**MONITORING OF REGIONAL DETERMINATE MEDICAL­SOCIAL SIGNS IN PATIENTS WITH SHOCK­PRODUCING TRAUMAS**

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On the basis of a comparative analysis of medical aid delivery to 114 victims of shock­producing traumas treated at the Arkhangelsk Regional Clinical Hospital (a trauma center of the I­st level) in 2013 and to 104 victims treated in the Arkhangelsk hospitals in 2002, there have been specified determinate medical and social signs in characteristics of gender, age, social position, alcohol intoxication, injury mechanism, comorbidity. The men made up the majority (79.8 %) among the victims. In the structure of injury causes, traffic accidents (46.2 %) and criminal injuries (28.8 ± 5.8) % prevailed, associated pathologies were observed in 15.8 % of the victims. People at the young and most able­bodied age leading an active life suffered shock­producing traumas more often. Thus, the average age of victims in 2013 was (36.6 ± 1.5) years (min = 18, max = 93), including the men ­ (36.5 ± 1.6), the women ­ (36.8 ± 3.7) years in comparison with 2002 when the average age was (39.0 ± 1.4) years; rejuvenation of the victims has occurred (2.5 years less). High correlations of traumatism with alcoholic intoxication is a separate social and medical problem. In the state of alcohol intoxication, 35.1 % of the victims suffered traumas, including 42.8 % of the men and 4.3 % of the women, the average alcohol concentration in blood (1.59 ± 0.12) % corresponded to the average degree of intoxication.

**Keywords:** shock­producing trauma, polytrauma, multiple and associated injuries

**CAR EXHAUSTS AND HUMAN ECOLOGY   
(Literature review)**

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The review is devoted to the analysis of the latest data on research of hygienic aspects of influence of firm and gaseous components of car exhausts on human and environmental health in modern cities. The history of studying of impact of motor transport exhausts components on human health and environment from 1930 to 2014 has been considered. According to literature data, the most dangerous components of exhausts have been separated: gases (SO3, NOx), polyaromatic hydrocarbons (pyrene, phenantrene, acenaptilene and fluorantene), firm particles of PM1 and PM2.5 (soot, ashes, oxides and salts of metals). It has been shown that motor transport conversion to new types of fuel (biodiesel, hybrid electric installations, bioethanol) didn’t reduce harmful effects of exhausts on ecology. The mechanism of negative effects of engine exhausts, according to literature, consists of induction of a local inflammatory reaction in airways, and then – in a system inflammatory response. The materials of the articles in the Scopus database (www.scopus.com), Web of Science (http://ip­science.thomsonreuters.com), Biological Abstracts were used (http://ip­science.thomsonreuters.com/cgi­bin/jrnlst/jloptions.cgi? PC=BA), PubMed (http://www.ncbi.nlm.nih.gov/pubmed/). The review of literature has shown that despite numerous foreign and domestic studies, solutions of the problem of a decrease in negative impact of motor transport exhausts on city ecology and human health was not developed.

**Keywords:** exhaust, cars, microparticles, ecological factor

**Working conditions and morbidity of gas­transport   
company workers in the extreme north EQUIVALENT AREA**

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Working conditions and morbidity among major occupational groups of a gas­transport company situated in the KOMI Republic of the Far North region of the Russian Federation have been analyzed. Prevalence of diseases in the primary morbidity structure is as follows: respiratory diseases (20.0 %), circulation diseases (14.5 %), musculoskeletal diseases (12.5 %), gastrointestinal diseases (9.6 %). Morbidity structure according to the number of temporary disability cases is different: respiratory (42.7 %), musculoskeletal (17.3 %), circulation (7.4 %), and gastrointestinal diseases (4.3 %). Morbidity among the gas­transport company workers was found to be higher than throughout the entire Komi adult population and among similar plant workers in the southern regions. Such evidence might be caused by the unfavorable effects of severe climate and by the specific character of the medical service at the northern gas­transport plant that registers diseases among workers more thoroughly. The increased cardiovascular, gastrointestinal and musculoskeletal disease incidence is observed among the gas­transport company workers exposed to noise and hot microclimate. The unfavorable effect of the mentioned adverse occupational agents is potentiated by smoking and irrational nutrition habits. Morbidity among the administrative officers of the gas­transport company is less than among the workers and engineer personnel exposed to harmful working conditions. The latter fact might result from the lowest harmful occupational exposure of the administrative staff and their most consistent participation in health improvement programs at industry­sponsored health care institutions.

