

and hazards they face. It is out of this enormous amount of occupational health experience that I present this paper. Finally, my strive to attain the highest competence in occupational health made me register for MPH (Occupational and Environmental health) in Tulane University School of Public health and Tropical Medicine. New Orleans, USA. This is costing me over US\$ 50,000.00. With this financial commitment already made, I would gratefully appreciate the requested waiver support to attend this all important ICOH 2018 Congress. My sharing of my over 10 years of occupational health experience in 5 different countries and 4 continents in the would add a rich flavour to the program.

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FACTORS INFLUENCING CONSENT FOR AUTOPSIES FOR COMPENSATION PURPOSES AMONGST SOUTH AFRICAN MINERS

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Introduction Statutory, autopsy-based compensation for occupational lung diseases for South African miners began 100 years ago. Cardio-respiratory organs are removed locally where miners die, regardless of the clinical cause of death and with written consent from a near relative. The organs are examined at the National Institute for Occupational Health in Johannesburg. Previous studies in many countries have shown that the process of obtaining consent is a major determinant of autopsy uptake.

Mines provide organ removal services for mineworkers who die while employed. We determined uptake and explored experiences and perceptions of personnel involved in obtaining autopsy consent.

Methods A sequential mixed-methods study was conducted. The proportion of miners who died and had an autopsy was determined for three mines (2009 to 2012). Fourteen in-depth interviews were conducted among personnel involved in obtaining autopsy consent in the three mines. Thematic content analysis was applied.

Results Average autopsy uptake was 34% in the platinum mine, and 12% and 86% in the two gold mines. Procedures for obtaining consent were similar. The categories of personnel involved in the process included human resource officers, nurses, prosecutors and union officials.

Barriers to the offering of autopsies were the location of death (consent was less likely to be offered if deaths occurred far from the mines), lack of awareness and poor knowledge and interpretation of the law governing compensation, work load and distrust of the inefficient compensation system. Enablers included sensitivity in communication (empathy, confidentiality, language and culture) and involvement of union officials.

Discussion Autopsy uptake was variable across the mining population and was influenced by several individual, sociocultural and institutional factors. Training is required to ensure that personnel who request consent are knowledgeable about the processes and benefits of autopsy compensation, and that they use appropriate communication strategies when talking to families.

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OCCUPATIONAL HEALTH IN MINING: RISK AND ASSURANCE EXPERIENCES

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Introduction Mineral extractive and processing industries are faced with difficult challenges regarding the management and control of risks inherent to the typical activities undertaken, with numerous hazards posing potential and serious risks to the safety, health and wellbeing of workforces and communities alike.

Methods Safety and health must be critical inclusion criteria across all stages of the mining lifecycle, i.e. exploration, design and construction, operation, extraction and processing, engineering and maintenance, and beyond, into mine closure and rehabilitation. Additionally, safety and health must be considered in transportation networks and distribution facilities, and in the manufacturing, recycling and disposal of mining products.

Occupational Health is driven by two disciplines – Occupational Hygiene and Occupational Medicine. These two pillars work together and complement each other through a process of Health Risk Assessment (HRA) and management.

Result In the workplace environment, the occupational HRA is the pivotal multi-disciplinary component to risk assessment, and a key consideration in the decision-making process.

The occupational HRA is the systematic identification and analysis of workplace hazards with the aim of implementing and monitoring control measures, i.e. actions and interventions that aid in eliminating or reducing the levels of hazardous exposures. These control measures apply across the board, and follow a Hierarchy of Control approach, from equipment, techniques, and processes; to protocols, policies and guidelines; as well as the education of workforces and communities living in areas surrounding mining operations.

Discussion The success of mining projects and operations hinges, among other criteria, on a sound understanding of the potential health risks for the development of inherently safer designs and operating systems.

This paper discusses learnings with respect to the occupational HRA requirements for mining operations and projects, in order to identify and mitigate the risks in terms of occupational health. Considerations for risk assessment methods are presented, together with the importance of ongoing review and quality assurance, to improve the HRA process.

