



New Zealand Occupational Hygiene Society (NZOHS) Conference

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Guest Editorial

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Introduction

The New Zealand Occupational Hygiene Society (NZOHS) Work Related Health Conference 2025 was held from 26–28 May at the Hilton Auckland, marking the fourth instalment of our biannual event. With the theme "*Challenges, Changes, Solutions*", the conference brought together over 160 delegates from across New Zealand and 13 other countries, including Australia, Canada, Indonesia, South Korea, the Netherlands, South Africa, and the United States. It was preceded by having the privilege of hosting the International Occupational Hygiene Association (IOHA) Board Meeting. This year's event truly lived up to its title as a *work-related health* conference, showcasing the breadth of presentations from various health & safety disciplines and from different countries around the world.

The programme featured four keynote speakers, four continuing education sessions, 27 concurrent presentations, and four practical workshops. The diversity of topics reflected the complexity of modern work-related health issues – ranging from best practice, occupational hygiene and health to psychosocial risk, human factors and ergonomics, and technology.

Keynotes

We opened with a keynote from Nancy Wilk, IOHA President, whose address on “driving change in occupational health and hygiene” set the tone, calling on us to meet global and local challenges with purpose. Other keynotes offered powerful and timely insights: Marty Byrne’s whistleblower story reminded us of the courage it takes to stand up for worker health and safety; Adrian Parris, British Occupational Hygiene Society (BOHS) President, highlighted the UK’s push on respirable crystalline silica in engineered stone; and Emanuele Cauda explored sensor technologies that are revolutionising health hazard identification.

Themes

As Scientific Committee Chair, I could see sub-themes emerging from the abstracts received and organised the conference content accordingly.

Under **Best Practice**, speakers shared the importance of high quality and defensible occupational hygiene work. The regulatory aspect was considered with Philippa Gibson’s advice on being an expert witness and my own story of successfully appealing enforcement. This sub-theme was further supported by Peter Aspinall and Bridgette Jennings’ guidance on writing effective reports, and Al Threlfall’s tips on communicating technical information

with clarity and trust. Miriska Gerber offered leadership tools for influencing health outcomes in uncertain times.

Mentally Healthy Work featured prominently, recognising that psychosocial risk is a health and safety duty. Matt Sadgrove's research on fatigue in the energy sector and Richard Wilkinson's breakdown of psychosocial risk factors underscored that when we assess health risks, this should include mental health.

Human Factors and Ergonomics addressed musculoskeletal disorders, which remain a major source of work-related harm. Chris Polaczuk and Stephven Kolose delivered a practical workshop on injury prevention in construction, while Leanne Hunter introduced toolkits for assessing musculoskeletal risks.

The ***Occupational Health*** stream highlighted the value of cross-disciplinary collaboration. Jane O'Kane advocated for greater visibility of occupational health nurses, Carolyn Haybittle stressed the need for team-based approaches in healthcare, and Wendy Spence and Dr Mary Obele provided practical models and discussions for integrating occupational health with occupational hygiene.

Technology and Modelling is a rapidly evolving space, as seen in Karla Anderson's exploratory work using AI for report generation, and Suzanne Broadbent's workshop on a dust modelling tool for mining. Tools shared by Joost van Rooij and Nick Browne demonstrated the power and use of probabilistic and predictive modelling techniques.

International Perspectives provided real-world case studies and shared solutions to shared challenges. Ilze Schoeman discussed the ongoing asbestos fight in South Africa; Andre Winkes shared control measures for hexavalent chromium in the Netherlands; and Professor Doo Yong Park provided insights on occupational disease trends in Korea. From Indonesia, Muthia Ashifa shared the practical implementation of a health risk management programme in a major hazard facility, in a context where regulatory frameworks are still developing. Sharann Johnson and Samantha Connell inspired us to think globally about resource constraints, impact, and digital solutions.

Finally, traditional occupational hygiene topics – ***Chemical and Physical Hazards*** covered new and persistent risks. David Springer looked at PFAS in everyday products while Trudy Geoghegan delivered dual presentations on dust, vibration and noise exposures in Urban Search and Rescue teams. Other highlights included assessments of pesticide exposure (Leon Pretorius), smelter emissions and effects on lung function (Andrew Orfanos), the effectiveness of copper chromated arsenic controls (Sage Robinson), and tools to assess heat stress risk (Johnny Fernandez).

Conclusion

As you can see, this edition captures a rich variety of ideas, experiences, and innovations. Our profession is evolving beyond what others perceive occupational hygiene to be – measuring dust and noise. It is much, much more than that. Communication, collaboration, and leadership are becoming increasingly important in how we do better work health. This means the various health and safety disciplines should work closely together more frequently to benefit worker health.

It is my honour to serve as guest editor for this special issue of the *New Zealand Journal of Health and Safety Practice*. I present to you this collection of abstracts from the NZOHS Work Related Health Conference 2025 – a reflection of our collective commitment to meeting today's *Challenges*, *Change*, and providing *Solutions*.

Keynotes

The evolution of occupational hygiene embracing sensor technologies

Emanuele Cauda

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Professionals involved in occupational hygiene have the responsibility to protect workers from several hazards and stressors. This can be accomplished by adopting frameworks which can be slightly different around the world, but they all focus on the identification and assessment of the hazard, and the management of risk. Occupational hygienists can use several tools to carry out their different activities. Among these tools, sensor technologies can provide invaluable in-time information and potentially timely feedback. The keynote will propose critical considerations about the adoption and operationalization of sensor technologies from multiple perspectives: technology, data processing, workers engagement, value extraction, and ethics.

Protected Disclosure – the Price of Integrity

Marty Byrne

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In early 2021 Marty Byrne was contracted to undertake a business review of a Nelson-based Marine Engineering company. The company concerned had been prosecuted by WorkSafe in relation to a workplace injury that occurred in 2019 and had pleaded guilty to the relevant charges. Only days after sentencing a series of events transpired that changed Marty's life and also caused him to realise the personal challenges and costs one can incur by holding to one's values.

