing uptake of HP smoking in young students was having a family member smoking it; adult anti-smoking and anti-HP campaigns are therefore also important.

Title: Risk Perception and Its Influencing Factors among Construction Workers in Malawi

Author(s): EN Chaswa, IBM Kosamu, S. Kumwenda and **W. Utembe**
Source: *Safety 2020, 6, 33*

Abstract: This study employed a deductive research approach and a survey strategy to assess risk perception and its influencing factors among construction workers in Malawi. Three specific construction hazards and their associated risks were selected. The hazards were "working at height (WAH)" "manual handling of loads (MHL)" and "heavy workload or intense pressure to be more productive (HWP)." The study engaged multistage sampling of 376 subjects. Univariate analysis, factor analysis and multiple linear regressions were performed in order to determine the main influencing factors among the independent variables. The study established that workers were aware of risks posed by their work. The majority perceived the risk associated with WAH, MHL and HWP as very high (62.7%, =8.80 ± 1.95); (48.5%, =8.10 ± 2.38); (57.9%, =8.49 ± 2.22) respectively. The study identified six factors as variables that showed a significant effect on workers' perception of risk ($p < 0.05$). These factors were: "dreaded factor," "avoidability and controllability," "expert knowledge," "personal knowledge," "education level," and "age". It is concluded that contractors in the Malawian construction industry should integrate analysis of behaviors and risk perception of the workers and other players to guide the identification of better health and safety interventions at their worksites.

Keywords: risk perception; safety; construction; workers; working at height; manual handling; workload; Malawi

Title: Vascular function and cardiovascular risk in a HIV infected and HIV free cohort of African ancestry: Baseline Prole, Rationale and Methods of the Longitudinal EndoAfrica-NWU Study

Author(s): CMT Fourie, S. Botha-le Roux, W. Smith, AE Schutte, Y. Breet, **JS Joseph**, et al.

Source: *DOI: https://doi.org/10.21203/rs.3.rs-29419/v3*

Abstract:

Background: People living with the Human Immunodeciency Virus (PLHIV) have an increased susceptibility to develop non-communicable diseases such as cardiovascular disease (CVD). Infection with HIV contributes to the development of CVD independent of traditional risk factors, with endothelial dysfunction being the central physiological mechanism. While HIV-related mortality is declining due to antiretroviral treatment (ART), the number of deaths due to CVD is rising in South Africa - the country with the highest number of PLHIV and the world's largest ART programme.

The EndoAfrica study was developed to determine whether HIV infection and ART are associated with cardiovascular risk markers and changes in vascular structure and function over 18 months in adults from different provinces of South Africa. This paper describes the rationale, methodology and baseline cohort prole of the EndoAfrica study conducted in the North West Province, South Africa.

Methods: In this case-control study, conducted between August 2017 and June 2018, 382 volunteers of African descent (276 women; 106 men), comprising of 278 HIV infected and 104 HIV free individuals were included. We measured health behaviours, a detailed cardiovascular prole, and performed biomarker analyses. We compared baseline characteristics, blood pressure, vascular function and biochemical markers between those infected and HIV free.

Results: At baseline, the HIV infected participants were older (43 vs 39 years), less were employed (21% vs 40%), less had a tertiary education (7% vs 16%) and their body mass index was lower (26 vs 29 kg/m2) than that of the HIV free participants. While the cardiovascular prole, ow-mediated dilation and pulse wave velocity did not differ, glycated haemoglobin was lower (p=0.017) and total cholesterol, high density lipoprotein cholesterol, triglycerides, gamma-glutamyltransferase and tobacco use were higher (all p<0.047) in PLHIV .

Conclusion: Despite PLHIV being older, preliminary cross-sectional analysis suggests that PLHIV being treated with ART do not have poorer endothelial or vascular function compared to the HIV free participants. More detailed analyses on the baseline and follow-up data will provide further clarity regarding the cardiovascular prole of South Africans living with HIV .

Keywords: HIV , antiretroviral therapy, cardiovascular risk markers, endothelial function, vascular function, African ancestry, South Africa

IN THE SPOTLIGHT

Lufuno Muleba, Medical Scientist in Immunology & Microbiology

Why did you choose this career and research path?
I chose this career because I enjoy science, even from my university days. I didn't know it then, that I would land up at the NIOH, but when I arrived here, I realized I got to learn new things every day, interact with people/clients from different walks of life. I play a role in solving some of the occupational health challenges faced by South African workers on a regular basis. It brings joy and fulfilment that my work contributes to the improvement of occupational health and to healthier working environments for South Africans.

What training and qualifications did you undergo and where?
I have a BSc in medical science, which I have obtained from the University of Limpopo. Currently, I am enrolled for an Mtech degree with the University of Johannesburg. I've been trained in a BSL 3 laboratory, which tests devices that are used in the killing of airborne pathogens like TB. These devices are used in many hospitals across South Africa. And I get to wear what many people call the "space suite"! I've also been trained in the mycology unit. Growing up I was so fascinated about the moulds that grew on rotten food products and also on the walls of buildings and in the back of my mind, I always wondered if this causes diseases and particularly in workers. I guess curiosity has always been a part of my life (good thing that it doesn't really kill the cat, just makes it smarter!).

