

10024-Mortality from obstructive lung diseases among asphalt workers

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Work in the asphalt industry entails exposure to bitumen and coal tar fumes. Asphalt work has been associated with non-malignant respiratory diseases, but causal links have not been established. A historical cohort of asphalt workers from eight countries (Denmark, Finland, France, Germany, the Netherlands, Norway, Sweden, Israel) was assembled by the International Agency for Research on Cancer. The cohort consisted of 79,822 male workers first employed for at least one season between 1913 and 1999 and accumulated 1,287,209 person-years of observation. Mortality from non-malignant respiratory diseases was compared to the general population. Exposure-response relationships were evaluated using a study-specific exposure matrix. The exposure matrix contained semi-quantitative exposure estimates to bitumen fume, coal tar, polycyclic aromatic hydrocarbons (PAHs), silica, asbestos and diesel exhaust for all jobs. In addition, quantitative exposure estimates were available for exposures to bitumen fume and PAH among pavers (the most numerous bitumen-exposed group in the cohort). Bitumen workers had higher mortality rates from chronic bronchitis, emphysema and asthma (obstructive lung diseases) relative to the general population: 143 deaths; standardised mortality ratio: 1.21; 95% confidence interval: 1.02, 1.43. Mortality from obstructive lung diseases was associated with cumulative and average exposures to polycyclic aromatic hydrocarbons (PAHs), mostly originating from coal tar. For example, cumulative exposure above 624 (ng benzo(a)pyrene/m<sup>3</sup>)\*years were associated with three-to-four fold increase in relative risk of obstructive lung diseases (p<0.05). Bitumen fume was weakly associated with mortality from obstructive lung diseases, but its effects could not be distinguished from those of coal tar. For example, in a sub-cohort unexposed to coal tar, exposures to more than 3.73 (mg bitumen fume/m<sup>3</sup>)\*year increased the relative risk of mortality from obstructive lung disease twofold, but the effect was not statistically significant. Our results seem to support the notion that exposures to PAHs, derived primarily from coal tar and possibly bitumen, are determinants for mortality from obstructive lung diseases. This is supported by mechanistic considerations of oxidative stress due to PAHs and their oxygenated derivatives. However, confounding (especially by tobacco smoking) and bias cannot be securely ruled out as an explanation for the observed associations. Our findings imply that the recently implemented ban on the use of coal tar in asphalt in Western Europe can be expected to reduce the risk of work-related obstructive lung diseases among asphalt workers.

## 10276-METALLIC DUSTS EXPOSURE AND RESPIRATORY HEALTH EFFECTS AMONG WORKERS FROM A SINTERED PRODUCTS PLANT

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**Objectives.** The aim of this study was to evaluate the exposure levels to metallic dusts of Pb, Fe and Cu in air working environment and the effects on the respiratory system of the workers in sintering technology.

**Methods.** The concentration of metals (Pb, Fe, Cu) in the air samples were determined by atomic absorption spectrophotometry. A sample of 95 exposed workers has undergone a respiratory symptoms questionnaire, clinical examination and lung ventilatory tests (FVC, FEV<sub>1</sub>, FEV<sub>1</sub>/FVC%, FEF<sub>25-75</sub>). Also they were ORL examined and cytological examination of nose secretion was performed.

**Results.** Air concentrations of metals exceeding MAC values were found mainly in the presintering phases ( mixing, screening and grinding). More than a half of the sample examined complains of nose symptoms, frequently work-related, higher among women and nonsmokers ( $p < 0.05$ ). Pharynx symptoms were reported more frequent by workers aged up 40 years, by men and smokers. Concerning the hoarseness, as the most important symptom for the affected larynx, we have found a higher prevalence of it among workers with the length of exposure up 10 years ( $p < 0.05$ ). The prevalence of chronic bronchitis was 27.4% of the subjects, statistically significant higher among workers with the length of exposure up 10 years ( $p < 0.05$ ) and in smokers ( $p < 0.02$ ). We have found in 6.3% of the sample examined FVC under 80% of the predicted values, in 7.4% FEV<sub>1</sub> under 80% of the predicted values, in 36.8% FEF<sub>25-75</sub> under 90% of the predicted values. Prevalence of FEF<sub>25-75</sub> < 90% was statistically significant higher among workers with the length of exposure up 10 years ( $p < 0.001$ ) and aged under 40 years ( $p < 0.05$ ). The ORL examination has shown chronic rhinitis in 38.1%, chronic pharyngitis in 38.1% and chronic laryngitis in 4.8% of the subjects. Cytological aspects of nose secretion were as follows: inflammatory alterations in 25% of the sample presented, eosinophyllic cells in 17%, preatrophic and atrophic aspects in 35% of the subjects.

**Conclusions.** These findings suggest that occupational exposure to metallic airborne particles of Pb, Fe and Cu in sintering technology may affect the respiratory system of the workers.

10309-INTAKE OF FRUIT AND ASTHMA INCIDENCE IN A COHORT OF CHINESE ADULTS IN SINGAPORE. Butler LM<sup>1</sup>, Koh WP<sup>3</sup>, Lee HP<sup>3</sup>, Yu MC<sup>2</sup>, London SJ<sup>1</sup>. <sup>1</sup>National Institute of Environmental Health Sciences, RTP, NC, USA, <sup>2</sup>University of Southern California, LA, CA, USA, <sup>3</sup>National University of Singapore, Singapore.