Driving change in occupational health and hygiene - How and who to partner with to support and care for workers both today and tomorrow

Nancy Wilk

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Global data indicates that we are not effectively preventing chronic, non-communicable occupational disease. Alternative approaches to classical occupational health and hygiene are needed to realize improvement. Occupational health and hygiene and worker well-being are priorities for organizations around the globe. Aspects of holistic, integrated approaches to occupational disease prevention and improved worker well-being, e.g., *Total Worker Health*®, overlap with Environmental, Social, and Governance. These intersections represent opportunities to collaborate, pool resources, and advance performance and outcomes for both. Aligning with the conference theme this keynote examines opportunities for partnerships and innovative solutions to support workers through disease prevention and improved well-being.

Respirable Crystalline Silica: Engineered Stone the Challenges of Managing Exposures in the UK

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There has been a global spike in accelerated silicosis cases in the kitchen worktop industry because of the widespread use of engineered stone, this has resulted in Australia banning the use, supply, manufacture, and import of certain forms of engineering stone, primarily due to concerns about the risk of silicosis from silica dust exposure during processing and installation. This has led to the UK rethinking and looking at a multi-layered approach to protect workers against health risks. This talk will provide an overview of the current

knowledge, the issues faced in the UK and the responses of the government, regulators and BOHS to the rising number of accelerated silicosis cases.

Best Practice

Science Speaks: 3 Powerful Ways to Connect with Non-Scientists

Al Threlfall

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The strength of Occupational Hygiene lies in building meaningful connections with those we serve in the workplace. In an era dominated by 'Google Academics' and AI tools like ChatGPT, we face unprecedented challenges in persuading a skeptical audience of our message. This session will delve into effective strategies to navigate skepticism, foster trust, and enhance understanding of our valued scientific principles.

What businesses really need from occupational reports

Bridgette Jennings

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Changing from a Consultant to an in-house hygienist has given me an opportunity to understand how businesses use occupational hygiene data, what their challenges are in terms of turning data into positive change, and how we can work together to leverage our unique positions.

When Science Wins: Using Occupational Hygiene to Challenge Regulatory Findings

Kerry Cheung

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Good health risk management protects organisations – not just from workplace hazards, but also from regulatory action based on incomplete assessments. This presentation examines how the Interior Health Authority (IHA) successfully challenged a WorkSafeBC sanction by using occupational hygiene data, structured risk management systems, and evidence-based arguments.

WorkSafeBC alleged that IHA failed to control formaldehyde exposure risks in healthcare settings. However, a thorough review of exposure data, control measures, and regulatory criteria revealed flaws in their assessment. By leveraging strong occupational hygiene practices and presenting clear evidence, IHA demonstrated compliance and overturned the sanction.

This session will break down the key lessons: the importance of well-documented risk assessments, how to challenge incorrect regulatory findings, and why robust occupational hygiene systems are an organisation's best defence. Attendees will gain practical insights into using data to defend workplace health programmes and ensure compliance.

Leading Work-Related Health Improvements in Uncertain Times

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As health and safety professionals, rely on regulators like WorkSafe to guide, influence, and support our efforts to reduce work-related health risks. But what happens when that guidance feels uncertain—when the regulator is going through its own challenges?

Improving work-related health has always required strong leadership, consistent focus, and collaboration across industry. This presentation explores how health and safety

professionals can continue to drive improvements in work-related health, even when confidence in the regulator is low. Rather than viewing current challenges as a barrier, we'll reframe them as an opportunity for professionals to lead from within—shaping workplace health outcomes through proactive thinking, cultural influence, and practical action.

Crucially, this session will also explore the power of collective mindset. How do we shift from frustration or inaction to proactive engagement? How do we re-energise ourselves and our networks in times of uncertainty? Attendees will be invited to critically assess their own attitudes and assumptions, and consider how our professional response can either reinforce the problem—or be part of the solution. We'll briefly touch on the current pressures facing the regulatory environment and how this affects industry attitudes and approaches. More importantly, we'll focus on what we *can* control: shifting our mindset, finding motivation, and influencing positive change through engagement, innovation, and collaboration. The session will include an open, solutions-focused discussion where attendees can share strategies, ideas, and insights for continuing to reduce work-related health risks—without relying solely on the regulator to drive the change. At a time when leadership is more important than ever, this session is a call to stay the course, stay positive, and keep health at the centre of what we do.

Why hygiene reports come back to bite you...

Peter Aspinall

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Attendees of this short presentation will learn the importance of delivering accurate occupational hygiene reports. They will understand the critical role these reports play in identifying workplace hazards and controls, and how recommendations and outcomes can vary if a planned methodology or scope is not well delivered or applied.

When reports contain incorrect information or lack technical accuracy, they can lead to significant problems. Inaccurate hygiene reports may not only compromise the health, safety, and well-being of individuals but also significantly impact business operations and costs. Poorly written reports can expose organizations to legal risks, with inaccurate report findings leading to insurance disputes and damage to the company's reputation, which can be particularly problematic in larger industries with extensive claims.

The aim of this short presentation is to highlight the key skills required for those responsible for drafting reports and those signing off on them. Attendees will learn best practices for documenting hygiene data, improving reports with detailed, accurate, and compliant scope information, and helping prevent the legal and operational issues that can arise from poorly written reports.

This presentation will demonstrate industry examples where assumed knowledge, poorly determined scope of work, and non-compliant reports have raised inaccurate health concerns or led to legal challenges.

Expert witness for occupational hygienists

Philippa Gibson

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With the regulator moving away from in house occupational hygiene expertise, we might see more hygienists being asked to provide expert witness for the prosecution, or the defence. An ex-inspector and prosecutor will share experiences and tips on expert witness for acute or chronic health risk prosecutions.

International Perspectives

Chromium-6 exposure matrix to overcome difficulties in exposure assessment

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To protect metal structures against corrosion hexavalent chromium containing paint is very widespread used. The chromium-6 is usually used in the form of zinc chromate, lead chromate or other insoluble chromate compounds.

It is very difficult to establish if the protecting paint contains chromium-6. It is also difficult and expensive or to measure the concentration of chromium-6 in the coating. Especially when old paint is removed exposure to dusts that contain chromium-6 will occur.