What are the most enjoyable aspects of doing research?
The possibility that the research outcomes will make a difference in the lives of many South African workers. It is for the people and will always be for the people (I like to always keep that in mind)! Each project tackled is different and with every one, more knowledge is gained. Thus, I am not the same medical scientist that I was before each investigation, as I become more equipped and more aware of how best I can serve our clients going forward.

What are your research highlights to date?
A project that was done at different healthcare facilities focusing on microbiological air quality assessment in these facilities. I am also doing my MTech research on the microbiological efficacy of hand sanitisers, which now with COVID-19 has demonstrated how important the study is.

What are your career goals?
My career goal is to continue conducting research, complete my Mtech and do a Dtech. And just be a really good scientist, always asking what more? Where is the need? And how can I be of service?

Surveillance

Mental health in the work place is a major concern, especially now with increased levels of stress related to income loss and the risk of occupational exposure. Suicide is one of the potential consequences of major mental disorders such as depression. It is important to understand the extent of this important public health problem in order to provide appropriate interventions. Thus this Occuzone surveillance report focuses on Statistics SA mortality data on suicides from 1997 to 2016 in the South African population.

HOW SUICIDE IN SOUTH AFRICA HAS CHANGED OVER 20 YEARS

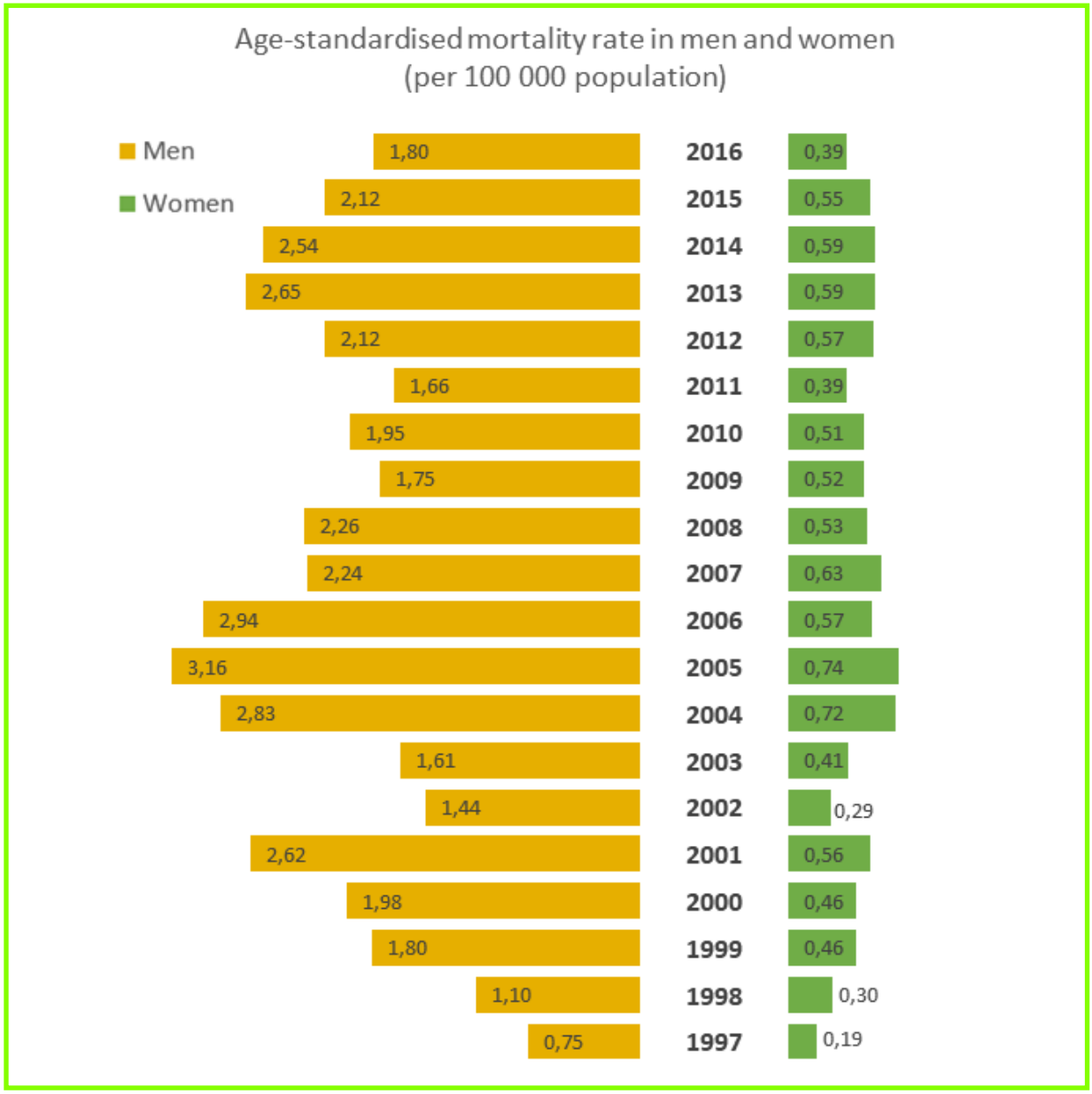
WHAT WE ALREADY KNOW

Suicide is one of the most significant public health problems facing South Africa. The World Health Organisation estimates that approximately 817 000 people died from suicide in 2016, which represents global mortality of 16 people per 100 000 or one death every 40 seconds. Suicide is more common in men than women across all age groups in most parts of the world and is the second leading cause of death among the 15-29 year age group globally [2]. Recently, the Global Burden of Disease Study 2016 showed that suicide rates were decreasing in the world, from 16 per 100 000 to 11 per 100 000 [3]. However, as suicide rates have fallen in many countries, not all countries followed this trend. We, therefore, investigated the patterns of suicide rates in South Africa for 20 years, from 1997 to 2016 using data from STATS SA.

FINDINGS

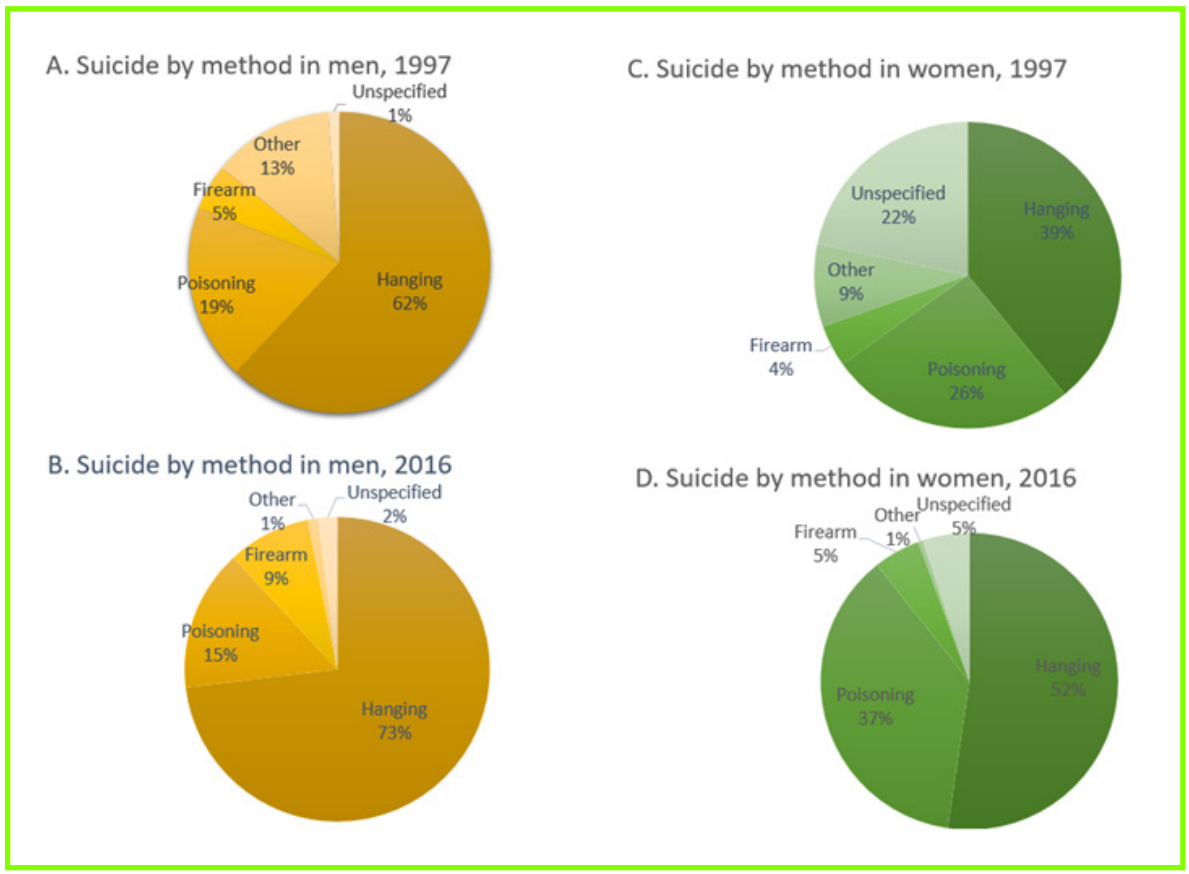
Who is at risk?

- Suicide rates were higher among men than women across the years.
- Age groups most at risk
  - In 1997, the highest risk of suicide was observed among men and women older than 75 years.
  - In 2016, men and women aged 15-29 years and older than 75 years were at increased risk of suicide.



