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359. Indoor air

P4017**Subjective and objective measurement of air quality in European schools**

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In the framework of HESE (Health Effects of School Environment) study, we compared measurements of perceived air quality (as measured by 10 cm Visual Analogue Scales) with objective measurements such as indoor and outdoor levels of PM10, NO₂, CO₂ and ultrafine particles. We studied 46 classrooms in 21 schools located in 6 different centers scattered at different latitudes of 5 European countries. Questionnaires were obtained both from 9-10 years-old pupils and from their parents. Outdoor air quality as perceived by parents significantly correlated with outdoors levels of PM10 and of NO₂ ($p < 0.001$), while when reported by pupils it failed to do so. In contrast, perception of indoor air quality by children, but not by parents, was significantly correlated with indoor measurement of PM10 ($p < 0.05$). Neither one did correlate with levels of CO₂. The perceived illumination reported by both parents and children was significantly correlated with objective measurements ($p < 0.01$). All these correlations were very loose, with large overlaps. The perception of indoor air quality by parents was strongly correlated ($p < 0.0001$) with the degree of overall satisfaction about the school, and negatively correlated with their perception that bad indoor air could affect school activity by their children and with the perception of cooperation by the school. Similar correlations, albeit weaker, were observed for children. A report that poor air quality affected their school performance was higher in children reporting at least a wheezing attack in the last 12 months (20%) than in those who did not (9%, $p < 0.05$). Thus, subjective and objective measurements may reflect different aspects of air quality, and both should be recorded.

P4018**Allergen contamination at school can be a risk factor for allergic sensitisation among pupils**

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Aims: To study allergen levels in schools in Korea in relation to asthma and allergic disease among pupils.

Methods: Totally 2365 pupils in 12 Korean primary schools completed a questionnaire. Airborne and settled dust were collected in 34 classrooms and analysed for allergens by ELISA.

Results: Doctor's diagnosed asthma was 6.5% in boys and 4.3% in girls (OR = 1.6, 95% CI = 1.1-2.2). Dog allergen (Can f 1) (88%) and house dust mite allergen (Der f 1) (62%) were most abundant in settled dust. However, only 4% of the settled dust contained cat allergen (Fel d 1), 1% had house mite allergen (Der p 1) and one sample had horse allergen (Equ cx). Cat and dog allergens were detected in almost all classrooms, when using airborne sampling on Petri dishes. We found associations between Fel d 1 level in dust and wheeze (P<0.01) and atopic sensitisation (P<0.05) and between Fel d 1 level in air and wheeze (P<0.05). Can f 1 level in dust was associated with daytime (P<0.001) and nocturnal breathlessness (P<0.05) and Can f 1 level in air was associated with daytime breathlessness (P<0.01). Der f 1 level in dust was associated with wheeze (P<0.001) and atopic sensitisation (P<0.01). Furthermore, there was a significant association between pupils keeping furry pets at home and allergen levels measured in settled dust and airborne samples from classrooms.

Conclusion: Since allergen levels in the classrooms were associated with pupil's reported wheeze, breathlessness and atopic sensitisation, allergen contamination can be a health risk for pupils. Transportation of the allergen from home environment should be considered. Air sampling is probably a better tool for measuring allergen exposure in schools.

P4019**Asthma and allergy in pupils: a comparison of symptoms, allergens and school environment in Taiyuan, China and Uppsala, Sweden**

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We compared school environment, asthma and allergy in 10 schools in Taiyuan, China with 8 schools in Uppsala, Sweden. Totally 1993 pupils (M=13 y) participated. In China, ever asthma (1.5% v.s. 9.5%; p<0.001) and asthma medication (0.5% v.s. 6.0%; p<0.001) were less common but daytime breathlessness was more prevalent. The Chinese classrooms were colder (mean 14.7 v.s. 21.4°), more humid (mean 42% v.s. 31% RH) and had higher indoor CO₂. Cat (Fel d 1), dog (Can f 1) allergens were higher in Sweden, but airborne Fel d 1 sampled on Petri-dishes were higher in China. Can f 1 was similar in both countries.