The occupational limit of chromium-6 is very low in the Netherlands because of the severe negative health effects. Chromium-6 is a genotoxic carcinogen, which means there is no safe exposure limit. Air monitoring of chromium-6 in dusts is very costly and the analysis is not consistent.

To assist small and medium companies a management regime is developed that includes a simple exposure matrix. The exposure matrix is based on available measurements.

The objective of this management regime is to provide everyone with guidelines for the safe processing and removal of coatings containing hexavalent chromium. The management system and its background will be explained, as well as an exposure study of lead chromate in a situation where paint is removed from very large sign structures that hold huge traffic signs above the freeway.

Trends in Occupational Diseases in Korea Over the Past Decade (2014–2023)

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After a brief introduction to the Korean occupational health and safety (OHS) system to provide context for understanding the country's occupational disease compensation system, this presentation examines trends in occupational diseases in Korea over the past ten years, from 2014 to 2023.

During this period, both the number of occupational disease claims and approvals have increased significantly. In 2014, there were 9,211 occupational disease reviews, with 4,391 cases approved (47.7%). By 2023, the number of reviews had risen to 31,666, with 18,333 cases approved (57.9%). These trends in reviews, approvals, and approval rates appear to have been primarily influenced by government policies.

The most common occupational diseases over the past decade (based on annual averages) were musculoskeletal disorders (8,721 cases), hearing loss (3,464 cases), respiratory diseases (2,071 cases), cerebrovascular disease (1,553 cases), heart disease (529 cases), cancer (435 cases), mental disorders (378 cases), skin diseases (103 cases), poisoning (49 cases), asbestosis (44 cases), and heat-related illnesses (40 cases).

This presentation will explore these trends, highlighting increases and decreases over the past decade, and discuss their implications.

Fighting the Asbestos Battle in South Africa

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South Africa's Asbestos Abatement Regulations (2020) require all property owners with asbestos-containing materials to maintain an up-to-date asbestos inventory, risk assessment, and management plan—reviewed biennially and approved every six years by a designated authority. Despite these requirements, widespread non-compliance remains. This presentation provides an overview of South Africa's regulatory framework and explores lessons learned through real-world case studies.

Drawing on over 60 years of combined experience between Dr. JJ Schoeman, Marguerite Pullen, and the presenter, this session highlights the practical application of regulatory requirements through high-risk asbestos projects, including personal and environmental monitoring. One case study details the asbestos remediation of a 14-storey commercial building, where fibre levels exceeded occupational exposure limits by 10 to 20 times, resulting in a R96 million (\$12.6 million NZD adjusted) remediation cost. The project underscores the critical importance of real-time exposure monitoring, effective suppression techniques, and regulatory compliance.

The second case study focuses on the rehabilitation of asbestos-contaminated land, including former mine sites and demolition rubble, with efforts to mitigate environmental risk near informal settlements. The work involves excavation, capping, and containment using gabion barriers and clean soil cover.

Key takeaways include the importance of using water to suppress airborne fibres, the value of partnering with experienced, licensed asbestos contractors (RACs), and the need to reclassify certain materials, such as ceiling boards, due to unexpectedly high fibre release rates. The presentation concludes with insights into regulatory gaps, challenges with competent person requirements, and recommendations for improving public and occupational health protections.

Strategy of Industrial Hygiene & Occupational Health Implementation in Integrated Energy Company

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There are a large number of hazards linked to both the nature of the physical environment and the effects of hazardous substances in the mining sector that pose a potential risk to health and well-being. Protecting the occupational health of workers is an integral part of being a responsible mining company. The responsibilities for carrying out processes of anticipation, recognition, evaluation and control to eliminate or reduce risk to the lowest practicable level (As Low as Reasonably Practicable or ALARP). In doing so, the commitment is to comply with government regulations and standards relating to health risks that arise from the workplace.

In one of coal mining in Indonesia, there are 5 elements of managing Industrial Hygiene & Occupational Health (IHOH); to conduct a health risk assessment, managing IHOH programs based on four health pillars of health program, management of ill-health in the workplace, fitness for work assessment and health monitoring, medical emergency management, IHOH reporting and maintaining records and leading and lagging indicator implementation. One of the strategies to implement all of those elements is through IHOH dedicated personnel and champions from all subsidiaries within the company. They were developed with basic and advanced industrial hygiene competencies and also managing occupational health in the workplace, not only for clinical aspects but also leading in handling

critical condition, like pandemic. Thus, these elements contribute to preventing occupational health-risks and improve the health status and work capacity of the employees.

Scaling Occupational Hygiene Capability: Implementing a Digital Solution for Exposure Assessment at Indorama Ventures

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Effective exposure assessment is critical for managing occupational health risks, yet many organizations face challenges due to limited occupational hygiene expertise. Indorama Ventures, a global chemical company, has implemented a software solution to streamline exposure assessments, enhance data visibility, and prioritize risk management actions. This system enables EHS generalists to support exposure assessment efforts, expanding the company's capacity despite a shortage of hygienists.

Designed to be intuitive, the software simplifies data entry and analysis, making risk trends more transparent across sites. To ensure successful adoption, system training is complemented by exposure assessment education, equipping EHS professionals with the knowledge to identify, assess, and mitigate risks effectively. This presentation will explore the development and implementation of the solution, lessons learned in upskilling a diverse workforce, and strategies for scaling occupational hygiene capabilities in a resource-limited environment.

By leveraging technology and targeted training, Indorama Ventures is strengthening its approach to occupational health, demonstrating how large-scale organizations can enhance risk management without extensive in-house expertise.

How many Occupational Hygienists is Enough?

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This paper will present the facts about the numbers of occupational hygienists, current global trends and competency in occupational hygienists.

Previous papers have commented that 45,000 occupational hygienists would be needed globally based on the GDP of countries. However, the evidence today is that the number is much less. It is regulations and certain industries which are driving the demand for occupational hygienists. IOHA and the national associations are key to the growth. Furthermore, the national associations are the custodians of competency and professional development.

