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EFFECTIVENESS OF A DOSE-BASED CONCEPT FOR DUST CONTROL – A LONGITUDINAL STUDY OF COAL MINERS' IN THE RUHR AREA

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Introduction A dose-based concept for dust control has been implemented in German coal mining since 1991. This concept foresees that miners with exposure to fibrogenic dusts cannot exceed a cumulative exposure of 440 total dust exposure value (TDEV) per year within an assessment period of 2 years. TDEV is defined to be a function of the 8 hour shift average concentration and the number of performed shifts. The Regulation of Health Protection in Mining set the work place limit at an 8 hour average of 4.0 mg/m³ for respirable dust and 0.2 mg/m³ for quartz component (>5% mass). This concept considers the exposure limits, and regulatory changes connecting to working durations, hence, cumulative personal exposure to dust. The present study evaluates the effectiveness of this concept, after 37 years of implementation.

Methods A complete inception cohort of 1369 coal miners who started working underground in the Ruhr area in 1974–1979 has been provided with continuous health surveillance. Concerning the course of lung function (VCmax, FEV1, FEV1/VCmax), the impacts of exposure metrics are estimated using Generalised Estimation Equation models. The risk of developing coal workers' pneumoconiosis (CWP) category $\geq 0/1$ is estimated by Cox regression.

Results Cumulative coal dust exposure shows no negative impact on VCmax and FEV1, but a very low but statistically significant effect on FEV1/VCmax. Cumulative exposure to coal dust shows a significant slightly increased risk of developing CWP $\geq 0/1$. In an alternative model considering average dust concentration and exposure duration, increased risk is attributed to exposure duration, but not to dust concentration.

Discussion The dust control programme connecting regulation of working duration incorporate with continuous health surveillance seems to be effective for preventing CWP in German coal mining after 37 years of follow-up.

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CAUSES AND COMMON FEATURES AMONG HAIRDRESSERS WITH RESPIRATORY SYMPTOMS AT WORK

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Introduction Respiratory symptoms at work are common among hairdressers throughout the world. However, their ties to clearly identifiable causes have been less compelling. Among others ammonium persulfate (AP), a common compound of hair dyes, has been reported to cause occupational asthma. But other chemical, allergenic and irritative substances and unfavourable air conditions (damp, dust, fume) are widespread in hairdressing saloons as well, making even the underlying pathomechanisms ill-defined. For a better understanding of work related airway diseases the objective of this study is to describe common features and potential causes in affected hairdressers.

Methods Hairdressers with respiratory symptoms at work who were referred to a specialised outpatient clinic between May 2012 and May 2017 were consecutively included in a case series. During presentation various anamnestic data as well as medical examinations including pulmonary function and allergy testing were compiled. Data were analysed using SPSS Statistics.

Results Hairdressers comprised 53% (n=105) of the patients referred to our clinic for occupational respiratory diseases. The hairdressers were predominantly female (91.4%) with a mean age of 39.2 (18–70). 15.2% showed a clear positive reaction to AP in the skin prick testing, while another 1,9% had an externally documented positive finding.

Conclusion This is to our knowledge the largest examined collective of symptomatic hairdressers and is therefore an important source to identify similarities and possible causes. A classification into four different subgroups can be suggested: 1. Patients with an obstructive airway disease (OAD) and proven AP-sensitisation; 2. Patients with OAD, no AP-sensitisation and no other known extra-professional condition explaining the symptoms; 3. Patients with OAD and a known extra-professional condition; 4. Symptomatic patients without verifiable OAD. Therefore, the cause for the work-related symptoms could not always be entirely clarified but a causal relationship seems likely for group 1 and possible for group 2.

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CASE STUDY OF THE FIRST OCCUPATIONAL COMPENSATION CLAIM OF ASBESTOS-RELATED DISEASE IN INDONESIA

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Introduction Chrysotile asbestos has been imported into Indonesia and processed in numerous factories since 1950. Despite many years of asbestos exposures, no claim of occupational asbestos-related disease has been recognised and compensated by the National Labour Insurance program.

Methods An employee from an asbestos gland packing factory was selected to undergo an examination in accordance with the seven step process required for occupational disease diagnosis set by the Indonesian Ministry of Health (Regulation #56, 2016) and criteria set by the American Thoracic Society. The employee was interviewed and underwent a physical exam, ILO standard chest radiography, spirometry, and high-resolution CT (HRCT) imaging.

Result The employee had over 23 years of occupational asbestos exposure and presented with chronic non-productive cough, exhaustion, low body weight, and intermittent chest pain. The ILO standard radiograph and HRCT were consistent with asbestosis and the spirometry test showed a mild restrictive ventilator defect. The case was reported to the district Ministry of Manpower and compensation of 74 million rupiah (USD 5000) was awarded by the National Labour Insurance Program in late 2016. This amount was calculated based on the percentage of physical disability and the base salary of the worker.

