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Surgical Service Key Performance Indicators for the Arctic Regions of Russia

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Abstract

The article represents surgical service key performance indicators (KPIs) in the Republic of Sakha (Yakutia) (RS(Y)) for the period between 2014 and 2016. According to the official statistics, the Arctic regions of RS(Y) are surgically understaffed, though formally there is high demand for medical staff and beds in surgery. The understaffing is due to peculiarities of RS(Y) its vast territory, low occupancy rate, the presence of sparsely populated territories and seasonal isolation of the population.(**International Journal of Biomedicine. 2019;9(4):334-337.**)

Key Words: surgical service • key performance indicators • staffing • air medical service • Yakutia

Introduction

The regions of Russia differ in the availability of medical services and medical staffing, the level of life, and development of transport and communication. A considerable part of normative legal documentation in the field of healthcare does not take into account specific characteristics of vast territories, the regions of the Far North in particular. RS(Y) is not an exception. Implementing the principles of healthcare organization and improving the availability of surgical services, including high tech medical services, are some of the priority tasks for the modern healthcare system. It should also be noted that federal and regional health care institutions have incomparably different capabilities to render surgical aid.[1-4]

The historical background of the lifestyle in RS(Y) has been defined by the presence of a great number of sparsely populated villages far from administrative centers and medical healthcare centers. These conditions have led to the creation of a very specific life-support system for the local population. There are available, but incomplete, medical and preventive healthcare institutions for the local population, a high demand for specialized and air medical emergency service, as well as specialized exit medical aid.[1,5,6] These peculiarities demand development and implementation of differentiated regional mechanisms in the state healthcare policy in the regions of the Far North of the Russian Federation (RF).

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Materials and Methods

The evaluation of surgical service KPIs in RS(Y) is represented for the period of 2014-2016. We analyzed the provision of surgical service and staffing, availability of hospital beds, and air medical service calls in cases of surgical pathology.

Results

Yakutia (the Sakha Republic) is the largest subject (3103.2 km^2) of the Russian Federation. It is one of the coldest regions in the world. In 2010, Yakutia had a population of 958,500 people; the population density of the Republic was 0.31 persons per 1 km^2, while in a number of the Arctic regions, it ranged from 0.1 to 0.01 persons per 1 km^2. About 40% of

the territory lies above the Arctic Circle, where only 7% of the population lives, including the indigenous peoples of the North who lead a traditional nomadic way of life. All these factors have a certain impact on the medical aid organization for the population.

Ethnically, it is represented by the Yakuts (49.9%), the Russians (37.8%), the Ukrainians (2.2%), the Evenks (2.2%), the Evens (1.6%), and other ethnicities (6.3%). Currently, Yakutia consists of 35 administrative regions located in different climate zones, having different social and economic backgrounds, with an uncommon and differing network of medical and preventive healthcare institutions.

More than ninety percent of the Republic's territory is in the area of seasonal transport service, where communication is mainly by air, water and road (seasonal). About 76% of 34 districts do not have reliable transport links with the center of the Republic and surrounding regions. The most remote village is situated at a distance of 3,189km from Yakutsk, and in the interior, the distance from the medical centers to the Central District Hospital averages about 400km and year-around travel is not possible. Difficulties in healthcare service organization, determined by the low density of population and underdevelopment of transport infrastructure in the Far North, cause high demands for all kinds of resources.

The level of surgical service provision tended to decrease from 2014 to 2016, from 74% to 73.2% (Table 1). The level of paramedical personnel also tended to decrease, from 83.1% to 80.7%. However, the medical staffing in RS(Y) is higher in comparison to the situation in the RF as a whole: 48 per 10,000 population in 2014, 48.5 per 10,000 population in 2015, and 48.1 per 10,000 population in 2016. The surgical service provision also tended to increase: 2.0 per 10,000 population in 2014 and 2.2 per 10 000 population in 2016. Provision of paramedical personnel is also higher than in the RF (115.1 per 10 000 population in 2014, 113.3 in 2015, and 112.7 in 2016) (Table 1).