Patterns in suicide methods

- Men
  - Suicide rate by hanging increased significantly by an average percentage change of 3.5% (95% CI 1.1% to 6.0%) over 20 years.
  - Suicide rate by poisoning increased significantly by 3.9% (95% CI 1.8% to 6.0%) from 1997 to 2016.
- Woman
  - Suicide rate by hanging and poisoning increased significantly by 3.0% ((95% CI 0.6% to 5.4%) and 6.7% (95% CI 2.3% to 11.3%) respectively.



Occupations at risk

- Suicide risk may be greater among service workers and armed forces personnel, skilled agricultural workers, elementary workers and occupations not specified compared to technicians.

NOMSSA REPORT

- Suicide rates vary across different groups of people over time.
- Age-associated trends in suicide show that most vulnerable groups are those aged 15-29 years and older than 75 years.
- Suicide by hanging and poisoning have significantly increased in men and women over 20 years.
- Data analyses were limited by the quality of death registry data as a result of underreporting and misclassification of suicides. Therefore, improving the completeness and quality of information on death certificates is critical for optimal suicide surveillance.
- Understanding suicide data allows resources for prevention programs to target groups at increased risk of suicide.

Sources

Information was adapted from Kootbodien et al. 2020. Trends in suicide mortality in South Africa, 1997 to 2016. International Journal of Environmental Research and Public Health, 17(6), p.1850.
Mortality data were obtained from Statistics South Africa.
Statistics South Africa Datasets. Mortality and Causes of Death 1997-2016. Available here: http://nesstar.statssa.gov.za:8282/webview/.

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2. WHO. Suicide: Key facts Geneva: World Health Organisation; 2019 [Available from: https://www.who.int/news-room/fact-sheets/detail/suicide.]
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Suicide statistics across Job categories: NOMSSA report

Suicide mortality rate in SA from 1997 to 2016

2.1 per 100 000 population in men

0.5 per 100 000 population in women

Who is most at risk?

Sex

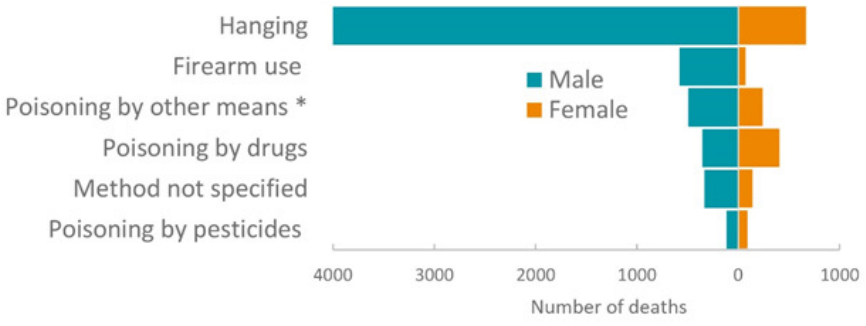
Greater suicide risk in men:
78% male
22% female

Age

Young adults (15-39)

Elderly (75+)

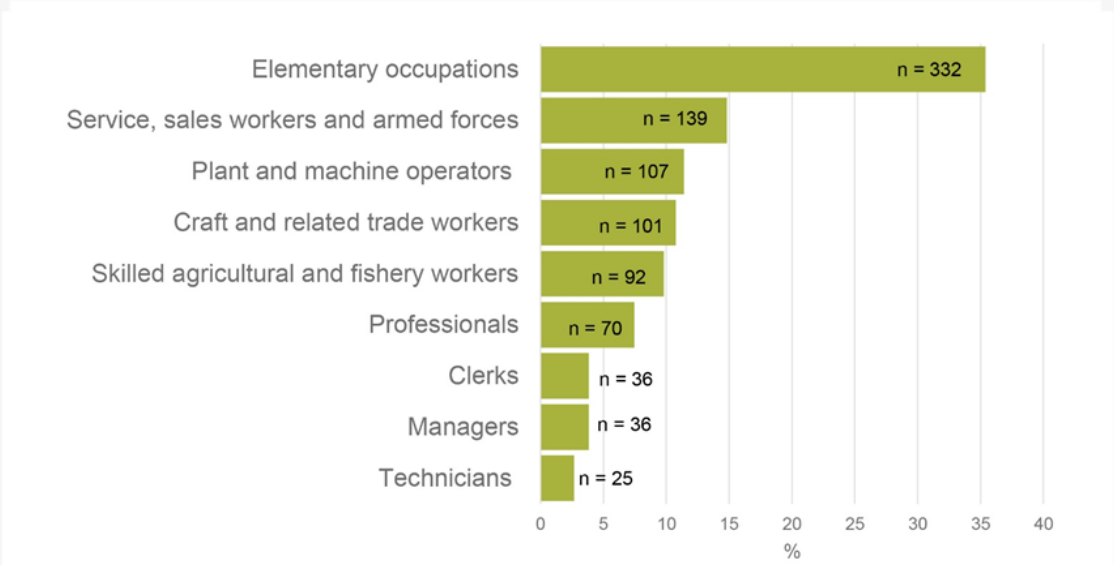
Suicide methods



The most common suicide methods are hanging, poisoning and firearm use.

NOMS-SA

Jobs with the highest prevalence of suicide by occupation



HELP IS AVAILABLE!

