7th International Conference on the History of Occupational and Environmental Health

15–17 November 2023, Durban, South Africa

Conference abstracts

The 7th International Conference on the History of Occupational and Environmental Health was organised by the Scientific Committee on the History of Prevention of Occupational and Environmental Diseases of the International Commission on Occupational Health (ICOH). Held at the University of KwaZulu-Natal during 15–17 November 2023, the conference was the first since the planned 2020 conference was cancelled due to the COVID-19 Pandemic. The conference theme, *Occupational and Environmental Health: At the Crossroads of Migrations, Empires and Social Movements*, brought together occupational and environmental medicine specialists, epidemiologists, social scientists, and historians to debate the issues facing workers and communities in their struggle for a healthier life. The scientific programme focused on the migration of workers in various time periods, the interconnections of empires, public health in post-colonial periods, and the role of trade unions and other social movements in occupational and environmental health. The evolution of occupational and environmental health in Africa, as well as globally, was addressed.

This was the first time the conference was held in Africa, and it was attended by approximately 100 delegates from about 20 countries. There were over 50 presentations given by participants from every continent, with the majority of these from African delegates. The abstracts from our keynote, lead, oral, and poster presenters are published in this issue of *Occupational Health Southern Africa*, the official conference publication, and a conference sponsor.

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Keynote and lead talks

Between adulation and denunciation: the institutional benefits of ambivalence in the history of occupational medicine

Breckenridge KD

Wits Institute for Social and Economic Research (WISER), Johannesburg, South Africa

Presenter: Prof. KD Breckenridge **e-mail:** keith@breckenridge.org.za

A consensus exists in the history of South African occupational health that tracks back from McCulloch to the very earliest writings on the gold mines. There is a general scholarly agreement that the mines have acted as engines of disease in the subcontinent, and that the medical interventions and forms of compensation offered by the institutions of industrial medicine amounted to – at best – weak and ineffective remedies, or – at worst – masks of ongoing contamination. In this talk I offered a critique of this consensus, asking – in light of the rapid decline in industrial employment and the widespread collapse of associated state institutions – what was internationally interesting and significant about the century of South African industrial medicine, and what it means for public health that the field no longer exists.

Artificial stone silicosis as a new public issue: the Spanish case

Cavalin C[1], Menéndez-Navarro A[2]

[1] Permanent research fellow, IRISSO, UMR CNRS-INRA 7170-1427, Paris-Dauphine University, PSL, Paris, France
[2] Department of History of Science, University of Granada, Granada, Spain

Presenter: Prof. A Menéndez-Navarro **e-mail:** amenende@ugr.es

Over the past fifteen years, Spain and Israel have each become 'Ground Zero' for an unexpected outbreak of silicosis among workers involved in cutting, bevelling, and polishing high-silica-content material, often called 'artificial stone'. These two countries house the main producers of this material, worldwide. Medical reports have described accelerated forms of silicosis in young healthy workers exposed, and (more rarely) have paid attention to immune-mediated diseases associated with crystalline silica. Several health agencies have recommended lower occupational exposure limits (OELs). However, exposure is still active in Spain, Israel, and worldwide.

Andalusia, the most populous Spanish autonomous community, has been especially affected by this outbreak. Demand for artificial stone was fuelled by the housing boom during the first decade of the century, giving rise to intensive occupational exposure in small workshops. From 2007 to 2019, 3 320 cases of occupational diseases due to exposure to crystalline silica recognised in Spain, can be identified with a specific industry code. Of these cases, 1 856 (55.9%) were attributable to the production and manufacture of artificial stone, of which 266 were reported in Andalusia. In 2017, an Integrated Silicosis Programme for managing quartz agglomerates was implemented by the Andalusian Regional Government.

This paper explored the ways in which different stakeholders have coped with the silicosis outbreak in Andalusia and how this epidemic has challenged the traditional understanding of silica hazards. The aim was to illustrate how artificial stone has become what is defined by the social sciences as a 'public issue'. This research is drawn from a variety of sources, including interviews with local agents, medical and public health experts, and administrative and epidemiological data.

Working and breathing in global Africa

Hecht G[1,2]

[1] Senior Fellow, Center for International Security and Cooperation, Freeman Spogli Institute, Stanford, United States
[2] Professor of Anthropology, Standford University, Stanford, United States

Presenter: Prof. G Hecht **e-mail:** ghecht@stanford.edu

For over a century, African minerals have played a particularly important role in fueling industrialised life across the globe. Today, the toxic residues of mineral extraction and use continue to plague communities throughout the continent – along, of course, with more recent forms of industrialised contamination. As the planet's environmental crisis continues to worsen, I argued that – contrary to stereotypes of Africa as marginal and 'lagging' behind other continents – we must look to African experiences to understand the present and future of working and breathing on our planet. I explored this theme through two examples: large-scale gold and uranium mining in South Africa's Gauteng province, and air pollution in west African cities.

Occupational lung diseases in mine workers in South Africa

Kistnasamy B[1], Rabada M[1], Mtshali[1]

[1] MBOD/CCOD, Department of Health, Johannesburg, South Africa

Presenter: Dr B Kistnasamy **e-mail:** Barry.kistnasamy@health.gov.za

The mining sector is a major driver of economic growth in South Africa, contributing some eight percent to the country's gross domestic product in 2022 and significantly to its foreign exchange earnings. However, despite the central role of mining in South Africa's economy for over 150 years, the associated health impacts have had a negative effect on mining communities, with mine workers in the southern African region historically registering the highest incidence rates of tuberculosis (TB) of any working population in the world. Before the 19th century, South Africa had a pastoral and subsistence economy, with Cape Town being a way station for passing ships on their way to and from the East for the colonial powers and 'explorers'.

The discovery of diamonds in 1867 and gold in 1884 led South Africa on an economic trajectory that surpassed many countries. The mining economy sucked in migrant workers from many countries, especially those in southern Africa. As part of the political economy of mining, various legal instruments assisted in dispossession of Africans of their land, and imposition of various taxes moved many into a cash economy based on migrant labour. The Anglo-Boer war dispossessed the Afrikaner population, and the scorched earth policy of the British ensured that farmland was destroyed, also leading to Afrikaner men seeking employment on the mines.

The medical assessments of white workers for their employment on the mines were undertaken by state-employed doctors, given the distrust of white workers of the doctors employed by the mining companies. Black African workers were assessed by medical orderlies based at The Employment Bureau of Africa (TEBA) facilities in labour-sending areas/countries or in Johannesburg. The compensation systems for occupational injuries and occupational lung diseases in mine workers were initiated in 1894 and 1912, respectively. The occupational lung diseases compensation system covered white workers until 1973. Research was conducted by the South African Institute for Medical Research (SAIMR) into vaccines and treatment interventions for various communicable diseases in mine workers and two major international conferences covering silicosis/pneumoconiosis were convened in South Africa as early as 1930 and 1959. The lack of preventive interventions resulted in the major class action settlements from 2002 onwards in the asbestos and gold-mining sectors. Social protection rights for Black African workers were only realised in the 1970s, after the historic Durban strikes for collective bargaining and trade union rights.

The mining sector, through the Minerals Council South Africa, has a legacy programme in partnership with the Department of Health that recognises the injustices of the past, and has taken corrective steps to restore the dignity of current and ex-mine workers and peri-mining communities that will ensure the sustainability of the sector.

Decolonising occupational health: informal workers and the struggle for occupational health

Lund F

Senior Advisor, WIEGO Social Protection Programme

Presenter: Prof. F Lund **e-mail:** francielund70@gmail.com

Against the background of informal work, and the intersection of the location of formal occupational health and safety (OHS) with formal work and workplaces, on the one hand, and global changes in the world of work on the other, WIEGO (Women in the Informal Economy: Globalising and Organising) undertook research that aimed to explore and assess potential points of entry for the extension of OHS to the majority of workers in the global south, who are informal workers often working in informal workplaces. WIEGO is a global research and advocacy organisation. Starting in 2010, WIEGO worked through and with affiliated informal worker organisations in Brazil, Peru, Ghana, Tanzania, and India. Those involved were poorer workers in cities, with a focus on poorer women. The occupational sectors were industrial outwork (piece rate work in private homes), street and market vendors, waste pickers, and domestic workers. Key aims of the study were to understand the risks faced by workers in their workplaces; identify how to modify legal and institutional barriers to including informal workers and workplaces in OHS; understand the allocation and control of primarily municipal resources to informal workers; support organisations to make focused demands for OHS interventions; and help to build in-country research and organising capacity in OHS for informal workers.

Based on this empirical work, the paper presented lessons learned for policy development at local, national and international levels, and for practical implementation at municipal level. While the challenges in moving towards a more inclusive OHS practice are enormous, the comparative country research initiative points to avenues that can be pursued towards a post-colonial vision of OHS. This will require, however, a serious and sustained commitment from intellectual and professional leaders in the occupational health discipline.

Guardians of workers' bodies? Trade unions and occupational health and safety

McIvor A

University of Strathclyde, Glasgow, United Kingdom

Presenter: Prof. A McIvor **e-mail:** a.mcivor@strath.ac.uk

This presentation contributed to an ongoing conversation on the role trade unions have played in occupational health and safety (OHS). The activities of unions were examined through the lens of experience in Britain, focusing on three themes: firstly, the idea within some of the literature that historically unions neglected workers' health, especially chronic ill-health and industrial disease; secondly, the challenges to this negative portrayal that support a rehabilitation of the historic role of unions; and, finally, the recent experience (since c1980) of unions in decline (and under attack), and the impact of this on OHS standards. It was argued that the role of trade unions needs to be contextualised and that tensions existed within some unions over jobs, wages, and health. Also, that we need to know more about working-class environmentalism. Nevertheless, there is robust and compelling evidence to support the argument that unions were, and continue to be, a powerful countervailing force operating as the key sentinels protecting workers' bodies in production. This has been a significant buffer in hard times.

