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**Results:** The indoor air concentration of viable fungi was comparable with the outdoor air concentration, while the total spore concentration was moderately increased indoors compared with outdoors but significantly lower than previously measured in documented cases of hypersensitivity pneumonitis among farmers.

**Conclusion:** We question if the lung diseases of these patients were caused by mould exposure in their indoor environments and document the need for quantitative exposure measurements when diagnosing hypersensitivity pneumonitis in patients living or working outside environments with well-documented high mould exposure levels.

#### P4014

##### Spirometric findings in asbestos-exposed subjects with pleural plaques missed by chest radiography but detected by HRCT

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**Introduction:** High-resolution computed tomography (HRCT) is recognizably more sensitive than chest X-ray (CXR) in detecting small-to-moderately large pleural plaques (PP) in asbestos-exposed subjects.

**Objectives:** We reasoned that if the PP missed on CXR are associated with decreased lung function, this would lend support to a wider use of HRCT in these subjects.

**Methods:** HRCT and spirometry were obtained in 1075 miners and millers who have been exposed to progressively lower airborne concentrations of asbestos over time (Groups I to III) and were free of PP or asbestosis on CXR.

**Results:** We found that 100/1075 (9.3%) of the subjects had PP only on HRCT 44/90 (48.8%) in Group I, 44/537 (8.2%) in Group II and 12/448 (2.7%) in Group III. As shown in the Table, subjects with PP on HRCT but not CXR had consistently lower spirometric values than those deemed as normal by both methods ( $p < 0.05$ ). Similar results were obtained after adjusting for smoking status.

**Conclusions:** We conclude that the lack of sensitivity of CXR in detecting PP in asbestos-exposed subjects is a matter of concern, as subjects with these abnormalities only on HRCT had decreased lung function values. This seems of special relevance among more exposed subjects.

## 408. Asbestosis, silicosis and hypersensitivity pneumonitis

#### P4013

##### Farmer's lung – How much farming is required? A quantitative re-evaluation of eight cases of hypersensitivity pneumonitis attributed to indoor mould exposure

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**Background:** Hypersensitivity pneumonitis is by definition caused by the inhalation of antigens, but limited quantitative data are available on exposure levels required to cause the disease.

**Objective:** To analyse exposure levels for mould spores in patients with clinical findings compatible with hypersensitivity pneumonitis and a history of indoor mould exposure.

**Methods:** We report eight consecutive patients diagnosed as hypersensitivity pneumonitis based on symptoms, high resolution computerized tomography, bronchoscopy, IgG findings, and self-reported mould exposure at home or work. Indoor and outdoor air samples from their dwellings or work sites were collected with slit to agar samplers, N6 Anderson samplers, and filter samplers used for quantification of moulds by the Camnea method. The concentration of fungi was calculated and expressed as colony forming units (CFU)/m<sup>3</sup> and total spores/m<sup>3</sup>.

#### P4015

##### Environmental exposure to asbestos-related radiological and/or functional interference in patients with clinical findings, and computed tomography findings of the quality of life

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Natural asbestos deposits found in some countries such as Turkey are main sources of environmental asbestos exposure (EAE) which may constitute a major health problem. The aim of our study was to further evaluate the asbestos related standard radiological findings in a population with EAE with low dose computed tomography (CT). Also pulmonary function tests, diffusing capacity, exercise capacity (6 m walking test, 6MWT) and quality of life (SF-36) were assessed. People from al Sller region of Denizli with Standard chest X ray findings consistent with asbestos exposure were enrolled in this study. Pleural plaque (PP) and lung volumes (LV) volumes were calculated by measuring the three axes. PP ratio was calculated by dividing PP to LV. Total 75 with mean age 70.4 with radiographic abnormalities were enrolled to the study. 66 cases PP were on thorax CT. Remaining 9 patients calcific granuloma (2 cases) and calcific sequela (7 cases) were misinterpreted as calcific PP. Additionally asbestosis in 12 cases. There was no statistically significant correlation between diffusing capacity, 6MWT with PP volume as well as PP index. Quality of life indexes were lower than the established norm values of Turkish people. However the diffusing capacity, 6MWT and quality of life values were statistically lower in asbestosis patients. Our study is the first to demonstrate that EAE may affect quality of life. Early asbestosis may have an impact on respiratory functions and exercise capacity of affected people. As previously shown asbestos related PP have no effect of respiratory function tests and exercise test.