Warning signs:*

- Hopelessness
- Rage
- Increased alcohol use
- Withdrawing from family and friends
- Anxiety, agitation, being unable to sleep
- Dramatic mood changes
- Expressing feelings that life is meaningless
- Feeling desperate or trapped
- Seeing no reason for living
- Diagnosed with a mental illness
- Acting reckless
- Self-destructive behaviour
- Talking or writing about death and dying
- Obtaining the means to hurt themselves
- Neglecting appearance and hygiene

Please contact the following numbers:

- Suicide Crisis Line – 0800 567 567 or SMS 31393
- SADAG Mental Health Line – 011 234 4837
- Police – 10111

Sources

- All data have been sourced from Statistics South Africa http://www.statssa.gov.za/
- Kootbodien, T., Naicker, N., Wilson, K.S., Ramesar, R. and London, L., 2020. Trends in suicide mortality in South Africa, 1997 to 2016. IJERPH, 17(6), p.1850.
- * Adapted from https://wmich.edu/suicideprevention/basics/warning-signs

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NOMS-SA

Specialized Service Delivery

The NIOH provides specialised and cost effective occupational health and safety services to national and provincial government departments, various industries as well as OHS support within the NHLS. As part of maintaining a high level of service delivery, the institution continues its efforts to conduct research work which translate into improved specialised services. In this issue, our service delivery highlights focus on two specialised services: ASPIRE (Aerogen Science Promoting Innovative Research) Laboratory and Translating Exposure Assessment and Hazard identification of Nanomaterial Research in Industrial Settings into Service Delivery.

ASPIRE LABORATORY (AEROGEN SCIENCE PROMOTING INNOVATIVE RESEARCH)

Airborne infections like tuberculosis (TB) is a public health problem that pose substantial risks to health workers and workers in other settings, for example correctional facilities, transportation (public and aircrafts), mines, offices, etc. Infection occurs by inhalation of airborne microorganisms emitted by persons with active disease. Workplaces often use air portable cleaning devices as well as wall and ceiling-mounted UVGI devices to clean or disinfect the air thus protecting workers from exposure to the airborne pathogens. WHO recommends a ventilation rate of 12 ACH (air changes per hour) in airborne precaution rooms, an adjustment for a room volume of 24m^3 must yield- an equivalent ventilation rate (CADRe) of 80l/s/person. Many manufacturers make bold product claims without proven microbial efficiency testing. Furthermore, it is important to know the number of devices required for differing room volumes and occupancy to achieve the required clean air changes. Therefore, it is important to test these devices for effectiveness against the specific agents for which they make claims against. Testing devices will help test the proof of concept as well as determine the effectiveness of the technology.

The performance of air cleaning device's capability of inactivating microorganisms is tested in a controlled test room (biosafety level 3 (BSL 3) laboratory). The volume of the test room is adjustable through a movable ceiling measuring between 36m^3 to 46 m^3. The temperature, relative humidity and ventilation of the room can be adjusted depending on the experiment. The biological aerosols are generated from a nebuliser discharge port into the test room and samples are collected using various sampling media like polytetrafluoroethylene (PTFE) filters and high volume sampling devices at different time- intervals to see after how long the device reduces the bioaerosols. The collected PTFE filters are then extracted for DNA which is quantified using quantitative real time polymerase chain reaction (qPCR) techniques and reported as DNA copies/m^3 where one DNA copy represents one bacterial cell. The equivalent air changes per hour (ACHe) and (CADRe) is then calculated to determine the performance of the device.

The ASPIRE Laboratory housed at the NIOH Immunology and Microbiology section is the only lab in South Africa that provides this specialized service in accordance with international standards.

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TRANSLATING EXPOSURE ASSESSMENT AND HAZARD IDENTIFICATION OF NANOMATERIAL RESEARCH IN INDUSTRIAL SETTINGS INTO SERVICE DELIVERY

Hazard identification of nanomaterials is challenging due to their complex and diverse physicochemical characteristics. This has resulted in inconsistent inter-laboratory toxicological findings. Moreover, their complex characteristics have made the assessment of exposure to nanomaterial in the workplace challenging as more than one dose metric needs to be taken into account, i.e. particle number and surface area, as opposed to mass only. Hazard identification, exposure assessment and dose–response assessment (Toxicological Health Risk Assessment) combined together are critical for the determination of the No Observed Adverse Effect Levels (NOAELs) and Low Observed Adverse Effect levels (LOAELs). These are needed to ultimately derive regulated occupational exposure limits (OELs) for nanomaterials. Despite these challenges, the National Institute for Occupational Safety and Health (NIOSH) in the USA has set a current OEL for carbon nanotubes (CNTs) and nanofibers (CNFs; NIOSH., 2013). Other international governmental agencies are also setting OELs for different types of nanomaterials based on current data (Mihalache et al., 2017). South Africa, through NIOH, has contributed in generating such data for the Organization for Economic Co-operation and Development (OECD) for gold nanoparticles. This work has generated a NOAEL and LOAEL for gold nanoparticles, which could further assist with deriving an OEL once data from occupational exposure assessments are obtained.