It is also undeniable that capacity to resist and to mediate these wider degenerative forces has been critically neutered now that less than a quarter of the UK workforce are union members and collective bargaining has dissipated. Occupational health standards have worsened in the process, though this manifests itself now (at least in developed economies like the UK) less in physical injury and disability (though these legacies are still visible and continue to blight traditional working-class communities), and more in deteriorating psycho-social health with the stress epidemic in the modern workplace. Workers' bodies and minds are again bearing the brunt of a profound economic transformation.

The European greed for gold and silver, slavery, and the development of occupational health

Stanton, DW

Consultant

Presenter: Dr DW Stanton **e-mail:** davidws@me.com

The author, after producing a *Silicosis Prevention Information Resource, including an Historical CD* containing copies of the bulk of the known publications on dust prevention for the South African gold-mining industry, became involved as a consultant to legal teams in the silicosis litigation class actions for and against the South African (SA) gold-mining companies. Historical work conducted for this litigation influenced the author to research how African slavery was able to influence the poor working conditions in the SA gold mines. This work then influenced the author to conduct further extensive research for a possible book, viz. *The European Greed for Gold and Silver, Slavery, and the Development of Occupational Health*.

Brief information was presented from three of the thirty proposed book chapters: 'Hispaniola', 'New Spain' (Mexico), and 'The Welsh Slate Industry'. This covered the first Spanish missionaries who were sent to the Indies (the Americas), and their efforts to try to improve working conditions for Native Americans forced to work by the Spanish colonists at the gold and silver mines. Some of the early Spanish Crown letters and instructions sent to protect African slaves and Native Americans in the Indies were also discussed.

The talk ended with brief information on the Welsh slate industry, which was originally funded from African slavery, and on the very distinguished nineteenth-century geologist and mining engineer, Sir Clement Le Neve Foster. He served as one of the first Inspectors of Metalliferous Mines in the United Kingdom from 1872, and from 1880 until his retirement in 1901 was the Metalliferous Mines Inspector for the North Wales District, where he also had responsibility for the underground slate mines. Some examples were given of his conspicuous service to protect the health of metalliferous and slate miners in the nineteenth century.

Oral presentations

Importance of historical information for exposure assessment in the soft tissue paper industry

Andersson E[1,2], Torèn K[1,2]

[1] Occupational and Environmental Medicine, School of Public Health and Community Medicine, Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden

[2] Department of Occupational and Environmental Medicine, Sahlgrenska University Hospital, Gothenburg, Sweden

Presenter: Dr E Andersson **e-mail:** eva.andersson@amm.gu.se

Wood pulp production on a industrial scale started at the end of 19th century and became an important industrial product in Sweden. At around 1920, Sweden became the largest exporter worldwide of pulp. In the early 1940s, the production of crêpe paper and soft tissue paper started, mainly for the production of toilet paper, a product increasing used. Currently, the demand for soft tissue paper is still growing, especially in Asia, and production is increasing. One method to assess exposure in retrospective, historical cohort studies is to apply job exposure matrices (JEMs). This methodology started in the early 1980s and has been used both for general populations and industry-specific exposure assessment.

We have collected data from the very early soft tissue paper-mills in Sweden, comprising a cohort of 8 624 workers who started to work in the mills from the late 1940s. We performed exposure assessments with regard to paper dust and noise, based on dust measurements starting from the 1970s from the mills. A total of 1 578 dust samples and 1 157 noise measurements were assessed. The exposure from the late 1940s to 1980 was based on reviews of historical trade association books that described changes in equipment, processes, management, and economics over the history of every paper mill in Sweden. In-depth interviews were conducted with previous and current personnel – including operators, supervisors, and upper management – to understand how working conditions in all sections of each mill had varied over the years.

From all our information we developed two mill-specific semi-quantitative JEMs; a dust JEM with seven levels from 0.01 to >10 mg/m^3, and a noise JEM with seven levels from < 75 to > 100 dB(A). For every year, department and job title categories were data populated and assigned exposure levels that were used for analyses of different health outcomes. Dust exposures are considerably reduced but noise exposures are still high.

The history of MEDICHEM and the ICOH SC on the chemical industry

Coombs WM

Retired Occupational Medicine Specialist, Past President MEDICHEM and Chair ICOH SC CI

Presenter: Mr M. Coombs **e-mail:** mcoombs@iafrica.com

A synopsis was given of the chemical industry up to 1972, the reasons for the establishment of MEDICHEM so as to serve occupational health (OH) in the chemical industry, affiliation with ICOH, and the Board of MEDICHEM approved as the ICOH Scientific Committee (SC) for the Chemical Industry.

We explored the archives of MEDICHEM and the SC, and now, close to fifty years later, we documented the successes, failures, needs for change, the future, and how this will affect OH in the chemical industry.

The last fifty years, as for the beginnings of chemistry, have brought much to be debated. The context of sustainable development (responsible care, corporate citizenship, green chemistry), new, emerging, and old technology, and the impact on and by OH professionals, ethics, and the future of the relationship of OH professionals within the chemical industry, was further explored as a finding during the search and archiving of the history of MEDICHEM and the SC.

In addition, the format of publication of such archiving and documentation was discussed, with the ICOH repository as a backdrop.

Metal working fluids and bacteria

Dahlman-Höglund A[1,2]

[1] Occupational and Environmental Medicine, School of Public Health and Community Medicine, Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden
[2] Department of Occupational and Environmental Medicine, Sahlgrenska University Hospital, Gothenburg, Sweden

Presenter: Dr A Dahlman-Höglund **e-mail:** anna.dahlman-hoglund@amm.gu.se

Metal working fluid (cutting fluid) has historically been used during the 20th century in industry for processes such as grinding, turning, drilling, and milling. Since the 1970s, various types of non-mineral oil-based metal working fluids, including synthetic fluids, have been used in Sweden.

The mean exposure to cutting fluids in the form of either oil mist or aerosols has decreased over time in many countries, using personal monitors: 1.23 mg/m^3 during the 1970s; 0.57 mg/m^3 during the 1980s, and 1.0 mg/m^3 during the 1990s. In Sweden, we can see the same trend; in the 1970s 5 mg/m^3 oil mist, during the 1980s around 3 mg/m^3 oil mist, and in the 2010s 0.2 mg/m^3 aerosols.

Today, the average machining speed of the new machines is two times higher than for machines 30 years ago, and we know that aerosol generation increases with increasing machine rotating speed. From Swedish studies, we can show that using compressed air over many years, working with half-open machines, and grinding are important factors in exposure to inhalable aerosols and in governing exposure levels.

In the 1990s, the workers were exposed to oil mist/aerosols of metalworking fluid containing *P. pseudoalcaligenes*. Twenty years later, we can see the same bacteria genera grow and many other gram-negative bacteria such as *Escherichia coli* and *Legionella ssp.* Today, we can find *Mycobacterium immunogenum* in MWF containing mineral oils. Bacterial content of the cutting fluid varies depending on the cutting fluid type and biocidal additives, and can vary between the tank and in the machine.

History of the *Braceros* – migrant labourers in California, US

Das R

Division of Occupational and Environmental Medicine, Department of Medicine, University of California, San Francisco, United States

Presenter: Dr R Das **e-mail:** rupali@flash.net

In response to labour shortages during World War II, the *Bracero* programme enabled 4.6 million Mexican migrant men to work temporarily in the United States (US). The programme began in 1942 but continued until 1965, well after the War. Workers (*braceros*) primarily served Californian agriculture. This presentation described the history of the largest guest worker programme in US history, focusing on occupational health and social issues. Sources included: published articles, unpublished reports and public access documents, and historical archives. While the programme helped provide cheap labour, *braceros* suffered from poor working conditions and mistreatment by US employers. The US- and Mexican Government-backed programme promised a minimum wage, sanitation, housing, food, and protection from racial discrimination. It attracted many impoverished rural Mexicans desperate for work. In reality, however, the selection process for *braceros* was lengthy, humiliating, and tainted by corruption. Agricultural employers frequently ignored governmental guarantees, resulting in unpaid wages and substandard food and housing. The work was demanding and hazardous. While injury data specific to *braceros* were not collected, in 1957 there were 50 disabling injuries/1000 workers in agriculture versus 32.4 disabling injuries/1000 workers in all industries. Piece-rate compensation, the need for rapid work, and improper tools likely contributed to high rates of injuries. Ignored safety regulations and transportation accidents resulted in numerous fatalities. *Braceros* were unable to improve their working conditions, as they were denied the right to representation and collective bargaining; those who filed complaints and insurance claims faced retribution and deportation. The programme ended due to increasing recognition of the hazards faced by workers, expansion of mechanisation, and a successful labour movement leading to the formation of the United Farm Workers. The *Bracero* programme allowed the US agricultural industry to grow, while severely exploiting individual Mexican workers and influencing trade agreements to this day.

Silicotuberculosis – unstable in history and neglected in science

Ehrlich R

Division of Occupational Medicine, School of Public Health and Family Medicine, University of Cape Town, South Africa

Presenter: Prof. R Erlich **e-mail:** Rodney.ehrlich@uct.ac.za

Background: What we today distinguish as silicosis and pulmonary tuberculosis have a long but contested history of biological, epidemiological and nosological association.

Methods: To try to illuminate this history, the South African published literature on gold miners over the past 100 years was examined to describe how co-occurrence and separation have been conceived.