Table 1.

The level of medical and paramedical provision in RS(Y) from 2014 to 2016 (per 10,000 population)

Indicators	2014	2015	2016	The RF
Medical staffing	6186.25	6259	6310.5	
Individuals	4580	4637	4617	543.6 thousand
Staffing, %	74.0	74.1	73.2	
physician staffing	48.0	48.5	48.1	37.2
Surgical staffing	2.0	2.0	2.2	
Paramedical staffing	13234.25	13300.25	13409.5	
Individuals	10994	10844	10816	1309.8 thousand
Staffing, %	83.1	81.5	80.7	
Nurse staffing	115.1	113.3	112.7	89.6

The provision of hospital beds per 10,000 individuals is decreasing considerably; thus, it was 107.0 in 2014 and dropped to 98.2 in 2016. Nevertheless, the indicator is higher than in the RF in whole (Table 2).

Table 2.

The provision of hospital beds in RS(Y) from 2014 to 2016 (per 10,000 population)

Indicators	2014	2015	2016	The RF
Average number of beds occupied per day (including beds for fee)	10214	10186	9425	1097.1 thousand
Hospital bed provision per 10,000 patients	107.0	106.4	98.2	75.0
Bed occupancy	314	322	323	319
Bed turnover	25	27	28	27.9
Hospital bed per 1 person	3.332	3.290	3.104	
Admission rate per 100 patients	26,8	27,3	26,4	
Average hospital stay	12.5	12.0	11.7	11.4
Inpatient mortality rate	0.7	0.7	0.8	1.71

By the end of 2016, there were 1,314 surgical beds; more of them (636 beds) were surgical beds for adults: 251 were traumatology beds for adults, 72 were neurosurgical ones (Table 3). Historically, the structure of hospital bed supply was established according to the needs of the local population. On the whole, inpatient mortality rate in surgical beds of RS(Y) was 0.9 by the end of 2016. There was the highest hospital mortality rate in neurosurgical and proctological beds (2.4 and 2.3 respectively).

Thus, the statistics confirm the common data that the regions of the Far North are better provided with hospital beds and medical staff per 10,000 patients than in the RF as a whole.[7] It is certainly well grounded that these are the regions of the Far North that have difficult transport infrastructure, seasonal isolation of the population and severe natural and climate conditions for living. All these conditions predispose the region toward upkeep of networks of medical and healthcare institutions in each populated area.

The surgical staff requirement confirms the indicator that the regions of the Republic are well provided. The most understaffed regions are Abyysky, Allaikhovsky, Bulunsky, Verkhoyansky, Kobiaysky, Ust-Maysky, Ust-Yansky, and Verkhne-Kolymsky. The surgeons are required each year. It should be noted that the most problematic regions are the Arctic regions of the Republic, i.e. Abyyskiy, Allaikhovsky and Bulunsky districts. The indicator there reaches up to 50% of staff provision (Table 4).

As RS(Y) is a vast territory, in emergency cases the air medical service is required. Annual calls for air medical service vary; however, the data per 1000 patients are rather stable, 1.6 in 2014 and 1.6 in 2016 (Table 5).

As described in Table 6, the air medical service calls for surgical treatment were almost two times more in the period of 1993-1995. The number of planned and emergency operations was also two times more. The dynamics of 2013-2015 is rather stable in the number of air service calls and planned/emergency operations.

Table 3.

Surgical beds profile in RS(Y)

