

Table 8

The ratio of men and women in subjects of the Russian Federation in FEFD
(per 1,000 men, there women)

РФ	2010 year	2011 year	2012 year	2013 year	2014 year	Тпр, (%)
	1163	1162	1160	1159	1158	- 0,42
FEFD	1083	1082	1081	1081	1081	- 0,18
The Republic Of Sakha (Yakutia)	1058	1057	1059	1060	1060	0,19
Kamchatka territory	1018	1014	1001	996	1003	- 1,5
Primorsky Krai	1089	1085	1084	1085	1086	- 0,28
Khabarovsk territory	1101	1101	1097	1098	1096	- 0,45
Amursk region	1109	1112	1113	1115	1108	- 0,09
Magadan region	1057	1060	1060	1062	1065	0,76
Sakhalin region	1080	1077	1078	1077	1079	- 0,09
Jewish Autonomous region	1101	1103	1102	1105	1105	0,36
Chukotka Autonomous district	995	971	966	964	961	- 3,42

– a consequence of the Great Patriotic War of the 20th century, participation of the Russian Federation in the local and international conflicts. Also male “supermortality” at able-bodied age and on diseases for the studied period (2010–2014) remains very high.

The analysis of an age and sex pyramid allows to characterize not only demographic history of the state, but also to predict a demographic situation in the future including in territorial subjects of

the Russian Federation in the territory of the FEFD for implementation of programs of the state support, including preferential supply of medicines and other social programs.

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HYGIENE, SANITATION, EPIDEMIOLOGY AND MEDICAL ECOLOGY

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THE ENVIRONMENT AND INCIDENCE OF MALIGNANT NEOPLASMS IN THE POPULATION OF THE DIAMOND PROVINCE OF YAKUTIA

ABSTRACT

The degree of influence of anthropogenic, techno-genetic loads on the state of the environment and the characterization of the incidence of malignant neoplasms of the population of the regions that make up the diamond province of Western Yakutia are analyzed.

Keywords: diamond province, environmental factors, neoplasms, morbidity.

To the zone of the diamond province are regarded the districts of Western Yakutia: Anabarsk, Olenek, Mirninsky, Suntarsky, Nyurbinsky, Verhnevilyuysky, Vilyuysky, Olekminsky and Lensky, whose vast territory extends from the Irkutsk region to the shores of the Arctic Ocean and occupies 22.1% (684.3 thousand km²) of the territory of the Republic of Sakha (Yakutia). In the Myrninsky, Nyurbinsky, Anabar and Oleneksky districts, the diamond mining industry is developed and oil and gas production is increasing. The Vilyuysk hydroelectric power station, the Vilyuy Reservoir are constructed, huge reserves of hydrocarbons are reconnoitered, all this has caused considerable technogenic and

anthropogenic loads of the environment (E) which remain a big environmental problem of the Western Yakutia. From traditional industries in these territories, agriculture is developed, mainly the branches of meat and dairy cattle breeding, herding, farming, and also lacustrine fishing and hunting. In addition, in the Olekminsky district forestry, timber processing industry, precious stones mining are developed, and the Lensky district is a transport hub of the diamond mining, oil and gas industry, and the woodworking industry is also developed here. Climatic conditions in the regions of Western Yakutia are estimated in the range from “relatively moderate” (Olekminsky and Lensky) to “extremely

extreme” (Anabarsky, Olenek) [2].

The purpose of the study is to assess the degree of influence of anthropogenic, technogenic loads, environmental factors on the incidence of malignant neoplasms of the population living in the eon of the diamond province (Western Yakutia).

MATERIALS AND METHODS OF RESEARCH

The materials of Yakut republican oncological clinic (YROC) reporting were classified for the period from 1989 to 2010. Materials from the State report of the Ministry of Nature Protection of the Republic of Sakha (Yakutia) for the period from 2010 to 2014 were used [3, 4], Statistical data on the Territorial authority of Fed-

eral State Statistics Service in the Sakha Republic (Yakutia)[13, 14], the results of their own research [1, 6 - 11]. Assessment of influence of anthropogenic and technogenic loads of state of environment is carried out with use of data of E.I. Burtseva [2]. Statistical data are processed according to a common methodology using an application package.

RESULTS AND DISCUSSION

Anthropogenic load. In the regions of Western Yakutia, in connection with the rapid development of the diamond industry and the discovery of huge hydrocarbon reserves with the prospect of their industrial development, both for domestic consumption and for imports to the countries of Southeast Asia, since the second half of the 20th century, the population of the region has increased significantly. By 1990, in comparison with 1959, it was 2.4 times.

