Table 7

Total nuptiality and divorce rates

	2000	2005	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Number of marriages per 100 population												
Sakha Republic	6,1	7,4	8,3	7,7	8,4	8,7	9,4	8,2	8,6	8,3	8,0	6,5
Amginsky	4,1	6,0	7,2	7,0	8,0	7,2	7,0	7,5	7,6	7,4	6,9	5,9
Gorny	3,9	6,1	6,9	6,1	5,8	7,7	7,9	5,4	7,3	9,2	9,0	5,3
Kobyaysky	7,1	5,2	5,5	6,6	6,1	6,8	6,6	6,5	5,9	8,1	6,2	5,6
M-Kangalassky	5,4	7,0	8,1	7,8	7,8	7,7	9,1	6,3	7,2	9,7	8,4	6,6
Namsky	4,9	5,1	7,1	6,5	6,3	6,7	7,4	5,8	6,5	6,6	5,8	4,7
Tattinsky	6,2	6,8	7,2	6,3	8,2	7,5	7,8	6,8	7,0	8,0	7,1	6,5
Ust-Aldansky	5,9	5,5	8,0	7,0	5,2	5,2	6,0	5,2	5,9	7,2	6,0	4,7
Khangalassky	5,8	7,2	6,7	6,5	7,1	8,9	9,6	8,5	10,7	10,1	8,2	7,2
Churpachinsky	6,4	7,3	7,9	8,4	8,7	9,0	8,7	7,1	7,1	7,8	7,5	5,9
Yakutsk	6,2	8,5	10,1	9,1	9,7	10,4	11,5	10,0	10,0	8,0	8,7	6,7
Number of divorces per 1000 population												
Sakha Republic	4,2	3,9	4,4	4,7	4,9	4,7	5,0	4,5	4,8	4,7	4,3	4,3
Amginsky	1,3	2,3	2,0	3,3	3,6	3,6	2,9	3,0	2,6	3,2	3,5	2,8
Gorny	1,7	2,1	2,0	3,1	2,2	3,5	3,6	2,7	3,5	3,4	3,4	3,1
Kobyaysky	3,6	2,8	2,2	2,9	2,6	2,6	3,8	3,6	3,2	3,6	2,3	4,0
M-Kangalassky	2,0	2,0	2,4	2,3	3,8	3,3	4,0	3,8	4,2	4,2	3,6	3,5
Namsky	2,2	2,7	2,6	2,9	3,2	2,9	2,8	3,3	3,4	2,7	3,4	3,7
Tattinsky	1,8	1,8	3,2	2,7	3,9	3,2	3,2	2,9	4,2	3,3	3,0	2,9
Ust-Aldansky	2,0	1,8	1,8	3,2	2,5	2,4	2,2	2,7	2,1	2,2	2,4	2,3
Khangalassky	2,2	2,8	2,7	3,4	3,8	3,7	4,7	3,9	4,7	4,2	4,2	4,6
Churpachinsky	2,4	2,5	2,4	3,2	4,3	3,7	3,4	2,8	4,1	3,7	2,9	3,2
Yakutsk	4,5	4,0	4,9	5,2	5,0	4,9	5,6	4,6	5,1	4,8	4,3	4,1

of nuptiality: more than others in Ust-Aldansky (five times), Gorny (three) and Namsky (two) districts.

"Leaders" by high divorce rate are Yakutsk (for seven years the divorce rate was above average) and Khangalassky (two) district. In other areas the picture is favorable, because, at least once, there were years with low or below average levels of divorce rates.

Conclusion. Thus, the medical and demographic situation in the CEZ is generally favorable. Most of the districts and Yakutsk are characterized by a relatively high fertility and low mortality, which leads to a positive picture of natural growth. Infant mortality does not cause much concern. There are negative indicators only by nuptiality in a number of districts.