Abstract P4014 – Table 1

	Group I		Group II		Group III	
	CXR(-)/HRCT(-)	CXR(-)/HRCT(+)	CXR(-)/HRCT(-)	CXR(-)/HRCT(+)	CXR(-)/HRCT(-)	CXR(-)/HRCT(+)
FVC, %	97.7±18.5	92.3±16.5	102.7±16.9	96.4±18.1*	103.2±20.8	90.9±17.7*
FEV1, %	98.6±22.8	90.3±19.2	100.1±18.9	90.9±23.0*	99.3±21.7	83.7±18.5*
FEV1/FVC	76.2±7.1	73.3±8.6	76.4±7.4	72.8±10.9*	76.1±8.2	71.7±10.4

\* $p < 0.05$  when comparing CXR(-)/HRCT(-) to those CXR(-)/HRCT(+).

**P4016****Exposure characteristics of patients with different pathological types of malignant mesothelioma**

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**Background:** Malignant mesothelioma (MM) of the pleura and peritoneum has 3 main pathological sub-types: epithelioid, sarcomatoid and biphasic with different clinical behaviour and prognosis but all related to asbestos exposure.

**Aim:** To identify any distinguishing characteristics of patients with different subtypes of MM that may relate to their differing clinical manifestations.

**Methods:** All cases of MM that have been recorded in Western Australia since the first case in 1962 until 2010 were reviewed for the demographic characteristics, histological type, and asbestos exposure history.

**Results:** There have been 1867 (1612 male) confirmed cases of MM between 1960 and June 2011. Of those there are 237 sarcomatoid, 744 epithelioid and 367 biphasic subtypes with 519 cases not specified. Analyses were confined to cases with defined pathological sub-types. Results from univariable analyses are presented in Table 1. In a multinomial logistic regression, age at diagnosis, exposure route and topography were significantly associated with subtype.

Characteristics of MM subtypes

	Epithelioid	Sarcomatoid	Biphasic	p-value
Sex (%male)	84.0	90.3	89.4	0.009
Age at diagnosis (yrs)*	66.8 (11.9)	70.2 (9.9)	66.4 (11.4)	<0.001
Time since 1st exposure (yrs)*	43.2 (11.9)	45.4 (11.5)	41.7 (11.8)	0.004
Smoking (%)	55.6	50.2	53.7	0.390
Exposure type (%Crocidolite)	24.7	14.7	26.9	0.003
Exposure route (%Environmental)	15.9	8.4	11.2	<0.001
Topography (%Pleural)	91.5	98.7	94.3	<0.001

\*Mean (SD).

**Conclusion:** Compared to other subtypes sarcomatoid MM appears in older subjects and is less common with environmental exposure to asbestos. It is also less common in the peritoneum than pleura.

**P4017****End of domestic asbestos exposure epidemic in Metsovo; N.W. Greece**

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**Introduction:** Metsovoites had been exposed to tremolite asbestos from a white-wash ("luto"), used by all until 1940. This exposure has resulted in frequent pleural calcifications (PCs) and a mesothelioma epidemic, fading due to abandonment of luto.

We have reported that most older Metsovoites have PCs in chest CT and asbestos bodies (ABs) in BAL. These parameters are used now in younger Metsovoites to evaluate if those not exposed are free from signs of exposure.

**Materials & methods:** 22 Metsovoites age 30-49 had chest CTs and 8 of them BAL. Age was chosen because it takes 30 yrs for PCs to appear and because they were born between 1960-80 when luto use had declined considerably giving us the possibility to evaluate Metsovoites who have lived all their life free of luto. Previous BAL studies of 7 age matched Metsovoites were used as control. There were no similar control chest CTs. Therefore we studied all available (86) chest CTs of Metsovoites over 30.