Occupational exposure assessments are, therefore, central in OEL derivations. For this reason, the Department of Science and Innovation (DSI) has established the Nanotechnology Health, Safety and Environmental (HSE) Risk Research platform to investigate exposure levels in research and industrial settings across South Africa (Gulumian et al., 2014). The Toxicology and Biochemistry department at NIOH has been tasked to lead this objective and, thus, conducted a baseline study to identify research laboratories and industries within the Gauteng, Western Cape and KwaZulu-Natal that synthesize nanomaterials for various applications. Presently, exposure assessments at these facilities are well underway and these assessments follow a multi-tiered approach. To conduct this tiered-based approach, the department has invested grant funding for dedicated instrumentation to assess the toxicity and intracellular uptake of released nanomaterials and specifically developed dedicated in vitro methodologies. Therefore, the Toxicology and Biochemistry department at NIOH is the only laboratory able to conduct these combined toxicity and exposure assessments for nanomaterials in South Africa.

Translating the results from the research into service delivery can take many forms, e.g. data collected during exposure assessments and toxicity assessments support the development of guidance documents, where strategies can be proposed to control exposure to nanomaterials. Moreover, these results assist in developing OELs particularly for the South African occupational setting and, thus, help conduct human health risk assessment for nanomaterials in the country. It is envisioned that the department could provide a complimentary service to national or international research and industrial communities, where the degree of nanomaterial exposure could be assessed, if release or emissions are suspected. For more information visit the website (www.nioh.ac.za/nanotechnology/; www.nioh.ac.za/fact-sheets/nanotechnology/)

- Gulumian, M., de Jager, P., Masoka, X., Vetten, M., Andraos, C., Boodhia, K., Koekemoer, L., Sanabria, N., Matatiele, P., Singh, E. Nanotechnology in South Africa: A Baseline Study. Commissioned by the Department of Science and Technology (DST), March 2014.
- Mihalache, R., Verbeek, J., Graczyk, H., et al. (2017). Occupational exposure limits for manufactured nanomaterials, a systematic review. Nanotoxicology, 11, 7-19.
- NIOSH. (2013). Current Intelligence Bulletin 65: Occupational Exposure to Carbon Nanotubes and Nanofibers. Department of Health and Human Services, Centers for Disease Control and Prevention

Teaching & Training

The NIOH has continued to carry out numerous training sessions for various industries in both the formal and informal sectors. Most of these sessions related to essential services, government and frontline workers on issues related to among others, preventative measures, the usage of PPE and face masks, and the potential sources of exposure in different workplaces.

In keeping with social distancing, these interactive training sessions were held online via Zoom conferencing where stakeholders across the country could log in and watch. Videos, audio and presentations for these sessions were subsequently uploaded onto the NIOH website and sent out to all relevant stakeholders. Due to a high demand, these Zoom sessions were also live-streamed via our YouTube channel. In terms of CPD accreditation, the following professional bodies have approved our training sessions for COVID19:

- **HPCSA medical and dental board approved**
- **SADA approved**
- **SAIOH approved**
- **SAIOSH approved**
- **StellMed approved (Occupational Nurse Practitioners)**

***CPD accreditation is still pending for the PBEHP, SACPCMP, ECSA, ASAQS and the SAQSP amongst others. These processes are ongoing and future announcements are pending.**

TRAINING CONDUCTED

PPE Use and COVID-19

The NIOH held a training session on 07 April that focused on the important topic of PPE during COVID-19. The session covered aspects related to the proper selection and use of PPE and information for the appropriate choice and use of gloves to reduce the risk of exposure to infectious agents. The session included live demonstrations on the following topics: donning & doffing of gloves, and correct handwashing & hand sanitising techniques. The training ended with a presentation on the available resources relevant to PPE use.

https://www.youtube.com/watch?time_continue=7&v=zN5y1u44RZU&feature=emb_logo

Emotional Wellbeing & HCWs

This training session was held on 08 April and covered important aspects related to emotional well-being of workers, specifically healthcare workers and frontline workers. The expert panel included Dr Antoinette Miric, Dr Tina Sideris, and Mrs Lauren Gower who discussed aspects of mental health – specifically the emotional response to COVID-19 and the necessary care for HCWs. It covered anxiety management, self-care practices, and strategies for mindfulness and good emotional well-being during the pandemic. There was an interactive Q&A session that lasted an hour after the presentation was given.

https://www.youtube.com/watch?time_continue=2&v=z4hqqhQQOwQ&feature=emb_logo

Management Roles and Responsibilities

On 09 April, the NIOH hosted a training session on the roles and responsibilities of management during the COVID-19 pandemic. The comprehensive session was conducted by Mrs Michelle Morgan, deputy manager for the NHLS Safety, Health & Environment (SHE) Department. The session covered the OHS legal requirements for managers, based on the OHS Act, related to the general duties of employers to their employees and included aspects related to: the provision of workplace health and safety policies, the facilitation of a Risk Assessment, and how to understand and implement the principles of the hierarchy of controls. It also covered aspects related to the 'duty to inform', accountability of chief executive officers, and the appointment and functions of Health & Safety Representatives (HSR) and Committees (HSC).

