**FEATURES OF VIRAL CONTAMINATION OF DRINKING WATER IN ARKHANGELSK REGION**

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Goal of study: to carry out an analysis of drinking water viral contamination dynamics in the Arkhangelsk region for development of proposals improving water supply of the population. In order to reveal markers of viral contamination in water, there have been carried out examinations of water samples by a laboratory in the Center for Hygiene and Epidemiology in the Arkhangelsk Region from 2006 to 2014 with use of different methods. With use of the virological method and the method of enzyme immunoassay (EIA), there were examined 934 drinking water samples from the public drinking water supply system, and with use of the method of polymerase chain reaction (PCR) ­ 617 water samples. Presence of enteroviruses and their genetic material in drinking water samples was confirmed in the laboratory in 2008, 2010 and 2014. In what connection, the proportion of samples with positive research results for enteroviruses with use of the PCR method was in 2008 ­ 4.5 %, in 2010 ­ 7.4 %, in 2014 ­ 1.6 %. In the analysis with use of the virological method, a positive result was received in 2010 – there were isolated 3 strains of Coxsackie enteroviruses В5 (2.4 %) and in 2014 ­ there was isolated 1 strain of Coxsackie enteroviruses В3 (0.5 %). The results of the analysis of water samples carried out with use of the EIA method with the goal to reveal hepatitis А virus and rotaviruses antigens have shown annually registered facts of presence of markers of these causative agents in piped water. Thus in the mentioned years, the proportion of samples containing group­specific antigens of rotaviruses was 1.3 %, hepatitis A virus antigen ­ 0.5 %. Annually in water samples, there are detected DNA/RNA of the following microorganisms: Salmonella spp., rotaviruses of A group, Noroviruses of 2 genotype, astroviruses, adenoviruses of F group. In the structure of the detected DNA/RNA of the causative agents, there prevail rotaviruses of A group (57.4 %) and adenoviruses of F group (24.1 %). There have been proposed recommendations for solution of problems of water situation improvement for supply of good drinking water to the Arkhangelsk region population.

**Keywords:** Arkhangelsk region, drinking water, viral contamination, proposals for water situation improvement

**ASSESSMENT OF NEUROPHYSIOLOGICAL FUNCTIONS of CENTRAL NERVOUS SYSTEM WHEN EXPOSED TO LEAD**

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The article presents the results of the response of the central nervous system during lead exposure using the diagnostic complex "Registrar of the spectrum of electromagnetic brain activity induction (MS MAGEE-01)”. The principle of operation of MS MAGEE-01 is based on the known physiological principles of segmental structure of the peripheral nervous system and neurophysiological models of integration of autonomic and somatic functions of the nervous system developed by G. A. Shabanov and co. According to the results of functional topical diagnosis with use of the diagnostic complex MS MAGEE – 01, it has been revealed that various functions responsible for the body performance responded to the interaction of persons and lead in the form of changes in the brain tonic activity in certain groups of peripheral receptors (reflex links). The greatest response was observed in the interval from 10 to 20 minutes after exposure, in 30-40 minutes, the effect decreased slowly and all functions returned to the status of the background research phase. After the interaction with lead, there appeared changes in various organs and tissues registered for some time on the diagnostic complex MS MAGEE – 01. This determines the direction of further research and allows identification of effective ways for further screening.

**Keywords:** lead, impact, response, central nervous system

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**AGE FEATURES OF HEMISPHERIC ASYMMETRY OF CEREBRAL BLOOD FLOW  
IN CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER**

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The article presents the features of asymmetry of cerebral blood flow determined with use of rheoencephalography of 97 boys aged 7­10 years and 56 boys aged 11­14 years with the attention deficit hyperactivity disorder. It has been found that in primary school the children showed reduction in blood filling intensity and improvement of elastic properties of blood vessels for distribution and resistance in the carotid region, increased elastic properties of blood vessels in the vertebrobasilar area on the left. Obviously, these changes in the cerebral blood flow reflected the specific characteristics of the cerebral blood flow in children with this disorder. For children at secondary school age, there is registered an increase of the blood flow intensity, the tone of large arteries and elastic properties of blood vessels for distribution and resistance in carotid and vertebrobasilar area on the left, which corresponds to the existing ideas about organization of hemodynamic processes in the brain and the role of the left­hemispheric dominance in children in ontogenesis.