**Results:** Only 3/22 had used luto (35,47,48 yo). All 8 BAL studies were negative, in contrast to the exposed control group, where 6/7 (85,7%) BAL studies showed ABs. Only one chest CT was positive for PCs (48yo: luto until 13yo). From the 86 chest CTs, 5 belonged in the 30-39 and 9 in 40-49 yo group. None of the 30-39yo group had PCs and none had used luto. There was one CT positive in the 40-49yo group (11%). He had used luto in childhood as was the case with 2/6 others of this group in which luto history was obtained.

**Conclusion:** There is no evidence of asbestos exposure in younger Metsovoites who have not used luto. The domestic use of this tremolite-whitewash has been the only source of asbestos in Metsovo. Its abandonment has resulted in the end of this epidemic.

**P4018****Asbestos-related disease: Clinico-pathological correlation**

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**Introduction:** The accurate diagnosis of asbestos-related diseases is important. For compensation asbestosis is defensibly diagnosed without the aid of pathology while the diagnoses of lung cancer and mesothelioma require surgical lung biopsy. South African law makes provision for the autopsy examination of the cardio-respiratory organs of deceased miners for compensation purposes. This provides unique opportunities to correlate clinical and pathological findings.

**Methods:** Deceased cases assessed in-life for compensation using chest radiographs by the Asbestos Relief Trust and who had an autopsy at the National Institute for Occupational Health from May 2010 to May 2011 were studied. The in-life and autopsy diagnoses of asbestosis and its severity, mesothelioma and lung cancer were compared. Sensitivities, specificities and related values were calculated.

**Results:** 94 cases were studied. ARDs were diagnosed at autopsy in 78 (83%) of the cases: 47 (50%) had asbestosis, 20 (21%) mesothelioma and 15 (16%) lung cancer. Sensitivity, specificity and accuracy rates for the clinical diagnoses were 47%, 83% and 65% for asbestosis; 65%, 96% and 89% for mesothelioma and 40%, 100% and 90% for lung cancer respectively.

Using an ILO grading of 1/0 and above for the radiological diagnosis of asbestosis, there were 25 (53%) false negative cases. For pathologically diagnosed slight, moderate and marked asbestosis, agreement was 31%, 53% and 58% respectively.

**Discussion:** Cases with slight asbestosis were more likely to be missed clinically (69%) than marked disease (42%). Many malignancies were undiagnosed in life. These findings underline the difficulty of diagnosing ARDs and the importance of autopsies in detecting disease missed in-life.

**P4019****Relationship between endogenous NO and blood gas parameters in former asbestos workers**

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**Background:** Nitric oxide is a major endogenous regulator of the vascular tone. Inhaled nitric oxide gas has been used for treatment of pulmonary arterial pressure and hypoxaemia (especially in persistent pulmonary hypertension of the newborn). It is not known whether there is a relationship between endogenous bronchial NO concentration and blood gases parameters.

**Patients and methods:** 48 former asbestos workers (all non-smokers) were examined within the framework of a surveillance program. Lung function tests, blood gas analyses, diffusion capacity for CO (D<sub>LCO</sub>), and multiple FeNO measurements (inclusive the estimation of the alveolar NO fraction C<sub>alv</sub>) were performed.

**Results:** D<sub>LCO</sub> was reduced in asbestos workers (83.4% pred. according to Cotes, 1979). The mean value of Pa<sub>o2</sub> at rest was borderline.

None of the patients exhibited high FeNO values (FeNO=16.9±1.2 ppb). In contrast, C<sub>alv</sub> was significantly increased when compared to the control group (n=43) (1.4±0.2 vs. 0.5±0.1 ppb, p<0.001).

There was a significant negative correlation between FeNO and C<sub>alv</sub> on the one hand and AaO<sub>2</sub> on the other hand (r<sub>sp</sub>= -0.33, p<0.05; r<sub>sp</sub>= -0.36, p<0.05). C<sub>alv</sub> showed a positive correlation with Pa<sub>o2</sub> (r<sub>sp</sub>= 0.29, p=0.1).