	China	Sweden	OR (95% CI)
Health parameters	%	%	
Doctor's diagnosed asthma	1.2	9.0	0.12 (0.06-0.23)***
Wheeze	8.4	8.0	1.08 (0.63-1.84) NS
Daytime attacks of breathlessness	29.8	7.1	5.71 (3.29-9.92)***
Nocturnal attacks of breathlessness	2.1	1.0	2.23 (0.54-9.28) NS
Furry pet or pollen allergy	3.8	16.2	0.24 (0.16-0.37)***
School environmental exposure	Median	Median	P-Value
CO ₂ (ppm)	1962	700	<0.001
Settled dust Fel d 1 (ng/g)	<100	1300	<0.001
Settled dust Can f 1 (ng/g)	<200	1650	<0.001
Airborne Fel d 1 (ng/m ² /day)	38	8 (a)	<0.05
Airborne Can f 1 (ng/m ² /day)	16	10 (a)	NS

NS, not significant; ***P<0.001; (a) Data from HESE study in Uppsala

In Sweden, only, horse allergen (Equ cx) was found in high levels in settled dust (median 1250 U/g dust). In conclusion, there were large differences in the school environment, as well as in asthma and allergy. Allergen measurements in settled dust only, may largely underestimate the classroom exposure.

P4020**Preparedness of European schools to cope with asthmatic children**

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In the HESE (Health Effects of School Environment) study, we investigated the

school policies regarding asthma and air quality. We studied 46 classrooms in 21 schools located in 6 different centers scattered at different latitudes of 5 European countries. Questionnaires were obtained both from 9-10 years-old pupils, from their parents, and from one teacher for each classroom. Only 2 schools had a written policy for air quality. Only 1 reported the presence of a school nurse 5 days a week, all day, with 7 other reporting the presence only 4 to [frac12] hour per day. In 11 schools a school nurse was never present. In only one of the schools there was an operator trained to administer a bronchodilator if a school nurse was not present. Only one school had a explicit policy about carrying asthma medications from home, and one had a written policy about treating asthma attacks. In short, none of the schools fulfilled the US or the Australian requirements for an "asthma friendly school". In the sample there were 70 children with a diagnosis of asthma according to the parent report (13%), and 52 reported at least one asthmatic symptom in the previous 12 months. However, only 11 asthmatics were known by the teachers. Among children with current asthma, 16 (31%) reported having had at least one asthma attack while being at school. In only three occasions, however, an intervention of the school operators did occur. In most cases the child self-administered a medication without intervention by a school operator, or nothing was done. Our data suggest that European schools are largely unprepared to face the problems of asthmatic children, and that an effort is needed to improve and homogenize school health services across Europe.

P4021**Influence of housekeeping activities in asthma symptoms**

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The objective of this paper is to evaluate the influence of housekeeping activities and cleaning products in the trigger of Asthma symptoms and the need for rescue medication in those situations.

Individual inquiries elaborated by the working group were applied to 34 female patients with Asthma. Each patient was studied regarding: age, job, need for rescue medication and trigger of wheezing, chest tightness, dyspnea and cough while performing various housekeeping activities and exposure to household products.

The average age of the patients was 50,6 years. 64% had a job not related with housekeeping activities. 64% needed rescue medication while performing those activities. The other results are summarized in the following table: (table 1)

	Wheezing	Chest tightness	Dyspnea	Cough
Activity				
Vacuum	47%	41%	41%	38%
Sweep	24%	39%	32%	39%
Wipe the dust	68%	65%	70%	68%
Hang cloths	9%	38%	24%	24%
Shopping	35%	50%	39%	32%
Wash cloths	15%	12%	9%	15%
Wash dishes	6%	9%	15%	6%
Take care of children	6%	9%	15%	6%
Play with children	18%	24%	26%	9%
Product				
Bleach	50%	35%	47%	41%
Ammonia derivatives	41%	32%	38%	32%
Pulverizers	35%	27%	29%	27%
Metal cleaners	15%	12%	18%	12%
Toilet cleaners	18%	12%	15%	15%
Powder products	21%	12%	24%	21%

The housekeeping activity that triggers symptoms in more women is "to wipe the dust" followed by "vacuum". The cleaning product that triggers symptoms in more women is bleach followed by ammonia derivatives. Most women needed rescue medication while performing housekeeping activities.