Results: Between the turn of the 20th century and the 1930 Johannesburg Silicosis Conference, there was continuing debate about whether the 'infective component' of 'miners' phthisis' was always present in disabling silicosis. The conference established that the diseases, irrespective of severity, were distinct. The phenomenon of subradiological silicosis was ignored in the new definitions. Mid-century papers attempted to distinguish, inter alia, between 'silicotuberculosis' and 'tuberculo-silicosis' on grounds of chronology of dust and mycobacterial exposure and pathogenesis. By contrast, medical commentators in the mining industry challenged the aetiological linkage of the two diseases into the 1980s. Even where it was accepted, it was argued that silica in the absence of silicosis was not a causal factor, ignoring biological evidence to the contrary. While clinicians continued to emphasise the co-occurrence and diagnostic complexity of combined disease, epidemiological and laboratory studies on co-occurrence remain scarce, both in South Africa and globally.

Conclusions: Despite a century of intimate (and tragic) association of silica and *Mycobacterium tuberculosis* in the South African gold-mining industry, the varying, multiple, and ultimately unstable understanding of what is today called silicotuberculosis, along with historical resistance within the South African mining industry, have hindered scientific inquiry.

Advancing our understanding of migration, work, and health by exploring our historical roots in social medicine

Flynn M[1], Salmen-Navarro A[2], Seneviratne M[3], Hui C[4,5], Vearey J[5,6], Wickramage K[5,7]

[1] National Institute for Occupational Safety and Health, United States
[2] New York University School of Medicine, New York, United States
[3] Scientific Committee on Occupational Health in Small Scale Enterprises and Informal Sector, ICOH
[4] University of Ottawa, Ottawa, Canada
[5] Migration Health Development and Research Initiative
[6] African Centre for Migration & Society (ACMS), University of the Witwatersrand, Johannesburg, South Africa
[7] International Organization for Migration

Presenter: Mr M Flynn **e-mail:** mflynn@cdc.gov

Occupational health has evolved into a fundamentally technical and applied field dedicated to identifying and eliminating hazards found at the workplace. While this approach has led to significant reductions in occupational injury and illness, it has limited its ability to account for the social structures that circumscribe occupational health outcomes, particularly for socially marginalised populations such as immigrant workers. It has also led to the artificial, yet fundamental, distinction between work-related and non-work-related exposures, injuries, and illnesses, which has evolved into a line of demarcation between occupational safety and health and other disciplines within public health such as migrant health.

This presentation discussed key concepts that have been central to the development of occupational health over time. Specifically, it explored occupational health's historical roots in social medicine and how historical advances, such as the establishment of a regulatory infrastructure, may have inadvertently contributed to its increased reliance on reductionist views of cause and effect that are prevalent today. It discussed the predominance of the biomedical paradigm in occupational health, and how this has limited the field's ability to address occupational health inequities for socially marginalised groups such as immigrants. Finally, it discussed the advantages of moving towards a bio-social approach to health and how this could lead to a more comprehensive understanding of the relationship between work and health. This understanding could also allow the field to better address the changing nature of work arrangements and the inequitable distribution of occupational health outcomes across the social axis.

A history of the Mine Medical Professionals Association

Govender VG[1], Emby DJ[2]

[1] School of Public Health, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa; Medical Bureau for Occupational Diseases, National Department of Health; Masakhane Strategic Health Consulting (Pty) Ltd.; former MMPA President

[2] Honorary Emeritus Member of the American Roentgen Ray Society; Honorary Life Member of the College of Radiologists of South Africa; Honorary Life Member of MMPA

Presenter: Dr V Govender **e-mail:** vanessa@masakhanehealth.co.za

A few decades into the great Gold Rush of 1886, mine medical officers found themselves at the crossroads of migrations, empires, social movement, and diseases. There was a gradual unanticipated, but disturbingly extensive, burden of ill health among manual labourers from indigenous Black African populations, who were recruited locally and from neighbouring countries.

Following a meeting in March 1921 held under the aegis of the Chamber of Mines, the Mine Medical Officers Association (MMOA) was established. The first Constitution set out two principal objectives, viz. to discuss problems of special interest relating to the work of mine medical officers, and to foster friendly intercourse and exchange of views among the Association's members and other organisations connected with the mining industry.

The history of the Association is replete with scientific papers written by its members, from as early as 1924, on scurvy, meningitis, injuries, and sepsis, and, in later years, silicosis, tuberculosis, HIV, and hearing loss – proof that the Association had not only achieved its mission but had become a leader in the management of occupational diseases. Evolving from an era steeped in safety culture, the Association steered its members towards ensuring the prioritisation of health, along with safety.

In its first 50 years, the name of the Association changed to the Transvaal Mine Medical Officers' Association, and then back to the MMOA to accommodate members from the Free State mines. In 2009, to incorporate other medical professionals and sustain its membership, it was renamed the Mine Medical Professionals Association (MMPA).

The MMPA has enjoyed a meritorious journey, fostering preventive healthcare and promoting occupational health as enablers for safety in mines. As an Association, the MMPA has achieved its vision of *"raising the profile of medicine in mining"* in the last 100 years. It celebrated its centenary in 2021.

The colonial legacy of mercury toxicity: the story of Thor and a tribute to Mark Colvin

Hariparsad S, Naidoo R

Discipline of Occupational and Environmental Health, University of KwaZulu-Natal, Durban, South Africa

Presenter: Dr S Hariparsad **e-mail:** HariparsadS1@ukzn.ac.za

Margate, a picturesque town in Kent, England would be the ominous setting of a terrifying legacy to unfold thousands of miles away in South Africa. Margate was home to Thor Chemicals, the manufacturer of mercury-based products.

In the late 1970s, concerns were raised by the Health and Safety Executive (HSE UK) about the excessively elevated airborne levels of mercury and high levels of mercury in the workers' urine. In 1987, the HSE delivered an ultimatum to Thor Chemicals – to shut down processes or face prosecution. Thor chose to relocate to the remote, semi-rural Cato Ridge, in KwaZulu-Natal, South Africa in 1988.

In South Africa, Thor transformed its English mercury production process into a mercury reclamation and recycling process. Escaping international and national scrutiny, Thor became the global leader in mercury waste recycling. In 1989, toxic mercury deposits were discovered in the nearby river. Workers began exhibiting symptoms of mercury poisoning. Urine levels of workers were found to be at least 12 times higher than the World Health Organization (WHO) limit, with workers complaining of *"going mad"*.

Protests in 1990 by non-governmental organisations and the Chemical Workers' Industrial Union (CWIU), and investigations by Dr Mark Colvin, exposed the extent of mercury toxicity among the workers. By 1994, three workers had died from mercury poisoning and 32 workers had urine mercury levels of > 200 mg/l. The Government's Department of Labour fined Thor R13 000!

In 1994, a civil claim of culpable homicide was filed against Thor Chemicals in the Court of London. In 1997 and 1998, Thor settled, paying R17 million to affected workers.

Despite its 1998 announcement of the closure of its plant, more than 10 000 drums of mercury waste remained improperly stored, stockpiled with evidence of seepage into the surrounding environment as recently as 2019.

In August 2019, a fire destroyed at least 30% of the mercury waste and released toxic waste. In October 2019, after pressure from the South African Government, a Thor Chemicals subsidiary agreed to pay R300 million to clean up the mercury waste and transport it to a Switzerland company.

While the cycle of exportation of hazards from Europe and back is complete, some thirty years later, in its wake the destruction of the lives of workers, their families, their communities, and the farming environment remains the legacy.

OHS programmes nurtured from tailings of mines

Hegmann KT, Hughes MA, Thiese MS, Allen J

Rocky Mountain Center for Occupational and Environmental Health, University of Utah and Weber State University, Salt Lake City, United States

Presenter: Dr KT Hegmann **e-mail:** kurt.hegmann@hsc.utah.edu

A mine's history of injuries and fatalities was addressed with occupational health and safety (OHS) programmes developed, from1923, by its medical director, Paul Richards, MD (born 25 November 1892). These efforts subsequently fostered academic programme development.

Background: Great human migrations are invariably motivated by economics. Mining is the penultimate example of massive 'rushes', although more have migrated for agricultural and manufacturing opportunities. Irrespective of economic driver(s) in the rushes to riches, occupational health is often an after-thought.

Mine history: Bingham Copper Mine in Utah is the world's all-time greatest copper mine. Mining began in 1863, and production is now 19M/17.2M short/metric tons (~$416B in inflation-adjusted total value). After arriving at Bingham, Utah on 7 October 1922, Dr. Richards took over the town's hospital, his employer, and began accident investigations, injury prevention programmes, and respiratory protection. Mining deaths were eventually all but eliminated. Dr. Richards also helped write Utah's Occupational Disease Act (1941). However, most OHS activity was relatively dormant after his death on 20 November 1958.

Hopeful future: An OHS rebirth with business-labour partnerships, built on Dr. Richards' legacy in the mining industry, is now accelerating. Efforts are spearheaded by a coalition of partners of the University of Utah/Weber State University Rocky Mountain Center for Occupational and Environmental Health (est. 1977). A series of state laws have been enacted including: (1) funding support through tax credit mechanisms (SB159, 2005 General Session (GS)); (2) incorporation of the Center into state law (1SSB234, 2007 GS); (3) statutory Center enlargement to involve a second university (2SSB172 2021GS); and (4) new, ongoing state appropriations (2022 and 2023).