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PREMATURE MORTALITY OF THE POPULATION OF THE REPUBLIC SAKHA (YAKUTIA) FROM EXTERNAL CAUSES

ABSTRACT

A retrospective analysis of the official statistics for the period 1990-2016 was conducted in order to study the level and structure of mortality in the Sakha Republic (Yakutia), It is established that the medical and demographic situation in the Sakha Republic (Yakutia) over the past 25 years is characterized by the high birth rate and high mortality in the young age groups from preventable causes. The mortality of the population by external causes, with a high degree of preventability, leads the causes of mortality in the age categories of children, adolescents, and working-age people. The children deceased from external causes in the age of 1 to 14 years account for 65% of all deaths in this age group, at the age of 15-17 years - 91%, and of working-age persons - 37%. Considering the structure of external causes of death, one pays attention to the high level of deaths by violence. According to 2016 data, the suicide mortality rate (22.7 per 100,000 population) was 34% higher than the average for Russia (14.9), and the murder rate (15.3 per 100,000 population) more than doubled the average one.

Another concerning problem is the death rate resulting from exposure to low natural temperature (cold trauma), which is hardly accounted for in the official statistics. Annually, cold trauma in Yakutia takes more lives than road traffic accidents. According to the 2015data, the cold trauma death rate was 15.1 per 100,000 population, whereas the death rate from road traffic accident was 7.8 per 100,000 population.

Keywords: premature mortality, external causes, Far North regions.

INTRODUCTION

Mortality rate is one of the main indicators characterizing the level of socio-economic development and well-being of territories, health status of the population, and accessibility and quality of medical care provided. Regions of the Russian Federation differ a lot in natural and climatic, economic, social, and environmental conditions; age composition and regional features of mortality rates of the population [1, 3, 5]. The study and identification of removable causes of death in certain regions can contribute to reducing mortality; serve as a basis for developing targeted regional programs to tackle the most significant factors that determine the mortality rate of the population from specific causes at the territorial level.

A comprehensive analysis of the health status of the population in the Sakha Republic (Yakutia), its dynamics in 1990-2016, as well as a study of trends and projections of the future of the republic revealed both some similarities between the processes occurring here and in other regions of Russia (high rates of mortality, morbidity, pathologies becoming chronic, disability, short life expectancy), and the patterns of pathology specific for the Far North, associated primarily with socio-economic and climatic-geographic conditions of living.

During the period 1990-2016, it is possible to single out 2 periods of the increase in the mortality rates in the republic: the first - 1990-1995 (the growth rate at 46%, from 6.7 to 9.8 ‰), the second - 2000-2005 (the growth rate at 5%, from 9.7 to 10.2 ‰). Later, after the period of stabilization of the indicator at the level of 9.3-9.8 ‰ in 2013, its decreased to 8.4 ‰ in 2016 (Fig. 1).

One of the distinctive features of the mortality in the Sakha Republic (Yakutia) is the high level of premature mortality in young age groups by external causes. The human losses due to injuries and poisonings dominate the structure of mortality in children and working-age people, accounting for 65%in the age group from 1 to 14 years, 91% at the age of 15-17, and 37% at the working age [2].

The purpose of this study was to examine the level, structure, and the dynamics of mortality of the population in Yakutia by external causes.

Materials and Methods. A retrospective analysis of the statistical data on mortality of the population in Yakutia in 1990-2016 was carried out. As the source of information, we used data from the Federal State Statistics Service (Rosstat), Territorial Office in the Sakha Republic (Yakutia); medical certificates of death (form 106/y-02); reports of forensic medical examinations; and death certificates of the Registry Office of the Sakha Republic (Yakutia). The study was carried out using statistical, analytical, mathematical methods, as well as methods of comparative analysis.

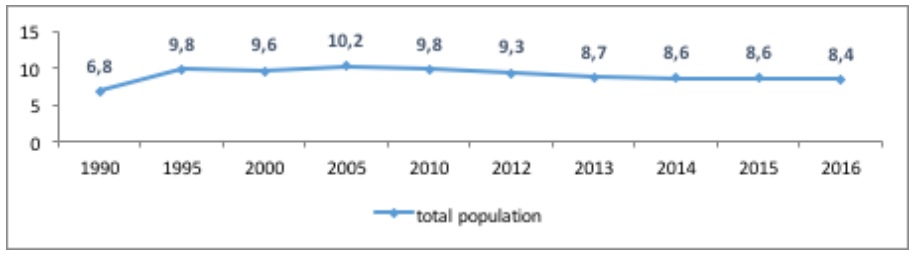

Fig.1. The dynamics of the mortality rate in the Sakha Republic (Yakutia) in 1990-2016.