P4022**The impact of indoor air quality on health status of COPD patients**

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Background: Outdoor air quality is known to be related to respiratory morbidity and mortality. We know little about the relationship of indoor air quality to respiratory health of vulnerable groups.

Objective: To investigate the association of home indoor air quality with health status of patients with Chronic Obstructive Pulmonary Disease (COPD).

Participants: 150 patients in the North East of Scotland who had had a hospital admission for COPD in the past two years and who consented to monitoring of air quality in their homes.

Measurement: Living room levels of PM_{2.5} were measured over 12 hours using Dusttrak™. NO₂ measured as ppb was collected by passive samplers over one week in living rooms and bedrooms. Endotoxin was measured as EU/gm from a one sq

metre sample of living room floor dust. Health status was assessed for Symptoms, Activity limitation and Disease impact using the St George's Respiratory Health Questionnaire.

Results: Patients' mean age was 68 (9.5) yrs. 45% were male. Mean %predFEV was 42.8 (SD 18.7). 27% were current smokers and 43% lived in smoking households. Median indoor levels of PM_{2.5} were 18 ug/m³ (IQR 6-75), NO₂ 6.2 ppb (IQR 4.7-12.3), endotoxin 95.6 EU/gm. Independent of own smoking status PM_{2.5} was associated with Symptoms (p<0.01) and endotoxin was associated with Activity limitation (p=0.04) and Disease impact (p=0.04). NO₂ was not related to health status. Both PM_{2.5} (p<0.001) and endotoxin (p=0.04) were significantly higher in smoking households.

Conclusion: High levels of PM_{2.5} and endotoxin were found in homes of COPD patients, associated with a high proportion of smoking households. PM_{2.5} and endotoxin were significantly associated with poorer health status among these patients.

P4023

The impact of indoor temperature on health status of COPD patients

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Background: National differences in winter indoor temperatures are related to respiratory health independent of outdoor temperatures, with Scandinavian countries having higher winter indoor temperatures than Britain and Southern Europe. A temperature of 21C for 9 hours per day is recommended for thermal comfort.

Objective: To investigate the association of home indoor temperatures with health status of patients with Chronic Obstructive Pulmonary Disease (COPD).

Participants: 150 patients in the North East of Scotland with a hospital admission for COPD in the past two years and who consented to monitoring of indoor temperatures in their homes.

Measurement: Living room (LR) and bedroom (BR) temperatures were measured in one week between October 2004 and April 2005 using ILog dataloggers. The UK Met Office gave outdoor temperature data for Aberdeen. Health status was assessed for Symptoms, Activity limitation and Disease impact using the St George's Respiratory Health Questionnaire.

Results: Patients' mean age was 68 (9.5) yrs. 45% were male, 33% lived alone, 81% had central heating. Mean %predFEV was 42.8 (SD 18.7). 27% were smokers. In 150 monitoring weeks median outdoor maximum temperature was 9.5°C, minimum 2.9°C. Median indoor temperatures were LR 20°C (IQR 18-22) BR 19°C (IQR 17-20). 42% of homes had no days when a temperature of 21°C was maintained for 9 hours. Days when temperature was maintained 21°C/9hrs was significantly associated with Symptoms (p<0.01) Activity limitation (p=0.03) and Disease impact (p<0.001).

Conclusion: Health status of COPD patients is impaired if 21°C temperature is not maintained in living rooms for 9 hours per day. Almost half the homes in this study did not reach this level of warmth.