Conclusion: This example shows that with industry-labour historical partnerships and government support, broad advances in OHS programmes with disease and injury reductions are possible.

https://www.mining-technology.com/projects/bingham/

https://miningdataonline.com/property/357/Bingham-Canyon-(Kennecott)-Mine.aspx

Jean Rodier: a pioneer in occupational medicine in Morocco

Hicham C

General Secretary, Moroccan Foundation Against Neurological Diseases (FLMN)

Presenter: Dr C Hicham **e-mail:** chafiqhicham@hotmail.com

Jean Rodier (3 April 1920–9 June 2003) arrived in Morocco by accident in September 1945. He became attached to the country and decided to return the year after he received his doctorate in pharmacy, to work at the Institute of Hygiene of Morocco in Rabat.

In 1946, he was appointed Head of the laboratories of toxicology and chemistry-physics at the Institute of Hygiene of Morocco. He carried out considerable work in the field of individual toxicology and was designated in this capacity as an expert at the Moroccan courts, including the Court of Appeal.

In Morocco, he was particularly interested in the mining toxicology of lead, cobalt, antimony, phosphates, and – especially manganese. He focused on the disease related to manganese, viz. manganism. This exceptional work spanned nearly twelve years, combining field research, biological essays, dust analysis, and animal testing at the Institute of Hygiene. The outcome of this research was a twenty-minute medical short film on manganism, which was given an award at the 20th Congress of Occupational Medicine in Helsinki in July 1957.

He also authored a significant number of works in the field of water. These were grouped into a 125-page introductory book, first published in Rabat in 1951. In 1956, he published a second book, the *Manual of Biochemistry Practice*, which gathered the teaching courses he gave while he was a professor at the School of Laboratory Technicians of Morocco (1948–1958).

He was appointed Head of the Industrial Hygiene Laboratory in Morocco from 1955 until his departure in 1958, and organised the Centre for Studies and Research on Occupational Hygiene in Morocco in 1956, at the dawn of independence.

During his twelve-year stay in Morocco, Jean Rodier wrote 70 articles, almost all in French, favouring national journals including *Bulletin de l'Institut d'hygiène du Maroc* and *Maroc médical*. He also occasionally published in *Les Archives des maladies professionnelles* and authored a review in *La Revue neurologique* in 1954.

He won the medical prize of Morocco in 1949 for his work on manganism, and the scientific prize of Morocco in 1957. He was decorated Knight in the Order of Academic Palms on 3 January 1961, for all the work he achieved while he lived in Morocco.

A hidden history – perspectives on the role of women in the history of OEHS in Africa in the past 60 years

Kisting-Cairncross S[1], Mlangeni M[2], Ngowi V[3]

[1] Independent Occupational Medicine Specialist, Cape Town, South Africa
[2] National Institute for Occupational Health, Johannesburg, South Africa
[3] Muhimbili University of Allied and Health Sciences, Department of Environmental and Occupational Health, Dar es Salaam, Tanzania

Presenter: Dr S Kisting-Cairncross **e-mail:** sophia.kisting@gmail.com

This paper addressed the understudied subject of women in the history of occupational and environmental health and safety (OEHS) during the last 60 years in Africa. It is a period of critical importance for the economic development of Africa. The past 60 years has seen many countries in Africa gain their independence, increase their economic growth across both industrial and agricultural sectors, and the emergence of trade unions as well as improved OEHS legislation. However, the role of women in the history of OEHS in Africa is understated.

What is the historic role of women in these developments? Scattered sources of information, including 'grey literature', suggest women have, over the decades, played an important role in OEHS legislation and policy development, in teaching and training, in advocacy for improved conditions of work, for child care and maternity and paternity leave, and for OEHS medical services as well as freedom from violence. To explore this history and start a more informed discourse that encourages research in this area, we obtained perspectives from different OEHS stakeholders and some key informants in several countries in Africa.

The review of records was triangulated with the results of a survey and interviews with OEHS stakeholders and key informants, using a qualitative interview guide informed by a structured literature review. The paper elaborated on how women played an important role in the history of OEHS during this significant economic period of Africa's development. Women asserted their role and contributed to shaping, improving, and remaking subsistence as well as public and private workspaces during this period.

South Africa – occupational health in the non-mining industry: from 1976 to the post-COVID era

Kocks DJ[1], Nogueira C[2]

[1] Extraordinary Professor, Department of Public Health Medicine, School of Public Health, Faculty of Health Sciences, University of Pretoria (UP), Pretoria, South Africa; Chair of the South African Society of Occupational Medicine (SASOM); National Secretary for South Africa of the International Commission on Occupational Health (ICOH)
[2] Project and Data Manager, Office of the Dean, Faculty of Health Sciences, UP, Pretoria, South Africa; ICOH Vice President for Scientific Committees; SASOM Executive Committee Member (co-opted); Board Member of Workplace Health Without Borders (WHWB)

Presenter: Ms C Nogueira **e-mail:** info@sasom.org

Occupational health in the non-mining sector became an entity recognised by the South African Government in 1976. The Erasmus Commission of Enquiry (1976) into occupational health, followed by the 1979 Wiehahn Commission Report on the Industrial Relations System in South Africa, identified specific legal challenges to be addressed. After nearly 20 years, the Occupational Health and Safety Act (Act No. 85 of 1993) defined in legal terms the occupational health services that would be required. However, much earlier than 1985, non-governmental organisations became pioneers in occupational health.

The South African Society of Industrial Health, constituted in 1948, underwent various changes and was renamed the South African Society of Occupational Medicine (SASOM) in 1985. SASOM, an affiliate member of the International Commission on Occupational Health (ICOH), is tasked with promoting, protecting, and enhancing the quality of life and wellbeing of the working population of South Africa. Its members are medical practitioners registered with the Health Professions Council of South Africa (HPCSA).

In 1966, the Industrial Nurses of the Southern Transvaal met for the first time; during 1976, they changed their name to 'occupational health nurses' to be in line with international standards at that time. Since 1980, the organisation has been known as the South African Society of Occupational Health Nursing Practitioners (SASOHN); its main mandates are promoting occupational health nursing through accredited standards of practice, education, and training, and co-operation with national and international organisations.

Occupational hygiene, as a recognised discipline, came into existence in 1992 at a meeting of the transitional committee of the then Institute of Occupational Hygienists of Southern Africa (IOHSA). At a strategic meeting in 2000, the Southern African Institute for Occupational Hygiene (SAIOH) was launched; it is the officially recognised and accredited professional organisation responsible for the certification and registration of occupational hygiene professionals in southern Africa.

Listening to the unremembered – Chinese indentureship in South Africa

Manning W

OHS Practitioner, Durban, South Africa

Presenter: Mr W Manning **e-mail:** 20187994@wol.co.za

Notwithstanding the deep history of the South African-born Chinese community, discourses of 'othering' and 'exclusion' continue to be developed around them. The unremembering of Chinese indentureship to the South African Chamber of Mines in the early 20th century, in the so-called 'Chinese Experiment', is a case in point. Over 64 000 Chinese workers were subjected to extreme forms of exploitation, which included exposure to known deadly working conditions, police violence, and the legalised access to narcotics. While international historiography of Chinese indentureship as a system of exploitation is extensive, the post-indentureship fates of Chinese labourers is largely unknown and uncertain. For those indentured in South Africa, even less is known since all were repatriated, excepting a small number of escapees, at the end of the scheme in 1910. The only South African indentured-Chinese labourers for whom we have certain knowledge are the group skeletons held by the Raymond A. Dart Collection of Human Skeletons at the University of the Witwatersrand. By reflecting on the continued possession and use of those skeletons for scientific research, this paper posed broader questions regarding our professional practice. Are we unremembering the migrant workers of the 2022 Qatar Football World Cup? Do mandatory medical measures involve a degree of unremembering? Do our national healthcare systems unremember workers? It was suggested that only a change of paradigm to a worker-centric, service-based model of occupational health and safety, where worker agency is enhanced, will ensure that we, the professionals, listen and remember.

Research on chalk particles: a systematic review

Mbazima SJ[1,2], Joseph JS[1,3]

Presenter: Dr JS Joseph **e-mail:** jitcyj@nioh.ac.za

1 Department of Toxicology and Biochemistry, National Institute for Occupational Health, Division of the National Health Laboratory Service, Johannesburg, South Africa

2 School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, Johannesburg, South Africa

3 Department of Life and Consumer Sciences, College of Agriculture and Environmental Sciences, University of South Africa, Johannesburg, South Africa

Chalk dust exposure is the inhalation of dust particles that are generated when using chalk for writing or wiping on a chalkboard. Chalk dust exposure can have negative effects on human health, especially for teachers and students who use chalk frequently in classrooms. Chalkboards were first used in the 19th century in Europe and in the United States of America, and became popular because they were cheap, reusable, and easy to erase. However, they also produced a lot of dust when writing or wiping with chalk. It is known that chalk dust exposure can cause health problems, such as eye irritation, skin irritation, respiratory tract irritation, and mucous membrane irritation. However, the history of chalk dust exposure and related diseases is not well documented. Therefore, this review aimed to assess the history of chalk dust exposure and disease. Some studies have suggested that chalk dust exposure may be associated with an increased risk of asthma, allergies, chronic bronchitis, and lung cancer. In recent years, some alternatives to chalkboards have been developed and adopted in schools, such as whiteboards, smartboards, projectors, and tablets. These alternatives can reduce or eliminate the generation of chalk dust and improve indoor air quality in classrooms. However, these technological tools are not optimally used in countries like South Africa, due to power outages, software failure, malfunction, and theft.