http://www.nioh.ac.za/wp-content/uploads/2020/06/01_Michelle-Legislated-Roles-Responsibilities-of-Employers.pdf

Return to work preparedness

The NIOH held 2 sessions on return-to-work preparedness on 21 and 23 April. These sessions mainly covered 2 aspects: what to do with a positive worker; and what to do after lockdown restrictions are lifted. It covered aspects related to workplace preparedness, cleaning and decontamination, medical surveillance and fitness for duty. It also touched on issues related to mental health and compensation.

https://www.youtube.com/watch?time_continue=1&v=aGniQfTMHzY&feature=emb_logo

COVID-19 update and workplace preparedness for Environmental Health Practitioners [EHP]

On 24 April, the NIOH held a training session specifically aimed at workplace preparedness for Environmental Health Practitioners. The session was co-hosted by Mr Ramathuba, the National Director for Environmental Health in the National Department of Health. The training included topics related to the importance of BioRisk Assessment for frontline workers, the legislative framework of Environmental Health guidelines for implementation by EHP in the fight against COVID-19, and included a demonstration of the donning and doffing of gloves and respirators.

https://www.youtube.com/watch?v=qYigE2oyYtc&feature=emb_logo

NHLS session for Shop Stewards

On 30 April, the NIOH hosted training sessions for NHLS shop stewards on workplace preparedness during COVID-19. Important aspects covered included: potential sources of exposure in the workplace, what the medical screening procedures and follow up process entails, workers at high risk of acquiring the disease, symptom monitoring and screening tools, protocols for return to work & the required precautionary measures to take.

Risk Assessment tool – step by step guide

The NIOH carried out a training session on the importance of conducting a Workplace Risk Assessment on 04 May. This training involved a step-by-step guide, which was hands-on, and provided an opportunity for participants to review or begin a baseline risk assessment. Topics in this session included the implications of COVID-19 & approach to risk management as well as a practical example of how to facilitate a risk assessment effectively.

https://www.youtube.com/watch?time_continue=64&v=_e4sgkQyuLA&feature=emb_logo

Addressing Questions on Return to Work (RTW) Preparedness - Q&A session

This special session, held on 05 May, was hosted in an attempt to address the many queries received by stakeholders on issues related to RTW, temperature screening, protocols for screening and vulnerable workers, PPE, COIDA related matters and miscellaneous issues, as well as aspects of cleaning protocols for COVID-19.

https://soundcloud.com/user-349804591/addressing-questions-on-return-to-work-preparedness

Employers in the food industry

Employees and management from the food industry participated in this training, held on 06 May. The training covered the screening procedures required and procedures to follow related to COVID-19 positive employee/s. Mr Warren Mallon from the Department of Employment and Labour also covered the required precautionary measures for COVID-19 in the food industry. Other topics that were discussed in depth included: food control, presented by Mrs Penny Campbell (NDOH) and the regulation of chemical disinfectants and respiratory equipment presented by Ms Thando Magolego (NRCS).

https://www.youtube.com/watch?time_continue=10&v=ucjR4Hr76l4&feature=emb_logo

COVID-19 and Construction Work & Return- to- Work

This training, held on 04 June, focused on workplace preparedness for the construction sector and detailed return to work procedures, policies and screening processes necessary for the return-to-work. It covered also the guidelines for the sector, which was presented by Mr Ganesen from the Department of Employment and Labour.

https://www.youtube.com/watch?time_continue=264&v=7x71BLkhWEg&feature=emb_logo

Return-To-Work (RTW) In the Gauteng Province Government

On 5 and 10 June, the NIOH provided training to 16.2 Appointees, Occupational Health & Safety Practitioners and Organised Labour at the Gauteng Provincial Government. These closed training sessions covered topics related to RTW, temperature screening, protocols for screening and vulnerable workers, PPE, COIDA related matters and miscellaneous issues, as well as aspects of cleaning protocols for COVID-19.

The below training sessions were a joint collaboration between the NIOH & the Wits Health Consortium (WHC). We wish to acknowledge also the support and funding from the Health and Welfare Sector Education and Training Authority (HWSETA).

It is also important to note and acknowledge the free provision of data to all employees in the health and social development sector that joined the below webinars. This marked a milestone in our training provision.

These webinars will be run regularly and have been developed in modules based on topics and specific to sectors.

Training for Shop Stewards

Two sessions were held for Shop Stewards on 25 and 29 May on the implications of COVID-19 on the workplace and the protection of workers. Topics covered included workplace preparedness, required precautionary measures for COVID-19 in the workplace as well as screening procedures and follow-up. Representatives from Labour engaged in a robust Q&A session and provided important inputs in the second session wh included NEHAWU, HOSPERSA, DENOSA & PSA.

https://www.youtube.com/watch?time_continue=1158&v=TZvX0_3Kwug&feature=emb_logo

What are the Responsibility of Employers during COVID-19?