P4024

Public health impact of exposure to environmental tobacco smoke at work in Europe

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Background: Many European countries have varying degrees of legislation on workplace tobacco smoke exposure, while others are in the middle of the process of deciding what to do about this occupational exposure. The aim of this study was to estimate the population attributable fractions due to workplace environmental tobacco smoke (ETS) exposure for respiratory and cardiovascular diseases in several European countries.

Methods: Systematic Medline database searches were carried out till November

2005 to select the best disease-specific effect estimates (OR or incidence rate ratio IRR) for ETS exposure at work. Recent data on the occurrence of workplace ETS exposure was also searched through a Medline search. Attributable fraction (AF_{exp}) and population attributable fraction (AF_{pop}) were calculated.

Results: Table 1 gives the best effect estimate (OR or IRR) and AF_{pop} (as %) for each disease for 14 European countries.

Conclusions: Our estimates of population attributable fractions due to workplace ETS exposure in Europe suggest that at current exposure prevalences the public health impact is substantial. The growing evidence points to a need to protect workers against ETS exposure in their workplaces.

P4025

Sources of indoor air pollution, asthma and allergies. A paneuropean survey

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We studied the relationships of indoor air pollution to asthma and allergic diseases based on analysis of data from the WHO LARES study (8,519 individuals in 3,373 household in 8 selected European countries). We also investigated the combined role of indoor air pollutants, considering factors able to modulate both the exposure and the health outcome. Of the 1,393 dwellings, a gas stove was present in 6.8%. The other combustion products were used more rarely (2.4%). Gas water heaters were used in 21.4% of the dwellings: 17.0% were connected to the outdoors and 4.4% were not. In 64.9% of the dwellings there were potential sources of VOCs; in 20.7% there was at least 1 smoker of 1-15 cigarettes per day and in 10% 1 smoker of >15 cigarettes. One dwelling out of 5 had a dog, 14.8% a cat, 5.4% a bird and 3.1% a rodent. Cockroaches were present in 10% of the dwellings, mites in 4.4% and rats and mice in 3.9%.

The odds of suffering from wheezing significantly increased in dwellings with rats, mice, cockroaches and moulds. Asthma attacks were significantly related to having a gas water heater not connected to the outside, and to the extent of moulds in the home. Nasal problems and nasal allergy were associated with mites and moulds, as was eczema. Nasal problems were also more frequent in the presence of rats and mice. There was a significant negative association of ETS in the home with asthma attacks, nasal allergy and eczema respectively. The analysis of the joint effects of main indoor exposures adjusted for all other factors confirmed the results for moulds, rats and mice, gas appliance and ETS. The effect of mites and cockroaches disappeared, probably because these pollutants were related to moulds.

P4026

Asthmatic symptoms and atopy in relation to microbial components in schools in Taiyuan, China

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We investigated associations between microbial components in classrooms and asthma, allergy and respiratory infections among pupils in 46 classrooms in 10 junior high schools in Taiyuan, China. They answered a questionnaire based on ECRHS, 1993 (90%) participated. Settled dust was collected and analysed for muramic acid (MA) (marker of bacteria), 3-hydroxy fatty acids (3-OH FAs) (marker of LPS, endotoxin) and ergosterol (marker of moulds), by tandem GC-MS. The mean age was 13 y, 1.8% had ever had asthma, 8.4% had current wheeze, 30% daytime breathlessness, 2.1% nocturnal breathlessness, and 3.8% reported allergy to pollen or pets (atopy). MA was negatively associated with wheeze, daytime and nocturnal breathlessness (p<0.05). The amount of LPS per sample was negatively associated with daytime and nocturnal breathlessness (p<0.05). When analysing different 3-OH FAs, C10, C12, C14 and C18 were negatively associated with breathlessness, C10 negatively with wheeze and ever asthma, C14, C16, and C18 negatively with atopy, while C14 was positively associated with respiratory infections. When analysing concentrations of 3-OH FAs, only C10 was negatively associated with ever asthma, wheeze, and breathlessness, and positively associated with airway infections. Ergosterol was negatively associated with daytime breathlessness, atopy, and respiratory infections. Number of students was the main predictor of the amount of microbial components in the classroom. In conclusion, bacterial components could be protective for asthma respiratory symptoms, which is in line with the hygiene hypothesis. The most consistent endotoxin effect was found for C10 and C12, chain lengths produced by Pseudomonas species.