In the regions of Western Yakutia, due to the rapid development of the diamond industry and the discovery of huge hydrocarbon reserves with the prospect of their industrial development, both for domestic consumption and for imports to the countries of South-East Asia. From the second half of the XX century, the population of the region increased significantly by 1990 compared to 1959 by 2.4 times. In this, an important role was played by external migration from the countries of the near abroad and other regions of Russia. According to data of republican statistical office, the share of the visitor of the population in Mirninsky district made 93,3% of all population, in Lensky – 89,3, in Olekminsky – 51,8 and Oleneksky – 50,8%. In other areas which are a part of the diamond province: Nyurbinsky (82,2%), Suntarsky (92,9), Verkhnevilyuysky (94,8), Vilyuysky (68,9) and Anabarsky (87,2%), a majority of inhabitants makes indigenous people. The increase in the population increased the anthropogenic and man-caused environmental pressures on Western Yakutia by 178,0%. For the purpose of the most accurate determination of the effect of anthropogenic pressure on the environment, a methodology based on calculating the level of population density per 1 km² is used (Table 1).

Relatively high coefficients of population density (people per 1 km²) in 1959 were observed in Verkhnevilyuysky (0.30), Suntarsky (0.29), Lensky (0.29), Nyurbinsky (0.29) and Vilyuysky (0,25) districts, and the lowest values are in Myrninsky (0.04) and in the Arctic districts (Anabar and Oleneksky – < 0,02). At the same time, the load on the environment was characterized as “lowered” in the Southern and Vilyuisk regions and in the Arctic as “low”.

Table 1

Dynamics of anthropogenic pressure in the regions of Western Yakutia [5,13,14]

District	Population density, the people on 1 km ²			Ranging scale			Environmental load		
	1959	1990	2012	1959	1990	2012	1959	1990	2012
Lensky	0,29	0,67	0,51	2	4	4	U	R	R
Olekminsky	0,16	0,19	0,16	2	2	2	U	U	U
Mirninsky	0,04	0,57	0,44	1	4	4	L	R	R
Suntarsky	0,29	0,45	0,42	2	3	3	U	M	M
Nyurbinsky	0,38	0,56	0,47	3	3	3	M	M	M
Verkhnevilyuysky	0,30	0,51	0,51	3	4	4	U	R	R
Vilyuysky	0,25	0,59	0,45	2	4	4	U	R	R
Anabarsky	0,02	0,07	0,06	1	1	1	L	L	L
Oleneksky	0,01	0,01	0,01	1	1	1	L	L	L

Note. In Table 1, 4-5, the environmental load: L – low, U – under, M – medium, R – raised, H – high.

It should be noted that the indicators of anthropogenic load on the environment in the dynamics over the 30-year period (1959-1990) have undergone a significant change towards the growth of indicators. Thus, by the end of the analyzed period, the environmental load in the zone of the Vilyui group of areas was assessed as “elevated”, and in the southern and arctic regions as “medium” and “low” (Fig. 1).

Medico-demographic characteristics. The highest rates of birth rate of children significantly influencing indicators of a natural increase of the population were observed in Olenekskom (24,8%), Verkhnevilyuysk (21,5), Vilyuysk (22,1), Nyurbinsky (21,6), Suntar (21,0) and the Anabar (19,4) districts. The majority of the population of these areas is made by Yakuts and the small peoples of the North (SPN), their specific gravity fluctuates from 50,8 to 98,2% of total number of the inhabitants living in them. Meanwhile in Mirninsk (93,3), Lensk (89,3), the Olyokma (51,8) districts where the inverse ratio of a share of the visitor is observed (Russian, etc. nationalities) and indigenous people, birth-rate coefficients is comparative below [5,13,14] (tab. 2).

Correlation analysis revealed a strong inverse correlation between the number

of newcomers in the diamond province of Yakutia and the birth rate of children in the field ($r = -0.79$). And between the birth rate of children and the number of indigenous peoples of the North living in the same areas, there was a direct strong connection ($r = 0.88$). Similar results were revealed during the correlation analysis between population growth rates and the relative density of the newcomer and the indigenous population (respectively: $r = -0.79$ and $r = 0.70$).