Keywords: school­age children, ADHD, hemispheric asymmetry, cerebral blood flow

**EFFICIENCY OF SOCIAL AND PSYCHOLOGICAL ASSISTANCE TO ADOLESCENTS  
WITH BRONCHIAL ASTHMA**

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Bronchial asthma in adolescents is an actual problem in the XXI century. In modern conditions, the role of psycho­emotional and psychosocial factors in etiology and pathogenesis of the disease increased. In the city of Moscow and the Moscow region, there were examined 200 adolescents aged 14­15 years (120 boys, 80 girls) with asthma ­ an experimental group and 200 adolescents at the same age (110 boys, 90 girls) without it ­ a control group. To study psychological characteristics of the adolescents and monitoring of effectiveness of the program, there has been selected a number of psychological tests – the multifactor method of studying personality (FPI); the method for determining of the subjective control level (ACC); self­esteem; health, activity, mood (SAN) and the leading emotional modality. Initial diagnosis of these techniques has allowed us to determine specificity of personal organization of the adolescents with psychosomatic diseases, as well as directions and priorities in the work with them. After training of the adolescents, there has been conducted a follow­up study. Independent groups of data not obeying the normal distribution law were compared using the non­parametric Wilcoxon Signed Ranks Test, nonparametric Mann­Whitney test and the Exact test. It has been found that delivery of social­psychological assistance lead to increased stress resistance and adaptability by developing the skills of self­control and self­regulation of mental and emotional state of the adolescents, it was also an important element of student­centered care for asthma. By becoming more optimistic, active, motivated and communicative, teenagers are more successful among their peers.

Key words: bronchial asthma, teenagers, social­psychological assistance

**SEX DIFFERENCES OF BEHAVIORAL RESPONSE UNDER DIFFERENT ENVIRONMENTAL CONDITIONS IN THE ELDERLY**

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The article presents the results of studies of the behavioral response in 53 elderly people (60­65 years of age). The purpose of the study is to compare physiological parameters of a behavioral response in men and women in old age. Indicators of decision­making strategies in a free, probabilistic and deterministic environments were assessed through a computer complex for psychophysiological researches KPFK­99 «PSIHOMAT», which includes a test computer system «Binatest». It was found that older people behavior strategy in a free environment has the character of a random search. Stereotype of choice, which is important to adapt to changing environmental conditions and to organize complex behavioral programs, is typical for men between the age of 60­65. Manifestation of impulsivity, as well as lower rates of operations thinking when analyzing the situation and making the right decision, indicating incomplete digestion of probabilistic structure are seen in women between the age of 60­65. In a deterministic environment, when increasing the rate of activity, there was a decrease of accuracy of the assignment in men. It is noted that in tasks where you need to quickly perceive the details and often switch attention, women show greater efficiency.

**Keywords:** elderly, behavioral response, probabilistic forecasting, stereotypes

**CHRONOTROPIC EFFECT OF FUNCTIONAL TESTS DURING HUMAN BODY MOBILIZATION**

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With the aim of studying the features of the vegetative components of cardiac activity in the period of functional stress of the body, that are interesting for study of adaptive changes in the human circulatory system, there has been studied the heart chronotropic response to the paired somato­vegetative cardiac reflex caused by a modified breakdown Aschner­Danini in first year military servicemen and students of the Syktyvkar State University in conditions of relative rest and after physical loading, samples Martin­Kushelevsky. With use of the method of electrocardiography in the second standard lead, there were recorded RR­intervals before and after functional tests. It has been found that in the servicemen with the heart heterogeneous chronotropic function which bodies adapted to new environments, vagal samples in the body state of relative rest caused a bigger heterogeneous chronotropic response of the heart than in the students adapted to external conditions. After the subjects underwent exercise loading, the heart response to induced coupled cardiac reflex was unidirectional and more pronounced than at rest. The results indicated increased influence of the vagus on the heart work in conditions of the body mobilization. Associated vagal test combined with the exercise loading is the method of choice in evaluation of the autonomic system regulating the circulation homeostasis in conditions of high requirements to the body.

**Keywords:** heart chronotropic effects, autonomic nervous system, sample Aschner­Danini, test Martin­Kushelevsky, body mobilization.

