

Dynamics of Childhood Cancer Mortality in the Republic of Sakha (Yakutia)

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Abstract

The article analyzes childhood cancer mortality in the Republic of Sakha (Yakutia) (RS(Y)) for 2000-2015 according to official medical statistics. (**International Journal of Biomedicine. 2019;9(3):263-265.**)

Key Words: malignant neoplasms • childhood cancer mortality • survival rate • Yakutia

Introduction

Each year, more than 300,000 children, ages birth to 19 years, are diagnosed with cancer worldwide.⁽¹⁾ Of the approximately 4,000 children registered as having cancer in the Russian Federation annually, around 3,200 will survive. Overall pediatric cancer survival rates in the Russian Federation have risen from around 10% in the early 1990s to around 80% today.⁽²⁾ One of the reasons for that improvement is the increased prioritization of pediatric cancer in the mid-2000s. However, despite significant progress in child oncology, malignant neoplasms (MNP) are the second most common cause (5.9%) of children's death after injuries and poisoning (73.6%).⁽³⁻⁵⁾

Materials and Methods

We analyzed the childhood cancer mortality the Republic of Sakha (Yakutia) (RS(Y)) for 2000-2015 according to official medical statistics. The sources of information were the data from the Territorial Office of the Federal State Statistics Service (Rosstat) in RS(Y) and medical certificates of death (Form 106/y-02).

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Results

According to the Territorial Office of the Federal State Statistics Service, in the regional ranking of the Far Eastern Federal District (FEFD), RS(Y) had the highest birth rate and rate of natural increase, and the lowest mortality rate (MR) at the end of 2015. In 2015, the proportion of children aged 0-14 years in the total republic population amounted to 23.1%. The proportion of adolescents from 15-17 years amounted to 4.0%. As of January 1, 2016, there were 258,222 children under the age of 17 years (versus 309,516 in 2000): 151,544 in urban areas and 106,678 in rural areas.

In 2015, the overall MR was consistently lower than in the Russian Federation and FEFD: 8.5‰, 13.0‰ and 12.6‰, respectively. The infant MR, in dynamics since 2010, has tended to decrease: 1.4 ‰, in 2010 and 1.0 ‰ in 2015 (Table 1).

Table 1.
Child mortality rate in RS(Y)

	2000	2005	2010	2015
Total mortality rate (per 1,000 people)	9.7	10.2	9.8	8.5
Total number of deaths of children aged 0-17 years	432	352	267	249
The average annual number of children aged 0-17 years	308,516	268,921	251,633	259,601
Infant MR per 1,000 child popul. (per average annual number)	1.4	1.3	1.1	1.0

Table 2.**In the structure of causes of mortality of children aged between 0 and 17 years in RS(Y)**

Causes of death	2010		2011		2012		2013		2014		2015	
	Abs (n)	%	Abs (n)	%	Abs (n)	%	Abs (n)	%	Abs (n)	%	Abs (n)	%
Total	267	100	233	100	303	100	294	100	279	100	249	100
Perinatal causes	44	16.5	40	17.2	79	26.1	93	31.6	78	28	60	24.1
Congenital malformations	30	11.2	42	18	60	19.8	34	11.6	40	14.3	30	12
Respiratory diseases	21	7.9	11	4.7	13	4.3	16	5.4	22	8	20	8
Infectious diseases	12	4.5	3	1.3	5	1.7	5	1.7	1	0.4	8	3.2
Neoplasms	10	3.7	8	3.4	3	1.0	6	2.0	4	1.4	5	2.0
Nervous system diseases	6	2.2	5	2.1	8	2.6	11	3.7	12	4.3	13	5.2
Blood diseases and immune system disorders	1	0.4	...	...	1	0.3	...	...	1	0.4	...	...
Endocrine system diseases	1	0.4	3	1.3	2	0.7	1	0.3	3	1.1	4	1.6
Circulatory system diseases	3	1.1	6	2.6	8	2.6	8	2.7	10	3.6	7	2.8
Digestive system diseases	1	0.4	2	0.9	3	1	1	0.3	3	1.1	3	1.2
Genitourinary diseases	...	...	...	...	1	0.3	1	0.3	...	...	...	...
musculoskeletal system diseases	1	0.4	...	...	1	0.3	1	0.3	2	0.7	...	...
Injuries and poisonings	124	46.4	104	44.6	106	35	97	32.9	95	34.1	91	36.5
Sudden death syndrome	9	3.4	8	3.4	11	3.6	20	6.8	8	2.9	8	3.2

In the structure of causes of mortality of children aged between 0 and 17 years (Table 2), injuries and poisoning (46.4% in 2000 and 36.5% in 2015) ranked in the first place, perinatal causes - second place (16.5% in 2000 and 24.1% in 2015), and congenital malformations - third place (11.2% in 2000 and 12.0% in 2015).