The results of the analysis make it possible to confirm that the maximum incidence of women with malignant neoplasms (MN) of reproductive organs in the republic is registered in industrial regions where the majority of the female population are visitors. It should be noted that the low birth rate of children causes an increase in the incidence of female (MN) of the reproductive organs. This is evidenced by the results of pair correlation, presented in Table. 3, which allow us to state that the decrease in the birth rate of children is associated with an increase in the incidence of heart failure in reproductive organs in women ($r = -0.68$), primarily the mammary gland ($r = -0.62$) [6-8].

Economic and technogenic loads of the environment. The environment of the ter-

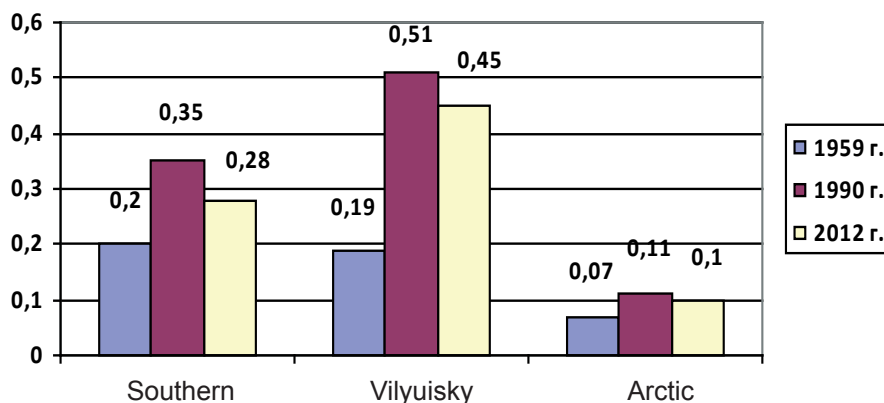


Figure 1. Anthropogenic load in the regions of Western Yakutia for 1959-2012.

Table 2

**Medico-demographic indicators of the population of areas of Western Yakutia
(Per 1000 population) [5,13,14]**

Content	Year	Districts of Western Yakutia								
		Southern		Vilyuysky		Arctic				
		Lensky	Olekminsky	Mirinsky	Nyurbinsky	Suntarsky	Verkhnevilyuysky	Vilyuysky	Anabarsky	Oleneksky
Children were born	1990	17,2	22,2	15,4	23,7	27,3	30,2	25,8	29,0	28,1
	2000	11,6	13,1	10,5	17,6	17,1	18,6	15,7	18,7	17,8
	2005	13,4	11,6	11,1	17,2	15,2	17,4	15,4	20,7	13,7
	2011	15,3	16,5	13,3	21,6	21,0	21,5	22,1	19,4	24,8
Mortality the population	1990	6,8	9,4	3,8	7,8	8,3	8,3	7,7	9,5	9,0
	2000	11,4	12,1	6,6	10,6	8,8	8,9	10,1	11,3	8,3
	2005	12,5	13,6	6,7	10,9	10,7	10,0	10,1	11,7	12,9
	2011	10,9	13,7	6,9	9,4	10,1	9,9	9,4	10,9	13,2
Growth the population	1990	10,4	12,8	11,7	17,9	19,0	21,9	18,1	19,5	19,0
	2000	0,2	1,0	3,9	6,9	8,3	9,6	5,6	7,4	9,5
	2005	1,1	2,1	4,4	6,3	4,5	7,3	5,3	8,5	0,7
	2011	4,4	2,8	6,4	12,1	10,9	11,6	12,7	8,6	11,7
Yakuts and SPN(%)	1990	10,0	41,6	4,4	82,2	92,9	94,8	68,9	87,2	49,2
	2011	10,7	48,2	9,7	95,2	98,0	98,2	86,3	96,4	50,8
Russian and other nationalities (%)	1990	90,0	58,4	95,6	17,8	7,1	5,2	31,1	12,8	50,9
		89,3	51,8	93,3	4,8	2,0	1,8	13,7	3,6	49,2

territories of the regions of Western Yakutia is experiencing enormous economic and man-caused stresses on the part of mining enterprises (Table 4). In particular,

Table 3

Indicators of childbirth and morbidity of female malignant neoplasms of reproductive organs in industrial areas of Western Yakutia