The world is changing, and to meet the demands the IOHA NARC (National Accreditation Recognition Committee) has changed the education pathways for candidates seeking professional competency assessments offered by credentialing organisations.

This paper will challenge you to think about how you can make a difference and protect worker health when the professional numbers are small and below a critical mass.

Chemical and Physical Hazards

The Effect of Smelter Emissions on Worker Lung Function

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The purpose of the proposed study is to evaluate the effect of exposure to respirable dust, heavy metals, and irritant gases on the respiratory health of workers at the SMC Townsville Zinc Refinery, specifically, those working in the Roasting and Electrolysis Plants.

The suitability of either fractional nitrogen oxide concentration in exhaled breath (FeNO) and multiple breath nitrogen washout (MBNW), with subsequent calculation of lung clearance index (LCI) as useful respiratory markers that can be implemented within workplace health surveillance programs for the early monitoring, diagnosis, and management of airway inflammation and disease will also be assessed.

In Phase 1 of the study worker exposure to the respiratory hazards present within the Roasting and Electrolysis Process Plants will be quantitatively characterised utilising both active and real-time sampling methods. In both instances participants will be required to wear portable measuring devices throughout an entire work shift upon where data will either be downloaded or sampling filters sent to a laboratory for subsequent analysis. Personal exposure monitoring data collected during Phase 1 will be reviewed and compared to workplace exposure data reported within the scientific literature within similar industries.

Acute and chronic respiratory health impacts associated with exposure to respiratory hazards within Roasting and Electrolysis will be characterised in Phase 2 of the study by comparing the outcomes of health monitoring between workers who either work in Roasting or Electrolysis with those who have never worked in either of these plants.

Respiratory health impacts will be assessed through the following activities:

- Review of historical and current worker health surveillance data (Spirometric) either collected previously by SMC or collected as part of this study.
- Completion of a detailed respiratory questionnaire.
- Measurement and comparison of Spirometry, FeNO and LCI values between SMC employees working within either the Roasting or Electrolysis Plants (Exposed Group) with those that have never worked in either of these two Plants (Control group).

FeNO and MBNW will be undertaken using two separate portable measuring devices in which participants will simply perform a normal breathing manoeuvre through the device.

This piece of research will help to determine whether sensitive changes in worker respiratory function such as airways inflammation and ventilation heterogeneity identified using either MBNW and LCI can be attributed to the respiratory hazards generated within the Roasting and Electrolysis Plants. The successful utilisation of either of these two methods in workplace health surveillance programs to identify sensitive changes in respiratory function will lead to better health outcomes with fewer workers developing irreversible occupational respiratory disease. Such an outcome will improve both worker morbidity and mortality and reduce the financial burden on our health care system.

From Lipstick to Lunch Plates: Unmasking PFAS in Everyday Essentials

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Introduction – Per- and polyfluoroalkyl substances (PFAS) are a group of synthetic chemicals widely used for their water-resistant, grease-proof, and durable properties. Dubbed "forever chemicals," PFAS persist in the environment and bioaccumulate, raising concerns about their potential health impacts, including links to cancer, immune system suppression, and developmental issues. While awareness of PFAS contamination is often tied to industrial sources such as firefighting foams, many consumers are unaware of their presence in everyday products. This talk explores the hidden pathways by which PFAS infiltrate our daily lives, from cosmetics to cookware, and their alarming potential to cycle through the environment and food chain.

Background – Awareness of PFAS contamination has historically focused on industrial applications and environmental hotspots, with firefighting foam being the most widely

recognized source. However, PFAS are also deliberately used in a range of consumer goods, where their unique properties make them desirable. These include cosmetics (to improve product longevity and spreadability), grease-resistant food packaging, and non-stick coatings for cookware. Despite regulatory scrutiny and growing awareness, many consumers remain unaware that PFAS are present in products they use daily, potentially exposing them to harmful levels over time.

Outcomes – Our research highlights the widespread prevalence of PFAS in everyday items, underscoring the need to shift the narrative beyond firefighting foam. While the use of PFAS in consumer goods is less visible, it has far-reaching implications, not only for human exposure but also for environmental contamination. For example, food packaging treated with PFAS can leach these chemicals into food and subsequently into soil.

Heat Stress Assessment Using ACGIH and AIOH Tools

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Although the climate or weather conditions in New Zealand are cold to mild in general, it could become hot during the summer season. Therefore, it can expose workers to the hazard of heat stress and they will be at risk from heat-related illnesses. The observation of the early onset of heat-related symptoms is used as an indication of workers' potential risks from heat stress. However, using the latter as the only tool is reactive and will not be sufficient to manage heat stress in a workplace.

Heat stress occurs when a worker's workplace (ambient temperature, radiant temperature, humidity and air movement), uniform (PPE) and activities interact all together to induce an increase in inner body temperature. As a natural body response, the body's thermoregulatory system is activated to dissipate heat from within. This natural process produces heat strain on a worker's body which leads to heat-related illness or even fatality in the worst-case scenario. Therefore, it is important not to rely on the onset of symptoms alone but to assess the potential adverse health impact of heat stress by considering the worker's workplace conditions, tasks undertaken and personal factors. This can be done with the use of heat stress indices as a tool.

The short presentation aims to provide the audience the information about the existing tools both from the American Conference of Governmental Industrial Hygienists (ACGIH) and the Australian Institute of Occupational Hygienists (AIOH). This will be carried out by presenting the three-tier protocols (screening and basic thermal assessment, predicted heat strain (PHS), and heat strain and physiological monitoring) established by the two referenced organisations that will provide the audiences with the opportunity to select the applicable tool/s for their future use when assessing heat stress in New Zealand.

The presentation will expound on the three-tier protocols by comparing them side by side to provide practical usage of each tool and identify their respective limitations. By the end of each presentation, it is the hope of the presenter to bring awareness and familiarity with the available approaches to the audience to consider when assessing heat stress and therefore manage its potential adverse health impacts to the workers across New Zealand.