**Keywords:** gas­transport plant, working conditions, morbidity, health, disability, the Far North

**REGIMES OF WORK OF CAR ASSEMBLY CONVEYOR IN CONDITIONS   
OF HEATING UP MICROCLIMATE**

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In the car assembly conveyor workplaces in summertime, high air temperature up to 30­31°С is observed. The purpose of the present research was establishment of parameters of a regime of work ­ physiological intensity of the working process (an integrated estimation of density and rate of labor actions), time and conditions of rest protecting workers from sharp exhaustion and overheat. There has been described the method of definition of a level of physiological intensity of physical work in which the risk of thermal overheat and sharp exhaustion of workers in conditions of a heating up microclimate was prevented. Use of the method is shown in terms of development of physiologically safe regimes of work in the car assembly conveyor by air temperature in workplaces 26­31°С. There have been determined variants of admissible combinations of parameters of operating modes (physiological intensity of work; conveyor productivity; total time of regulated breaks in work) and conditions of rest (decreased air temperature in rest points; speed of air movement at rest; a share of time of rest in a sitting position). Admissible physiological intensity of work and productivity in the car assembly conveyor workplaces has been established by air temperature 26­31°С and relative humidity 40­50%.

**Key words:** physical work, conveyor work, heating load, physiological intensity of work, work and rest regime

**FEATURES OF AUDITORY COGNITIVE EVOKED POTENTIALS P300 IN SUCCESSFUL HEART RATE VARIABILITY BIOFEEDBACK IN ADOLESCENTS LIVING IN ARCTIC AREA**

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The purpose of the investigation was to evaluate the auditory cognitive evoked potentials P300 parameters before and after vagal influences on the heart rhythm activation with biofeedback control in adolescents aged 15­17 years in the Arctic­Polar region (64°30’ N) and the Subpolar region (67°30’ N). There have been identified different variants of the P300 latency change, reflecting the neurons integration in the functional systems to ensure and optimize the sympathico­vagal balance under cognitive test in a single session of the heart rate variability (HRV) biofeedback in order to increase the HRV total power during the short recording (5 minutes) in adolescents living in the North. Optimization of excitation and inhibition in neural networks in the first variant has been revealed, what caused reduction of the P300 latency in the parietal, central, frontal and temporal brain parts. A greater involvement of the anterior temporal regions of the cerebral cortex occurred in the adolescents of Polar region. In the second variant, increased internal differential inhibition for achievement of a successful biofeedback control has been noted, that was reflected in prolongation of the P300 latency. In the adolescents from the Subpolar region, this variant of the brain reactivity was typical for the people with the initially shorter P300 latency; the P300 latency prolongation occurred in the frontal, parietal, central regions of both hemispheres and the right temporal part of the brain. A variant of the brain reactivity with prolongation of the P300 latency was most pronounced in adolescents with initially high emotionality levels; prolongation of the P300 latency occurred in all the studied left and right brain parts.

**Keywords:** heart rate variability biofeedback, cognitive evoked potential P300, adolescents, North

**PSYCHOLOGICAL DIFFERENCES OF INTELLECTUAL AND EMOTIONAL SPHERES OF BOYS AND GIRLS AT PRESCHOOL AGE**

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Preschool age is a period of improvement, personal development, which is characterized by individual features. The importance of the study of age­related characteristics of the emotional sphere of children is determined by the fact that there is a close relationship between emotional and intellectual development. It has been noted that violations in emotional development of preschool children lead to inability of use of other abilities, in particular intelligence, for further development. As a working hypothesis of the study we have taken a provision that boys and girls at senior preschool age had differences in intellectual, emotional and volitional development.

The study included 300 preschool children aged 6­7 years in the city of Moscow and the Moscow region. A mandatory condition for inclusion in the survey was a voluntary written informed consent of the child’s legal representatives. The study was conducted in two stages. In the first stage with the help of the psycho­diagnostic techniques, there were assessed the levels of verbal and social intelligence. In the second phase, there were studied the emotional and volitional spheres of the boys and girls. Statistical processing of the data included a comparative analysis of the average group indices, for statistical significance assessment, there was used the t­student test for unrelated samples.

It has been found that verbal intelligence of the senior preschool girls in the sphere of associative thinking was higher than in the boys (p = 0.027), and the amount of vocabulary at the beginning of the girls schooling was much bigger. The boys were more aggressive than the girls (p < 0.001), but the girls were more anxious (p = 0.027). In addition, the senior preschool boys had higher arbitrariness of verbal communication than the girls (p < 0.001), they were more intellectually productive in situations of positive emotional reinforcement (p < 0.001). This factor must be considered in the process of training of preschool children, especially in evaluation of their intellectual activity.