**Rationale:** Dietary antioxidants influence inflammatory processes in the lung. Recent studies suggest that fruit intake, a major source of antioxidants and other micronutrients may protect against asthma. However, there are few prospective data. **Methods:** A population-based cohort of Chinese men and women, aged 45-74 years, in Singapore was established between 1993-1998. The in-person baseline interview included a 165-item food frequency questionnaire developed for and validated in this population. On telephone follow-up interviews beginning in 1999, subjects were asked about history and timing of asthma diagnosis. We analyzed the relation between dietary intakes at baseline and self-reported incidence of new doctor diagnosis of asthma among the 30,200 cohort members on whom follow-up has been completed. A total of 231 individuals reported the new diagnosis of asthma, within the average follow-up of 5.5 years. **Results:** Higher fruit intake was inversely associated with asthma. Individuals in the highest quartile of intake were at the lowest risk of asthma for both citrus fruits [odds ratio (OR)=0.68; 95% confidence interval (CI)=0.47-0.99 for >3.1 versus <0.3 servings/week], and non-citrus fruits (OR=0.55; 95% CI=0.36-0.83 for >9.3 versus <2.8 servings/week). Odds ratios were adjusted for age, total caloric intake and smoking. **Conclusions:** In this cohort of Singaporeans of Chinese ethnicity, higher intake of fruit may reduce the risk of developing asthma in adulthood. The association with both citrus and non-citrus fruits suggests that nutrients other than vitamin C may be important.

10448-Dependence of the structure of cells on the changes of environment. Interdisciplinary study

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Stimulus which does not evoke response in the health organism may act irritatively in the ill organism and activate triggering mechanism on the level of cells, tissues, organs. Beside the environment also irradiation, which is nowadays often used in the medical practice, becomes a stimulus of this kind. Mainly diagnostics of increasing number of respiratory diseases needs application of physical methods among which also irradiation occurs (Lubec et al.,1996, Radiation Physics and Chemistry (Pergamon) **47**, 855-858; Michailov et al., 1997, in: Frontiers of Radiation Therapy and Oncology, Vol. 31, 22-35, editors J.L.Meyer, J.M.Vaeth, San Francisco, Calif., publisher: KARGER).

In this work we want to point out how application of irradiation influences microscopic structure of cells in tissues. Reckless approach in ordering and applying irradiation leads to damage of still intact cells. We carried out monitoring on 16 male BALB/c mice with average weight 20.2 g and age 8 weeks. Experimental group consisted of 8 animals that were whole body irradiated with the 6.02 Gray dose from cobalt Crisobalt source. After 10 days animals were killed and excisions were elaborated for evaluation in light microscope, transmission electron microscope and scanning electron microscope and for morphometry. In this way we looked into microscopic structures inevitable for intact function of the mucociliary clearance.

**We have found:**

- 1) diminution of alveolar macrophages**
- 2) apoptosis of cells**
- 3) proliferation of collagen ligament**
- 4) retraction of endothelium**
- 5) forming of collateral vessel capillaries in the barrier of gaseous exchange.**

These changes mean serious damage of microscopic structure what results in the rise of relapsing diseases of respiratory system with frequent inability to work. Application of irradiation thus affects health of individuals as well as economy of the country.

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## 10909-PREVALENCE OF RESPIRATORY SYMPTOMS IN THE PRIMARY SCHOOL STUDENTS IN ADMINISTRATIVE DISTRICT YATAĞAN

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**OBJECTIVE:** The frequency of respiratory symptoms in children seems to be increasing several countries in regard to the developing industry and outdoor air pollution.

The aim of this study was to determine the prevalence of respiratory symptoms and the relationship with region, sex, age, socio-economic levels and personal habits in Yatağan where there is a coal fired power plant. There is not another industrial establishment that can cause air pollution except the power plant in Yatağan. During Fall 2000 and Spring 2001 there had been inversion events and SO<sub>2</sub> proportions rose 5-6 times over the threshold level. In regard to that points concerns begin to increase within the residents in this region.

**MATERIALS AND METHODS:** 5680 students, who were enrolled in primary education schools according to the Yatağan National Education Directorate data, included in the study. Final number of joining into the study decreased into 4951 (87%) due to that reasons; not responding the form, mistakes in printing of questionnaire form, and being exterior of the 6-14 years range. The questionnaire was composed of items on personal qualities educational status, personal habits and hobbies of the parents, characteristics of the residence household size, household annual income, atopy history, presence of pets, taking any of the respiratory drugs, having sonorous breathing, having wheezing, having persistent or repeating cough.

All the data examined statistically. Chi Square test was used for comparisons. P value is considered as 0.05.

**RESULTS:** Proportion of students who are hospitalized at least one due to breathing disturbance is 10 %. Proportion of physician-diagnosed bronchitis at least one time is 26.5%. Having phlegm in mornings in the last 1 year is 16.3% waking up with breathing disturbance is 4.1% and having breathing disturbance due to an animal or dust is found to be 3.4%. Proportion of taking a theophylline-included drug in the last 1year is determined as 3.2%. Sonorous breathing frequency is % 16.3, persistent or repeating cough frequency is found to be 19.1%.

There was positive association between having sonorous breathing and mother education, number of rooms in the house, passive smoking, moisture in the house, having old furniture in the house, presence of a pet in the house (P<0.05). There was inverse association between having sonorous breathing and house income, number of people sleeping in the same room, house situation of getting sunlight (P<0.05).

No significant difference was found between having persistent or repeating cough and age, sex, mother age, mother's working status, father age and the material that the bad was made of.

**CONCLUSION:** Lack of a surveillance system in the region causes a difficulty to reveal the relation between respiratory system symptoms and air pollution levels. However the results are found high than other studies in our country. This draws us to the conclusion that air pollution would be effective.