Two sessions were held on the importance and responsibilities of employers during COVID-19 on 09 and 12 June respectively. Topics covered included: the legislated roles and responsibilities of employers, what employers need to implement in response to COVID-19, and compensation for COVID-19 disease in terms of the COID Act – presented by Dr Lucas Mosisdi from the Compensation Fund.

https://www.youtube.com/watch?v=uz6fevS4HeA&feature=emb_logo

Available control measures for COVID-19 at work

This training held on 23 and 30 June, focused on the available control measures for COVID-19 in specific workplaces and covered topics on workplace risk assessment and mitigation of risk, administrative controls, PPE, medical screening of employees and guidance on routine and deep cleaning of workplaces when positive cases are identified.

https://www.youtube.com/watch?v=JAb1TlmFKXY&feature=emb_logo

What to do when an employee tests positive for COVID-19 at work?

This important training was held on 26 June and 01 July and covered topics related to the medical screening of employees (procedures & follow-up), and a step-by-step approach to follow when a positive employee is identified in the workplace. Information was also provided on contact tracing in the workplace as well as guidance for the routine deep cleaning of workplaces when positive cases are identified. There was also a session on the practical implementation and experiences in dealing with COVID-19 positive employees.

https://youtu.be/Hrh4iiBrkCk

What useful OHS information resources are available for COVID-19 workplace preparedness and prevention?

This session, held on 2 July, focused on the existing available sources of OHS information for COVID-19 workplace preparedness and prevention and provided tips and guidance on where to find these resources online. The target audience included: Employers & Management, OH Professionals, OHS Practitioners, Employee Health & Wellness Practitioners, Trade Union Representatives, SHE Representatives, Regulators and Policy Makers, and Labour Inspectors.

https://youtu.be/7xFCk5gWFF8

The NIOH was also invited by AUDA-NEPAD, in May 2020, to participate in a series of trainings on COVID-19 Workplace response for all sectors of the economy across the continent - leading discussions and providing training focused on the African response to the pandemic. This is in partnership with other agencies and Institutions such as the African Union, National Department of Health, International Labor Organization, and OSH Africa.

Risk Assessment for COVID-19

This training session took place on 28 May and covered topics related to the implications of COVID-19 & the approach to risk management as well as a practical example of how to facilitate a risk assessment effectively.

Available Workplace Control Measures for COVID-19

The above session was held on 2 June and focused on the available control measures for COVID-19 in specific workplaces and covered topics on workplace risk assessment and mitigation of risk, administrative controls, PPE, medical screening of employees and guidance on routine and deep cleaning of workplaces when positive cases are identified.

UPCOMING EVENTS

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

Medical screening and testing for COVID-19 in different workplaces
Planned Date: 30 July & 6 August | Time: 10h30-12h30 | Target audience: Employers Trade Unions Regulators, Policy makers OSH practitioners

Managing of COVID-19 Persons Under investigation (PUIs) in different workplaces
Planned Date: 4 August | Time: 10h30-12h30 | Target Audience: Clinicians, Health teams

COVID-19 RELATED INFORMATION & EDUCATION MATERIALS

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

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

***The NIOH website is zero-rated by Vodacom, Telkom, MTN, Rain, MWeb & Internet Solutions. No data charges will therefore apply for users of these mobile network providers.**

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

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

1. **The steps you need to know when donning gloves**
   https://twitter.com/nioh_sa/status/1270640765467754497
2. **What employers need to know about risk assessment**
   https://twitter.com/nioh_sa/status/1267350168006877185
3. **Who should be wearing medical N95 respirators during the Covid-19 pandemic**
   https://twitter.com/nioh_sa/status/1253266050264809472
4. **What you need to know about surgical masks to promote health and safety in the workplace**
   https://twitter.com/nioh_sa/status/1263741273359421440
5. **As employers welcome staff back at work, follow these simple guidelines to ensure health and safety in the workplace**
   https://twitter.com/nioh_sa/status/1260464798241894400
6. **Are you working during lockdown? This is how you can stay safe**
   https://twitter.com/nioh_sa/status/1247774605990752256
7. **What you need to know about donning and doffing surgical masks**
   https://twitter.com/nioh_sa/status/1278221803224207369
8. **This is how to doff gloves correctly using the Beak method**
   https://twitter.com/nioh_sa/status/1276140184753627138
9. **How to doff gloves correctly to safeguard yourself**
   https://twitter.com/nioh_sa/status/1272567041736626176
10. **Steps employers can take when a worker is symptomatic or tests positive for Covid-19 at work**
    https://twitter.com/i/status/1284069083156287489

NIOH Factsheets & Posters

- http://www.nioh.ac.za/covid-19

Please see below links to more useful training material

- **NIOH Training videos and presentations**
  http://www.nioh.ac.za/covid-19-presentations/
- **NIOH Training per presenter videos (compressed for mobile use)**
  http://www.nioh.ac.za/covid-19/covid-19-training-per presenter/

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