Furthermore, a positive association was found between FeNO and D<sub>LCO</sub> (r<sub>sp</sub>= 0.40, p<0.05).

**Discussion and conclusions:** The decreased values of D<sub>LCO</sub> reflect the pulmonary fibrosis in asbestos exposed subjects. This is associated with reduced FeNO. The positive correlation between C<sub>alv</sub> and Pa<sub>o2</sub> could be explained by local effects of NO in the alveoli. The relationship of endogenous NO with blood gases parameters may be due to its vasodilative effects.

**P4020****The evaluation of the relationship between malignant mesothelioma and environmental asbestos exposure in Sivas**

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**Objectives:** Sivas province is located in the Central Anatolia where asbestos exposure is common. We aimed to study the relationship between environmental mineralogical effects and epidemiologic features of patients with MM.

**Methods:** In total, 219 patients with MM who were diagnosed in our hospital between 1993 and 2010 were retrospectively analyzed in terms of demographical and clinical features. Rock, soil and house plaster samples were taken from the habitats of those patients and were evaluated with optical microscopy and X-ray diffraction methods.

**Results:** The patients aged between 18 and 85 years (male/female ratio=1.4). Most of the patients (86%) confirmed an asbestos exposure history. The most frequent symptoms were chest pain (60%) and dyspnea (50%) and the duration of the symp-

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toms was 4 months in average. The plaster materials used in most of the houses were made up of mainly carbonate and silicate minerals and some chrysotile. Ophiolitic units contained fibrous minerals such as serpentine (clino-orthochrysotile) chiefly and pectolite, brucite, hydrotalcite and tremolite/actinolite in smaller amounts.

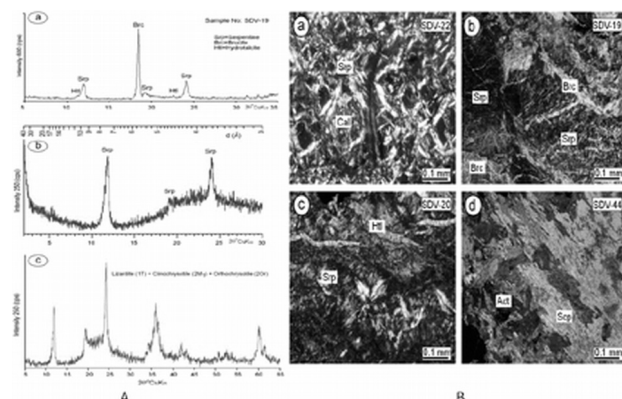


Figure 1. A) X-ray diffraction patterns of serpentine sample, a) whole-rock, b) clay fraction, c) polytype. B) The optical microscopy microphotographs of fibrous and associated minerals from (a) were (a)serpentine, (b)brucite, (c)hydrotalcite, (d)actinolite, (e)serpentine+brucite, (f)serpentine+brucite, (g)serpentine+hydrotalcite, (h)actinolite+serpentine.

**Conclusions:** MM is primarily related to environmental chrysotile exposure in Sivas. However, single or combined roles and/or interactions of other fibrous and non-fibrous minerals in the etiology of MM are not yet fully understood and remain to be investigated.

#### P4021

##### Prevalence of obstructive and restrictive functional patterns in a population of environmental asbestos exposed

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**Background:** Tremolite is one of the six recognized types of asbestos. This material is toxic and inhaling the fibers can lead to asbestosis, lung cancer and both pleural and peritoneal mesothelioma. Resident population in the area of Lagonegro (Basilicata, Italy) has been shown to be exposed to environmental tremolite pollution, deriving from superficial rocks and asbestos caves. A branch of the ongoing health surveillance program for residents is evaluating the prevalence of obstructive or restrictive pulmonary functional patterns.