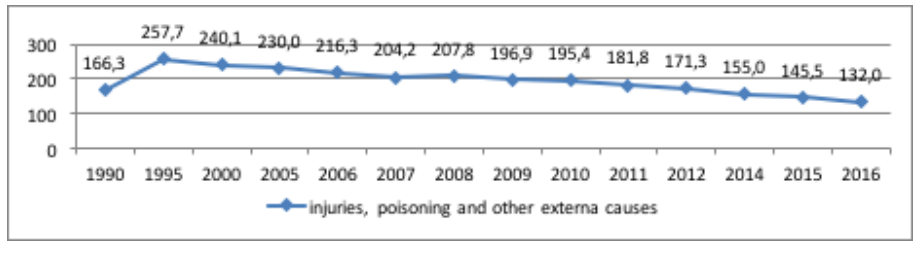

Fig.2. Dynamics of mortality by external causesin the Sakha Republic (Yakutia) in 1990-2016 (per 100,000 population)

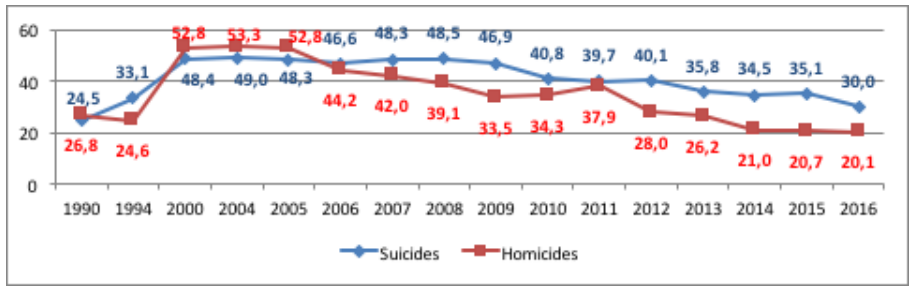

Fig.3. Dynamicsofviolentdeathsrates in the Sakha Republic (Yakutia) in 1990-2016 (per100,000 population)

Results and Discussion. In the dynamics of the main causes of mortality of the republic's population, external causes regularly ranked second following the circulatory system diseases in the period 1990-2014, then moving to the third position after neoplasms in 2015-2016. However, the statistics show that the level of human losses from external causes in the republic is remaining alarming. In 1990, the mortality rate from this class of causes was 166.3 cases per 100,000 population; in 1995 it reached a maximum value of 257.7; later it gradually reduced to 132.0 per 100,000 population in 2016 (by 48.8%), but this level is still quite high and exceeds by 21% the average Russian indicator (104.8 per 100,000 population) (Fig. 2).

According to the Federal State Statistics Service data, suicides predominate in the structure of external causes of death in Yakutia (22.7% in 2016), followed by homicides (15.3%) and accidental drownings (8.7%). In the dynamics of the violent deaths rates in 1990-2016, the period 2000-2005 was especially unfavorable, when the suicide and homicide indicators reached the highest values, almost doubling the 1990-1994indicators, and the suicide rate was more than 2.5 times higher than the extreme critical parameters determined by WHO experts (20 suicides per 100,000 population) (Fig. 3).

Almost throughout the period under study, the violent deaths rates in the republic were significantly higher than in the Russian Federation and the Far Eastern Federal District (Table 1).

Despite a significant improvement in the indicators in 2000-2016 (a reduction in deaths from suicides by 38.0%, homicides - by 62.0%), the situation is still alarming. According to 2016 data, the death rate from suicides (30.0 per 100,000 population) was 48% higher than the average for Russia (15.6) and 34% higher than for the Far Eastern Federal District (19.7). The death rate from homicides in Yakutia (20.1 per

Table 1

Suicide and homicide mortality in the Russian Federation, Far Eastern Federal District and the Sakha Republic (Yakutia) In 2000-2016 (per 100,000 population)