The legacy of the manufacture and use of asbestos-cement in Katanga (DR Congo)

Mukonki Kyungu F[1,2], Pyana Kitenge J[1,2], Mukalay wa Mukalay A[1,2], Nemery B[3]

[1] Unit of Occupational Health, School of Public Health, University of Lubumbashi, Lubumbashi, DR Congo
[2] School of Public Health, University of Lubumbashi, Lubumbashi, DR Congo
[3] Centre for Environment and Health, KU Leuven, Leuven, Belgium

Presenter: Dr B Nemery **e-mail:** ben.nemery@kuleuven.be

Hardly anything is known about the health impact of the use of asbestos in sub-Saharan Africa. We attempted to retrace the history of the manufacture and use of asbestos-cement materials in the (former) province of Katanga in the Democratic Republic of Congo (DRC).

During the colonial period, asbestos-cement roofing sheets (generally called '*Eternit*') were promoted for building houses, especially in mining estates. A total of 19 851 tons of unmanufactured asbestos were imported by the Belgian Congo from 1950 to 1959, presumably for supplying two factories producing asbestos-cement materials: Eternit du Congo (ETERCO) in Léopoldville (now Kinshasa), and TRABEKA in Lubudi, Katanga (now in the Lualaba province). The latter plant produced more than 30 million tons of various asbestos-cement products from 1929 to 1977. In addition, 55 719 tons of asbestos-cement products were imported into Congo from 1953 to 1959. No data are available for the period after independence (1960), except for the period 1975–1986, when 6 167 tons of unmanufactured asbestos were imported. Asbestos was never mined in Congo and there is no evidence for environmental contamination by naturally occurring asbestos.

In a recent case report, we attributed the occurrence in a young man of a malignant peritoneal mesothelioma to his exposure to asbestos-cement materials in the house where he grew up, in a mining housing estate in the (former) Katanga.

To this day, roofs of corrugated asbestos-cement sheets are widespread, and often in tatty condition, in urban areas and mining compounds throughout southern Katanga. More cases of mesothelioma are to be expected in the future.

History of occupational health, challenges, and way forward in Tanzania

Mwelange LP

School of Public Health and Social Sciences, Department of Environmental and Occupational Health, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania

Presenter: Dr LP Mwelange **e-mail:** mwelange@gmail.com

Background: Occupational health and safety services are crucial for sustainable development, reducing accidents and diseases. Improved worker health and safety boosts productivity, job creation, and industrial harmony. Since Tanzania's independence in 1961, occupational health and safety standards have been governed by the Factories Ordinance CAP. 288 of 1950. The nationalisation policy of 1967 led to ineffective enforcement of occupational health and safety standards, due to the Government's role as employer, enforcer, and regulator. In the 1990s, factories were privatised, causing management to prioritise production over occupational health and safety. Therefore, the Government established the Occupational Safety and Health Authority (OSHA) in 2001 to improve workplace health and safety, reduce accidents and diseases, and achieve better productivity through enforcement and promotion of occupational health and safety practices.

Methods: This was a review of the published documents related to occupational health in Tanzania. The following published documents were used in the review: Factories Ordinance CAP. 297, promulgated in 1950; Occupational Health and Safety (OHS) Act 2003; National Occupational Health and Safety Policy 2009; A Performance Audit Report on the Management of Occupational Health and Safety in Tanzania of 2013; Occupational Safety and Health Authority (OSHA) Strategic Plan 2021–2026; Occupational Safety and Health – Country profile Tanzania 2014; and Status of Occupational Health and Safety and Related Challenges in Expanding Economy of Tanzania of 2015.

Results: Occupational health services are accessed by less than 5% of the working population in Tanzania. Only 24% of targeted formal workplaces were registered. OSHA has only 45% of the staff needed for them to perform their duties efficiently. Few doctors are qualified as occupational medicine practitioners (< 10 in the country). Over 80% of Tanzanians lack OSH law coverage and occupational health services.

Conclusion: Tanzania needs to develop an effective institutional framework to enhance OHS in the formal and informal sectors. Also, it is vital to develop a solid and effective research capacity in occupational health.

Workers' health and the *Union Minière du Haut-Katanga* in the Belgian Congo

Nemery B

Centre for Environment and Health, Department of Public Health and Primary Care, KU Leuven, Leuven, Belgium

Presenter: Dr B. Nemery **e-mail:** ben.nemery@kuleuven.be

During the Belgian colonial rule of the Congo (1908–1960), the private company *Union Minière du Haut-Katanga* (UMHK) had a monopoly on the extraction and processing of minerals in southern Katanga, the northern part of the African Copperbelt. Thousands of workers were employed in underground and open-cast mines, and in metallurgical plants producing copper, cobalt, uranium, and many other metals.

The economic and social history of mining in Katanga has been addressed in many scholarly publications. In the first decades, the problem of worker shortage represented a major difficulty for the industry. Initially, men were forcefully recruited from surrounding or even faraway regions to work for three to six months; poor working and living conditions led to high mortality from dysentery and pneumonia. Later, efforts were made to improve hygiene in worker camps, which were initially built following the South African Orenstein model of dormitories. However, largely at the initiative of medical doctors, the UMHK took measures aimed at 'stabilising' the workforce. These measures consisted of building worker camps ('*cités*') with family housing, improving food rations, providing medical care, and educating children. This 'totalitarian' policy was conducted without worker participation; unions were forbidden. Nevertheless, organised forms of resistance did occur, including a violently repressed strike in December 1941. Although occupational accidents and work-related diseases are mentioned in passing, conspicuously little has been published about specific occupational safety and health issues at the UMHK. An interesting experiment, consisting of aerosolising salt solutions to increase particle size in order to prevent silicosis, was conducted in an underground mine, but the outcome of that study is unknown.

Aluminium powder in South African mines

Rees D[1,2], Nelson G[1]

[1] School of Public Health, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

[2] National Institute for Occupational Health, NHLS, South Africa

Presenter: Prof. Emeritus D Rees **e-mail:** David.Rees@wits.ac.za

Numerous unsuccessful silicosis medicinal treatments and preventatives have been used, worldwide, over many decades. Among the most well-known is the Canadian McIntyre Research Foundation's patented aluminium powder, which was used to *"reduce the solubility of silicious material"*, based on animal studies. The compound is approximately 15% aluminium metal and 85% aluminium oxide. It was administered to silica-exposed miners in countries such as Australia, Canada, Chile, and Mexico, and factory workers in the USA and England, and possibly elsewhere, as a prophylaxis against silicosis. The powder was dispersed into specific areas in the workplace, such as change rooms, or inhaled directly by workers from the 1940s into the late 1970s. Mostly without their formal consent, and sometimes as a condition of employment, tens of thousands of workers were exposed to the powder: 27 000 in Ontario, Canada, alone.

Despite its widespread use globally, and the high rates of silicosis among South Africa's hundreds of thousands of gold miners, aluminium powder was not introduced into the country. We examined the reasons for the lack of enthusiasm for the 'treatment' in South Africa, notwithstanding its potential commercial advantages, being cheaper than dust control. The presentation relied, in part, on an influential 1963 report of an investigation by Prof. Ian Webster from the Pneumoconiosis Research Institute in South Africa. Webster concluded that *"There is no proof that aluminium powder has prevented the development of silicosis"*, and that *"Aluminium prophylaxis does not stop the progression of silicotic fibrosis"*, but, somewhat surprisingly, recommended that *"Should the State or an industry wish to use aluminium prophylaxis, the Pneumoconiosis Research Unit should assist them"*.

Asbestos in Brazil: the process of creating agendas, subjects, and policies

Ribeiro EA[1], Paiva CHA[2]

[1] Postgraduate Programme in Family Health, Estácio de Sá University, Rio de Janeiro, Brazil
[2] Postgraduate Programme in Family Health, Estácio de Sá University and Oswaldo Cruz House/Oswaldo Cruz Foundation, Rio de Janeiro, Brazil

Presenter: Dr EA Ribeiro **e-mail:** earibeiro@gmail.com

The aims of this work were to analyse the process of creating agendas, subjects, and policies concerning the production of asbestos in Brazil. It also identified and studied the Brazilian legislation on the use of asbestos, focusing on the actions of the various actors involved, and describes scientific debate on the issue. Exploratory research of a qualitative nature was carried out, using documentary research from 1970 to 2019, and drawing on theoretical contributions from the fields of sociology and history, with special attention focused on Kingdon's work. The complexity of the interrelations between actors and the State in the formulation and implementation of public policies was demonstrated. Asbestos has been on the decision-making agenda several times, but the creation of a national public policy has occurred on only a few occasions. The use of asbestos was banned by the Federal Supreme Court, but the actors involved in the matter continue to duel.

Reconstructing the fragmented history of 'Colinet-Caplan syndrome'

Ronsmans S[1], Blanc PD[2]

[1] Centre for Environment and Health, Department of Public Health and Primary Care, KU Leuven, Leuven, Belgium
[2] Division of Occupational and Environmental Medicine, University of California, San Francisco, United States

Presenter: Dr S Ronsmans **e-mail:** steven.ronsmans@kuleuven.be

The first description of an association between rheumatoid arthritis (RA) and pneumoconiosis is generally attributed to Anthony Caplan, who reported in 1953 on a 'peculiar' pattern on chest X-rays of south Wales coal miners with concomitant RA and pneumoconiosis. As early as 1950, however, Émile Colinet, a Belgian rheumatologist at the Saint-Pierre Hospital in Brussels, had described a 30-year-old woman with a ten-year history of diffuse rheumatic arthritis that had started two years after beginning work *"in a factory where large quantities of silica flour were handled"*. Her chest X-ray – which Colinet did not provide – was described as 'silico-tuberculosis'. In March 1953, he reported a 34-year-old woman with clinical manifestations of both RA and scleroderma, who at age 15 had begun work in the same factory – without specifying what this factory produced.