In the dynamics, cancer-related deaths in children and adolescents have tended to decrease (3.7% in 2000 and 2.0% in 2015) and more significantly since 2010 (17.2 per 100,000 population in 2010 and 8.8 per 100,000 population in 2015) (Table 3). According to the data obtained, more boys die from MNP (21.0 per 100,000 population in 2010 and 13.1 per 100,000 population in 2015) than do girls (13.4 per 100,000 population in 2010 and 3.8 per 100,000 population in 2015); however, mortality rates for boys and girls do not correlate with morbidity rates. This discrepancy requires in-depth medical and statistical research.

In the structure of the annual mortality, hemoblastosis occupies the first place; however, there has been a decrease in the annual mortality since 2010 (6.3 per 100,000 population in 2001-2005, 4.7 per 100,000 population in 2006-2010 and 5.7 per 100,000 population in 2011-2015) (Table 4).

In the gender aspect, the MR was higher among boys (7.5 per 100,000 population in 2001-2005, 5.3 per 100,000 population in 2006-2010 and 4.5 per 100,000 population in 2011-2015) than among girls (5.1 per 100,000 population in 2001-2005, 3.5 per 100,000 population in 2006-2010 and 1.2 per 100,000 population in 2011-2015). MR among children with central nervous system tumors (second place in the

structure of the annual mortality), in dynamics and gender aspects and characterized by similar features, is presented in Table 5.

Table 3.**Dynamics of cancer-related deaths in children and adolescents (per 100,000 population of the corresponding age) in RS(Y) ^(6,7)**

Age	2001-2005	2006-2010	2011-2015
0-4	3.0	3.1	2.0
5-9	4.2	2.8	0.6
10-14	5.4	2.6	3.1
15-19	4.6	4.3	3.1
Total	17.2	12.8	8.8
Boys			
0-4	4.1	4.4	1.1
5-9	5.5	3.6	1.8
10-14	4.8	3.9	4.3
15-19	6.6	6.5	5.9
Total	21.0	18.4	13.1
Girls			
0-4	1.9	1.7	...
5-9	2.9	1.9	...
10-14	6.0	1.2	1.9
15-19	2.6	1.9	1.9
Total	13.4	6.7	3.8

Table 4.

Dynamics of the annual mortality of children and adolescents with hemoblastosis (per 100,000 population of the corresponding age) in RS(Y)^(6,7)

Age	2001-2005	2006-2010	2011-2015
0-4	0.9	0.6	...
5-9	1.7	2.1	0.6
10-14	2.2	1.1	3.0
15-19	1.5	0.9	2.1
Total	6.3	4.7	5.7
Boys			
0-4	0.6	...	...
5-9	2.2	0.6	0.6
10-14	2.6	3.0	2.4
15-19	2.1	1.7	1.5
Total	7.5	5.3	4.5
Girls			
0-4	1.2	0.6	...
5-9	1.2	1.3	...
10-14	1.8	0.6	0.6
15-19	0.9	1.0	0.6
Total	5.1	3.5	1.2

Table 5.

Dynamics of the annual mortality of children and adolescents with central nervous system tumors (per 100,000 population of the corresponding age) in RS(Y)^(6,7)

Age	2001-2005	2006-2010	2011-2015
0-4	1.5	1.4	...
5-9	1.1	0.3	0.2
10-14	1.6	1.1	0.6
15-19	0.8	0.2	0.9
Total	5.0	3.0	1.7
Boys			
0-4	...	2.2	0.6
5-9	1.7	0.6	...
10-14	0.9	2.2	0.6
15-19	1.2	0.5	1.0
Total	3.8	5.5	2.2
Girls			
0-4	0.6	0.6	...
5-9	0.6	...	...
10-14	2.3	...	0.6
15-19	0.4	...	0.6
Total	3.9	0.6	1.2

Conclusion

Thus, in the dynamics for the study period, there was a decrease in childhood cancer mortality. Over the past 30 years, an improvement in MNP treatment contributed to increasing cancer survival and cure rates up to 80%. This improvement became possible through the introduction of modern diagnostic methods, high-intensity polychemotherapy programs, and improvement of the accompanying therapy. Modern treatment of patients with acute leukemia belongs to the category of the high-tech and expensive. The financial costs of treatment directly depend on the incidence rate and require constant epidemiological monitoring.⁽⁷⁾

Competing Interests

The authors declare that they have no competing interests.

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