District		Years	Birth rate, 0/00	Years	Total women with MN, 0/0000	Including, 0/0000			
						mammary gland	body of the womb	uterus cervix	ovary
Southern	Olekminsky			1989-1998	66,1	31,4	17,7	4,6	12,4
		2000-2010	13,3	2001-2010	85,2	32,5	33,9	6,5	12,3
	Lensky	1980-1990	18,3	1989-1998	58,3	26,1	17,1	3,7	11,4
		2000-2010	14,2	2001-2010	99,7	54,2	20,9	11,8	12,8
Vilyuysk	Mirninsky	1980-1990	17,9	1989-1998	42,3	27,6	6,2	3,8	4,7
		2000-2010	12,0	2001-2010	86,3	47,0	16,8	11,7	10,8
	Suntarsky	1980-1990	24,9	1989-1998	19,2	9,2	5,4	0,8	3,8
		2000-2008	16,7	2001-2010	37,6	14,6	10,0	4,6	8,4
	Nyurbinsky	1980-1990	23,3	1989-1998	24,1	9,6	5,5	2,8	6,2
		2000-2008	17,4	2001-2010	30,3	15,9	6,8	3,8	3,8
	Verkhnevilyuysky	1980-1990	25,3	1989-1998	24,5	8,5	7,5	2,8	5,7
		2000-2008	17,4	2001-2010	23,0	7,4	10,1	1,8	3,7
	Vilyuysky	1980-1990	23,6	1989-1998	33,6	17,8	9,6	2,1	4,1
		2000-2010	16,3	2001-2010	43,7	24,1	12	2,3	5,3
Arctic	Anabarsky	1980-1990	26,8	1989-1998	26,0	10,4	5,2	0,0	10,4
		2000-2010	19,3	2001-2010	25,0	10,0	5,0	5,0	5,0
	Oleneksky	1980-1990	28,5	1989-1998	24,5	14,7	4,9	0,0	4,9
			18,4	2001-2010	29,4	24,5	0,0	4,9	0,0
The correlation coefficient between the birth rates for 1980-1990 and the incidence of heart failure for 2001-2010.					-0,68	-0,62	-0,18	-0,81	-0,38

the environment of Myrinsky district experiences a high load from discharges of contaminated sewage into surface water bodies and disturbed lands (extraction of rock from the bowels of the earth), medium - from transport, average annual emissions of pollutants into the atmosphere. Mirinsky district is represented as the main cross-border zone, which is directly influencing environment of the areas located in a flood plain of the lower current of the Vilyuy River. Besides, OS of the Vilyuysk district experiences high strain from the gas industry located in his territory. In other regions of the Vilyuysk group (Suntarsky, Nyurbinsky, Verkhnevilyuysky and Vilyuysky) which are more agricultural load of OS from branch is estimated ranging from "raised" to "medium" (tab. 5) now.

The environment of the Olyokminsky district experiences the raised strain from transport, agriculture, extraction of mountain weight at extraction of construction material, emissions of pollutants in the atmosphere, dumpings of the polluted sewage. The main loading on the environment of Lensky district is connected with increase in volumes of the mountain weight taken from an earth subsoil at oil production, gas, dumpings of pollutants into the atmosphere, dumpings of sewage, motor transport, by expansion of the areas of the broken lands.

In the Arctic districts of the Western Yakutia agriculture load of the environment insignificant. So, the environment of the Anabarsky district tests from reindeer breeding "under", and Oleneksky – "low" loading (tabl.6).

So, in 2001-2010 in comparison with 1989-1998 the number of the diseased per 100 thousand population has increased in Lensky by 96,5 people (at the average annual rate of a gain – 9,2%), in Mirinsky district – on 85,0 (6,2) and Anabarsky – on 15,4 (1,3%) persons. In other regions of the Western Yakutia the situation close to stabilization has been stated, at fluctuations of average annual indicators from + 0,8% in Verkhnevilyuysky to - 0,05% in Oleneksky areas.

Despite it, on the level of annual indicators of incidence during 2001-2010 the first 5 places have reserved (in decreasing order of indicators) Lensky (267,0), Olyokminsky (215,0), Mirinsky (188,0), Vilyuysky (176,0), Nyurbinsky (171,0) areas, i.e. where the enterprises that extract diamonds, oil and gas are working with the greatest intensity.