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MERCURY FREE GOLD MINING: ADVANCING THE GLOBAL MINAMATA RESOLUTION

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Aim of special session To discuss the toxicity of mercury versus borax, health affection of miners and legal aspects of mercury use in gold-mining.

Presenters: ¹Jesper Bælum, ²Stephan Bose-O'Reilly, ³Florencia Harari, ⁴Jane F Thomsen, ⁵Jinky L Lu, ⁶Sophia F Lu

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1637a SHORT INTRODUCTION TO THE MINIMATA RESOLUTION AND HEALTH CONSEQUENCES OF MERCURY VERSUS MERCURY FREE GOLD MINING METHODS

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Extracting gold from the ore among artisanal farmers have traditionally involved metallic mercury in order to amalgamate the gold and afterwards evaporate the mercury. Mercury poses well-known hazards to health and environment. Therefore alternative methods have been introduced to replace mercury. An alternative method is using borax, which is mixed with a concentrate of the heavy metals collected by washing the ore, and heated with a burner thereby extracting the gold.

Substituting a method by another always leads to concern about introducing unwanted health risks to the miners, their families, and the environment.

Mercury on one hand is a neurotoxin and the concentrations reached during amalgamation and evaporation are within the levels causing health effects to the worker and to bystanders. Additionally, the exposure to the family may be considerable due to evaporation from spills and from the debris after mixing mercury with the ore.

On the other hand heating borax emits boron to the air and the worker may be exposed. In animals boron in high doses can cause testicular impairment and impairment of fetal and infant neurodevelopment must be considered. This and possible other hazards related to the method may be taken into account.

The presentation will discuss these pro and cons when introducing an alternative method to extract gold not using mercury.

1637b HEALTH EFFECTS OF MERCURY POISONING AMONG MINERS AND FAMILIES IN ASGM

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Introduction Mercury is used to extract the gold from the ore in artisanal small-scale gold mining areas (ASGM). The toxic mercury is a serious health hazard for miners and the general

population. It is estimated that up to 100 million people are exposed.

Methods An extensive review of available data sources will be performed and combined with results of our own health assessments in ASGM.

Results Miners show tremor, ataxia and other neurological symptoms together with a raised body burden of mercury. Many of them were diagnosed with chronic inorganic mercury vapour intoxication. Children and the general population in mining areas show similar symptoms and have increased mercury levels. 14–19 million miners work globally, between 25% and 33% of those miners are intoxicated.

Conclusions ASGM is causing severe negative health effects for miners and their families including children. Political action is needed to address those issues and to reduce the exposure with mercury in ASGM. Possible interventions are mercury free gold mining methods which are available. The health care sector needs to be strengthened to be able to diagnose and treat mercury intoxications. Further research is needed to analyse the specific health hazards of pregnant women, and infants.

1637c OCCUPATIONAL AND ENVIRONMENTAL BORON EXPOSURE AND HEALTH EFFECTS

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Boron is a naturally occurring metalloid, widely distributed in nature. Boron is not essential for humans. People are exposed to boron mainly via drinking water, including bottled water, and food, but also occupationally. Little is known about potential health effects of boron exposure. In experimental animal studies, boron exposure has been shown to cause testicular lesions and affect early-life development, including bone malformations and lower birth weight. Studies on workers with occupational exposure to boron have, however, not revealed evidence for impaired fertility. On the other hand, our recent studies in the Andean part of northern Argentina, with elevated boron concentration in the drinking water in some villages, showed that serum boron concentrations above 80 µg/L during pregnancy were inversely associated with length and weight at birth. A follow-up study in the same study area showed that also infant boron exposure could be detrimental for the infant growth and that boys seem to be more susceptible than girls. In this presentation, a critical review of the scientific evidence available concerning occupational and environmental boron exposure and health effects will be presented and discussed.

1637d THE MERCURY-FREE GRAVITY BORAX METHOD IN ARTISANAL SMALL-SCALE GOLD MINING

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Artisanal small-scale gold mining (ASGM) is the largest single anthropogenic source of mercury emissions. Mercury is used