	2000	2005	2006	2007	2008	2009	2010	2011	2012	2015	2016
Suicide mortality											
Russian Federation	38,8	32,2	30,1	29,1	27,1	26,5	23,4	21,8	20,8	17,5	15,6
Far Eastern Federal District	49,9	42,7	40,2	40,4	38,2	35,4	34,0	31,8	30,8	24,9	19,7
Sakha Republic (Yakutia)	48,4	48,3	46,6	48,3	48,5	46,9	40,8	39,7	40,1	35,1	30,0
Homicide mortality											
Russian Federation	28,0	24,9	20,2	17,9	16,7	15,1	13,3	11,7	10,8	8,0	7,0
Far Eastern Federal District	45,2	44,0	35,9	33,4	31,5	28,4	25,6	23,6	21,7	16,2	14,4
Sakha Republic (Yakutia)	52,8	52,8	44,2	42,0	39,1	33,5	34,3	27,9	28,0	20,7	20,1

100,000 population) is almost 3 times higher than the average for Russia (7.0) and 28% higher than in the Far Eastern Federal District (21.7). It should also be noted that the rate of decrease in the mortality rate of the population in Yakutia from suicides from 2000 to 2016 was much lower than in the compared territories: 39.0% against 60.0% in the Russian Federation and the Far Eastern Federal District.

The suicide rates exceed those of the Russian Federation and the Far Eastern Federal District in all main age groups (Table 2).

The presented data demonstrates pronounced disorders in psycho-emotional health of the population, which is an objective reflection of the social unhappiness in the society.

The link between the prevalence of alcoholism in a population and the rate of violent deaths is widely recognized. Alcohol is present in the blood of every second suicide, in 2 out of 3 murdered and in 3 of 4 murderers [4]. According to the data from the Ministry of Internal Affairs of Yakutia, 90% of homicides and 42% of suicides in the region are committed in the state of alcoholic intoxication.

As for the child mortality in the age of 0 to 17 years, in general, most regions of the Far Eastern Federal District face a bad situation, with the indicators that significantly exceed the average for the Russian Federation. By the child mortality rate in the regions of the Far Eastern Federal District, Yakutia ranks fourth (in ascending order) after Sakhalin, Magadan and Amur Oblasts. For both sexes, the mortality rate in Yakutian children aged 0-17 years in 2014 was 108.6 per 100,000of the population of the corresponding age and 20.5% higher than in the Russian Federation (86.0), with the mortality rate among boys being 24% higher than in general across Russia (139.0; RF -105.2).

Among the causes of death in children aged 0 to 17 years, injuries and poisoning lead steadily, with the death rate of boys being 2.1 times higher than that of girls. Accidents rank first in the structure of the causes of death in children from 1 to 14 years (65%) and at the age of 15-17 years (91%).

The mortality of boys in Yakutia by external causes (48.4 per 100,000 population) is 44% higher than in Russia (26.9) and 20% higher than in the Far Eastern Federal District (38.7). The death rate of girls (20.0 per 100,000 population) is higher by 23.5 and 1.5%, respectively (15.3 and 19.7 per 100,000 population). A particularly concerning issue is an extremely high mortality rate in children and adolescents by suicide, whose indicator (9.9 per 100,000 of the population of the corresponding age) is 3 times higher than the average Russian

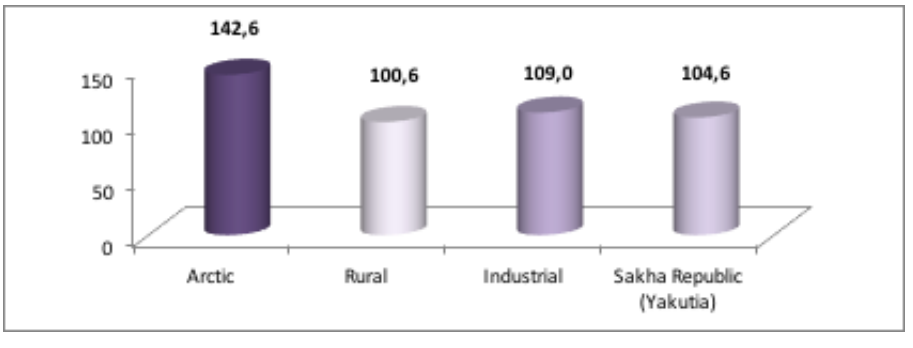

Fig. 4. Children mortality rate in the age 0-17 in different regions of the Sakha Republic (Yakutia) (per 100,000 population of the corresponding age)