In Mirinsky, Lensky and Anabarsky districts growth of the general indicators of oncological incidence of the population has happened at the expense of high average annual rates of a gain of indicators

Table 4

Assessment of economic and technogenic loads of the environment of territories of the Western Yakutia

Index	Districts of Western Yakutia								
	Southern		Vilyuysky					Arctic	
	Len-sky	Olek-min-sky	Mir-ninsky	Sun-tarsky	Nyur-binsky	Verkh-nevil-yuysky	Vilyuy-sky	Anabar-sky	Ole-nek-sky
Loading agricultural on the environment	R	R	H	R	R	M	M	U	L
Transport loads of the environment	U	R	M	U	U	L	U	L	L
Extracted from the bowels of the earth of the rock mass until 2002 - million m ³	506,6	0,5	1931,6	0,25	14,5	*/	12030,5	13,9	*/
level of load of the environment	R	L	H	L	L	*/	H	L	*/
Annual emissions of pollutants in the atmosphere for 1995-2005 - thousand tons	6,67	2,83	7,06	1,41	4,85	2,05	1,15	0,81	0,3
level of load of the environment	M	U	M	L	M	U	L	U	L
Dumpings of the polluted sewage: -one million m ³	5,20	2,45	30,3	*/	1,60	5,80	*/	2,10	*/
level of load of the environment	R	M	H	*/	U	R	*/	M	*/

*/ - data not available

Table 5

The load of agriculture on the environment of the regions of Western Yakutia [13,14]

District	Years	Cattle		Horses		Deer	
		Beast	Environ-mental load	Beast	Environ-mental load	Beast	Environ-mental load
Lensky	1995	6355	M	861	L	-	-
	2008	2154	L	1190	L	-	-
	±голов	-4201	-	+329	-	-	-
Olekminsky	1995	12773	R	5232	R	2470	M
	2008	11098	R	5461	R	3338	R
	±голов	-3675	-	+229	-	+868	-
Mirninsky	1995	2585	L	720	L	100	L
	2008	1986	L	511	L	16	L
	±голов	-599	-	-209	-	-86	-
Suntarsky	1995	27561	H	10308	H	-	-
	2008	27562	R	10809	H	-	-
	± голов	-9689	-	+501	-	-	-
Nyurbinsky	1995	30369	H	10389	H	-	-
	2008	19411	H	10017	H	-	-
	± голов	-10958	-	-372	-	-	-
Verkhne-vilyuysky	1995	22420	H	7177	R	-	-
	2008	14060	R	7344	R	-	-
	± голов	-8360	-	+167	-	-	-
Vilyuysky	1995	22420	H	8880	H	-	-
	2008	14051	R	6427	R	-	-
	±голов	-8369	-	-2453	-	-	-
Anabarsky	1995	-	-	-	-	21262	H
	2008	-	-	-	-	15485	U
	± голов	-	-	-	-	-5777	-
Oleneksky	1995	-	-	-	-	11961	R
	2008	-	-	-	-	2207	L
	± голов	-	-	-	-	-9754	-

Note. ± the heads – in 2008 in comparison with 1990.

of malignant new growths of bodies of a digestive tract (5,5; 3,1 and 5,6% respectively). In particular, in Mirninsky district annual indicators of colon cancer cases from 1989-1998 to 2001-2010 have grown by 1,6 time, rectal cancer – in 2,0, a liver cancer– in 1,4 and pancreas cancer– by 2,6 times. The similar situation is observed in Lensky (2,3; 2,0; 1,4 and 2,6 times, respectively) and Nyurbinsky (colon cancer – 3,0; pancreas cancer – 2,1 times) districts. In the increase in the total indicators of cancer morbidity in Western Yakutia, a significant contribution was made by the high average annual rates of increase in the incidence of malignant respiratory diseases: in Mirninsky - 5.5%, Lensky - 3.1 and Anabarsky - 5.6%.

Of particular concern is the relatively rapid growth in the majority of regions of the diamond province of the overall morbidity rates of MN in men - sex, and in women - in reproductive organs. Thus, in the male population, the highest mean annual rate of increase in the incidence of malignant genital organs is different: Vilyuysky (13.1%), Verkhnevilyuysky (12.8), Myrninsky (9.2) and Lensky (6.1%), and in female - Mirninsky (9.2%), Suntarsky (6.9), Oleneksky (6.3) and Lensky (6.1%) districts.

Average annual rates of a gain at MN of urinary bodies are high (Lensky – 10,8, Mirninsky – 8,6, Nyurbinsky – 7,5, Olyok-minsky – 4,8), nervous system and a brain (Mirninsky – 9,0%, Vilyuysky – 9,7, Verkhnevilyuysky – 5,7%), a thyroid gland (Nyurbinsky – 20,7%, Mirninsky – 13,5, Suntar – 9,6%) and lymphatic and haematogenic tissue (Anabarsky – 19,5%, Vilyuysky – 7,3, Suntarsky – 5,9%).