Pesticide exposure assessments: using skin swabs and biological monitoring as detection methods to determine worker exposure to pesticides

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The agricultural sector in New Zealand is considered a primary industry, producing 40% of the country's merchandise export. Consequently, the use of pesticides within the agricultural sector amounts to significant amounts. Historical studies indicated that between 1984 and

1994 a peak of 3700 tons were used per annum (Holland and Hill, 1999). They further state that herbicides dominated the usage at 68% followed by fungicides at 24% and insecticides at 8%. Current trends remain similar in that pesticide usage equates to tonnages per annum (Hageman et al., 2019). It is well documented that pesticide use and application in occupational settings poses significant health risks, particularly when exposure is inadequately assessed or controlled.

Accurate quantification of pesticide exposure remains a challenge in occupational hygiene due to significant limitations associated with air sampling techniques, analytical methods, reliance on specialized equipment and high analytical costs. Additionally, air sampling fails to account for dermal exposure and subsequent absorption, a critical exposure pathway in pesticide uses and application. This study proposes to use an integrated approach through combining personal skin swabs and biological monitoring, to detect and quantify pesticide exposure more effectively.

The framework involves collecting skin swabs from high-contact dermal surfaces, such as hands, arms, and neck, to quantify external contamination. The skin swabbing can be complemented by biological monitoring, using biomarkers of exposure and effect, such as metabolite concentrations in blood and/ or urine, to assess internal dose and potential health effects. By combining these methods, the proposed approach provides a more comprehensive understanding of total exposure and its biological implications.

The talk/ presentation will outline health effects related to commonly used pesticides in New Zealand, the proposed methodologies of swabbing and sample collection, and highlight the conceptual and practical advantages of combining skin swabs with biological monitoring, as well as address the anticipated challenges. By shifting the focus toward alternative sampling methods other than air sampling, the objective is to promote alternative exposure assessment practices to determine pesticide exposure.

Copper Chromium Arsenate (CCA): An occupational exposure assessment and control implementation story

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Copper Chromium Arsenate (CCA) is an important wood preservative containing oxides of hexavalent chromium (47.5%), copper (18.5%), and inorganic arsenic (34%), with widespread use across the Asia Pacific region. Exposure to CCA can lead to a variety of health effects, depending on the level and duration of exposure. The most common routes of exposure are through inhalation of sawdust or wood smoke, ingestion of contaminated food or water, and direct skin contact. Short-term exposure to CCA can cause irritation of the skin, eyes, and respiratory tract. Long-term exposure can lead to more serious health effects, such as an increased risk of cancer, including lung cancer, skin cancer, and bladder cancer. Arsenic exposure has also been linked to cardiovascular disease, diabetes, and developmental effects in children, as such waste streams from such sites need to be considered from an environmental health perspective. This presentation uses a health risk assessment of a number of New Zealand CCA plants to convey lessons learned in both the methodology of assessment and practical control strategies employed to mitigate worker exposure. The presentation has a focus on cost effective control and assessment strategies that can be applied to the typically low-cost treatment operations often found throughout the Asia Pacific region where the majority of business are small to medium enterprises.

Case Study - Using exposure modelling to estimate USAR rescue workers' exposure to vibration from cutting and power tools

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Urban Search and Rescue (USAR) teams use powerful cutting tools to tunnel into collapsed buildings, racing the clock to rescue people trapped inside after natural disasters. These tools transmit vibration to workers' hands, arms, or bodies, which can cause discomfort, loss of grip and long-term injury.

The same tools are used in similar ways in the construction and demolition industries, but the USAR working environment presents additional challenges in measuring and monitoring workers' exposure. For instance, the harsh physical environment and workers' variable work patterns make it difficult to undertake representative exposure measurements.

This case study will demonstrate how vibration exposure modelling was used to estimate USAR Technicians' exposure to hand-arm vibration. The UK Health and Safety Executive vibration exposure model was used with published vibration magnitude data for each tool, and work profiles developed in consultation with experienced USAR Trainers. The output from this work will be used to educate workers; improve controls; and inform decisions about whether further investment in tools or exposure measurements would be beneficial.

This presentation will summarise the controls recommended and discuss the benefits and limitations of this modelling approach. It will also highlight New Zealand regulations and WorkSafe guidance on managing vibration exposure hazards.

The lessons from this case study may be applicable to a wide range of industries where workers may use power tools or are exposed to vibration via tool or machinery such as: construction, demolition, landscaping and agriculture.

Protecting those who protect us: A case study of Urban Search and Rescue (USAR) emergency responders' exposures to health hazards during simulated post-earthquake rescue operations.

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This case study presents a preliminary investigation into Urban Search and Rescue (USAR) personnel's exposure to occupational health hazards during a training exercise which simulated deployment to an earthquake-damaged city.

USAR Technicians locate, and rescue people trapped in collapsed structures or other hazardous situations during disasters. USAR operations use the same tools and similar techniques to construction and demolition industries, with the added challenges of being deployed in a disaster zone and working under the time pressure to rescue people alive. Although the immediate and physical hazards of this work are well understood by international USAR organisations, little or no published assessments have been done on the exposure of these rescue personnel to health hazards such as dust, silica, noise and vibration.

This baseline study was conducted as a proactive first step to identify and characterise the occupational health hazards in the USAR environment, identify opportunities to improve how those hazards are managed and inform decisions about whether further occupational hygiene assessments would be beneficial and achievable.

This assessment was conducted during a training exercise of Fire and Emergency New Zealand's USAR team. The exercise simulated a deployment and real-time rescue operations; it was held at a specialist facility where collapsed structures are fully replicated. The study involved observations and qualitative assessments at the base of operations and two rescue operation sites. Spot measurements for noise and dust were taken during rescue operations to benchmark the observations, and vibration exposure was modelled using the UK HSE hand-arm vibration model, as part of the overall analysis.

The key recommendations included opportunities to leverage current operational practices to reduce exposure to vibration; improving worker awareness of the hazards and how to manage them within the operational constraints.

Occupational Health

Synergy in Health: Integrating Health Monitoring and Occupational Hygiene for a Healthier Workplace

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Introduction – Health New Zealand employs a diverse workforce across various sectors, each with unique occupational health challenges. Recognizing the need for a comprehensive approach to employee health, we have developed a synergistic model that combines continuous health monitoring with robust occupational hygiene practices. This model not only addresses immediate health concerns but also fosters long-term well-being and productivity.