P4027

Microbial volatile organic compounds (MVOC) and plasticizers in schools in relation to asthma and respiratory symptoms among pupils

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Aims: To evaluate microbial and plasticizer exposure at schools in relation to asthma and allergic symptoms among pupils

Table 1

Country	Lung cancer	CHD	Asthma	COPD	Stroke	Pneumonia
Best OR or IRR	1.17	1.21	2.16	1.36	1.82	2.5
Spain	5-8	6-9	17-29	9-14	15-24	19-32
Italy	4-6	5-7	16-22	8-11	14-19	18-25
Netherlands	4-5	5-7	16-20	8-10	13-17	18-23
Belgium	4	5	15-16	8	13-14	17-18
Germany	4	4-5	13-16	7-8	11-13	15-18
Ireland	4	5	16	8	13	18
France	3-4	3-5	10-15	5-7	8-12	11-17
UK	2-4	2-4	6-13	3-6	5-11	7-15
Switzerland	3	4	11	5	9	12
Norway	3	3	10	5	9	11
Iceland	3	3	10	5	8	11
Estonia	2	2	7	3	6	8
Sweden	0-1	0-2	1-6	1-3	1-5	2-6
Finland	1	1	3	2	3	4

Methods: Pupils (N=1014) in 8 primary schools in Uppsala (Sweden) answered a questionnaire. Exposure measurements were performed in 23 classrooms (May-June).

Results: None of the classrooms had visible mould growth/dampness and 74% of the classrooms had CO₂ < 1000 ppm. Mean total MVOC concentration was 423 ng/m³ indoors and 123 ng/m³ outdoors. Indoor air concentration of Texanol and TXIB, two common plasticizers, were 0.89 and 1.64 µg/m³. MVOC and plasticizer concentration were correlated (r=0.5; p<0.01). At higher indoor concentrations of total MVOC, nocturnal breathlessness (p<0.01) and doctor's diagnosed asthma (p<0.05) were more common. Moreover, there were associations between nocturnal breathlessness and 3-methylfuran (p<0.01), 3-methyl-1-butanol (P<0.05), dimethylsulphide (P<0.01), 2-heptanone (P<0.01), 1-octen-3-ol (P<0.05), 3-octanone (P<0.05), Texanol (p<0.05) and TXIB (p<0.01). In addition, TXIB was associated with wheeze (p<0.05), daytime breathlessness (p<0.05), doctor's diagnosed asthma (p<0.05) and current asthma (p<0.05).

Conclusion: Despite good ventilation and lack of visible signs of mould, we found on one hand an association between respiratory symptoms and indoor MVOC concentration and on the other hand between asthmatic symptoms and two plasticizers. Exposure to MVOC and plasticizers at school may be a risk factor for development of asthmatic symptoms in pupils. Further studies focusing on health effects of chemical emissions from indoor plastic materials, including PVC-floor coatings, are needed.

P4028

Dust and airborne concentrations of endotoxins in Strasbourg and in a rural environment (Haut-Doubs)

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Aim: To compare dust and airborne concentrations in Strasbourg (STG) and rural environment.

Material and methods: 100 dwellings were randomly selected to be representative of the type of dwellings in STG area. In the Haut-Doubs, 49 farms with cow producing milk and 50 non-farming dwellings used as controls were also randomly selected. Samples were performed in all dwellings in the dust of the oldest mattress and the floor of the room where the mattress was located. 2 airborne samples were performed using a portable pump. Endotoxin measurements were performed using the limule test (Chromogenix®). A standardized questionnaire was filled for each home visit with supplementary questions in the rural area.

Results: The levels of endotoxin in the mattress dust were significantly higher in the rural area than in STG (farm: mean ± SD: 2.9 ± 4.1, control farm: 1.09 ± 2.4, STG: 0.85 ± 2.7 µg/g p<0.001). In the air, no difference was found between the 3 groups.

