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**The epidemiology of circulatory diseases in Russia and in the regions (on the exampleE of the Far-Eastern Federal district)**

*For the purpose of calculating the forecast of diseases of the circulatory system and assess the real needs for high-tech medical care to the population we analyzed data on the prevalence of diseases of the circulatory system and its individual forms over a long period of time in the Far-Eastern Federal district. The article shows considerable growth in overall and primary morbidity diseases of the circulatory system in the region over the past 10 years, and increased the corresponding values in the series available for the analysis of individual species. Unfortunately, still, there is a healthcare professionals planning needs for surgical interventions or other nosological forms of diseases of the circulatory system, there are only data showing the number of hospitalizations and surgical interventions, which makes it impossible to assess the real need for some form of medical care.*

### **Эпидемиология болезней системы кровообращения в России и в регионах (на примере Дальневосточного федерального округа)**

*С целью расчета прогноза заболеваемости болезнями системы кровообращения и оценки реальной потребности в высокотехнологичной медицинской помощи населению авторами статьи проанализированы данные по распространенности болезней системы кровообращения и отдельных ее форм за длительный период времени по Дальневосточному Федеральному округу. В статье показана динамика существенного роста объемов общей и первичной заболеваемости болезнями системы кровообращения в регионе за последние 10 лет, а также повышения соответствующих показателей в ряде доступных анализу отдельных ее видов. К сожалению, по-прежнему в распоряжении специалистов здравоохранения, планирующих потребности в оперативных вмешательствах тех или иных нозологических форм с болезнями системы кровообращения, имеются лишь данные, свидетельствующие о количестве госпитализаций и оперативных вмешательств, что не дает возможности оценить реальную потребность в том или ином виде медицинской помощи.*

***Keywords:*** *epidemiology, medical, health, diseases of the circulatory system, management, the Far East of Russia.*

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Today, diseases of the circulatory system is firmly in second place in the structure of general morbidity in the Russian Federation. Modern and effective treatment of most types of diseases of the circulatory system is not only socially significant task, but also included in the list of expensive high-tech types of medical care. The main aim of our study was to evaluate the dynamics of prevalence of diseases of the circulatory system and their main nosological forms in the last 10 years on the territory of the Russian Federation and the Far Eastern Federal district, making it possible to predict trends in the incidence and prevalence of certain types of diseases of the circulatory system and define the real need for some form of medical care in a given region and in the whole country.

In 2013, the Ministry of health of the Russian Federation, according to the Central research Institute of organization and informatization of health Ministry of health of Russia registered more 32141 thousand cases of diseases of the circulatory system, of which more than 4 thousand of newly diagnosed cases. The overall incidence of diseases of the circulatory system among adults has increased over the last 10 years, 26,6%, and primary morbidity – 37,47%. Changes in overall and primary morbidity of circulatory system diseases in children older and younger age groups at 10 years were as follows: in the group of children 15 to 17 years total incidence of circulatory diseases has increased over the last 10 years 35,5%, and primary morbidity – 25,36%; in the group of children up to 14 years inclusive total incidence of diseases of the circulatory system has decreased over the last 10 years is 7,4%, and primary morbidity – 4,9% [6].

In 2013 in the Far-Eastern Federal district, the incidence of newly diagnosed diseases of the circulatory system were the highest in Kamchatka (89,6% higher than the national average) and the Amur region (50,7%). In the Magadan region and Primorsky region indicators of primary disease was observed in 37 to 40% below the national average [1]. Low level of General morbidity for adolescents in 2013 (in 2 – 3 times less than the average for the country) noted in the Sakhalin region, the Primorsky region, the Chukotka region. The frequency of newly identified cases, in 1,5 – 1,9 times exceeded the average level in the country, took place in the Jewish Autonomous region. The primary incidence below the average value recorded in Kamchatka territory and the Chukotka region.

The level of general morbidity diseases of the circulatory system in children up to 14 years in 2013 3,1 – 3,4 times below the average noted in the Sakhalin region, 2,6 times – in the Kamchatka region. 4,9 times below the level of primary morbidity are registered in the Kamchatka region, 2,1 – 2,6 times lower in the Sakhalin region and the Chukotka region.

## One of the most common forms of diseases of the circulatory system among adults is coronary heart disease. In 2013 in the regions of the Russian Far East among all the subjects of the Russian Federation the maximum prevalence of coronary heart disease were not observed in the 2.0-2.6 times lower average values of country-fixed indicators in Chukotka, 1.5-1.9 times lower in Magadan and Sakhalin regions and the Jewish Autonomous region [1].

