In the last decade, ambient particles have decreased from 150ug/m$^3$ to 40ug/m$^3$ in São Paulo city (SP) because of public policies to control fuel emissions. Traffic professionals are more exposed to air pollution. We tested if ambient air from SP is still deleterious to traffic professionals. Non or ex-smokers (≥1 year) cab drivers (N=46) and traffic controllers (N=23) were evaluated 4 times. We checked clinical symptoms and blood inflammatory markers (HDL/LDL/total cholesterol, triglycerides, blood cell counting, clot tests, ultra sensitive c reactive protein–us CRP and erythrocyte sedimentation rate–ESR) on the day after workshift. Pollutants were collected during 24h exposure by individual samplers for fine particles (reflectance) and NO$_2$(colorimetry). Clinical and blood data were tested against pollutants by linear regression model for repeated measures through generalized estimated equation (GEE). Alpha was 5%. PM$_{2.5}$ was 40.33±20.83ug/m$^3$ and NO$_2$ 197±43.47ug/m$^3$. Traffic professionals referred cough (19%), coriza (21.4%), sneezing (35.6%), nasal stuffiness (34.5%) and itch (28.6%), rhinitis (35.6%), wheezing (14.3%), dyspnea (10.7%) which improved during non working periods (60.7%) (holidays or weekends). ESR, clot tests (prothrombin INR, activated partial thromboplastin time and thromboplastin time), LDL chol and mononuclear cells in blood were associated to both PM$_{2.5}$ (p<0.05). There was no correlation of usCRP to inflammation and fibrinogen to pollutants. We conclude that urban pollutants exposure in SP city is still associated with clinical upper respiratory, vascular and systemic inflam-
mation, hypercoagulability and lymphocytes and monocytes increase in traffic professional.

P3997  Trolley fuel exhaust and respiratory impairments; a cross sectional study in Indian fishermen, Subhabrata Moitra1, Santi Gopal Maji1, Prasun Haldar1, Asis Pandit2, Subhasish Sahu1. 1Department of Physiology, University of Kalyani, West Bengal, India; 2Department of Physiology, Krishnagar Government College, Krishnagar, WB, India

Introduction: The fishermen of India are exposed regularly to the fuel exhausts of the trolleys. No study has been reported on the respiratory health of the fishermen.

Aim: The study aimed to see whether there is a relationship between trolley fuel exhaust and respiratory impairments among the fishermen in India.

Methods: A total of 259 male fishermen participated in the study among which 152 were regularly exposed to trolley fuel exhaust (mean age 58±9.8 years) and 107 were never exposed to that (mean age 53±10.3 years). Examination of the exames of subjects who had CHHS questionnaire for the assessment of respiratory symptoms and lung function test. Data were analysed using odds ratio with 95% confidence interval and independent ‘t’ test adjusting for age, smoking status, parental asthma and second hand smoke exposure at home or work.

Results: Fishermen exposed to trolley fuel exhaust had higher prevalence of respiratory symptoms for chronic phlegm (OR = 3.4, 95% CI = 1.2-8.3), morning cough with sputum (OR = 2.3, 95% CI = 1.1-4.6), prolonged cough (OR = 2.5, 95% CI = 1.4-6.2), whistling in chest (OR = 2.8, 95% CI = 1.4 ± 7.3) and breathing trouble (OR = 2.6, 95% CI = 1.2-6.2) compared to the those unexposed to trolley fuel exhaust. Spirometric parameters showed that the mean values of FVC, FEV1/FVC, FEV1/50, FEV1/FVC, FEV1/FVC and FVC/50 were lower in the subjects exposed to fuel exhausts but statistically significance (p<0.01) was observed for FEF25%, FEF50%, FEF75% and FEF25-75%.

Conclusion: The study suggests that occupational exposure to trolley fuel exhaust is associated with higher prevalence of respiratory symptoms and lung function impairment among fishermen of India.

P3998  To study the effect of chronic inhalation of street dust on pulmonary function in street cleaners, Zuber Ahmad1, Aslam Mohammad2. 1TB and Resp. Diseases, J. N. Medical College, AMU, Aligarh, UP, India; 2Department of Physiology, J. N. Medical College, AMU, Aligarh, UP, India

Purpose: Street cleaners who sweep streets manually are exposed to different types of pollutants which have deleterious effects on pulmonary functions. We undertook this study to know the status of pulmonary functions in these occupationally exposed persons.