Conclusion: Endotoxin concentration in dust were higher in the rural area than in STG area. However, no difference was found in the air. Our results underlined the difficulty to assess endotoxin exposure.

P4029

Building-related asthma studies at NIOSH, 2000-2005

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Background: We investigated employee health in buildings with work-related asthma cases and a range of dampness.

Methods: We used standardized questionnaires in 3 populations occupying 16 buildings for internal and national comparisons. We conducted pulmonary function, methacholine challenge, and skin prick tests. We analyzed respiratory health outcomes in relation to semi-quantitative observational scores for moisture, water staining, visible mold, and mold odor and microbial indices in air and dust.

Results: Asthma and symptom prevalences were 2-4 times expected. Observational exposure indices predicted building-related respiratory symptoms. Significant associations existed between respiratory symptoms and ergosterol, Penicillium/Aspergillus extracellular polysaccharides, and culturable fungi in floor dust and airborne total fungi and endotoxin. Symptoms were substantiated by abnormal lung function, methacholine results, or medication use in 2/3 of cases in a building in which risk of asthma onset increased 7.5-fold after occupancy; sick leave due to building-related respiratory problems accounted for 12% of sick leave in this building. Atopy was not associated with building-related respiratory complaints. Repair of the building envelope and cleaning did not interrupt incident cases of work-related respiratory disease in the 16 subsequent months.

Conclusion: Some water-damaged buildings have excess respiratory disease which warrants research on etiologic markers and effective remediation strategies. The findings and conclusions in this abstract have not been formally disseminated by the National Institute for Occupational Safety and Health and should not be construed to represent any agency determination or policy.

P4030

Toxic gas inhalation during the use of house cleaning materials

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Background: During house cleaning and mixing of various cleaning materials, toxic gas, especially chlorine, is produced. Sodium hypochlorite solutions can liberate dangerous amounts of chlorine or chloramine if mixed with acids or ammonia, included both among the usual cleaning products.

Objective: Our aim was to study, retrospectively, the symptoms induced by such toxic gas inhalation, the clinical course and outcome of the patients. In the course of the last two years, 14 patients were hospitalized in our department, after inhalation of gas released from mixture of such agents. All patients were women, 12 of them had inhaled gas produced from mixture of bleach (NaClO) with hydrochloric acid (HCl), 2 from combination of bleach with nitric acid (HNO₃).

Results: Main symptoms on admission were dyspnoea and rarely cough while on regular bronchospasm, wheezing and prolonged expiration were the most important findings. Arterial blood analysis on admission was remarkable for hypoxia (mean PaO₂ 74,3mmHg), mild hypocarbia and a normal pH, while spirometry before bronchodilation FEV₁ was 38-91% (mean 59,7%) and after bronchodilation 41-109% (mean 83,1%). Chest X-ray revealed no abnormal findings. Symptoms were relieved within the first 24 hours almost in all cases. Mean duration of hospitalization 1,8 days.

Conclusions: Inhalation of gases released from hypochlorite solutions may cause eye and nasal irritation, sore throat, and coughing at low concentrations. Inhalation of a small amount of these gases causes a sudden onset of symptoms, mainly bronchospasm, even without a history of bronchial asthma, which is responsive to usual treatment. Pulmonary injury may occur after a latent period of 5 minutes to 15 hours.

P4031

Regular smoking among youth: parental and household factors

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Introduction: Smoking onset is due to a wide variety of factors such as social environment or parental smoking.

The aim of this study was to profile the family and living environment of young regular smokers aged 16 to 30 years old desiring to stop their tobacco consumption.

Methods: A cross sectional study was performed in France beside 20 General Practitioners (GPs). They had to recruit regular smokers aged 16 to 30 years old which desire to stop their tobacco consumption.

Regular smoking was defined as a minimum of 1 cigarette each day for at least 1 year. Data were collected by GPs during consultation.