*Table 1*

**Coronary heart disease in Russia and the Far-Eastern Federal district in 2004 – 2013 (number of cases per 100,000 adult population)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Index** | | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** |
| The Far East | First identified cases | 447,2 | 444,3 | 455,9 | 449 | 473,6 | 539,2 | 505,5 | 514,7 | 522,4 | 748,3 |
| Just registered | 4086,6 | 4381,8 | 4536,7 | 4419,5 | 4429,8 | 4607,6 | 4838,5 | 4967,7 | 4953 | 4958 |
| The Russian Federation | First identified cases | 481,6 | 521,1 | 566,0 | 537,5 | 544,8 | 569,9 | 608,2 | 633,2 | 633,1 | 963,1 |
| Just registered | 5516,5 | 5944,6 | 6158,8 | 6200,2 | 6183,0 | 6244,0 | 6341,7 | 6357,4 | 6301,6 | 6247,5 |

From the table 1 it is evident that over the last 10 years there has been a significant increase in newly identified cases of coronary heart disease in middle the Far East by 67,3% (447,2 to 748,3) per 100,000 adult population. The total number of registered cases increased by 21,3% (from 4958 to 4086,6 cases) per 100,000 adult population. A significant increase in primary morbidity occurred in 2013 (by 43,2% compared with 2012) against the background of little to no dynamics of total morbidity (growth in comparison with 2012 +0,1%). In our view, for a more accurate assessment of the incidence of primary coronary heart disease in the Far East region is necessary to analyze this indicator in dynamics for the next 2 – 3 years.

Among the subjects of the Russian Far East for 2013, the incidence of unstable angina in the Magadan region increased in 2012 compared to the previous year 3,3 times (the average in the country increased by 11,2% and amounted of 174,6 per 100,000 adult population), and in the Kamchatka region, the incidence in 2013 was 2 times higher than the national average. The lowest incidence of acute myocardial infarction in the Far East it is recorded in the Chukotka region – in 1,9 times lower than the national average (134,7 per 100,000 adult population).

The overall incidence of chronic ischemic heart disease on average in Russia amounted to 3575,6 cases per 100,000 of the adult population, higher than in 2012 by 6,7%. The Far East the greatest increase over the 2013 year in comparison with previous was observed in the Khabarovsk territory (53,3%).

Acquired heart diseases. The main factors influencing the large prevalence varying etiologies are the socio-economic situation and the change in life expectancy in the regions [8]. Available data on prevalence of rheumatic valvular heart disease in the territory of the Russian Federation from 2004 to 2009 show similar to the global trend of reducing this etiology with the exception of total number (per 100 thousand population) of cases in adolescents (14 – 15 years). The Far East tends to decrease and the total number of cases observed in all age groups. Dynamics of acquired heart disease of other etiology (in developed countries today is prevalent degenerative etiology of malformations) are not represented according to the Central scientific-research Institute of organization and informatization of health Ministry of health of Russia.

Operations on valves are high-tech methods of treatment that requires large expenses, the corresponding technical equipment, implantable materials. It is doubtful that the morbidity data of the population of the Russian Federation heart disease, is completely absent in statistical reports of the Ministry of health of the Russian Federation, will be available earlier than 2015.

Cardiac rhythm and conduction are the main causes of sudden cardiac death and are the second largest group of patients with cardiovascular disease who need surgical and interventional therapies [2].

An approximate idea of the prevalence of cardiac arrhythmias and conduction can be obtained at the moment only on the basis of information on the number of patients treated in hospitals of patients and surgical interventions in the regions and in Russia overall (table. 2).

*Table 2*

**In-hospital treatment of cardiac arrhythmias and conduction in institutions**

**of the Far-Eastern Federal district, 2011 – 2013**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **The number of patients** | **with atrioventricular block** | | | **with fibrillation and atrial flutter** | | | **with ventricular tachycardia** | | |
| **2011** | **2012** | **2013** | **2011** | **2012** | **2013** | **2011** | **2012** | **2013** |
| The Far East | 684 | 792 | 794 | 8123 | 9414 | 10057 | 166 | 336 | 143 |
| On 100 thousand population | 10,95 | 12,64 | 12,7 | 130,0 | 150,24 | 160,87 | 2,66 | 5,36 | 2,29 |
| In Russia | 13081 | 14615 | 16032 | 132696 | 145446 | 165954 | 5245 | 6617 | 6815 |
| On 100 thousand population | 9,16 | 10,22 | 11,18 | 92,88 | 101,67 | 115,77 | 3,67 | 4,63 | 4,75 |
| The number of operations | all | | | implantation of electrical pacemaker | | | with correction of tachyarrhythmias | | |
| 2011 | 2012 | 2013 | 2011 | 2012 | 2013 | 2011 | 2012 | 2013 |
| The Far East | 1553 | 2362 | 2327 | 1191 | 1561 | 1630 | 305 | 620 | 620 |
| On 100 thousand population | 24,86 | 37,70 | 37,22 | 19,06 | 24,91 | 26,0 | 4,88 | 9,89 | 9,92 |
| In Russia | 48912 | 51316 | 58578 | 31604 | 33827 | 36984 | 16189 | 18938 | 21184 |
| On 100 thousand population | 34,24 | 35,87 | 40,86 | 22,12 | 23,65 | 25,8 | 11,33 | 13,24 | 14,79 |

Presented by the Ministry of health information apparent increase in the volume of inpatient treatment of patients with cardiac rhythm and conductivity in the Far East from 2011 to 2013: with atrioventricular block by 16,1% on absolute data and by 16% per 100 thousand population; fibrillation and atrial flutter by 23,8% and 23,7%, respectively, in ventricular tachycardia data are inconsistent.

