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### ESTIMATING THE PREVALENCE OF OCCUPATIONAL EXPOSURE IN LUNG CANCER. RESULTS FROM AN HOSPITAL-BASED CASE-SERIES IN ITALY

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**Introduction** Lung cancer (LC) is the leading oncologic cause of death among males. The role of occupational history with exposure to well-established carcinogens is very important, but usually deeply underestimated. To undervalue the occupational origin of cancer can affect the efficacy of preventive measures and preclude patients to receive insurance benefits.

We performed a systematic occupational medicine evaluation of a cases-series of lung cancer cases to properly quantify the proportion of LC cases with previous occupational exposure to carcinogens.

**Methods** We systematically evaluated all consecutive LC cases hospitalised in a large university hospital, in Milan. An active systematic search was carried out for 24 months, by trained occupational physicians, using a standardised questionnaire.

**Results** We collected 123 consecutive LC cases (66% males). Former and current smoking habit was found in 61% and 22%, respectively. A clear exposure to occupational carcinogens (in details: asbestos, polycyclic aromatic hydrocarbons, paintings, diesel exhaust) was recognised in 10% of males cases.

**Discussion** Previous occupational exposure to carcinogens was frequent among males cases in Northern Italy. The observed prevalence was even lower than the one reported in a previous systematic search in Lombardy (Porru S, *et al.* Int Arch Occ Env Health 89:981–9). If we applied our observed proportion of occupational cases to the entire incident LC cases in Lombardy population, we should observe about 460 male occupational LC cases per year (AIRTUM-AIOM report 2016), actually more than the entire number of cancer (all sites, both gender) annually notified to National Institute for Insurance (INAIL Rapporto regionale 2015).

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### SPIROERGOMETRY EXAMINATION IN PATIENT WITH LUNG SILICOSIS

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**Introduction** The purpose of the study was to compare lung function tests in patients with occupational interstitial lung disease (silicosis) and patients with airways diseases (COPD, asthma) by spiroergometry examination and spirometry, and to find differences between groups.

**Methods** From 2005 to 2016, one hundred and fifty-five patients underwent spiroergometry and lung function testing. The sample of patients was male (143) and female (12) who were or have been exposed to hazardous work with exposure to solid fibrogenic aerosol. From the sample we exclude 6 patients with hypersensitive pneumonitis. Patients sample we split into 3 groups: the first

is represented by patients with silicosis (50), where we included patients with simple and complicated silicosis; the second group represents patients with airways disease (chronic obstructive pulmonary disease, asthma and chronic bronchitis – 52) and the last group consists of a comparative sample of patients without pulmonary or respiratory disease (47). Spiroergometry was performed by a bicycle spiroergometer with gas analysis (O<sub>2</sub> and CO<sub>2</sub>). The test was done by ramp-type load. The termination of the examination depended on the patient's abilities.

**Results** Oxygen consumption (VO<sub>2</sub> – Lt/min.) at rest, at anaerobic threshold (AT) and at maximal load (MAX.) show no statistical significant differences (Rest: 1.gr. 0,37 vs 2.gr. 0,35 vs 3.gr. 0,36; AT: 1.gr. 1,12 vs 2.gr. 1,25 vs 3.gr. 1,24; MAX: 1.gr. 1,66 vs 2.gr. 1,88 vs 3.gr. 2,0). We found only statistical difference (p=0,044) between groups in oxygen consumption per kilogram of weight (VO<sub>2</sub>/kg – ml/kg/min.) at maximal load (1.gr. 19,23 vs 2.gr. 22,07 vs 3.gr. 23,35). Exhaled carbon dioxide (VCO<sub>2</sub>—Lt/min.) show statistical significant values (p=0,018) between groups at maximum load (1.gr. 1,82 vs 2.gr. 2,1 vs 3.gr. 2,33). There were statistical significant differences at respiratory parameters (BR-breath reserve, VD/VT ratio).

**Discussion** Parameters VO<sub>2</sub>/kg-max and VCO<sub>2</sub>-max can be very valuable and useful for diagnosis and prognosis of the patient. Benini (2017) suggests that patients with significantly reduced oxygen consumption per kilogram of weight have an increased risk of death and overall impaired exercise tolerance. Also abnormal ventilation response during an exercise test is associated with worse survival.

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### A RETROSPECTIVE COHORT STUDY OF CANCER MORTALITY IN EMPLOYEES OF A RUSSIAN CHRYSOTILE ASBESTOS MINE AND MILLS: UPDATE 2017

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**Introduction** A retrospective cohort study of employees of one of the world's largest chrysotile asbestos mine and mills (JSC Uralasbest, Asbest, Russia) is presently being conducted. The primary aim of the study is to more precisely characterise and quantify the exposure-response relationship for total and site-specific cancer risks associated with chrysotile exposure.

**Methods** The study includes workers employed for at least one year during 1975–2010 in the mine, enrichment factories, transportation, laboratory, and the explosives unit. Ascertainment of cohort members through extraction of occupational histories from the enterprises' archives started in 2012.