**ENDOCRINE PROFILE OF THE MALE POPULATION IN RUSSIA DEPENDING  
ON THE GEOGRAPHIC LATITUDE OF OCCUPATION**

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The goal of research is to examine the characteristics of the hormones of the pituitary­gonadal and pituitary­thyroid gland systems in the peripheral blood of the male population living in different areas of Russia, taking into account the population groups. The study involved 136 men aged 22 to 50 years old, who are permanently resident in the North no less than three generations. Among them there are 80 local residents of Arkhangelsk (64**°** 32´ N), 19 local residents of Vologda (59**°** 13´ N) and 37 local residents of Nes, Nenets Autonomous Okrug (66**°** 36´ N). According to the basis of nationality group of men living in Nes was divided into: Russian ­ 23 people and settled aboriginal population (Nenets, Komi) ­ 14 people. We have shown that functional activity of the pituitary­thyroid axis (thyrotropin, thyroxine, free triiodothyronine) in the male Caucasoid and settled aboriginal population of the polar region exceeds its level in the inhabitants of the circumpolar area (Arkhangelsk). At the same time, men living in the mid­latitude area (Vologda) had minimal activity of the pituitary­thyroid axis (triiodothyronine, free thyroxine), compared with polar and circumpolar areas. It was shown that the functional activity of the pituitary­gonadal axis in men living in Vologda (luteinizing hormone, follicle­stimulating hormone, inhibin B, free testosterone, dehydroepiandrosterone sulfate) and in Nes (follicle­stimulating hormone, inhibin B, testosterone, free testosterone, sex­hormone­binding globuline) was higher compared with the inhabitants of the city of Arkhangelsk. The levels of sperm antibodies were minimal in men living in Nes. At the same time, changing the traditional way of life from nomadic to a settled one leads to the negative tendencies such as the decrease of the synthesis reserves of steroid hormones in the settled aboriginal population that is shown by the decreased serum levels of progesterone and dehydroepiandrosterone sulfate.

**Keywords:** hormones, sperm antibodies, sex­hormone­binding globuline, North, adaptation, men

**LEECH THERAPY IN KAZAKHSTAN: PATIENTS’ CHARACTERISTICS AND COMPLIANCE WITH TREATMENT**

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Leech therapy is one of the most commonly used methods of complementary medicine. In Kazakhstan, leech therapy is officially recognized method of rehabilitation, however, no studies describing patients of leech therapy clinics or factors associated with compliance with this treatment with original data from Kazakhstan have been published yet. The aim of this study is to present socio­demographic characteristics of patients receiving leech therapy and assess factors associated with compliance with leech therapy in Kazakhstan. This is a cross­sectional study which includes all patients who attended the clinic “Hirudo” (Almaty, Kazakhstan) from July 2012 through December 2014. Data were collected from medical records and by interviews performed by the first author. Independent associations between predictors and the compliance to treatment were assessed by multiple binary logistic regression. Adjusted odds ratios (aOR) with 95 % confidence intervals (CI) were calculated. Cardiovascular patients comprised 67,5 % of all patients during the study period. Pensioners were the most common social group (41,7 %). The main factors associated with compliance with leech therapy were lower costs compared to standard treatment (aOR = 25,3; 95 % CI: 17,2–37,3), satisfaction by the quality of care (aOR = 4,0; 95 % CI: 1,8–19,6) male gender (aOR = 1,5; 95 % CI: 1,0–2,2) and married status (aOR = 6,4; 95 % CI: 4,1–10,2). We also observed an inverse association between patients’ age and compliance. Thus, compliance with leech therapy among Kazakhstani patients is mainly determined by lower costs compared to standard treatment and subjective satisfaction by the quality of care. Men and married patients are also more likely to comply with this treatment. However, we emphasize that the evidence needed for such an extensive use of leech therapy as in Kazakhstan is still missing warranting further research by means of well­designed clinical trials.

**Key words:** leech therapy, compliance, predictors, satisfaction by quality of care, Kazakhstan

**CROSS­SECTIONAL STUDIES: PLANNING, SAMPLE SIZE, DATA ANALYSIS**

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In this paper, we have described the main principles of cross­sectional studies planning and data analysis. A theoretical base for cross­sectional studies’ design has been presented as well as advantages and disadvantages of this type of studies. We present the methods for sample size calculation and data analysis using statistical software. Calculation of confidence intervals using free software “Epi Info” and online calculators has also been presented. The main effect measures used in cross­sectional studies have been described. Examples of cross­sectional studies in the fields of clinical medicine, dentistry and public health performed in the Arkhangelsk region have been given. The primary audience for this article consists of master and doctoral students whose research is still in the planning phase. This paper supplements, but does not substitute the literature in the field of clinical epidemiology.

Key words: cross­sectional study, prevalence study, prevalence, prevalence ratio, Epi Info.