The total number of surgical interventions regarding infringements of heart rhythm and conductivity increased in the Far East 49.8% and 49,7%, respectively. The number of operations pacemaker implantation increased correspondingly in the Far East – 36,9% and 36,4%; surgery, correction of tachyarrhythmias increased more than 2 times.

Taking into account the progressive development of methods of diagnosis and treatment in the regions and in the country overall assessment of the real needs of this group of patients surgical treatment is becoming increasingly important.

Cerebrovascular diseases are one of the most common noncommunicable diseases in the adult population (the child population pathology spread slightly). Dynamics of general and primary morbidity in the Russian Far East are given in the table. 3.

*Table 3*

**Cerebrovascular diseases in Russia and the Far East in 2004 – 2013**

**(number of cases per 100,000 adult population)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Index** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** |
| The Far East | First identified cases | no data | no data | 487,3 | 477,8 | 595,3 | 597,6 | 582.1 | 674.7 | 705,6 | 763,3 |
| Just registered | no data | no data | 4059,8 | 4072,8 | 4108,8 | 4098,0 | 4320.1 | 4286.9 | 4454,1 | 4429,8 |
| The Russian Federation | First identified cases | no data | no data | 595,2 | 578,9 | 764,5 | 711,4 | 732,0 | 756,9 | 794,8 | 829,8 |
| Just registered | no data | no data | 5922,0 | 5903,0 | 5898,0 | 5949,3 | 6041,2 | 5834,7 | 5902,4 | 5990,9 |

The total number of registered cases of cerebrovascular diseases for 2006 – 2013 rose slightly: in the far East (9.1%) is slightly higher than in the country as a whole (1,1%). The frequency of newly registered cases during the same period has increased significantly: in the Far East by 56,6% and in Russia as a whole by 39,4%. Only for the last accounting year level of primary morbidity in the Magadan region increased 2,4 times, Jewish – 1,7 times, in Chukotka and Kamchatka – is 30 – 40%. While in the far East in 2013 in comparison with 2012 even registered a decrease in the total number of registered cases of cerebrovascular diseases by 0,5% on the background of General increase for the country as a whole 1,5. The number of institutions that perform operations on extracranial arteries increases annually. Note that in 2013 the city of Khabarovsk, was the leader among the institutions with the highest level of surgical activity in this section and, respectively, for the country as a whole.

In the annual reports of the Ministry of health of Russia the defeat of the great arteries presented in two sections: "Cerebrovascular disease: occlusion, stenosis precerebral arteries and occlusive disease, thromboangiitis obliterans" that does not represent the real structure and the prevalence of lesions of the descending aorta and its branches with regard to atherosclerosis as the leading nosological forms (about 16% for all vascular diseases, from 67% to 94% when Leriche syndrome) [7].

Global data may define high medical and social importance of the majority of nosological forms of diseases of the circulatory system, which leads to the need for studying their prevalence. Over the last 10 years have seen an increase in overall and primary morbidity diseases of the circulatory system among adults and adolescents by 25 – 35% and increased the corresponding values in the series available for the analysis of individual nosological forms: ischemic heart disease (including angina and acute myocardial infarction), Cerebrovascular diseases in the adult population. Data on the structure and prevalence of circulatory diseases in the most remote region of the country (the far East), on average, comparable to nationwide with significant differences for entities within the region. The results indicate an active role of dispanserization of population, uneven among Russian regions the growth and development of diagnostic methods on one side and the types of medical and surgical treatment.

Unfortunately, in the statistical reports of the Ministry of health of the Russian Federation information on the incidence and prevalence of diseases of the circulatory system presents only separate nosological groups: "rheumatic valve disease", "disease characterized by elevated blood pressure", "coronary heart disease", "angina", "acute myocardial infarction", "myocardial re-infarction", "cerebrovascular disease", "disease, thromboangiitis obliterans". Such types of diseases of the circulatory system as non-rheumatic acquired heart defects (and since 2009, all types of acquired heart disease), atherosclerosis of the descending aorta and its branches, as well as violations of cardiac rhythm and conduction are usually neglected from year to year.

An approximate idea about the prevalence of acquired heart disease, disorders of cardiac rhythm and conduction pathology of the descending aorta and its branches (including arterial aneurysm, Leriche's syndrome, and peripheral arteries) can be obtained at the moment only on the basis of information about the volume of surgeries, number of hospitalized patients in the regions and Russia in General. But in this case, it is possible to fix only the nature of the pathology, the composition of the operated patients, which does not allow for a prediction of their prevalence and incidence, as well as to clarify the need for some form of assistance.

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