Health monitoring – Health monitoring is a proactive approach to identifying and managing health risks before they become critical. At Health New Zealand, we have in some districts implemented some health monitoring techniques, however the future is to streamline, nationalise and ensure that Health NZ include regular health screenings, biometric assessments, and wearable technology where we can. These tools provide real-time data on employees' health status, enabling early detection of potential issues such as respiratory problems, cardiovascular conditions, and musculoskeletal disorders. I want to share our direction in this space along with how we are planning to integrate the planning with occupational hygienist work

Integration and synergy – The integration of health monitoring and occupational hygiene at Health New Zealand is achieved through a multidisciplinary approach. Our occupational health team collaborates closely with hygiene specialists, safety officers, and management to develop and implement tailored health and safety programs. This collaboration ensures that health monitoring data informs hygiene practices and vice versa, creating a feedback loop that continuously improves workplace health standards.

Outcomes and benefits – The synergy between health monitoring and occupational hygiene has led to significant improvements in employee health and safety at Health New Zealand. Key outcomes include:

- **Early Detection and Intervention:** Health monitoring allows for the early identification of health issues, enabling timely interventions that prevent the escalation of conditions.
- **Reduced Absenteeism:** By addressing health risks proactively, we have seen a reduction in absenteeism due to illness and injury.
- **Enhanced Productivity:** A healthier workforce is a more productive workforce. Our integrated approach has led to increased employee engagement and productivity.
- **Cost Savings:** Preventive health measures and effective hazard control reduce healthcare costs and compensation claims, providing financial benefits to the organization.
- **Employee Well-being:** Our commitment to health and safety fosters a positive work culture, enhancing overall employee well-being and job satisfaction.

Conclusion – Health New Zealand's integrated approach to health monitoring and occupational hygiene exemplifies the potential of synergy in occupational health. By combining these two critical components, we have created a model that not only protects

employees but also promotes their long-term health and productivity. This approach serves as a blueprint for other organizations seeking to enhance their occupational health programs and achieve a healthier workforce.

Occupational Health Nurses: Your Hidden Asset in Workplace Health

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Occupational Health Nurses (OHNs) are at the forefront of promoting safe, healthy work environments in New Zealand/Aotearoa, integrating clinical expertise with proactive risk management. This presentation explores the evolving role of the OHN, detailing the expectations of their professional body (NZOHNA), their scope of practice under the Nursing Council of New Zealand and what to look for when working with or choosing an OHN provider.

Attendees will gain insight into the essential technical skills, clinical knowledge, and collaborative working approach that empower OHNs to deliver robust workplace health solutions.

As a professional body of over 380 members, the New Zealand Occupational Health Nurses Association (NZOHNA) envisions every New Zealand/Aotearoa workplace as a 'Good Work' environment—healthy, safe, and balanced between productivity, performance, and job satisfaction. We expect our members to be critical thinkers capable of solving complex problems and addressing strategic risks and opportunities. To ensure these high standards, our registered and professional OHNs are assessed against an occupational health nursing-specific framework that verifies ongoing competence in both technical and clinical knowledge and skills.

With a broad range of workplace-specific skills, our OHNs adopt a holistic approach to occupational health. They can conduct comprehensive assessments, deliver mental health support and health education, manage injuries and illnesses, provide acute care, and design prevention programs. Their expertise in identifying health hazards, conducting risk assessments, and implementing surveillance is enhanced by advanced health data analysis, all of which are crucial for creating safe work environments and mitigating risks.

This session will show you how to utilise your OHN resources better to get the most out of their skills, and what to consider when choosing a service provider or building a cross-disciplinary team that works to deliver practical solutions. By blending nursing expertise with occupational health insights, and forging partnerships with management and other health and safety professionals an OHN can help you craft tailored policies and practices that reduce injuries and illnesses.

Amid our evolving social, economic, and political challenges, OHNs are a valuable resource you can access. By remaining current on regulatory changes, engaging in continuous professional development to keep pace with industry trends and maintaining clinical excellence, OHNs can help you tailor your approach to support diverse workforces.

Health and safety professionals attending this session will be equipped with practical insights into the core professional skills that define OHN practice and how these can best be leveraged within an organisation or multidisciplinary team setting. Discover how strategic partnerships and a robust professional skill set can transform workplace health, turning challenges into opportunities for positive change.

Join us in our vision, where every New Zealand workplace is a 'Good Work' environment.

Collaboration in Action: When Hygienists and H&S Teams Team Up

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In this workshop, we'll explore how occupational professionals can work together to identify hazards, assess risks, and implement effective controls. For example, we'll cover cases where hygienists helped identify chemical exposure risks that the safety team then addressed with new PPE protocols, or how they collaborated on ergonomic assessments to prevent musculoskeletal injuries.

This interactive workshop will provide key insights into how cross-functional teamwork can elevate workplace safety, health, and well-being.

Understanding diagnostic competence, validity, accuracy, reliability & repeatability

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Occupational hygiene and health monitoring refers to the practice of systematically assessing and tracking a worker's health status by measuring their exposure to workplace hazards like chemicals, noise, dust, or vibration, to identify potential health risks and implement preventive measures to safeguard their well-being; essentially, it involves monitoring both the workplace environment and the worker's health to prevent work-related illnesses and injuries.

Determining health effects from workplace hazards is based on Exposure monitoring + Biological monitoring + Health monitoring.

Health Monitoring involves conducting medical examinations or tests to detect, identify early signs of health problems related to workplace exposures, such as hearing tests for noise exposure, or lung function tests for dust exposure.

Importance of health monitoring:

- Early detection of health risks – By monitoring exposure and health status, potential health problems can be identified early, allowing for timely interventions and preventive measures.
- Compliance with regulations – Ensuring adherence to workplace exposure standards set by regulatory bodies.
- Risk management – Identifying areas where exposure control measures need to be improved
- Worker protection – Contributing to a safer working environment by proactively managing potential health hazards

An overview of spirometry:

Why do it: evidence-based need established. Documentation includes air levels / workplace exposure level documented.