**Results** At present, the cohort comprises more than 35 000 workers. A detailed occupational history was collected for each cohort member. Temporal trends in exposure levels were analysed using a database containing 89 290 monthly-averaged gravimetric dust concentrations from stationary sampling points in the enrichment factories (1951–2001) and 1457 in the mine (1964–2001). Parallel gravimetric and fibre (PCOM)

concentrations were used to estimate dust to fibre conversion factors. Currently a job-exposure matrix is being developed to translate individuals' job histories into exposure histories for both dust and fibre concentrations. Sverdlovsk region mortality data of cohort members have been ascertained by linkage with medical death certificates recorded at the Sverdlovsk Regional Civil Acts Registration Office. In addition, a comparison of mortality rates in Asbest city and in Sverdlovsk region (1997–2010) was performed. Further efforts are ongoing to ascertain vital status and migration of cohort members from Sverdlovsk region. A parallel cross-sectional survey aimed at estimating tobacco smoking in current workers and veterans (more than 7000 participants) was conducted.

**Conclusion** The study will continue through 2019. Given the large size of the cohort, the large proportion of female workers and the detailed exposure data, information obtained in this study will expand knowledge of the cancer burden and prevention potential after chrysotile exposure.

#### 1413 OCCUPATIONAL RESPIRATORY HAZARDS IN THE EMERGING MEDICINAL CANNABIS INDUSTRY IN AUSTRALIA

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**Introduction** Recently there has been a rapid development of the international medicinal and recreational commercial cannabis industry. In Australia, the downgrading of *Cannabis sativa* L. to a Schedule 8 controlled substance, when prepared or packed for human therapeutic use, has heralded the introduction of a local medicinal cannabis industry. This paper will present the findings of a gap analysis which will be used for a later student of exposures.

**Methods** This project involved a critical review of current approaches to health and safety in the medicinal and recreational cannabis industry in Australia and abroad. The data analysis involved the review of literature related to cultivation and production from the farm through to final product sales, including the policies developed by partner organisations, law enforcement and regulatory agencies, as well as research publications.

**Results and discussion** Early studies of the hemp fibre production demonstrate a relationship between inhalable dust exposure and respiratory conditions such as byssinosis, chronic asthma and chronic obstructive pulmonary disease (COPD). More recently, attention has focused on the allergenic properties of *C. sativa* L. pollen exposure, as well as healthy and safety hazards on outdoor recreational cannabis farms in the United States. It is evident that there are multiple biological, physical and chemical hazards associated with cannabis cultivation and manufacturing procedures, some that are inherently unique to the plant. A greater understanding of the aetiological properties of medicinal otherwise referred to as drug or hybrid type, *C. sativa* L. containing greater than 0.35% delta 9-tetrahydrocannabinol (THC) content is required to determine if exposure control is required, including the development of an occupational exposure limit (OEL).

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#### REVIEW OF THE RESPIRATORY COMPONENT OF THE QUEENSLAND COAL MINE WORKERS' HEALTH SCHEME

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**Introduction** Coal miners in Queensland Australia have a pre-employment medical and then medical every five years. In 2015, cases of coal workers' pneumoconiosis (CWP) were identified among miners/ex-miners, outside the medical scheme.

**Methods** We reviewed the respiratory component of the medical scheme and evaluated its design and implementation. We reviewed 91 completed medical forms, 257 chest x-rays (CXR) and 260 spirometry and surveyed the spirometry equipment and training of providers. We interviewed employer and trades union representatives.

**Results** Medicals had become focussed on fitness for work rather than surveillance. Some forms were poorly completed and the questions were inadequate to evaluate respiratory health.

The criteria to trigger a CXR were unclear. Only 25% of the CXRs 'good' under the ILO classification scheme. 18 of the CXRs showed Category 1 simple pneumoconiosis, only two were identified in the original radiology reports.

40% of the spirometry had not been performed to ATS/ERS standards and were uninterpretable. We identified 30 abnormal spirometry of which only 1 had been identified in the medical report. The survey of spirometry providers identified poor knowledge of the equipment, poor quality control processes and inadequate training.

**Discussion** An effective scheme needed to more clearly articulated its surveillance purpose and to be reviewed on a regular basis. We recommended that a smaller number of experienced doctors trained and approved to undertake these assessments. The scheme needed better spirometry testing and interpretation, a better CXR referral process, improved CXR interpretation and reporting using the ILO criteria. Clinical guidelines were needed to inform diagnosis and management of CMDLD. Medical screening and surveillance is not a substitute for effective dust control, which is the primary protection against CWP. This is particularly important because it can progress even after dust exposure has ceased. These findings have implications for medical screening in other industries.

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#### TRACKING AETIOLOGY AND EXPOSURE FOR IDIOPATHIC LUNG DISEASES: RECENT ADVANCES FROM IN SITU MULTI-ELEMENTAL IMAGING WITH LASER SPECTROMETRY

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**Introduction** There is a major health problem due to the occupational related exposures to mineral particles, metals, and