In conclusion, we note that the results of the correlation analysis indicate that the factor “the volume of rock mass extracted from the bowels of the earth” had a strong direct relationship with the general indicators of oncological morbidity in the population of Western Yakutia ($r = 0.62$) and the straight line with hemoblastoses ($r = 0.19$).

Indicators the characterizing “annual emissions of pollutants in the atmosphere” had direct link with the general indicators of cancer of digestive organs ($r = 0.43$) and breath ($r = 0.39$). Thus, when carrying out anticarcinogenic fight in regions of the Western Yakutia, a zone of intensive industrial development important development of the actions directed first of all to decrease in impact on a human body of anthropogenic, technogenic factors of the environment is represented.

Morbidity of the population of Western Yakutia by malignant neoplasms and its average annual growth rate over periods from 1989 to 1998 and from 2001 to 2010.

Table 6

Morbidity of the population of Western Yakutia by malignant neoplasms and its average annual growth rate over periods from 1989 to 1998 and from 2001 to 2010. (Per 100 thousand population) [4-6]

Localization	Year	District of the western Yakutia								
		Lensky	Olekminsky	Mirninsky	Suntarsky	Nyurbinsky	Verkhnevilyuyusky	Vilyuyusky	Anabarsky	Oleneksky
1	2	3	4	5	6	7	8	9	10	11
Malignant neoplasms - total	1989-1998	170.0	217.0	103.0	174.0	174.0	175.6	166.0	111.3	177.3
	2001-2010	267.0	215.0	188.0	169.0	171.0	160.9	176.0	126.7	178.4
	growth rate	9.2	-0.1	6.2	-0.3	-0.1	-0.8	0.3	1.3	0.05
Including:	1989-1998	8.2	5.8	5.8	7.8	4.2	5.0	5.6	0.0	0.0
	2001-2010	3.6	3.5	2.3	2.7	5.5	2.3	4.4	1.4	15.5
	growth rate	-7.9	-4.9	-8.85	-10.0	2.45	-7.45	-2.4	0.0	0.0
Digestive organs, total	1989-1998	59.2	83.4	28.7	93.5	76.3	94.6	78.4	47.9	82.6
	2001-2010	81.2	66.0	48.5	80.8	68.0	60.0	72.8	47.3	70.8
	growth rate	3.2	-2.2	3.4	-1.4	-1.1	-4.4	0.7	-0.1	-1.5
- Lip, tongue, throat	1989-1998	8.6	15.9	2.3	30.2	26.8	36.0	21.9	20.1	32.5
	2001-2010	10.6	10.5	4.2	13.7	17.4	9.4	13.6	2.5	14.7
	growth rate	2.1	-4.0	6.2	-7.6	-4.25	-10.0	-4.5	0.05	-7.65
- stomach	1989-1998	23.7	35.8	10.7	19.3	24.7	25.7	22.9	17.7	20.0
	2001-2010	24.1	26.1	15.0	22.8	17.0	11.7	17.9	9.9	24.4
	growth rate	0.2	-3.1	3.2	1.8	-3.6	-7.5	-2.3	-5.1	2.0
- colon	1989-1998	5.8	7.8	4.8	11.2	1.9	5.8	9.0	0.0	5.0
	2001-2010	13.4	8.0	7.7	5.5	5.8	4.7	12.1	7.5	12.2
	growth rate	8.7	0.2	4.8	-6.8	11.8	-2.0	3.0	0.0	16.5
- rectum	1989-1998	6.7	3.9	4.3	5.8	5.2	3.8	3.5	0.0	5.1
	2001-2010	13.2	6.2	8.8	8.2	5.4	4.2	5.4	0.0	0.0
	growth rate	6.3	4.7	7.4	3.5	0.3	1	4.4	0.0	0.0
- liver	1989-1998	6.9	13.8	3.6	22.8	13.9	19.5	18	10.1	17.5
	2001-2010	10.3	10.5	4.9	25.9	14.3	26.7	16	22.4	17.1
	growth rate	4.1	-3	3.1	1.3	0.3	2.9	-1.2	8.3	-0.2
- pancreas	1989-1998	7.5	6.2	3.0	4.2	3.8	3.8	3.1	0.0	2.5
	2001-2010	9.6	4.7	7.9	4.7	8.1	3.3	7.8	5.0	2.4
	growth rate	2.5	-2.8	10.2	1.1	7.8	-1.4	8.7	0.0	-0.4
Respiratory organs, total	1989-1998	31.9	55.8	19.7	40.6	46.1	44.2	39.1	22.5	45.0
	2001-2010	54.8	53	26.9	35	34.4	39.3	37.7	32.3	46.5