Table 2

Suicide mortality in the population by main age groups in the Russian Federation, Far Eastern Federal District and the Sakha Republic (Yakutia) (number of deaths per 100,000 population of the corresponding age

Subjects of the Russian Federation	0-17 years of age	Working age	Over working age
Russian Federation	2.4	26.1	20.6
FEFD	5.5	40.4	25.4
SR(Ya)	9.9	54.4	31.4

Table 3

The number of deaths resulting from road traffic accidents and exposure to low natural temperatures in 2011-2015

Cause of death	2011		2012		2013		2014		2015	
	abs. numb	per 100,000 populat	abs. numb	per 100,000 populat	abs. numb	per 100,000 populat	abs. numb	per 100,000 populat	abs. numb	per 100,000 populat
Road traffic accidents	157	16.4	134	14.0	156	16.3	140	14.6	75	7.8
Exposure to low natural temperatures	195	20.4	164	17.6	150	15.7	158	16.5	145	15.1

one (2.4). In the structure of causes of death in adolescents, suicides account for 51.7%. The problem of adolescent self-aggression is more acute in the rural areas of the republic, with common unemployment, low material security of the families, household drunkenness, which often leads to an uncomfortable psychological climate in families. The child mortality rate has high values in the Arctic group of regions (142.5 per 100,000 of the population of the corresponding age), which is 29% higher than in the rural (100.6) and 24% than in the industrial regions of the republic (109.0) (Fig. 4).

Cold trauma is another pressing issue with the mortality in the regions of the Far North. Under natural and climatic conditions of Yakutia, where the cold season lasts for 7 months a year with the average winter temperature at 35-400C, the mortality by exposure to low natural temperatures (cold trauma) should attract serious attention. In the official statistics of the causes of death of the population, the cold trauma is taken into account among the 'other' causes, and therefore the real scale of the disaster, at least for Yakutia, remains hidden.

The analysis of the statistical data revealed that each year in Yakutia more people die of exposure to low natural temperatures than in road traffic accidents (Table 3).

According to Rosstat, in 2011-2015, the republic saw 662 people died in road traffic accidents, and by 18.5% more of those died due to exposure to low natural temperature (812).

Most of them (over 80%) were people of the working age, including 78% of men aged 16-60 years, and 22% of women aged 16-54 (Table 4).

In the context of the main age groups, the highest mortality rate by general hypothermia and frostbites is observed in the group over the working age (22.0 per 100,000 population) (Table 5).

Thus, the reserve for significant reduction in the preventable mortality of the population in the region depends on, first, by reduction of losses from external causes. It is necessary to take into account the main factors that determine the high level of preventable mortality of the population: low employment and low income of the population, living conditions that fail to meet modern sanitary and hygienic requirements, poor medical institutions infrastructure in the rural areas, lack of self-preserving behavior in people, all negatively affecting the quality of life. A high level of mortality by causes related to psycho-emotional health disorders is an objective reflection of the social and hygienic problems of the population, with this issue being particularly pressing in the Arctic and rural areas, characterized by a low level of socio-economic development.

Table 4

The number of deaths resulting from exposure to low natural temperatures in 2011-2015 by main age groups*

Age group	2011		2012		2013		2014		2015		total	ratio
	men	wom	men	wom	men	wom	men	wom	men	wom		
Under working age	4	1	0	1	2	0	2	0	0	0	10	1.3
working age	108	34	113	24	85	28	91	25	80	35	623	80.3
over working age	21	14	12	8	17	11	20	12	18	10	143	18.4
total	133	49	125	33	104	39	113	37	98	45	776	-
age not specified	13		5	1	6	1	6	2	2		36	-
TOTAL	146	49	130	34	110	40	119	39	100	45	812	-

* under working age – 0-15 years, working age – menof16-59 years, women of 16-54 лет, over working age – men of 60 years and older, women of 55 years and older.