**Keywords:** psychological differences, intellectual sphere, emotional sphere, preschool age

**COMBINATION OF HEREDITARY AND EXOGENOUS RISK FACTORS IN ADOLESCENTS WITH SYNDROME OF ELEVATED BLOOD PRESSURE**

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We have comparatively analyzed the role of genetic and exogenous factors as well as clinical, laboratory and psychological data of 100 adolescents aged 15­17 years with the syndrome of elevated blood pressure. The period of the disease ranged from 1 to 84 months. It has been found that family history and excess weight were the main factors of arterial hypertension in the adolescents. This was indicated by an earlier onset of the disease (in the group with a family history duration of the disease 22.95 ± 17.52 months, without it ­ 10.00 ± 15.95 months, р <0.001), a higher body mass index (26 77 ± 6.11 g/m2 and 23.12 ± 3.54 g/m2, р = 0.005) and the reduced heart rate variability in patients with a family history (power reduction of HF, LF, VLF, TP). Low physical activity and psychological characteristics of adolescents, such as increased levels of aggression, in particular ­ a high index of hostility (Bass­Dark test), situational and personal anxiety, sensitive type of character created additional risks. These data make possible prediction of arterial hypertension risks in adolescents with the syndrome of elevated blood pressure.

**Keywords:** adolescents, elevated blood pressure, risk factors

**INCIDENCE OF BIRTH DEFECTS IN THE REPUBLIC OF KAZAKHSTAN AND EAST KAZAKHSTAN REGION IN 2007­2012: CONSEQUENCES OF THE NUCLEAR TESTS AT THE SEMIPALATINSK TEST SITE**

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Long term consequences of the activities at the Semipalatinsk nuclear test site (SNTS) twenty years after the test site was closed in relation to inborn abnormalities remain largely unknown. This study aims at assessment of the incidence of inborn abnormalities in general and cardiovascular abnormalities in particular in the Republic of Kazakhstan and in administrative regions of the East Kazakhstan region among children aged 0­14 years using the national official statistical data. All anomalies classified in ICD­10 as Q00­Q99 and inborn anomalies of the cardiovascular system classified as Q20­Q28 registered in 2007­2012 in Kazakhstan were included in the study. The regions were ranked by the mean 6­years incidence rates of inborn abnormalities. Linear regression analysis was applied to assess the trends in the incidence of birth defects in each of the regions in the country and each of the administrative units in the East Kazakhstan region. The results of this ecological study demonstrate that in spite of long­term nuclear testing at SNTS, twenty years after the test site was closed the incidence of inborn abnormalities in general and of the cardiovascular system in particular are among the lowest in the country suggesting that the present impact of the consequences of the SNTS on the incidence inborn abnormalities at the national level is minor compared to other factors. However, regional data clearly indicate that the highest incidence of inborn abnormalities in the region is still registered in the administrative units which were affected the most by the activities at the SNTS.

**Key words:** birth defects, inborn abnormalities of the cardiovascular system, radioactive pollution, Semipalatinsk, Kazakhstan

**ECOLOGICAL AND DIAGNOSTIC ASPECTS OF URINARY SCHISTOSOMIASIS   
AS PRECANCER   
(Literature review)**

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The article has included the issues of modern approaches to diagnosis and treatment of urinary schistosomiasis, a common parasitic disease. Numerous studies of pathogenesis, clinical manifestations and further development of urinary schistosomiasis allow us to consider this parasitosis as a precancerous disease. Due to the high rates of modern population igration, the widened area of schistosomiasis spreading and young age of patients, this subject is characterized by high medical and social significance. Despite the development of modern science, issues of diagnosis of this disease are relevant. We have an unresolved problem of verification of hidden forms, and the lack of effective screening complicates activity of the medical systems of the countries located in endemic areas. Also, the issues of early detection of the bladder cancer associated with urinary schistosomiasis that manifests itself in decades after the primary infection are pressing. The article has given an overview of original research works carried out over the last 30 years dedicated to epidemiology of urinary schistosomiasis and specific features of clinical and laboratory diagnosis of the bladder cancer caused by schistosomiasis: from clinical symptoms to high­precision molecular studies. We have identified shortcomings of existing research techniques and have planned the ways to improve verification of urinary schistosomiasis taking into account high carcinogenic activity of the pathogen and growth of medical­statistical indices in patients with the bladder cancer among residents of different countries.

**Keywords:** schistosomiasis, bladder cancer, cancer diagnosis, molecular markers, immunofluorescence assay

**TYPES OF RESEARCH IN HEALTH SCIENCES**

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This is an introductory article about the main methodological principles of research design in health sciences, characteristics of basic types of study designs using practical examples with the description of the methods of sample size calculation and statistical analysis of data. Detailed classification of research designs and basic principles of evidence­based medicine are presented in the article.

**Key words:** classification of study designs, research methodology, study design, evidence­based medicine.