Methods: One hundred ten street cleaners, 80 non-smokers and 30 smokers, who were cleaning the streets for more than 5 years were included in this study. Sixty controls, 30 smokers and 30 non-smokers, were also included for comparison. Their lung functions FVC, FEV1, PEFR and FEV25-75 were assessed by spirometry. Statistical analysis of data was done according to unpaired ‘t’ test using spss version 16.0 software.

Results: The mean FVC, FEV1, PEFR and FEV25-75 were 85.87±15.16%, 63.69±16.22% and 53.31±20.20% respectively in nonsmoker cleaners, while in smoker cleaners these were 85.0±15.96%, 59.96±17.35%, 60.90±16.91% and 51.78±19.31% respectively. FVC was not found to be affected in these persons while other parameters were significantly decreased as compared to those in controls. In these controls these were 88.66±12.92%, 88.50±18.80%, 90.16±14.30% and 84.00±18.20% respectively in nonsmokers and 84.25±11.22%, 78.42±16.80%, 60.62±18.22% and 62.30±16.50% respectively in smokers.

Conclusion: Obstructive pattern was observed in both smoker and non smoker cleaners. Smoker cleaners had significantly higher obstruction than smoker controls. Thus street dust was found to act synergistically with smoking and further aggravates obstruction in airways so these persons should take preventive measures.

P3999  COPD among non-smokers, Dubravka Peladic, Bojana Butterac Petanjek, Sanja Gele Popovic, Taja Jalius Glincic, Mile Bogdan. Outpatient Department, University Hospital Centre Zagreb, Clinic for Lung Diseases “Izdvojnice, Zagreb, Croatia

Aim: This study aims at determining the number and percentage of non-smokers suffering from chronic obstructive pulmonary disease (COPD) and at investigating into its etiology

Subjects & methods: The study comprised a total of 250 subjects, diagnosed with COPD in line with 2010 Global Initiative for chronic Obstructive Lung Disease (GOLD) criteria. The subjects were first divided into 3 GOLD criteria-based subgroups (GOLD I, GOLD II & GOLD III/IV) and later on into the smoking and non-smoking arm. The non-smoking arm was also subdivided based on possible COPD risk factors. All study subjects underwent lung function and bronchodilator reversibility testing.

Results: Age differences between the two study arms were proven statistically insignificant. Age differences between GOLD I and GOLD II subgroups proved statistically significant [p=0.0465]. The disease severity registered across younger smokers equaled to that of far older non-smokers.

As for COPD risk factors, occupational exposure and earlier pulmonary TB were far more common in men, while passive smoking and the exposure to bio-fuel combustion releases were more common in women. Frequent respiratory infections experienced during childhood and adolescence were also more common in women. Out of 66 non-smokers, 40 had only one, 17 two and the remaining 9 none of the COPD risk factors, but this failed to affect the disease severity.

Conclusion: The results of this study prove that tobacco smoke and its constituents are not the only culprits for COPD onset. The disease can also be developed by non-smokers due to a number of risk factors elaborated herein.

P4000  Respiratory symptoms and lung function parameters in workers exposed to wood smoke and cooking oil fumes in Nigeria, Olumism O Adewole1, Olufemi Desalu2, K. K. Kenneth1, Tayo Adewole3, Greg Ethabor1, 1Medicine, OAUTHC, Ile Ife, Nigeria; 2Medicine, University of Ilorin, Nigeria; 3Medicine, Federal Medical Center, Ilorin, Nigeria. 1Medicine, OAUTHC, Ile Ife, Nigeria

Introduction: Exposures to wood smoke and oil fumes occurs in both home and industrial setting and is associated with occurrence of both respiratory and non respiratory diseases.

Methods: This is a community, and case controlled study involving mai suya and workers who are not exposed to wood smoke and oil fumes in an occupational setting. Both groups underwent an interviewer administered questionnaire followed by on spot spirometric test. Chi square was used to test for association between respiratory symptoms and the job categories. Odd ratios were determined for the risk of respiratory symptoms and exposure to wood smoke and oil fumes.