- Spirometry: understanding criteria for diagnosing lung conditions including the forced vital capacity (FVC) and forced expiratory volume in one second (FEV1). The ratio of FEV1 to FVC is used to determine if there is an obstruction. restrictive condition. What does LLN mean and its relationship to required action 2) identifying valid results
- Criteria for obstructive lung disease
- Criteria for restrictive lung disease

- Using spirometry to diagnose conditions - what how / why / - robust validated process.
- Spirometry: confounding factors for work vs non work causes
- Factors that can affect spirometry results
- Competency of practitioner and spirometry event: does either matter?

An overview of audiometry:

Why do it: evidence-base need established, and document includes noise levels / workplace exposure level duration frequency noise level

- Identify noise exposure history
- Key points about NIHL diagnostic criteria: ACC criteria; WorkSafe criteria
- Exposure history: work / non work. A detailed account of exposure to loud noises in the workplace, recreational activities, or other environments is crucial.

Audiogram findings:

- "Notch" at 4kHz: A significant dip in hearing threshold around the 4kHz frequency is a hallmark of NIHL.
- High-frequency hearing loss: Most noticeable hearing loss occurs in the higher frequencies (3kHz-6kHz).
- Bilateral symmetry: Hearing loss is usually present in both ears, although it may be slightly worse in one
- Practitioner competency, standard of practice
- Action required 1) referral work vs non work
- Competency of practitioner and Audiogram screening vs diagnostic testing: does either matter?

Human Factors and Ergonomics

Collaboration, the secret sauce to advancing Musculoskeletal Injury Prevention in Construction with 'Work Should Not Hurt.'

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The Institute for Work & Health (IWH) in Canada featured CHASNZ and our Work Should Not Hurt programme as a pivotal case study, as an example of how health and safety advocates can bring research to the worksite to promote positive change. Our presentation will demonstrate one of these initiatives alongside some of our key stakeholders and collaborators. Together we will discuss what made our collaboration successful, and what others can learn from it.

Aims - Demonstrate how collaboration with multidisciplinary teams and industry can develop practical tools to improve workplace safety, all on a modest budget.

Methods – We used principals of participatory ergonomics to drive our collaborative design sessions with stakeholders (e.g., scaffolding industry, industrial design, ergonomics, academics, and clothing and fabric technology). Using iterative design workshops, on-site ergonomics assessments, prototyping workshops, surveys, and leveraging industry advice from national tradeshow and conferences, we were able to develop a body protection solution to help prevent and reduce musculoskeletal injuries amongst scaffolders.

Results – Our world-first body protection solution is currently in its final design iterations and testing phase.

Conclusion - Our presentation will conclude by underscoring the transformative power of collaboration in addressing complex occupational health challenges. We will emphasize the scalability and adaptability of our design, demonstrating how organisations (of any size) can make a meaningful impact on workplace safety through inclusive and participatory practices.

A Musculoskeletal Risk Management Approach for Occupational Hygienists

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Musculoskeletal disorders (MSDs) continue to represent around 30% of all workplace harm in Aotearoa New Zealand¹. Businesses have, or still rely on manual handling training as a key control to manage musculoskeletal risks. But there is much evidence that indicates that 'how to lift' or 'manual handling' training programs are ineffective.

'How to lift' training refers to workplace interventions that train workers in lifting techniques, use warm-ups or stretches, or rely on workers following generic principles such as using the 'correct posture'². But not all training is ineffective. Businesses need to provide training and instruction on hazardous manual task risk management. This includes workers understanding the key risk factors and control measures associated with the work they undertake.

Work-related musculoskeletal disorders (WRMSDs) are complex with multiple, interacting contributing factors. These are grouped into five categories, biomechanical and physical, work organisation, environmental, psychosocial, and individual factors³. For too long we have focused solely on the physical or biomechanical factors which has led to a focus on manual handling training. But discomfort, pain, and injury causation are much more than the simplistic view where WRMSDs are caused by one or two physical factors.

The problem with relying on manual handling training as the sole control is that it relies on worker behaviour. It does not eliminate or minimise the exposure to the manual tasks or the range of contributing risk factors. And it does not reduce or prevent the development of WRMSDs².

Under the Health and Safety at Work Act (2015), businesses or duty holders have a primary duty of care for workers. Practically, this means applying a risk management approach to WRMSDs. The steps include: identifying the hazardous manual tasks; assessing and controlling the risks by following the hierarchy of controls to either eliminate or minimise the risk; and reviewing the controls to ensure they are still in place and working as expected. Businesses may also find it useful to periodically monitor the musculoskeletal health of their workers.

In 2024/25 WorkSafe New Zealand published a range of screening and risk assessment tools including a contributing factors checklist that considers the range of risk factors⁴. These can be used as part of a toolkit. They provide a starting point to identify the key risk factors associated with common manual tasks such as: lifting, carrying, pushing and pulling, handling while seated, and repetitive tasks using the upper limbs. Other tools such as the APHIRM toolkit⁵ may suit larger businesses and focus on psychosocial risks associated with WRMSDs.

Management buy-in is key to the success of this approach. Businesses need to understand the benefits and be committed to reducing the exposure to known risk factors associated with WRMSDs. There also needs to be genuine and meaningful worker engagement at all stages in this process.

Using different tools to apply a holistic approach to WRMSD risk management, following good work design principles, and implementing higher order controls will be more effective than relying on workers to 'lift correctly'.

Mentally Healthy Work

The Human Cost of 24/7 Electricity: Managing Nightshift Fatigue in the New Zealand Electrical Distribution Industry

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Fatigue is a well-documented occupational hazard across multiple industries, including healthcare, aviation, and oil & gas. However, its impact on safety within the New Zealand electrical distribution sector has remained unexamined until now. This research investigated the extent to which the safety risks associated with nightshift work are managed in this high-risk industry.