The picture became clearer in December 1953 when Clerens, a colleague of Colinet, recapitulated the two case histories of what he called, by then, 'Colinet-Caplan syndrome'. Clerens showed the chest X-ray of the first patient with a typical 'Caplan' pattern. Also, he provided more information on the patients' jobs: they were packaging scouring powder. It is likely that they worked in the Vim scouring powder factory near the Saint-Pierre Hospital. This seems to be confirmed by a report from the internal medicine department of the same hospital, from January 1953, of a 41-year-old woman – a Vim scouring powder worker – with fatal 'acute' silicosis. Colinet had already noted that several of the (female) coworkers of his first case had died from 'silico-tuberculosis'.

Although Colinet's name was soon dropped from the syndrome's eponym, his early reports highlight the extent to which women in this industry were struck by occupational diseases and underscore that the RA association is not limited to coal worker's pneumoconiosis, the general understanding of Caplan's syndrome. Regrettably, more reports on autoimmune disorders in scouring powder workers would follow.

Women and girls in mine labour: from Italy to South Africa

Salerno S

National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Rome, Italy

Presenter: Dr S Salerno **e-mail:** silvana.salerno@enea.it

"How can we know what happened in the past? We cannot travel back in time, ask the people who were alive long ago. Historians use evidence that survives from the past. Like detectives, they search for clues. They piece together what they think the past was like." (McGregor Museum, Kimberley, South Africa)

Searching for evidence on women in male-dominated work is hard to find, yet the hidden path of women and girls forced into mine labour in Italy, from the beginning of the nineteenth century, was discussed in this paper.

In Italy, women were forced into carrying the ore out of slate quarries (slate contained 25% of silica) (Meeting of Italian Scientists in Genoa, 1846); selecting lead and zinc minerals in Montevecchio mines (Sardinia), where in 1871 eight girls (10–15 years old) and three women died due to the fall of a wall (Peis Concas I, 2010); and going down sulphur mines for twelve and fourteen hours, sometimes during the night (Jessie White Mario, 1894). At that time, Sicily was a British trading colony (Kutney, 2007) and the 'track system' was imported, although it had been forbidden in England since 1834. *"Sulphur mine industry occupies many thousands of workers of every sex and age… hundreds and hundreds of boys and girls go down on steep ladders along paths carved in wet ground at risk of landslide"* (Villari P, Letters from the South, 1875).

Montessori, one of the first Italian women medical doctors, attended the London International Council of Women in 1899 to ask for the prohibition of women and children under the age of 14 years from working in sulphur and other mines (ICW Proceedings, London 1899), inspired by the Factory Acts. In 1902, Italy finally had its first law on limiting women and child labour. A discussion of women in South African copper mines, and the data on silicosis among women, concluded the paper's path.

A history of agricultural health and safety

Schenker M

University of California, Davis, United States

Presenter: Dr M Schenker **e-mail:** mbschenker@ucdavis.edu

The first milestone in the history of agricultural worker health and safety was the work of the Swedish archbishop, Olaus Magnus. He recognised in his *Historia de Gentibus Septentrionalibus* (1555) that grain threshers damaged their lungs by exposure to grain dust. The father of occupational medicine, Bernadino Ramazzini, generalised this observation in his seminal work, *De Morbis Artificum Diatriba* (1700), to recognising that particles in a variety of occupations were dangerous to breath. These could be dusts from animal, vegetable, or mineral sources. He particularly recognised the respiratory hazards to millers, grain sifters, horseback riders, and tobacco workers. Ramazzini noted that farmers were at high risk of pleurisy, pneumonia, and asthma, mainly due to exposure to *"the inclemency of the weather"*. In England, the Threshing Machines Act of 1878 focused on the mechanical hazards of agriculture, but the hazards of agricultural work were largely ignored as the industrial revolution focused on the dangers of mining and manufacturing. In 1939, John Powers wrote that *"During the past quarter century the hazards of industry, transportation, mining and construction have been recognized. For agriculture…there has been no such recognition, and farming, thought the oldest occupation in the world, remains the most hazardous"*. That focus changed in the 1950s with the creation of the National Institute for Farm Safety in the US, and in the UK the Agriculture (Poisonous Substances) Act (1952), and the Agriculture Safety, Health and Welfare Act (1956). The Occupational Safety and Health Administration (OSHA) Act in the US (1970) largely ignored the agricultural workplace until 1991, when the National Institute for Occupational Safety and Health (NIOSH) was funded to create a farm health and safety programme. The recent years have recognised the reality that agricultural work is now largely and increasingly done by immigrant workers, and efforts by government, academia and non-governmental organisations have focused on this vulnerable population.

Thomas slag pneumonia

Torén K[1], Naidoo R[2], Blanc PD[3]

[1] Occupational and Environmental Medicine, School of Public Health and Community Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden
[2] Department of Occupational and Environmental Medicine, University of KwaZulu-Natal, Durban, South Africa
[3] Division of Occupational and Environmental Medicine, Department of Medicine, University of California, San Francisco, United States

Presenter: Dr K Torén **e-mail:** kjell.toren@amm.gu.se

In 1878, the Bessemer process for steel production was modified by adding limestone to the process in order to remove phosphorous. A by-product of alkaline slag, 'Thomas slag', was generated, which could be used as a fertiliser. In Germany, it was noticed already in 1887 that workers processing the Thomas slag had a high prevalence of infectious pneumonia. In 1888, a drastic increase of deaths from lobar pneumonia, which mainly affected men in working age, was noted in an English county. The workmen themselves attributed it to inhalation of dust from a newly opened industry that was grinding and sifting alkaline slag from the Thomas process. A report from the Local County Council concluded that exposure to 'slag dust' was not the primary cause, but could be a contributing cause. In 1889, a German report concluded that workers processing Thomas slag fell ill with severe croupous pneumonia that was probably caused by pneumococci in combination with inhalation of the dust from the Thomas slag.

A German doctoral dissertation from 1890 described an epidemic of pneumonia among workers in Thomas slag mills, with high mortality in this new fertiliser-production industry. The mills were so dusty that workers two metres apart could not see each other. The content of the slag was phosphate, lime, silica, iron oxides, and manganese compounds. The thesis also presented a pathologic section from a deceased worker, noting copious slag particles in the lung. It was explicitly stated that there were no pneumococci in the lungs. The thesis concluded that this was a pneumonia caused by inhalation of the Thomas slag that, due to its etching properties, injured the lungs. In 1909, the German Government issued rules for the workplace conditions in Thomas slag mills, but occurrence of severe, often fatal, illness remained high. From 1929, pneumonia among workers processing Thomas slag was listed in Germany as an occupational disease.

The early investigators attributed the increased susceptibility to pneumococcal infections to the irritating properties of the alkaline lime; manganese was not mentioned as a possible etiologic factor. German researchers continued to describe case series of severe pneumonia among workers processing Thomas slag. Despite this rich early history continuing well into the 20th century, over the last 50 years the condition has been largely forgotten. Modern investigational techniques have not been applied to understand more fully the mechanisms underlying Thomas slag pneumonia.

Historical response to environmental disasters in the United States: a review of governmental intervention

Wilkenfeld MC[1], Chang B[2]

[1] Division of Occupational and Environmental Medicine, NYU Winthrop Hospital, New York, United States
[2] MS4 University of Texas School of Medicine, El Paso, United States

Presenter: Dr MC Wilkenfeld **e-mail:** MWilkenfeld@nyuwinthrop.org

In the aftermath of the 9/11 attacks resulting in the collapse of the World Trade Center, responders and workers in the impacted area developed a myriad of diseases, including cancer. Treatment is now covered by government-funded programmes, but these treatment programmes started only after extensive lobbying by sick workers and healthcare advocates. This calls into question government's handling of worker protection and communication of air quality results following the disaster. This presentation looked at several environmental disasters in the history of the United States, and compared the governmental response to protect workers at these disasters. We reviewed the response to radiation exposure at the Nevada Test Site, Asbestos exposure in Libby, Montana, and Silica exposure in Hawks Nest Tunnel, West Virginia. History has shown that the time it takes to institute coverage following evidence of exposure-related illnesses is prolonged, often resulting in needless morbidity and mortality. Study of the history of response to environmental disasters can improve the protection and health of workers involved in future events.

Poster presentations

History of occupational health and safety laws in Ghana

Amoabeng Nti AA[1], Arko-Mensah J[1], Kwarteng L[1], Takyi S A[1], Acquah AA[1], Botwe PK[1], Tettey P[1], Basu N[3], Batterman S[2], Robins T[2], Fobil JN[1]

[1] Department of Biological, Environmental & Occupational Health Sciences, School of Public Health, University of Ghana, Accra, Ghana
[2] Environmental Health Sciences, School of Public Health, University of Michigan, Ann Arbor, United States
[3] Faculty of Agricultural and Environmental Sciences, McGill University, Montreal, Canada

Presenter: Dr AA Amoabeng Nti **e-mail:** aaamoabeng_nti001@st.ug.edu.gh/effya76@gmail.com

The development of occupational health and safety (OHS) laws in Ghana has been driven mainly by developmental and historical antecedents in the mining industry. Health and safety concerns first gained prominence following agitations among the indigenous labourers from the northern territory in the (then) Gold Coast. The labourers complained of high rates of morbidities and mortalities from tuberculosis and injuries as a result of poor sanitation, housing, and workplace air quality in the mines. The series of protests and worker agitations led to the first occupational mortality audit in the mines and the subsequent passage of several mining health legislations, including the Mining Health Ordinance to address mining area sanitation, housing, and worker health issues. Since 1925, when the first mining health ordinance was passed, several other laws have been promulgated. In fact, health and safety is a right guaranteed to all according to the 1992 Constitution of Ghana.