Result: Both groups are similar in their demographic characters except in their smoking status. The test group had significantly increased occurrence of respiratory symptoms compared with the control group, p value <0.05. The most common respiratory symptoms was cough; present in 23 (48%) of the test group and 7 (23%) of the control group. Among non smokers OR for dyspnea and wheeze was 3.13 (CI 1.5-6.8), p value <0.04 and 1.2, CI (0.4-3.1), p value <0.04 respectively. The mean FEV1, FEV1 (predicted), FVC (predicted) were significantly lower among the test group compared with the control group among all respondents.

Conclusion: Workers exposed to wood smoke and oil fumes have increased risk of respiratory symptoms and altered pulmonary functions.

P4001  Gene polymorphism could be a useful prognostic tool in patients with work-related chronic bronchitis, Sergei Laskov1, Svirkov Alexander2, Rybina Tatjana3, Elena Amelchenko3, Natalya Savelk2, Oksana Omelyanchenko1, Treshkova Tatjana3. 1Department of Clinical Laboratory Diagnostics, Allergy and Immunology, Grodno State Medical University, Grodno, Belarus; 2Department of Acupuncture, Belarussian Medical Academy of Postgraduate Education, Minsk, Belarus; 3Laboratory of Occupational Diseases, Republican Scientific and Practical Center of Hygiene, Minsk, Belarus; 4Department of Pulmonology, 10th Minsk City Clinic, Minsk, Belarus. 1st Department of Internal Diseases, Belarussian State Medical University, Minsk, Belarus

Objective: Study aimed to assess gene polymorphism for the prognosis of the work-related chronic bronchitis.

Methods: 63 patients with work-related chronic bronchitis were enrolled to the study. Control group included 20 healthy comparable male volunteers without occupational hazards. Study participants were genotyped on tumor necrosis factor-a (TNF-α) gene - G308A and G-238A. IL-8 gene (A-C252T), proteintyrozinephosphatase 22 gene (R620W), IL-1β gene (CT). The IL-1β gene polymorphism revealed that heterozygous type was most frequent. IL-8 gene heterozygotes A-252T carriers revealed higher IL-6 values vs the homoyzgyous AA and TT (Kruskal-Wallis test: H=5,34, p=0,05). Respiratory failure was the rare complication in proteintyrozinephosphatase 22 gene (R620W) heterozygotes (Chi-Square=6,12, p<0.05). TrpTrp carriers had higher pulse rate vs the ArgArg carriers (Kruskal-Wallis test: H=9,23, p<0,01). Heterozygotes had higher CAT points and lower minute volume of respiration vs the ArgArg carriers (Chi-Square= 10,28, p<0,005). PTP 22 heterozygotes revealed first work-related chronic bronchitis manifestation in younger age than those with the Arg/Arg type (Chi-Square=3,96, p<0,05).

Conclusions: PTP2 gene polymorphism assessment could be a useful tool for the prognosis of the work-related chronic bronchitis onset and risk of respiratory failure development. PTP 22 heterozygotes are the risk group for the work-related chronic bronchitis development.
Indoor air pollution and poor ventilation inside the houses synergize to cause airflow limitation in non-smokers high altitude dwellers  
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Objective: Cytokine gene polymorphism could contribute to different susceptibility of occupational dust exposure and work-related chronic bronchitis development and management.  
Methods: 87 work-related bronchitis patients were enrolled to the study. Spirometry, pulse oximetry data, autonomic regulation, questionnaire SAN data were assessed on exacerbation and after treatment. Patients were genotyped on TNF-α gene G(-308)A and G(-238)A transitions.  
Results: TNF-α gene polymorphism revealed that heterozygous type was most frequent. Homozygous GG - G(-308)A and G(-238)A were determined in 5.7% and 12.6% of patients respectively. GG 308A carriers had higher body mass in heterozygotes - 70 kg vs 85 kg, p<0.04). Homozygotes revealed better pulmonary tests results after the treatment - FEV1/FVC increase (1.00 vs -0.09, respectively, p<0.04), respiratory volume (0.18 vs 0.02 L/p0.05, minute volume of expiration (6.20 vs 0.55, L/p0.01).GG 238 homogenotes demonstrated lower vital capacity vs those in the heterozygous (63 vs 71.5% of the predicted,respectively,p<0.02) GG 238 had higher oxygen saturation at rest (p<0.02), at the breath holding (p<0.05) and at the hyperventilation (p<0.005).Homozygotes had lower points increase in CAT test than those in heterozygotes after the treatment (-5 vs -1, p<0.04), better SAN test results (1.20 vs 0.35 points, p<0.01).  
Conclusions: TNF-α gene polymorphism is reliable for the prognosis of the work-related chronic bronchitis. GG 308 and GG 238 carriers with work-related chronic bronchitis revealed better pulmonary tests results and better improvement after the treatment vs heterozygotes with the comparable length of service.