	growth rate	5.5	-0.5	3.1	-1.6	-2.9	-1.1	-0.3	5.6	6.7
- larynx	1989-1998	2.9	5.7	2.3	0.8	2.8	3.4	1.0	2.5	2.5
	2001-2010	5.4	2.9	3.6	2.0	1.5	0.0	1.9	2.5	4.9
	growth rate	6.4	-6.5	4.6	9.6	-6.0	-8.9	6.0	0.05	1.1
- trachea, bronchi, lung	1989-1998	26.5	46.9	16.1	39	40.9	0.0	38.1	20.0	40.0
	2001-2010	49.4	50.1	23.3	33	32.9	39.3	35.8	29.8	41.6
	growth rate	6.4	0.6	4.2	-1.6	-2.1	-0.05	-0.6	4.0	0.4
Bones and articular cartilage	1989-1998	1.4	3.2	1.4	3.5	2.8	2.9	1.1	25.0	47.4
	2001-2010	3.4	1.5	1.9	0.4	2.3	0.0	3.5	0.0	2.4
	growth rate	9.3	-7.3	3.2	-10	-1.9	0.0	12.3	0.0	-10.0
Skin (including melanoma)	1989-1998	6.0	5.5	4.9	0.8	2.5	2.4	2.4	2.6	5.1
	2001-2010	9.3	4.3	8.3	3.9	9.3	3.2	2.3	2.5	4.9
	growth rate	5.0	2.4	5.4	17.2	14.1	2.9	-0.4	-0.4	-0.4
Female reproductive organs - total	1989-1998	58.3	66.1	42.3	19.2	24.1	24.5	33.6	26.0	24.5
	2001-2010	99.7	85.2	86.3	37.6	30.3	23.0	43.7	25.0	29.4
	growth rate	5.5	2.5	7.4	6.9	2.3	-0.6	2.7	-0.4	6.3
- mammary gland	1989-1998	26.1	31.4	27.6	9.2	9.6	8.5	17.8	10.4	14.7
	2001-2010	54.2	32.5	47	14.6	15.9	7.4	24.1	10.0	24.5
	growth rate	7.5	-0.3	5.4	5.2	5.1	-1.3	3.1	-0.4	5.2
- cervix	1989-1998	17.1	17.7	6.2	5.4	5.5	7.5	9.6	5.2	4.9
	2001-2010	20.9	33.9	16.8	10.0	6.8	10.1	12.0	5.0	0.0
	growth rate	2.05	6.7	10.5	6.4	2.15	3.0	2.25	-0.40	0.0
- uterus	1989-1998	3.7	4.6	3.8	0.8	2.8	2.8	2.1	0.0	0.0
	2001-2010	11.8	6.5	11.7	4.6	3.8	1.8	2.3	5.0	4.9
	growth rate	12.3	3.5	10.8	19.1	3.1	-4.3	1.0	0.0	0.0
- ovary	1989-1998	11.4	12.4	4.7	3.8	6.2	5.7	4.1	10.4	4.9
	2001-2010	12.8	12.3	10.8	8.4	3.8	3.7	5.3	5.0	0.0
	growth rate	1.15	-0.1	8.7	2.0	-4.75	-4.25	2.6	-7.05	0.0
Male sexual organs - total	1989-1998	5.8	5.0	4.0	3.9	3.5	2.0	2.1	0.0	5.1
	2001-2010	10.5	5.8	8.8	3.2	4.0	6.7	7.2	5.0	4.9
	growth rate	6.1	1.5	9.2	-1.9	1.2	12.8	13.1	0.0	-0.4
- prostate	1989-1998	5.4	4.4	2.1	3.1	0.7	1.0	0.7	0.0	5.1
	2001-2010	8.9	5.8	7.2	3.2	2.4	4.8	4.8	0.0	4.9
	growth rate	5.1	3.1	13.2	0.3	13.1	17.0	21.3	0.0	-0.3
- testicle	1989-1998	0.4	0.6	1.9	0.8	2.8	1.0	1.4	0.0	0.0
	2001-2010	1.6	0.0	1.6	0.0	1.6	1.9	2.4	5.0	0.0
	growth rate	14.9	0.0	-1.7	0.0	-5.4	6.6	5.5	0.0	0.0
Urinary organs	1989-1998	6.1	7.0	5.3	5.8	4.5	4.4	8.6	0.0	5.1
	2001-2010	17	11.2	12.1	6.3	9.3	6.5	12.1	5.0	2.4
	growth rate	10.8	4.8	8.6	0.8	7.5	3.9	3.4	0.0	-7.2
- kidneys	1989-1998	3.8	5.4	4.2	4.6	3.5	3.9	5.5	5.2	5.0
	2001-2010	9.8	5.8	8.5	4.3	7.0	6.5	8.6	5.0	2.4
	growth rate	9.9	0.7	7.3	-0.6	8.0	5.2	4.5	-0.4	-7.1
- urinary bladder	1989-1998	2.3	1.6	1.1	1.2	1.0	0.5	3.1	2.5	0.0
	2001-2010	7.2	5.4	3.6	2.0	2.3	0.0	3.5	0.0	0.0
	growth rate	12.1	13	12.6	5.8	7.8	0.0	1.1	0.0	0.0
- central nervous system	1989-1998	3.0	2.9	1.6	2.3	3.1	1.9	1.0	5.1	0.0
	2001-2010	3.9	2.2	3.8	2.4	3.1	3.3	2.3	0.0	2.4
	growth rate	2.6	-2.7	9.0	0.45	0.05	5.7	9.7	0.0	0.0
- thyroid gland	1989-1998	3.0	5.5	1.7	0.8	0.7	1.4	2.1	0.0	4.9
	2001-2010	3.9	4.7	7.7	2.0	4.6	1.9	3.9	7.5	4.9
	growth rate	2.6	-1.5	13.5	9.6	20.7	3.1	8.0	0.0	0.0
- hemoblastosis	1989-1998	12.0	7.7	8.0	4.2	7.3	5.2	3.5	2.5	5.0
	2001-2010	14.2	7.3	11.7	7.5	5.8	5.6	6.6	14.9	7.3
	growth rate	1.9	-0.5	3.9	5.9	-3.2	0.7	7.3	19.5	3.8