**Methods:** A total number of 1353 individuals were included into this study. The study group was composed by 695 residents in the tremolite-exposed area of Lagonegro (age 49.35±16.68, current smokers 122, ex-smokers 134). The control group was composed by 658 individuals living in areas not tremolite-exposed (age 54.13±17.75, current smokers 121, ex-smokers 174). All the participants to the study performed a lung function test.

**Results:** Prevalence of obstructive disease was 0.58% in the exposed group and 2.58% in the non-exposed group (p=0.029). Only current or ex smokers showed obstructive pattern respectively 3.7% and 3.9%. Odds Ratio for obstructive disease in tremolite-exposed subjects was 0.236 (95% CI 0.079-0.708). Prevalence of restrictive disease was 5.2% in the exposed group and 5.9% in the non-exposed group (p=0.539).

**Conclusions:** According to our data, tremolite exposure has apparently no influence on the prevalence of functional respiratory deficit. It is necessary to follow the exposed group in time by repeated measurements.

#### P4022

##### The prevalence of silicosis in dental prosthetic technicians working in Kahramanmaraş City

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**Objective:** The aim of our study is to determine, the presence and the frequency of occupational silicosis in dental prosthesis technicians in Kahramanmaraş.

**Materials and methods:** The questionnaire was administered to participants prepared by the Turkish Thoracic Society for occupational and environmental lung diseases, physical examination was performed, PFT were measured, and HRCT was taken. The resulting images were evaluated independently by three readers. When at least two report as pathologic, cases were accepted as silicosis.

**Result:** Technicians involving the study were 82, 80 of them were male (97.5%). The mean age was 30.9±8.5; the mean pack-year of smoking was 12.4±13.8, the mean working period was 15.8±8.7 years. In 7 abnormal respiratory examination findings were detected. During working, 24 (29.3%) continuously, 21 (25.6%)

never, 37 (45.1%) occasionally used the mask. No statistically significant difference was found between the mask usage and HRCT findings of silicosis (p>0.05) and between the symptoms in workplace and the duration of working period (p>0.05). PFT of employees were evaluated as normal. In evaluation of HRCT, 51 (62.2%) had normal and 19 (23.2%) had radiology compatible with silicosis. The localizations of the radiological involvement were determined; only upper lobes in 12 (63.2%), only the lower lobes in 1 (5.3%), upper and middle lobes in 3 (15.8%), upper and lower lobes in 2 (10.5%) and together with the upper, middle and lower lobes in 1 (5.3%) person.

**Conclusion:** This study showed that dental prosthesis technicians have high risk for catching silicosis.

#### P4023

##### Silicosis caused by sandblasting in teflon coated pan manufacturing

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Silicosis is an occupational disease of the lungs caused by inhalation of crystalline silica and is marked by fibrotic pulmonary reaction. Sandblasting has been commonly used during abrading of jeans, glass, and metal. We presented 17 silicosis cases occurring in teflon coated pan manufacturing. Symptoms questionnaire, pulmonary function tests, carbon monoxide diffusion test, and thorax HRCT were done. All of employees are male and mean age was 28.8±5.2 (18-41). The mean duration of working period for this job was 24.8±15.4 (9-60) months.

Table 1. Silicosis demographics

Case	Age	Smoking (pack-year)	Employment time (months)	Symptoms	Silicosis type	Current status
1	23	2	25	C-D	AS	NCS
2	32	-	60	S	CS	NCS
3	30	14	13	C	CS	NCS
4	27	-	35	NS	CS	NCS
5	29	-	14	C-D-S	ST	Ex
6	26	4	27	C-D	AS	Ex
7	27	5	11	C-D	AS	Ex
8	28	-	47	C-D	ACS	RF
9	25	8	21	C	AS	RF
10	41	-	45	NS	CS	NCS
11	18	-	9	D	AS	Ex
12	24	5	15	C-D	AS	Ex
13	30	9	30	CP-D	ACS	NCS
14	29	8	36	NS	ACS	NCS
15	35	11	10	C	CS	NCS
16	34	-	9	CP-D	AS	RF
17	31	8	14	D	CS	NCS

NS=No symptom, D= Dyspnoea, C=Cough, S=Sputum, CP=Chest pain, AS=Acute silicosis, ACS=Accelerated silicosis, CS=Classical silicosis, ST=Silicotuberculosis, NCS=No clinical symptoms, RF=Respiratory failure.