Cytokines and immunoglobulins for the prognosis of the work-related chronic bronchitis  
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Objective: Study aimed to assess cytokines and immunoglobulins for the prognosis of the work-related chronic bronchitis due to the occupational dust exposure.  
Methods: 63 patients with work-related chronic bronchitis were enrolled to the study. Control group included 20 healthy comparable male volunteers without occupational hazards. Serum IL-6, IL-10, TNF-α, IgA, IgG, IgM values were measured. Spirometry and respiratory pressure measurements were analyzed.  
Results: TNF-α levels correlated with the body mass (r=0.39, p<0.05, age (r=0.37, p<0.05) and spirometry data - minute volume of expiration (r=0.51, p<0.01) and respiratory volume (r=0.44, p<0.03). IL-10 levels were associated with the body mass (r=0.45, p<0.02) and total protein level (r=0.50, p<0.02). IL-6, Ig A and Ig M levels revealed statistically significant correlation with the WBC counts - (r=0.07, p<0.01, r=0.59, p<0.03, r=0.51, p<0.05 respectively). Ig A, E G values correlated with the minute volume of expiration (r=0.42, p<0.05), physiologic hormonal fluctuation during the menstrual cycle is known to induce changes in nasal epithelium and lung inflammation. The aim of this study is to analyze how the hormonal cycling of female mice is affected by near-ambient levels of pollution. Particulate matter (PM) was concentrated by an ambient particle concentrator (APC). 14 Male (M) Balb/C mice were divided into two groups: without exposure to PM (M/control group) and exposed to PM. 28 Female Balb/C were divided into four groups, according to the estrous cycle. Only female mice from proestrus (PE) and estrus (E) were enrolled. Those from PE were divided into two subgroups: with and without exposure to PM (PE/PM and PE/A). Neutral and acidic nasal mucus content was quantified in epithelium through morphometry. Inflammatory cells were analyzed by bronchoalveolar lavage (BAL). APM exposure in MPF increased both neutrophils in BAL (p<0.031) and neutral mucus content (p<0.016) from nasal epithelum, when compared to PE/PM. No statistical difference was observed to E/PM. In the M/UA group, it was observed an increase in both total BAL (p=0.042) and macrophages (p=0.043) when compared to PE/A. These findings indicate, indeed, near-ambient levels of PM exposure promoted a higher neutrophil recruitment in male than in female mice in proestrus.
P4007
Effects of differences in exposure conditions on pulmonary functions
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Introduction: Air pollution due to industrial waste and tobacco smoke has a serious detrimental influence on pulmonary functions. However, few reports have been published regarding the effects of differences in exposure conditions on the pulmonary functions.

Aims and objectives: The objective of this study was to examine how the differences in exposure conditions affect the pulmonary functions.

Methods: The subjects consisted of 869 people presented with functional decline as a result of working or living in an area with air pollution, and 434 people participated in an epidemiological investigation in an area without air pollution.

Reviews of pulmonary function tests were conducted by employing the medical examination data. Pulmonary functions were compared in smokers versus non-smokers in the area with pollution (smokers with vs. non-smokers with pollution) and were also compared to smokers in the non-polluted area (smokers without) and non-smokers in the non-polluted area (non-smokers without).

Results: In terms of the VC, the values were 90.9%, 95.5%, 98.2%, and 97.4% in the smokers with pollution, non-smokers with pollution, smokers without and non-smokers without, respectively. For the FEV1%, the value for smokers with pollution was 76.5%, non-smokers with pollution was 70.1%, smokers without was 70.8%, and non-smokers without was 79.2%. The smokers with pollution had a lower FEV1% than the other groups (p < 0.001).