Results: GPs recruited 52 regular smokers. The sex ratio was 61%/39% (women/men). Mean age was 23 years old (s.d. 4), mean cigarettes consumption was 80 units (s.d. 44) a week. The regular smoking onset was 7 years ago (s.d. 4). Most of the young (86%) smoked at home and 31% lived with 1 or 2 parent(s). The father was current or ex-smoker for 90% (current for 50% and ex-smoker for 40%). The mother was current or ex-smoker for 64% (current for 34% and ex-smoker for 30%), she was smoking during pregnancy for 16%. The majority of young (56%) lived with at least one other smoker, (an)other people smoked at home for 40% of them.

Conclusion: This study confirms the importance of householders tobacco status influence on young people. This environment could explain their difficulty to stop cigarette. Tobacco prevention should be intensified on smokers families before adolescence age of children.

P4032

Outcomes of latex-induced respiratory disorders in health care workers

(HCW) after 5 year of clinical survey

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Background: Our previous study have shown a high rates of natural rubber latex-induced upper and low airway diseases in HCW regularly using latex gloves.

Objective: The purpose of this study was to estimate the health outcomes according to reduction or elimination of natural rubber latex (NRL) exposure in HCW after 5 years of the onset of respiratory disorders.

Methods: 18 HCW with latex-induced asthma and 27 with upper airway allergy (UAA) following by non-specific bronchial hyperresponsiveness (NSBH) were investigated. Initial and follow-up visits included use of questionnaire, peak expiratory flow rates (PEF), measurements and dimension of the dose of methacholine causing a 20% fall in FEV₁ (PC20)

Results: 7 out of 18(38,8%) HCW with asthma and 16 of 27 (59,3%) with UAA used low-protein / powder-free latex gloves. Others 7 subjects with asthma were no longer exposed to NRL, whereas 11 with UAA had not reduced exposure. In the HCW who avoided exposure, the severity of asthma and other allergic symptoms decreased from a median score of 4,8 to 2,6 (P< 0, 05) and of 4,6 to 1,8 (P< 0,01) respectively. The median methacholine PC 20 dose in these patients increased from 0,06-0,125 mg/ml to 0,3-1.0 mg/ml (P≤ 0,02; 0,001). In those who only

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limited exposure the severity of symptoms had a tendency to reduction but without statistically reliable. Moreover in 5 of 16 HCW with UAA as well as in subjects who did not change glove use the appearance of asthma symptoms was detected. **Conclusion:** Elimination of exposure is the only secure method of latex allergy treatment, while reduction can be considered as an alternative.

P4033**Pulmonary diseases in prisoner patients. A one year experience of the modes of diagnosis, incidence and recurrence of pulmonary diseases and their correlation with other diseases appearing in this diverse population**

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Prisoners are a diverse social group due to their background, social habits and current way of living (imprisonment). The enclosurement in a restricted densely populated area with bad hygiene are some of the conditions that differentiate this population concerning certain diseases such as tuberculosis, infectious diseases asthma and malignancy. In this study the total number of incoming prisoner patients was examined within a one year period (2005) in connection with pulmonary diseases and firstly the modes of diagnosis such as sputum cultures, blood cultures, radiographic procedures, blood examinations, past history and the time of diagnosis. Secondly the number of newly diagnosed patients and the number of readmittance cases because of failure of treatment, potential therapy side effects, voluntary stopping of treatment and bad living conditions. Finally the correlation of different ethnic groups, certain diseases (hepatitis, cancer or HIV positivity) and the prementioned pulmonary diseases. Our results show a clear predominance of tuberculous cases in the total number of patients admitted often with symptoms of progressed disease such as hemoptysis and even respiratory failure. The diagnosis was possible even from the simple sputum culture with gastric lavage being the most infrequently used method. The second most often group was that of pneumonias with small predominance over asthma, COPD and malignancy. In all cases other diseases were present such as viral hepatitis and HIV complicating the selection and duration of treatment.