The three main statutes that have informed implementation of OHS in Ghana post-independence are the Labour Act 651 (2003), the Factories, Offices and Shops Act 328 (1970), and the Workman's Compensation Law PNDC Law 187 (1987). Others include: International Labour Organization (ILO) Radiation Protection, 1960 (No.115), ratified in 1961; Mining Regulations LI 665 (1970); EPA Act 490 (1994); Ghana Health Service and Teaching Hospital Act 525 (1996); Atomic Energy Commission Act 588 (2000); Public Health Act 851 (2012); and the Petroleum Commission Oil and Gas OHS policy: LI 2258 (2015).

Although there are legal instruments regulating most of the workplaces, these laws are fragmented. Moreover, the absence of a national policy on OHS in Ghana prevents the proper regulation of the occupational health space in Ghana. A draft bill of the OHS national policy is yet to be enacted into law.

History of disease exposure in school-aged children working in artisanal mines in North Kivu in the Democratic Republic of Congo

Kabemba Lukusamph JP

Volunteers for the Conservation of Fauna and Flora

Presenter: Mr JP Kabemba Lukusamph **e-mail:** jp.lukusa@gmail.com

Artisanal mining is one of the main sources of income in Rubaya, DR Congo. In the squares of open land amidst the verdant vegetation of the territory of Masisi, in North Kivu, we do not see powerful excavators, but simply shovels, pickaxes, and muscular arms to handle them. Carriers, more or less solidly built, replace the trucks. They evacuate the ore via the small paths gullied by the torrential downpours that fall on the region during the rainy season. In Rubaya, 45 km from Goma, a dozen open-pit mining squares exploit niobium, cassiterite, and coltan (colombo-tantalite). Around the gutted earth, transformed into a mud pit at the slightest rain, young people of school age work: digging, washing minerals, sorting, transporting, etc. Judging by the grimacing faces of the young people who work tirelessly, all the tasks seem exhausting. These ores will be used in particular for the manufacture of capacitors, present in all electronic products. Demand does not seem about to decrease, as the new digital economy is greedy for it. In 2011, the Congolese Government submitted a national action plan to the International Labour Organization (ILO) to end child labour in the mines. In particular, it planned to *"make known and apply the legislation relating to child labour"*, *"make technical and professional training accessible"*, and *"give access to an education programme for children removed from work"*. It also commited *"to improve the living conditions of vulnerable households"*, so that socioeconomic vulnerability does not push families to make their children work. The programme was ambitious, but it never passed the milestone of official adoption. The children working are exposed to neglected tropical diseases, tuberculosis, respiratory tract infections, HIV/AIDS, and viral hepatitis B. There is also a major risk of the diseases being spread in communities and increases in mortality rates of school-age children.

SASOM:1948 to date

Kocks DJ

Chairperson of the South African Society of Occupational Medicine (SASOM)

Presenter: Prof. D Kocks **e-mail:** kocks@wol.co.za

On 8 October 1947, the first South African Society of Industrial Health was established. The Constitution has been in existence since July 1948 as a group within the Medical Association of South Africa (MASA), presently known as the South African Medical Association (SAMA).

Since then (and still applicable today), the standards of moral or ethical decision making are:

1. The workman must retain the right to choose his own doctor and that it would be incumbent on the factory medical officer to retain any fees so earned by him, and
2. The Society will not at any time enter into discussion or negotiations with any other individuals or organisations regarding remuneration for services rendered by its members.

At the annual general meeting (AGM) in 1951, the 'Rules in the case of part-time and full-time medical appointments to factories and similar industrial organisations' were formulated. At the 1958 AGM, it was agreed to open membership to all members of the Medical Association of South Africa who have occupational health interests.

The name changed in September 1957 to the South African Society of Occupational Health. The Society was renamed again, in August 1985, to the South African Society of Occupational Medicine (SASOM) – as it is known today.

SASOM successfully initiated the *Occupational Health Southern Africa* journal (OHSA) in 1995, achieved recognition of occupational medicine as a separate medical specialty in 2005, and hosted the International Commission on Occupational Health (ICOH) 29th Triennial International Congress on Occupational Health in Cape Town in March 2009.

Current interfaces in South Africa are with NIOH, SASOHN, SAIOH, MMPA, SASTM, OTOH, Universities, FCPHM (Occ. Med) SA, HPCSA, COHSASA, Department of Employment and Labour (DoELForum), and *Occupational Health Southern Africa* journal (OHSA). International liaison and collaboration include ICOH, Occupational Health in the Chemical Industry (MEDICHEM), and the International Occupational Medicine Society Collaborative (IOMSC).

The history of electronic waste at Agbogbloshie, Accra, Ghana

Kwarteng L[1,2], Arko-Mensah J[1], Amoabeng Nti AA[1,5], Takyi SA[1], Acquah AA[1,6], Botwe PK[1], Tettey P[1], Dwomoh D[1], Basu N[4], Batterman S[3], Robins T[3], Fobil JN[1]

[1] Department of Biological, Environmental & Occupational Health Sciences, School of Public Health, University of Ghana, Accra, Ghana
[2] Biomedical and Public Health Research Unit, CSIR-WRI, Tamale, Ghana
[3] Environmental Health Sciences, School of Public Health, University of Michigan, Ann Arbor, United States
[4] Faculty of Agricultural and Environmental Sciences, McGill University, Montreal, Canada
[5] University Hospital – Legon, University of Ghana, Accra, Ghana
[6] Department of Physiotherapy, School of Biomedical and Allied Health Sciences, University of Ghana, Accra, Ghana

Presenter: Dr L Kwarteng **e-mail:** lawkwarps@yahoo.com

Agbogbloshie e-waste site in Accra has existed for nearly 27 years, with a current workforce of ~4 500–6 000 workers, often untrained individuals who learn the trade on the job. This site started as a scrap market where various services such as vehicle repair, spare parts trading, welding, auto mechanics, and tyre servicing were rendered to support operations of trucks supplying foodstuffs to the yam market on the edge of the Korle Lagoon. This scrap market expanded and transitioned into an informal e-waste recycling hub, as many young males from the northern sector of Ghana, escaping the intertribal conflicts and unfavourable agricultural conditions, as well as seeking better livelihoods in Accra, enrolled for this job.

Rapid growth in informal electronic waste recycling activities (delivery and receipt, sorting, manual dismantling, and open burning) at Agbogbloshie, has been propelled by a lack of stringent enforcement policies and cost-effective technologies to manage e-waste recovery/recycling properly. Usage of rudimentary techniques in recovering valuable materials and associated pollutant emissions have not changed much, even after the passage of the Hazardous and Electronic Waste Control and Management Bill in 2016. Pollutants emitted, especially from the black plumes observed from the open e-waste burning, are destructive to the environment and resources. Worker exposures to these hazardous working conditions, and pollutants in various environmental media at the site, predispose them to several health effects. Exposures among e-waste workers over the years have been assessed mainly through cross-sectional studies. These have estimated trace metals and organic pollutant concentrations in environmental (soil, air, fish, sediment, water) and biological (blood, serum, urine, hair) samples. Worker health studies have reported increased risk of respiratory symptoms and lung function decline among workers.

Findings from these studies have been useful in implementing health promotion campaigns and have also encouraged stakeholders to build a wire-stripping workshop, a clinic post, and a technical training support centre for the e-waste workers.

History of occupational health in the Philippines

Lu JL

National Institutes of Health, University of the Philippines, Manila, Philippines

Presenter: Prof. JL Lu **e-mail:** jinky_lu@yahoo.com/jdlu@up.edu.ph

In the Philippines, efforts to promote occupational safety and health were already evident during the American period, with the institution of the Employer's Liability Act No. 1874. The Act directed employers to compensate the family of a deceased worker whose death was caused by workplace conditions, or by the neglect of employers in the execution of their duty to protect the safety and health of their employees. There are other subsequent legislations aimed at providing occupational health and safety. The Workmen's Compensation Act, through Act No. 3428 of 10 December 1927, required compensation not only for death but also for illnesses and injuries caused by workplace exposures. Commonwealth Act No. 104 (29 October 1936), called the Industrial Safety Law, enforced certain rules and standards for the mining industry. Republic Act No. 1054, or the Free Emergency Medical and Dental Treatment Act (12 June 1954), stipulated the need for emergency dental services to employees. In 1903, physicians began to be employed in industries to provide medical treatment for sick and injured workers. During 1923–1932, the Section of Industrial Hygiene was established under the (then) Bureau of Health. This was followed by the implementation of the Workers' Compensation Act No. 3428 and the Emergency Dental and Medical Service Act No. 1054. After World War II, the Philippine Association of Occupational Medicine (now PCOM) was formed (www.doh.gov.ph). In 1950, the Joint International Labour Organization-World Health Organization (ILO-WHO) Committee on Industrial Hygiene issued its first international definition of occupational health. Finally, the history of occupational health and safety started with the functions and structure of the Department of Health (DOH). By virtue of E.O. 119, the DOH Office of Public Health Service was created, which had the Non-Communicable Disease Control Service tasked with the responsibility of formulating policies, programmes, and standards primarily for the prevention and control of occupational health, cardiovascular diseases, and cancer.

History of occupational contact dermatitis among paint workers

Mndasha GS[1], Mamuya SH[2]

[1] Simiyu Regional Referral Hospital, Ministry of Health, Community Development, Gender, Elderly and Children, Tanzania
[2] School of Public Health and Social Sciences, Department of Environmental and Occupational Health, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania

Presenter: Ms GS Mndasha **e-mail:** gmndasha@gmail.com

Background: Paints are chemical products, which consist of resins, additives, solvents, and pigments. Exposure to paints can cause occupational contact dermatitis (OCD), which affects workers' productivity and working performance.