Clinically total 17 cases was evaluated, 7 cases as acute silicosis(AS), 6 cases as classic silicosis, 3 cases as accelerated silicosis (ACS) and one case as silicotuberculosis (ST). Four cases of AS and one ST case were died during follow-up. Acute respiratory failure was present in one AS case and one ACS case. Clinical follow-up of other patients has been continued.

In view of this report, sandblasting of teflon pan manufacturing cause silicosis. These clinical type commonly acute form and mortality was high.

#### P4024

##### Silica-induced inflammasome activation in lung epithelial cells

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**Introduction and objectives:** In myeloid cells the inflammasome plays a crucial role in innate immune defenses against pathogen- and danger-associated patterns such as crystalline silica. Respirable mineral particles impinge upon the lung epithelium causing irreversible damage, sustained inflammation and silicosis. In this study we investigated lung epithelial cells as a target for silica-induced inflammasome activation.

**Methods:** Primary mouse tracheal epithelial cells, human bronchial epithelial cells (BEAS-2B) and primary normal human bronchial epithelial cells (NHBE) were exposed to toxic but nonlethal doses of crystalline silica over time to perform functional characterization of NLRP3, caspase-1, IL-1 $\beta$ , IL-33 and HMGB1. Gene expression microarray, quantitative RT-PCR, BioPlex analysis, caspase-1 enzyme activity assay, western blot techniques and cytokine specific ELISA were performed.

**Results:** We were able to show particle uptake by lung epithelial cells, transcriptional and translational upregulation of the components of the NLRP3 intracellular platform, as well as activation of caspase-1. This activation furthermore led to maturation of pro-IL-1 $\beta$  to secreted IL-1 $\beta$ , and a significant increase in the unconventional release of alarmins such as IL-33 and HMGB1. Small interfering



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RNA experiments using siNLRP3 revealed the pivotal role of the inflammasome in diminished release of pro-inflammatory cytokines, danger molecules and growth factors.

**Conclusion:** Our novel data indicate the presence and functional activation of the NLRP3 inflammasome by crystalline silica in human lung epithelial cells, which prolongs an inflammatory signal mediating a cadre of lung diseases.

#### P4025

##### Screening healthcare workers for Mycobacterium TB: Is QFT-G now the test of choice?

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**Introduction:** Quantiferon-Gold (QFT-G) is FDA approved for the diagnosis of infection with Mycobacterium tuberculosis. CDC guidelines have supported the use of QFT-G in all cases where Tuberculin Skin Test (TST) is used, including screening of healthcare workers (HCWs). We sought to establish the benefits of QFT-G in HCW screening within our own hospital practice.

**Methods:** In June 2010 we consecutively screened, by TST all newly employed HCWs. 41 patients over the period had full data for analysis. Country of origin and evidence of prior distant history of BCG vaccination on examination, were also documented. A TST of  $\geq 10$ mm was considered a positive result and was followed by a QFT-G.

**Results:** 41 TST were performed, 35/41 (85.4%) had a BCG scar. TST was positive in 23/41 (56.1%). QFT-G was positive in 15/23 (65.2%). Significantly 8/23 (34.8%) TST proved to be false positives on the basis of a subsequent negative QFT-G.

**Conclusion:** HCWs are identified as a cohort at risk of Mycobacterium TB infection. As a lab based assay QFT-G is not subject to biases or the errors of TST placement or reading. It also negates the need for a return visit in 48-72 hours for interpretation. 34.8% of our cohort had a false positive TST leading us to question the sensitivity of the test in this cohort. QFT-G has proved itself to approach 98% sensitivity and 89% specificity and is a suitable replacement for TST in HCW screening.