Discussion This is the first case of asbestos-related disease to receive compensation from the Indonesian government. It is important because asbestos hazards are relatively unknown by both the public and workers in Indonesia. Finding more asbestos-related disease cases is an urgent concern, especially among

exposed employees. Furthermore, given that many asbestosis cases progress to lung cancers, the amount of compensation solely from the asbestosis disability appears inadequate. It is suggested that the Indonesian Manpower Ministry review the compensation system to include follow-up and screening for malignancies, their treatment, and related disabilities.

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RESPIRABLE CRYSTALLINE SILICA (RCS) EXPOSURE MONITORING, HEALTH SURVEILLANCE AND HAZARD COMMUNICATION IN PREVENTING SILICOSIS AMONG STONE WORKERS

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Introduction Exposure to respirable crystalline silica (RCS) causes the serious lung disease silicosis among many workers globally. There was renewed attention to silicosis when new cases were reported among workers involved in the use of engineered stone in bench top manufacturing.

Methods A regulatory verification program was conducted in the State of New South Wales in Australia to investigate exposure of stone workers to RCS, compliance with health surveillance requirements and to improve communication of the health hazards of RCS to poorly informed workers. Airborne RCS exposures were measured in the workers' breathing zones using cyclone sampling heads for particle size selection. X-ray diffraction (XRD) analysis was performed to assess the silica content of the respirable dust. Compliance with national Work Health and Safety Regulations on health monitoring for RCS exposure, which include annual chest x-rays, were verified at each workplace. Hazard information was developed in consultation with workers and small group education conducted to improve their awareness and knowledge on silica hazards.

Result The Australian Workplace Exposure Standard (WES) of 0.1 mg/m³ for RCS was exceeded in many personal air samples. Workers who had worked in the industry for many years had not undergone a complete health monitoring including chest x-ray and spirometry.

Discussion The WES for RCS is being reviewed and lowered to 0.025 mg/m³ in some countries whilst some industries raise concerns on whether they can practicably achieve this limit. The reliance on chest x-rays and spirometry in the early detection of silicosis has also been queried by numerous case studies and by the Australian inquiry into coal worker pneumoconiosis.

We report our findings and explore whether technological changes result in high RCS exposures and a re-emergence of silicosis among poorly informed workforces. Developing professional collaboration among different disciplines to prevent this deadly disease will be discussed.

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GB SILICOSIS CASES FOLLOWING A RECENT GUIDANCE UPDATE

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Introduction Silicosis still occurs globally as a consequence of exposure to respirable crystalline silica (RCS). The Health and Safety Executive (HSE) regulates the workplace in Great Britain, and recently updated its silica based guidance relating to health surveillance. We report our early experience dealing with cases referred to our clinical service following this update.

Methods Our Occupational Lung Disease service runs a weekly multidisciplinary team (MDT) meeting. Following the relatively recent updated silica guidance issued by HSE, our clinical service offered to accept referrals of workers exposed to RCS who have undergone health surveillance at work. This would normally have consisted of lung function testing and a chest X Ray (CXR). A consultant respiratory physician and a radiologist, the latter reading to International Labour Organisation (ILO) radiology standards, discussed each case referred to the service at the MDT.

Result To date, 36 workers have been referred with potentially abnormal radiology. The mean age of this group of workers was 55 years (range 23–75), 8 were female. Twenty workers (56%), with a mean age of 55 years (range 35–75) and a mean duration of RCS exposure of 25.2 years (range 9–50), had an ILO grade recorded for the presence of small opacities on their CXR which were thought to be potentially consistent with silicosis. A further 11 were identified to have an incidental, not silica related, radiological abnormality and 5 had normal radiology.

Discussion Since HSE has refreshed and updated its silica based workplace guidance, workers have been identified with potentially abnormal chest x rays. Of those referred to us, a substantial proportion was identified to have small opacities consistent with silicosis. Workplaces must continue to risk assess all tasks potentially associated with RCS exposure, and subsequently intervene to reduce these exposures.

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FARMER'S LUNG DISEASE IN A COHORT OF BRITISH AGRICULTURAL WORKERS

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Introduction Farmer's Lung Disease (FLD) is the oldest recognised form of occupational hypersensitivity pneumonitis (OHP) and remains one of the most commonly reported causes in Europe. The aim of this study was to provide novel data on the prevalence and demographic risk factors of FLD in a large cohort of British farm workers.

Methods Farmers were identified from the baseline survey of the PIPAH cohort (Prospective Investigation of Pesticide Applicators' Health). The demographics of workers, who self-reported a doctor diagnosis of FLD, were compared to the remainder of the cohort.

Result Questionnaire data was available for 5115 current or former farmers, representing a cumulative total of over 210,000 years of farming practice. 26 farmers self-reported a diagnosis of FLD, representing a cohort prevalence of ~5 per 1000. Those with FLD were all male, and were older, more likely to be involved in animal production and less likely to be involved in crop production only than those without FLD. Those with and without FLD did not differ in respect of years lived or worked on a farm, or their smoking status.