Conclusions: Air pollution and tobacco smoke exposure are associated with reduced VC and FEV1. Exposure to both factors had a stronger effect on the FEV1 than did exposure to one factor. Therefore, active smoking cessation instruction is necessary for subjects in the polluted area.

P4008
Respiratory complaints and functions in barn workers
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Aim: This study aimed to investigate the respiratory complaints and functional impairments in workers included in family plants with few cattle.

Materials and methods: One hundred fifty workers (128 female) accepted were included between October, 2011 and January, 2012. Occupational and Environ-
mental factors, in the area with pollution (smokers with vs. non-smokers with pollution) and were also compared to smokers in the non-polluted area (smokers without) and non-smokers in the non-polluted area (non-smokers without).

Results: In terms of the VC, the values were 90.9%, 95.5%, 98.2%, and 97.4% in the smokers with pollution, non-smokers with pollution, smokers without and non-smokers without, respectively. For the FEV1%, the value for smokers with pollution was 76.5%, non-smokers with pollution was 70.1%, smokers without was 70.8%, and non-smokers without was 79.2%. The smokers with pollution had a lower FEV1% than the other groups (p < 0.001).

Conclusions: Air pollution and tobacco smoke exposure are associated with reduced VC and FEV1. Exposure to both factors had a stronger effect on the FEV1 than did exposure to one factor. Therefore, active smoking cessation instruction is necessary for subject in the polluted area.

P4009
The effects of atorvastatin in mustard gas exposed patients with chronic obstructive pulmonary disease: A randomized controlled trial
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Background: Statins have anti-inflammatory effects in patients with chronic obstructive pulmonary disease. This study designed to evaluate the effects of atorvastatin on serum highly sensitive C-reactive protein (hs-CRP) and pulmonary function in sulfur mustard (SM) exposed patients with chronic obstructive pulmonary disease.

Methods: In a double blind clinical trial, 50 patients with chronic obstructive pulmonary disease due to sulfur mustard and high hs-CRP, randomly entered in this study. 45 patients completed the study (n=22, placebo and n=23, atorvats-
tatin). Serum hs-CRP, pulseoximetry, spirometry and six-minute walk distance test (6MWD) were measured. COPD assessment test (CAT) and St George’s respiratory questionnaire (SGRQ) were completed by patients at the beginning of trial and after 9 weeks of prescription of 40 mg/day atorvastatin or placebo. At 4th week, pulseoximetry, spirometry and 6MWD were measured.

Results: At 4th week, there was no improvement in the atorvastatin group compared to the placebo group in SP02, FEV1, and 6MWD (p=0.79, p<0.12, p=0.12 respectively). At 9th week, there was no improvement in atorvastatin in serum hs-CRP, 6MWD compared to the placebo (p=0.35, p=0.28, p=0.94, p=0.43 respectively) but there was an improvement with atorvastatin in quality of life (with CAT score, P<0.001 and SGRQ total score, P=0.004).

Conclusions: A torvastatin does not alter serum hs-CRP and lung functions but may improve quality of life in SM-injured patients with chronic obstructive pulmonary disease.

Key Word: Sulfur mustard, A torvastatin, hs-CRP. Chronic obstructive pulmonary disease.

P4010
Presence of hypertension (HT), ischemic heart diseases (IHD) and a family history of hypertension are independently associated with reduced peak expiratory flow (PEF) in bus drivers.
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Background: Reduced lung function has been shown to be an independent predictor of cardiovascular mortality in patients of hypertension and IHD in earlier studies.

We aimed to study the association between HT, IHD and PEF values amongst road transport workers from Andhra Pradesh State, India.

Methods: 7,154 bus drivers, conductors, garage workers and office-based workers of the Andhra Pradesh State Road Transport Corporation (APSRTC) were randomly selected from 24 bus depots and administered a health questionnaire, uncorrected blood pressure monitoring and performance of the peak flow meter with the EU scale peak flow meter (Breathometer7, Cipla Ltd, India). Current, past and family histories of cardiovascular and respiratory ailments were captured. Associations between PEF values and HT and IHD were studied using the chi square test and the values expressed as odds ratios.