##### References:

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#### P4026

##### GTn heme oxygenase-1 polymorphism in beryllium-exposed dental technicians

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**Background:** Dental technicians (DTs) are exposed to Beryllium (Be) and other substances capable of inducing lung disease. Heme oxygenase -1 (HO-1) play a protective antioxidant role in the lung. The guanine-thymidine (GT) n repeats in the HO-1 promoter determine HO-1 induction level. Short (GT) n repeats (n = <25; S genotype) is considered as protective since HO-1 is induced more rapidly than in long (GT) n repeats (n =  $\geq 25$ ; L genotype).

**Aims:** To evaluate the correlation of HO-1 polymorphisms to functional and exposure parameters in DTs and the protective role of HO-1 on Be Oxide (BeO) exposed A549 epithelial cells apoptosis.

**Methods:** 65 DTs were followed-up for 2 years by questionnaires, induced sputum (IS) particles size distribution laser analysis (Dapi 2000 Donner Tech and Pulmonary Function Tests. HO-1 genotyping was done by PCR DNA sequencer (AB prism 310). A549 epithelial cell line was cultured with BeO and pretreated with Hemin and Znpp (for stimulation and inhibition of HO-1 respectively). HO-1 gene expression was evaluated in IS and A549 cells by quantitative PCR and apoptosis by TUNEL staining.

**Results:** Association was found between GTn and HO-1 gene expression in IS ( $r = -0.35$   $p = 0.017$ ). the GTn <25 group had higher HO1 expression than the GTn >25 group ( $0.18 \pm 0.16$  Vs  $0.07 \pm 0.06$   $p = 0.007$  respectively). Decrease in DLCO (Diffusion Lung CO) was associate with GTn >25. Hemin increases the HO-1 gene expression and decreases the apoptosis levels in A549 epithelial cells while is increased by ZnPP.

**Conclusions:** DLCO decrease is associated with L genotype. Decrease apoptosis in BeO-exposed A549 epithelial cells by hemin may indicate a protective role of HO-1.

Supported by USA-Israel Bi National Science Foundation.

#### P4027

##### Hypersensitivity pneumonitis related to Streptomyces mesophile and Penicillium chrysogenum: The usefulness of the Medical Indoor Environment Councilor (MIEC)

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**Introduction:** Hypersensitivity pneumonitis (HSP), secondary to the inhalation of organic antigens at home are rare and the diagnosis is very often difficult without home visit. Observation: We report a case of a 55 years male patient, ex-smoker, with an allergic asthma since childhood, well controlled with inhaled corticosteroids, who developed two respiratory distresses during asthma exacerbations. HPS was suspected because of the fever (39°C), the dry cough, rapidly progressive dyspnea, chest pain and crackles. Blood gas analysis found a hypoxemia of 52 mmHg, and the CT-scan showed a few ground glass images in the upper lobes. The respiratory function tests showed a severe obstructive syndrome and a decrease of diffusion test. Allergological investigation: The diagnosis was suspected because the symptoms were linked to domestic environment, triggered by stays in a camper. The (MIEC) visited the house and the camper and performed air and dust samples. Moldy walnuts were found in the camper. The identification of microorganisms presents on the nuts, in the air and in the dust, were used for the search for precipitins in double diffusion (DD) and electrosynthesis (E). Of the 14 antigens tested, serological tests were considered significant for Streptomyces mesophile (5 bands DD, 6 bands E) and Penicillium chrysogenum (1 band DD, 4 bands E). The patient removed the nuts from his camper. Since then, he has not experienced any exacerbation.

**Conclusion:** This is a case of domestic HSP to Streptomyces mesophile and Penicillium chrysogenum. The MIEC's intervention was useful for the diagnosis and the treatment.