(Per 100 thousand population) [4-6]

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EPIDEMIOLOGY OF PARKINSON'S DISEASE IN THE RS (YA)

ABSTRACT

Parkinson's disease (PD) is the second most common neurodegenerative disorder in the world after Alzheimer's disease. The prevalence of the disease varies widely in different ethnic and geographical groups. The purpose of the research is to study the epidemiological picture of PD in the population of the Sakha (Yakutia) Republic. We used the next sources of information: 1) own data collected during the examination of patients; 2) retrospective analysis of medical records about patients of the neurological department; 3) data from annual reports of neurologists; 4) the results of selective population studies conducted by the Department of neurology and psychiatry of Medical Institute of NEFU. All information was entered in the database «Register of patients with Parkinson's disease in the Sakha (Yakutia) Republic». The prevalence of PD in Yakutia was 67 per 100,000 of the adult population. The disease was more common in women than in men: 79.7 versus 52.9 per 100,000. The prevalence of the disease in Yakutsk was 76.5 per 100,000 population, and in the regions it varied widely from 9.8 to 185.6 per 100,000 population. The highest frequency of PD was found in the central regions (Gornyy, Khangalassky), in the regions of the Vilyui group (Vilyuysky and Verkhnevilyuysky), as well as in Tattinsky, Abyysky, Verkhnekolymsky and Lensky regions. The prevalence of PD increased in the older age groups: in the 40-49 age group this parameter was 12.9 per 100,000, and in the 70 years and older group it was 527.5 per 100,000. We did not reveal statistical differences in prevalence of PD among the Yakut (75.4 per 100,000) and Russian (73.4 per 100,000) population. The incidence of PD persists at a low level, but over the past 5 years, there has been a tendency to increase it: if in 2011 it was 1.42 per 100,000, in 2016 it would be 3.86 per 100,000 population. Thus, we conducted an epidemiological study of PD in Yakutia for the first time, identified regional features, found that the disease with the same frequency occurs in the Yakut and Russian population.

Key words: Parkinson's disease; epidemiology; prevalence; incidence.

INTRODUCTION

Parkinson's disease (PD) is one of the most common age-dependent neurodegenerative diseases [4]. If PD is

extremely rare up to 40 years, among those over 60 years of age prevalence reaches 1%, and among those over 80 years old - 4% [8].

The epidemiological data of the disease varies widely in different ethnic and geographical groups [6]. For example, prevalence of PD in France is 308 [9],