P4034**Relation between respiratory tract and voice organ disorders in teachers**

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Objective and aim: Nowadays voice organ diseases and respiratory tract diseases became the important medical, diagnostic, social and economic problem in Poland. The aim of this study was to investigate links between respiratory system disorders and voice organ impairments in the group of secondary schools teachers in Krakow. **Material and methods:** The examined group consisted of 173 teachers, non smokers (21 men and 152 women) aged 38,6 ± 9.9 years; seniority of work between 5-38 years. Control group included 40 healthy clerks matched by age, gender and seniority of work. The professional questionnaire was acquired. Laryngoscopy, phonetic examination, flow-volume curve and measurements of the respiratory tract resistance (Raw) were performed.

Results: Teachers complained of hoarseness and throat irritation more often than persons from the control group ($p < 0.05$), and it correlated with seniority of work of teachers ($r = 0.385$; $p < 0.05$). Forty five persons (26% of examined group) were classified as "higher risk" subgroup. In this subgroup the phonetic asthenia of glottis, swelling of vocal cords, chronic atrophic inflammation of upper respiratory tract mucosa and chronic cough and sputum production were found. Six persons of them had obstruction of large and small bronchi. Raw was higher in the group of teachers (mean-139%N) than in the controls (mean -103%N). Most of them reported allergy to chalk.

Conclusion: These examinations will become the base for creating improved prophylactic programme (proper hygienic condition of air in schools, blackboard without using the chalk and proper loudness in class-rooms).

P4035**Survey about the impact of smoking over pupils (school children) in the district of Hunedoara (Romania)**

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A survey has been made concerning the impact of smoking over pupils (school children) in the district of Hunedoara (1989 pupils, aged 7 to 18 years old, 1128 girls and 861 boys) in September - October 2003.

Further hypotheses (assumptions) can be drawn based on this survey, concerning the age young people start or experiment smoking, as well as the reason for which they are taking up smoking.

The main conclusions of this survey are:

(1) A significant number of pupils (797) about 40,07% declared they have tried to

smoke (412 pupils, 225 boys and 187 girls); from those, 51,69% are still smoking (412 pupils, 225 boys and 187 girls);

(2) Most of the tobacco consumers (smokers) come from the urban environment (21,03%) and only 18,47% come from the rural environment;

(3) The number of smokers increases with their age. At the age of 17-18 the number of smokers reach 31% of the total number of smokers;

(4) Only 16,57% of the girls smoke compared with 26,13% of the boys;

(5) Small towns have a larger number of pupils who smoke;

(6) The main declared circumstances in which young people "try" or become tobacco consumers are:

- urged by friends (19,05%);

- imitating parents' example (1,76%);

- imitating a personality they admire (1,66%).

P4036**Preliminary results of a double-blind placebo-controlled cross-over trial of air cleaning devices for secondary prevention of asthma in hairdressers**

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Per year, more than 300 suspected occupational asthma cases in hairdressers are reported to the statutory accident insurance company in Germany. To determine if those patients' lung function can be improved by using air cleaning devices a preliminary study was carried out.

Methods: All patients in northwestern Germany were offered an exam to determine the medical inclusion criteria of asthma or bronchial hyperresponsiveness. 9 women and 1 man were enrolled. Air cleaning devices were placed in the salons with or without a working filter during the 1st month then switched to non-working or working filter, respectively, during the 2nd month. During the 3rd month devices with working filters were used. Spirometry and methacholine challenges were carried out at baseline and after 1, 2 and 3 months. A diary recording medication and symptoms each day was kept by the participants.

Results: In 4 subjects lung function improved from baseline values and bronchial hyperresponsiveness completely disappeared after three months. In 5 subjects there was no change and in one subject the symptoms worsened so much within two weeks that the study had to be terminated.

Discussion: Four out of ten hairdressers benefited from the air cleaning devices in the salons they worked in. Since the enrolment criteria only established that hairdressers with obstructive airways disease or bronchial hyperresponsiveness could be included the group was heterogeneous and it was not determined if the symptoms at the workplace were caused by occupational asthma or e.g. COPD caused by smoking or allergies common aeroallergens.