#### P4028

##### Geochemical factors and incidence of sarcoidosis in Tomsk region

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**Methods:** Sarcoidosis incidence has been studied according over a 20-year period (528 patients without unhealthy working conditions). The incidence rate has been determined per 100000 of populations and compared to the geochemical data: 2126 measurements of 23 chemical elements (Na, Ca, Sc, Cr, Fe, Co, Zn, Br, Rb, Ag, Sb, Au, La, Th, U, Hf, Se, Hg, Ce, Sm, Eu, Yb, and Lu) were made by the neutron activation analysis in the dust-aerosol, soil and drinking water in Tomsk and Tomsk region. Sarcoidosis highest incidence was found on the territories exposed to anthropogenic factors: in Seversk 67.3 (nuclear fuel industries), Octyabrysk district of Tomsk 56.8, Tomsk rural district 68.14, Strezhevoy 47.2 (fuel and oil industries). In these districts the incidence rate was significantly higher compared to the mean findings in region - 42.6 ( $\chi^2 = 7.94$ -11.6;  $p < 0.05$ ). The incidence in the mainly agricultural districts was minimal 23.5. In Seversk recurrent forms were significantly higher - 20.56 versus 10.23 in Tomsk ( $\chi^2 = 7.94$ ;  $p < 0.01$ ). The correlations have been found between: the sarcoidosis incidence and the Na content in the dust aerosols ( $r = 0.9$ ;  $p < 0.05$ ), Ce in the soils of industrial territories ( $r = 0.9$ ;  $p < 0.05$ ), Ca in drinking water ( $r = 0.8$ ;  $p < 0.01$ ); recurrent forms of sarcoidosis and Lu in soils of the contaminated territories ( $r = 0.8$ ;  $p < 0.05$ ), Cr in soils of agrarian districts ( $r = 0.65$ ;  $p < 0.05$ ). Thus, the correlation between the ecological state of the territories and sarcoidosis incidence is sure to exist. Uncertainty of the obtained data does not allow understanding which factor plays the role. One cannot deny the influence of trace elements which have shown the correlations: Na, Ca, Lu, Ce, Cr.

#### P4029

##### Exhaled airway and alveolar nitric acid in extrinsic allergic alveolitis

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**Background:** In extrinsic allergic alveolitis (EAA), alveolar nitric oxide (Alvno) and the airway fraction of exhaled nitric oxide (FEno) have not been well studied.

**Methods:** EAA cases were derived from a referral center and an integrated health care delivery organization (IHCDO); age- and gender-matched referents were recruited from the IHCDO. Subjects were invited to participate in home visits including spirometry (EasyOne; nnd Medical Technologies, Andover, MA, USA) and FEno electrochemical quantification (NO Vario; FILT, Berlin, Germany) at 3 flow rates (50, 100, and 300 ml/sec) yielding the measured airway FEno and the calculated Alvno. We tested differences by EAA status using the chi square, t-test, and (for FEno and Alvno) Wilcoxon rank sum.

**Results:** We completed home visits for 118 EAA cases and 106 referents; 91 in each group (77% and 86%, respectively), yielded interpretable FEno and Alvno

TUESDAY, SEPTEMBER 4TH 2012

results. There were no statistical differences by case vs. referent status for age ( $60 \pm 13$  v.  $60 \pm 11$  years), female sex (56% vs. 63%), or height ( $167 \pm 9$  vs.  $167 \pm 9$  cm). EAA cases compared to referents had lower forced vital capacity (FVC) ( $3.1 \pm 1.0$  L vs.  $3.5 \pm 1.0$  L;  $p < 0.01$ ) and reduced FVC % predicted ( $83 \pm 18$  vs.  $96 \pm 19$ ;  $p < 0.001$ ). Airway FEno was higher in cases than referents ( $22.5 \pm 14.1$  ppb vs.  $17.4 \pm 8.4$  ppb;  $p = 0.03$ ), as was Alvno ( $4.1 \pm 4.9$  vs.  $2.7 \pm 4.9$  ppb;  $p = 0.003$ ).  
**Discussion:** Both airway FEno and Alvno are increased in EAA, supporting exploration of their associations with disease activity and health status.  
**Clinical:** Assessing airway FEno and Alvno in EAA may provide insights into exposure status and disease management.  
Supported by NIH 1RC1ES018211.