Table 5

Mortality rate by exposure to low natural temperatures in main age groups (per100,000 population)

Age range	2011	2012	2013	2014	2015	total
Under working age	2.2	0.4	0.9	0.9	0	1.1
Working age	23.2	22.7	19.0	19.8	19.9	21.2
Over working age	28.5	15.6	21.1	23.1	19.4	22.0

Conclusion. A high mortality rate in young age groups has a negative impact on the medical and demographic situation in the region, including the life expectancy of the population, the indicators of which are lower than the average Russian data. A high mortality rate in the working age group results in intensive losses in the labor potential of the region and economic damage to the society. From this point of view, the problem discussed in the article requires a comprehensive study to determine the economic effectiveness of the social policy and healthcare development programs, as well to justify the amount of the investments needed.

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THE ESTIMATION OF PREVALENCE AND STRUCTURE OF BIRTH DEFECTS IN ARKHANGELSK REGION IN 2012-2014: ARKHANGELSK COUNTY BIRTH REGISTRY DATA

ABSTRACT

Introduction

Birth defects (BD) are an important medical and social issue as they represent one of the most important causes of infant mortality and childhood disability. Constant epidemiological surveillance is a core issue in primary prevention of this pathology. The aim of this study was to assess prevalence of birth defects based on population birth registry data.

Materials and methods

The Arkhangelsk County Birth Registry was used in this retrospective cohort study. Database included information on all births at gestational age 22 and more weeks registered in Arkhangelsk County in 2012-2014. Data on variety of perinatal exposures, pregnancy and delivery complications as well as neonatal diseases were available for detail analysis.

Results

In 2012-2014, 1870 various birth defects in 1718 newborns were registered in Arkhangelsk County. The total prevalence of BD was 39,9 for 1000 newborns, and the prevalence after exclusion of co-called minor anomalies was 28,6 per 1000 newborns, that significantly higher than the Federal monitoring data for Arkhangelsk region. The most frequent groups of BD were congenital anomalies of circulatory system, congenital malformations and deformations of the musculoskeletal system as well as congenital anomalies of the urinary system.

When calculating the prevalence of BD that are subject of mandatory registration in Russia, it was found that their prevalence in the Arkhangelsk County was 6,4 per 1000 newborns in 2012-2014.

Conclusion

The total prevalence of birth defects, as assessed by the Arkhangelsk County birth registry, was higher than reported by the Federal monitoring. It can be assumed that this population-based tool allows to estimate the total prevalence of congenital anomalies more completely compared to the current Federal monitoring.

Keywords: birth defects, prevalence, surveillance, population-based medical birth registry.

INTRODUCTION

Congenital malformations (CM) are the direct cause of a significant number of infant deaths, they can lead to disability and can decrease quality of life [19]. In 2015, CM were diagnosed in 130,451 children of the first year of life, they became the cause of disability in 93,788 children. Moreover, it has been reported that CM had been directly connected with 2707 cases of infant deaths in the Russian Federation (RF) in 2015 [6].

According to World Health Organization (WHO) General Assembly's resolution, one of the main action for CM prevention is establishing of an effective national and international surveillance system. At the same time, adequate monitoring of CM should provide an opportunity to determine temporal trends in the prevalence of CM, to identify clusters of CM, to allow en evaluation of both population prenatal screening and preventive programs, and to provide sufficient data for any epidemiological studies of their risk factors [19].

International monitoring systems as a tool for systematic epidemiological surveillance of CM exist in the world from the middle of the last century. The most famous are the International Clearinghouse for Birth Defects Surveillance and Research (ICBDMS), that collects and organizes data from more than 30 regional registers from America, Asia and Europe, and report the prevalence of the most severe and easily visualized 39 forms of CM [12], and the European Registry Network for Epidemiological Surveillance for congenital anomalies (EUROCAT). The later covers almost a third of newborns in the European Union and collects data on more than 80 forms of CM [11].

Definitions of the terms used in the world practice are following: birth defects and congenital anomalies are identical terms and they represent structural and functional developmental abnormalities that present at birth [19]. According to EUROCAT guidelines minor anomalies are a diverse group of isolated anomalies with «insignificant structural, functional or cosmetic effects». They are not considered by EUROCAT when calculating the prevalence of CM [9].

The existing system of monitoring