Hospital bed profile	Number of beds by 31.12.16	Admission rate per 1000 individuals	AHS	Hospital bed per 1 person	AHS per year	Turn-over	IMR
Surgical profile, total	1314	41.8	10.5	0.440	324	31	0.9
Among them: adult surgery	636	30	10	0.299	330	33	1.3
pediatric surgery	21	3.2	8.1	0.026	322	40	0.7
adult neurosurgery	72	2.4	13.4	0.033	318	24	2.4
pediatric neurosurgery	15	1.3	13.1	0.017	295	22	0.3
cardiac surgery	33	1.2	10.5	0.013	306	29	1.2
vascular surgery	32	1.8	7.5	0.013	318	42	0.1
adult traumatology	251	8.9	12.5	0.112	315	25	0.6
pediatric traumatology	30	4.4	10.6	0.047	407	38	0
burn	50	0.9	18	0.016	304	17	1.2
adult urological	43	1.8	9.6	0.017	309	32	0.2
pediatric urological	20	3.2	8	0.025	331	41	0
proctological	25	0.9	10.2	0.009	363	35	2.3
pediatric contaminated surgery	20	2.4	10.6	0.025	330	46	0
maxillofacial surgery	30	2	7.1	0.014	330	46	0
pediatric maxillofacial surgery	10	0.9	6.6	0.006	147	22	0
pediatric dental surgery							
adult orthopedic	26	1.2	10.3	0.012	329	32	0

AHS - Average hospitalstay; IMR - Inpatient mortality rate

Table 5.

The air medical service calls in RS(Y) from 2014 to 2016

Indicators	2014	2015	2016
Numbers of calls	1497	1460	1580
Per 1,000 patients	1,6	1,5	1,6

Table 6.

The air medical service calls for surgical treatment in RS(Y)

Indicators	1993	1994	1995		2013	2014	2015
Number of calls	3953	3331	2986		1594	1547	1632
Operations	…	1011	787		418	389	368

Table 4.

The surgical staff provision in RS(Y) from 2014 to 2016 (per 10,000 population)

Districts	Surgical staff provision		
	2014	2015	2016
Abyysky	50.0	50.0	50.0
Adlansky	85.7	69.6	69.6
Allaikhovsky	50.0	50.0	100.0
Amginsky	100.0	66.7	66.7
Anabarsky	200.0	100.0	100.0
Bulunsky	44.4	44.4	47.1
Verkhne-Viluysky	133.3	133.3	133.3
Verkhne-Kolymsky	100.0	100.0	50.0
Verkhoyansky	85.7	85.7	33.3
Viluysky	88.9	94.1	100.0
Gorniy	171.4	240.0	80.0
Zhigansky	50.0	100.0	100.0
Kobiaysky	94.1	94.1	57.1
Lensky	52.6	55.6	64.9
Megino-Kangalassky	83.3	96.0	96.0
Mirninsky	83.9	90.3	82.5
Momsky	100.0	100.0	100.0
Namsky	120.0	120.0	44.4
Nerungrinsky	58.0	65.7	67.7
Nizhnekolymsky	100.0	80.0	66.7
Nyurbinsky	75.0	100.0	100.0
Oimiakonsky	42.9	28.6	100.0
Olyokminsky	75.0	75.0	75.0
Oleneksky	100.0	100.0	100.0
Srednekolimsky	100.0	66.7	100.0
Suntarsky	100.0	100.0	100.0
Tattinsky	100.0	100.0	50.0
Tomponsky	88.9	88.9	88.9
Ust-Adansky	133.3	100.0	100.0
Ust-Maysky	70.6	70.6	53.3
Ust-Yansky	50.0	33.3	66.7
Khangalassky	85.7	83.3	83.3
Churapchinsky	142.9	100.0	100.0
Eveno-Bytantaicky	100.0	100.0	100.0
Healthcare Committee, Yakutsk	82.9	81.0	66.7
Republican institutions	96.2	64.3	66.1
RS(Y), total	85.3	75.4	73.2

Conclusion

The analysis of surgical service KPIs for RS(Y) has definitely described high demand for surgical specialists in the regions of the Far North. The situation will increase

prospectively more as surgical technologies are developed. Besides that, the building of a new oncologic dispensary is planned. RS(Y) has preserved the existing medical staff of surgeons, thus it has increased the number of staff to develop and implement new high-tech methods of treatment. Moreover, it has preserved the medical staff of surgeons in all central regional hospitals, even in the Arctic regions where the density of population is extremely low.

Competing Interests

The authors declare that they have no competing interests.

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