Objective: To describe the history of paints and OCD among paint workers.

Methodology: A retrospective cohort study was conducted; data were obtained from a literature review based on the occupational history of paint and OCD among paint workers, from ancient times to present.

Results: During the 1700s, paint production began in Europe and the United States. Further production demands arose after the Second World War. Paint composition has changed over time; currently, solvent-based paints have been replaced with water-based paints, which require more preservatives than the predecessors and, thus, increase risk of OCD in paint workers. In the 1960s, benzisothiazolinone (BIT) was introduced in the paint industry as a preservative, which resulted in an OCD case of two paint workers. A report was published in 1976, and BIT was identified by the Danish as an important allergen to painters. In the 1980s, isothiazolinone preservative and its derivatives (methylchloroisothiazolinone (MCI), methylisothiazolinone (MI), BIT, and octylisothiazolinone (OIT)) were highly used and OCD cases increased. Also in 1982, the first two medical cases due to OIT usage among workers were published. In the early 2000s, MI was introduced as a preservative in industrial products, where the first cases of OCD due to exposure were reported by Isaksson. In 2013 MI was named as 'Contact Allergen of the Year' by the American Contact Dermatitis Society. Exposure to MCI/MI had increased, by more than six times, the OCD cases among workers from 2008 to 2015. Due to contact with different allergens and irritants, paint workers were at risk. In the United States, an estimated 13 million workers are exposed to chemicals each year and are at risk of developing OCD.

Conclusion: Excessive usage of chemicals in the paint industry has increased OCD cases among paint workers throughout history.

Occupational Health Southern Africa – a brief history

Nelson G[1], Beaumont K[2]

[1] School of Public Health, University of the Witwatersrand, Johannesburg, South Africa
[2] Mettamedia, Tulbagh, South Africa

Presenter: Prof. G Nelson **e-mail:** gill.nelson@wits.ac.za

Occupational Health Southern Africa is the only accredited occupational health journal in the region. It was founded in 1995 by the South African Society for Occupational Medicine (SASOM) and the South African Society for Occupational Health Nursing Practitioners (SASOHN), and was later joined by the Southern African Institute for Occupational Hygiene (SAIOH) and the Mine Medical Professionals Association (MMPA). The journal provides a platform for scholarly engagement through the publication of peer-reviewed research articles, opinions, reports, news, and related matters.

In 2004, the journal was accredited by the South African Department of Higher Education and Training and, in 2011, it was added to the SABINET African Journals online platform to enhance its accessibility and visibility. It is also listed on African Index Medicus. In 2017, the manuscript submission and review processes moved to an online platform. The COVID-19 pandemic necessitated a switch from print to digital publishing in 2019, which also prompted the overhaul of the website to make it more appealing, and comparable to top international scientific journal websites. That same year, an Editorial Advisory Panel, which includes international occupational health experts, was constituted to augment the expertise of the Editorial Board, which is constitutionally comprised of representatives of the stakeholder occupational health societies.

Over the years, the Editorial Board, Advisory Panel, and publisher have worked to transform the original magazine-type publication into a respected scientific journal. The journal conforms to the policies, procedures, and guidelines of the Committee on Publication Ethics (COPE) and the International Committee of Medical Journal Editors (ICMJE), to promote best practices in publishing. Despite the small team, 169 issues have been published to date, all of which are on the website www.occhealth.co.za. Efforts are underway to apply for international accreditation and to increase *Occupational Health Southern Africa*'s footprint on the African continent.

Effect of mining-related air pollution on human health from 2000 to 2018: the case of Zambia

Nkhama E[1], Ndhlovu M[2], Siziya S[3,4], Voyi K[5]

[1] Department of Environmental and Occupational Health, School of Public Health and Environmental Science, Levy Mwanawasa Medical University, Lusaka, Zambia
[2] Department of Epidemiology and Biostatistics, School of Public Health and Environmental Science, Levy Mwanawasa Medical University, Lusaka, Zambia
[3] Public Health Unit, School of Medicine, Copperbelt University, Ndola, Zambia
[4] School of Health Sciences, University of Lusaka, Lusaka, Zambia
[5] School of Public Health and Health Systems, Health Sciences Faculty, University of Pretoria, Pretoria, South Africa

Presenter: Dr E Nkhama **e-mail:** emmynkhama@gmail.com

Zambia's economy has largely been mining dependent, with the copper industry dominating for more than eight decades. Increasing global demand for copper, combined with the liberalised local economic policies pursued since the early 1990s, has seen the industry grow as old mines were revived and new ones opened. Despite the greater economic opportunities the industry offers the country, mining has attendant risks such environmental and health risks. We examined the air pollution and respiratory health risks related to mining activities in the main mining area of Zambia, the Copperbelt, from 2000 to 2018.

Sulphur Dioxide (SO_2) and particulate matter of aero-dynamic size PM10 and PM2.5 were predominant ambient pollutants from the mining operations over the years. Main sources of pollutants were flue gases from smelter operations, and dusts from within the mines and blown from abandoned waste rock. Emissions of PM10 amounted to 406.8 kilotonnes/year (kt/yr) and this accounted for 35% of the total emissions. Similarly, SO_2 emission of 346.7 kt/yr were reported. The mines' operations contribute over 98% of the country's SO_2 emissions. Recent investments in mining activities are expected to yield even increased SO_2 emissions because of several new copper smelters. SO_2 and PM emissions for most of the five large-scale mines, with smelters and other licensed dischargers, were above national set limits by 111–155% (the Zambia Environmental Management Agency standards). Most residential areas in mining towns lie directly within the affected vicinity of the smelters. Generally, studies reported that for an increase of 10 µg/m^3, the daily number of admissions of asthma in children increased by 1.3% (95% CI 0.4 to 2.2%), while an increase in PM10 level by 10 µg/m^3 was associated with 1.27%, 1.45%, and 2.00% increase in hospital admissions for heart disease, chronic obstructive pulmonary disease, and pneumonia, respectively.

Anecdotes of medical philosophy 300 years ago from Ramazzini

Renton K

Occupational Health, Wits School of Public Health, University of the Witwatersrand, Johannesburg, South Africa

Presenter: Mr K Renton **e-mail:** kevin.renton@wits.ac.za

Bernardino Ramazzini lived and worked in Modena and Padua, Italy, around the turn of the 16th century. He published a collection of his orations and notes in 1710, called *The Health of Princes*. The book deals with public health in respect of the lifestyle, environment, and medical treatment of both simple country folk and nobility.

The presentation analysed Ramazzini's writings and observations about fevers, health in general, and lifestyle in Italy 300 years ago, with a discussion of the medical treatments provided.

Ramazzini was fond of relating medical anecdotes and theories. He published extensively, so much so that his publisher grew weary of his prescientific writing, saying the doctors wanted to read about clinical guidance rather than 'theories'. As a result, Ramazzini had to pay for the publication of the last chapter of *The Health of Princes* himself.

Ramazzini had strong opinions on the common bloodletting practice of the time; unlike many of his colleagues, he was not in favour of this as a panacea. He relates his treatment success in the section *Epidemic Constitutions of Modena* over a five-year period (1690), where the patient – a poor farmer – was suffering from a 'double tertian fever' with parotitis, and how *"without taking any other kind of remedy, his good health was restored by drinking abundant wine"*.

The possible medical background and mechanism of the treatment used in this case, among others, was discussed. The presentation compared the medical thought and practice in Ramazzini's day with today, and distilled from the book some guiding principles still relevant for current public health.

The rise of the occupational hygiene profession in Norway

Smedbold HT[1,2,3,4]

[1] Occupational Hygienist and Researcher, Department of Occupational Medicine, St Olav's University Hospital, Trondheim, Norway
[2] Assistant Professor, Department of Public Health and Nursing, Faculty of Medicine and Health Sciences, Trondheim, Norway
[3] Senior Advisor, Proactima AS, Stavanger, Norway
[4] President of the Norwegian Occupational Hygiene Association

Presenter: Prof. HT Smedbold **e-mail:** hans.t.smedbold@ntnu.no (see also www.yrkeshygiene.no)

The title 'occupational hygienist' first came into use in Norway in the 1970s, starting with the Norwegian Labour Inspectorate employing academics with a chemical or physical background, and training them in the field of occupational hygiene. Part of the training was conducted in Sweden. Before, the term 'occupational hygiene' mainly was used in Norway to describe the field of preventive occupational medicine.

The first occupational hygienist in Norway recognised by the Norwegian Occupational Hygiene Association was Karl Wülfert. He came to Norway in 1928, after he had finished his PhD at the University of Munich (Germany) and had worked for a year in Sweden with the later Nobel Prize Winner in Chemistry, Prof. H von Euler-Chelpin. From 1931, he was involved in building up the new fish canning laboratory in Stavanger. In 1947, he became chief chemist at the new Laboratory for Chemical Analysis and Assessment of Exposure in Norwegian Working Life in Oslo. This laboratory was the precursor of what later become our National Institute of Occupational Health. In 1977, we got the modern Worker Protection Law, the same year the first academic position in occupational hygiene was established at the Norwegian Technical University (NTH) in Trondheim. Our first professor was Egil M. Ophus. The year after, we got our first occupational exposure limit (OEL)V list.

The Norwegian Occupational Hygiene Association was established in 1985. By 2022, the Association had grown to approximately 380 members. The number has been stable over the last 10–15 years. The density of occupational hygienists in Norway, based on the number of members of the Association, is approximately 8 500 workers per occupational hygienist. This places Norway among the top countries in the world; however, the numbers are still considered to be too low to ensure sufficient protection of the workers.