Results: Presence of HT, IHD and a family history of HT were independently associated with low PEF values, defined as less than 80% predicted PEF value [OR 1.3, 95% CI 1.1 – 1.5, p=0.008; OR 1.9, 95% CI 1.2 – 3.0, p=0.004; OR 1.2, 95% CI 1.0 – 1.4, p=0.039 respectively]. No difference in odds ratios were observed between different occupations.

Conclusions: PEF values < 80% predicted are strongly associated with presence of HT, family history of HT and presence of IHD. Reduced peak flow values should stimulate the need for performing a cardiovascular assessment.

P4011
Study of daytime sleepiness among tunnel workers on rotating schedule
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Introduction: Working on shifts, and especially, on a night shift, influences the endogenous sleep regulation system leading to diminished sleep time and increased somnolence. This may be dangerous in some cases, especially in large scale constructions, such as tunnels.

Aims and objectives: The aim of our study was to examine whether sleep dura-
tion and daytime sleepiness differed between day and night shifts among tunnel workers.

Methods: In this study 42 male workers (during the last semester) in a tunnel con-
struction were recruited and examined at workplace. They underwent spirometric and performance tests (Weep-6K) to identify the cuts from performance and standing. They were also instructed to perform a cardiovascular assessment.

Results: The workers present a mean age of 42 years old and a mean Body Mass Index (BMI) of 27.2 kg/m². 69% of them were active smokers, while 31% have never smoked. Interestingly, 93% of the tunnel workers were consuming two coffees per day at least, while the remaining 7% were not drinking coffee at all. Almost one third of them reported alcohol consumption on a daily basis. Severe cardiologic, respiratory or endocrine disease was not reported among the recipients and neither were depression and anxiety disorders. Our results showed that almost all the workers had a score less than 10 in the Epworth Scale.
Sleepiness Scale (a score of 10 or more is considered sleepy), except for two subjects in which statistical analysis did not reveal any statistically significant correlation between somnolence and the work schedule (p=0.88).

**Conclusions:** The rotating shift in a dark and demanding environment, as in the tunnel construction, does not play a significant role in daytime sleepiness.

**P4012**
Basic spirometric parameters of coke plant workers over the years
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The aim of this study was to examine respiratory system efficiency in workers employed as coke plant battery staff in Steel Mill in Krakow over the years.

**Methods:** The spirometric examinations were performed at 3 different times:
1st in 1974 - 65 workers (age: 32,7±4,8 years, period of occupational exposure-8,8±4,6 years); 2nd in 1990 - the same 65 workers (they worked all the time in the same workshop; 48,8±5,1 years; 24,6±4,7 years respectively); 3rd in 2012 - 49 workers (age: 46,27±8,9, period of occupational exposure - 22,4±7,91)

In 1974 -1990 the levels of industrial pollution at workplace were similar. The concentration of SO2 was 15,4±6,6 mg/m³ and exceeded TLV, NOx -2,6±1,5 mg/m³, total dust-7,5-29,1 mg/m³ and free silicon dioxide-1,5-11,5%, geometric dimension of dust granule-3,9-4,5 um. In 2012 due to changes in both ownership of coke plants and increase in workers security, measured values were: SO2 - 8,9±4,4 mg/m³, NOx -2,1±1,1 mg/m³, total dust-0,3-3,0 mg/m³ and free silicon dioxide –2,0-3,6%

**Results:** The medians of basic parameters measured at 1st, 2nd and 3rd examination were as follows:
VC - 5,22 l (118,2%N); 4,46 l (91,1%N) and 4,89 l (97,8%N).
FEV1 - 4,19 l (107,2%N); 3,37 l (90,6%N) and 3,81 l (99,9%N).
FEV1/VC: 79%; 76%; and 79,04% respectively.

**Conclusions:** After 16 years of occupational exposure to gaseous and dust pollutants (1st & 2nd) significant decline of basic respiratory parameters was noted but they were still in the normal range.

After transformations in Poland the coke plant was modernized and environmental conditions significantly improved therefore it was agree with expectation that the new generation of workers also had the high efficiency of respiratory system.