Using a qualitative research design, the study incorporated a literature review, focus groups with Network Control Operators and Fault Responders, full of wonderful stories lived over a working collective of 265 years and Industry analysis of fatigue management documentation that was then current. A reflexive thematic analysis was conducted, identifying fourteen key themes related to nightshift fatigue and its management. The findings were evaluated against Deming PDCA (Plan-Do-Check-Act) model to assess the effectiveness of fatigue controls in the sector.

Identifying Psychosocial Risk Factors for Occupational Hygienists (within our own businesses and in the field)

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In Australia and New Zealand (ANZ) it is thought that approximately 25% of construction workers are affected by mental health issues.

Standard working conditions in the construction and demolition industry are long working hours, driven by strict program delivery and tight budgets, generating tense and highly stressful workplaces. Such conditions can cultivate psychosocial hazards that adversely affect the mental health of workers, manifesting in anxiety, depression, and even suicide. In ANZ although construction workers, in general, have a higher suicide risk as compared to the general male population, young construction workers have an unusually high suicide risk (about twice that of young workers in other industries).

Due to the financially competitive nature of construction and demolition young occupational hygienists with relatively limited industry experience can be thrown into this environment. Generally working alone at site, often seen as outsiders and a hinderance to the process leading to resentment, which is daunting and isolating. Long working hours in isolation and a potential hostile work environment appears to be the perfect recipe for psychosocial hazards to generate mental health issues and burn out for occupational hygiene professionals.

As an industry we sell WHS solutions for so many scenarios, therefore we need to lead the way to anticipate, recognize, evaluate and control psychosocial risk factors for the working environments we create for our people, not only in the field but most critically within our own businesses.

Let this presentation highlight an industry issue which is too often ignored or hidden under the carpet. If this presentation can help one worker or save one life, then it was more than worth it.

Technology and Modelling

The new ECETOC TRA worker tool 3.2: Utilising workplace measurements to evaluate and improve exposure predictions of the screening tool

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The ECETOC TRA worker tool is widely used in Europe as a conservative screening tool to estimate inhalation and dermal occupational exposure in the risk assessment of chemicals. This TRA-tool is available for free at www.ecetoc.org.

Since the publication of the TRA tool, several studies were published which evaluated the ECETOC TRA worker tool v2.0, v3.0 and v3.1 exposure predictions against workplace exposure measurements. In some instances, these publications reported that the occupational exposure was underestimated by the TRA tool. To gain more clarity about these reported underestimations and to identify possible improvements to the TRA tool, an ECETOC TRA working group has carried out a systematic evaluation of all validation studies published since 2010.

To this end, a protocol has been developed to define minimum quality criteria for occupational exposure measurements and to delineate the comparison of these measurements with the ECETOC TRA worker tool v3.1. Overall, 249 exposure scenarios (ES) comprising approximately 4,500 data points have been utilised to evaluate short-term and long-term inhalation, and dermal exposure predictions. The results of the evaluation will be presented at the conference.

Using Generative AI to Generate Occupational Hygiene Reports

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Generative Artificial Intelligence (AI) has emerged as a tool to streamline work practices in many industries. This research utilises the ChatGPT-1 engine to generate two types of occupational hygiene reports typically produced by an occupational hygiene consultancy detailing the outcomes of a workplace exposure assessment to either noise or chemical (formaldehyde) exposure. Three levels of prompting of the AI engine were used to provide information and guidance to the engine. Randomly generated exposure results and generic observational data based on the authors professional experience were also provided to the AI engine where relevant. The reports generated with different levels of prompting were evaluated for technical accuracy, relevance and readability by occupational hygiene professionals with differing levels of technical experience in the field of occupational hygiene.

Practical knowledge for the use of the Bayesian statistical model

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The best practice interpretation of exposure data relies heavily on statistical methods to assess and control exposure agents. The use of Bayesian statistics is a powerful tool for Occupational Hygienists due to its power with even small amounts of data. It offers an approach that incorporates prior knowledge around exposure profiles typically found in the workplace. This presentation explores my experiences with the practical application of Bayesian statistics through IHStat_Bayes, focusing on how they improve exposure assessment and decision-making around health risk.

Bayesian statistics differ from conventional statistical techniques in that it integrates prior distributions – such as historical exposure data – into the analysis. The incorporation of a ‘prior’ in Bayesian models make them particularly useful for small sample sizes, which are

common in occupational exposure assessments. A key challenge in occupational hygiene is dealing with limited or incomplete exposure data. Bayesian models mitigate this issue by incorporating 'prior' information, thereby improving the reliability of exposure estimates.

One big advantage of Bayesian statistics in occupational hygiene is that it provides information about probability of a result through presentation of uncertainty. Bayesian methods can create full probability distributions, giving a more complete picture of exposure risks. This approach helps occupational hygienists make better decisions around the assessment of exposure levels from a typically small data set and utilising this estimate in the protection of worker health.

This presentation will provide practical examples from my experience using Bayesian statistics in occupational hygiene. I will demonstrate its usefulness through examples from a theoretical data set that will illustrate how Bayesian techniques can enhance decision-making in real-world scenarios.

The discussion will focus on the use of IHStat_Bayes as a user-friendly approach that does not require extensive expertise.

This presentation aims to clarify Bayesian methods by presenting clear, practical applications tailored from my experience as an occupational hygiene professional. I will cover a brief background of the Bayesian model used in IHStat_Bayes, examples to show its power using sample data of varying size, as well as how the outcome can be used in health risk assessments.

By embracing the use of Bayesian statistical methods, occupational hygienists can enhance their ability to evaluate levels of exposure and the assessment of health risks in a wide variety of workplaces. With a shift towards the use of probabilistic statistics we can improve the robustness of workplace exposure assessment and ultimately lead to safer workplace environments.

Australian exodus - Gold and Dust?

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There will be two parts to the workshop:

1. What does work as an Occupational Hygienist in Western Australian mines look like? How one Hygienist made the move - including the challenges, complexities, changes and solutions. Regulatory, cultural, corporate, technical - differences and commonalities.
2. Dust and RCS. How can we use Direct Reading Instruments (or Real-time monitoring) to make decisions to protect the health of workers? What can you do to make the instruments more useful? And an app to help establish action levels/decision-making criteria.