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ORGAN DONATION AND TRANSPLANTATION IN THE RUSSIAN FEDERATION IN 2022

15th Report from the Registry of the Russian Transplant Society

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Objective: to monitor the current trends and developments in organ donation and transplantation in the Russian Federation based on data from the year 2022. **Materials and methods.** Heads of organ transplant centers were surveyed through questionnaires. Data control was done using the information accounting system of the Russian Ministry of Health. We performed a comparative analysis of data obtained over years from various federal subjects of the Russian Federation and transplant centers. **Results.** Based on data retrieved from the National Registry in 2022, 46 kidney, 31 liver and 16 heart transplant programs were existing in the Russian Federation as of the year 2022. Organ donation activity in 2022 was 5.2 per million population (p.m.p.), with a 73.7% multi-organ procurement rate and an average of 2.8 organs procured from one effective donor. In 2022, 2,555 organ transplants were performed in the Russian Federation, which included 1,562 kidney, 659 liver and 310 heart transplants. Same year, the number of transplant surgeries performed in the Russian Federation increased by 10.0% compared to 2021. In Moscow, organ donation activity was 26.3 p.m.p. The city of Moscow and the Moscow Oblast alone had a total of 12 transplant centers, accounting for 52.6% of all kidney transplants and 64.8% of all extrarenal transplants in the country. The number of organ recipients in the Russian Federation exceeds 150 p.m.p. **Conclusion.** The geographic distribution of transplant centers in the Russian Federation continues to expand. Five new centers were opened in 2022. Over the past year, the number of effective donors and organ transplants increased in the country. The resource potential of medical institutions has not been exhausted and this is set to further increase the number of organ transplants performed. Moscow is the powerhouse of Russian transplantology. However, other regional leaders have since appeared in the Russian Federation, such as in Kemerovo, Kazan, Rostov-on-Don, Tyumen, Irkutsk, and Volzhsky. In the Russian Federation, priority is being given to pediatric transplant care. It is expedient to implement a complex of measures aimed at identifying potential recipients.

Keywords: organ donation, kidney transplantation, liver transplantation, heart transplantation, lung transplantation, transplant center, waiting list, registry, Shumakov National Medical Research Center of Transplantology and Artificial Organs.

INTRODUCTION

Current trends and developments in organ donation and transplantation in Russia are monitored via the National Registry under the auspices of a specialized transplantology commission jointly created by the Russian Ministry of Health and the Russian Transplant Society. Previous reports have been published in 2009–2022 [1–13].

Information contained in the Registry is provided to the following international registries:

– International Registry of Organ Donation and Transplantation (IRODaT);
– Registry of the European Renal Association – European Dialysis and Transplant Association (ERA–EDTA Registry);
– Registries of the International Society for Heart and Lung Transplantation (ISHLT Registries).

Since 2016, the National Registry has served as a tool for ensuring quality control and data collection integrity in the information system used for registering donated human organs and tissues, donors and recipients. The system operates under executive order No. 355n of the Russian Ministry of Health, dated June 8, 2016.

Annual reports of the register are not only statistical data for the reporting period, but also their systematic analysis with an assessment of the current state of transplantation care in the Russian Federation, trends and prospects for further development of this branch of healthcare.

Since 2019, the register is used to monitor the implementation of the departmental target program "Organ

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Donation and Transplantation in the Russian Federation", approved by the order of the Ministry of Health of Russia from June 4, 2019 No. 365 (from 2022 – a set of process measures).

Data for the Registry is collected via questionnaires administered to appropriate officials at all transplant centers in the Russian Federation. There is a comparative analysis of all data gathered over years from Russian regions, transplant centers and from international registries.

The working group would like to thank all regular and new participants in the Registry who have provided data, as well as the Russian Ministry of Health, and the Central Research Institute for Healthcare Organization and Informatization.

TRANSPLANT CENTERS

There are transplant centers in 37 federal subjects of the Russian Federation (see Fig. 1).

In 2022, kidney transplantation (KiT) was performed in 46 centers, liver transplantation (LiT) in 31, heart transplantation (HT) in 16, pancreas transplantation (PnT) in 3, lung transplantation (LnT) in 4.

In 2022, various transplant interventions were performed in 57 medical institutions. Of these, 18 were federal institutions, including 11 institutions of the Russian Ministry of Health, 2 institutions of the Russian Ministry of Science and Higher Education, 4 institutions of the Federal Biomedical Agency, 1 institution of the Russian Ministry of Defense, and 39 are institutions run by federal subjects of the Russian Federation.

In the new territories of the Russian Federation, in 2022 there was one transplant center in the Donetsk People's Republic at the Donetsk Clinical Territorial Medical Association of the DPR Ministry of Health of the DNR (Donetsk). Over the past year, there were 4 living-donor kidney transplants.

In 2022, 2,555 organ transplants were performed in Russia – 258 were pediatric transplants (see Tables 1 and 2). The number of organ transplants in the Russian Federation increased by 10.2% (+237) compared to 2021.

In 2022, 159 (in February) to 264 (in April) organ transplants were performed monthly, about 210 on average (see Fig. 2).

In the past year, 92 to 163 KiT, 42 to 72 LiT and 21 to 32 HT per month were performed in the Russian Federation.

Table 1

Organ donation and transplantation in the Russian Federation in 2022

Indicator	Number (units)
Organ donation	
Total number of organ donors	1,149
Deceased donors	763
Living (related) donors	386
Organ transplantation	
Total number of organs transplanted	2,555
share of pediatric transplants	258
Kidney	1,562
from deceased donors	1,334
from living-related donors	228
share of pediatric transplants	118
Liver	659
from deceased donor	501
from living-related donors	158
share of pediatric transplants	129
Heart	308
share of pediatric transplants	10
Heart-lung	2
share of pediatric transplants	1
Lungs	14
Pancreas	10

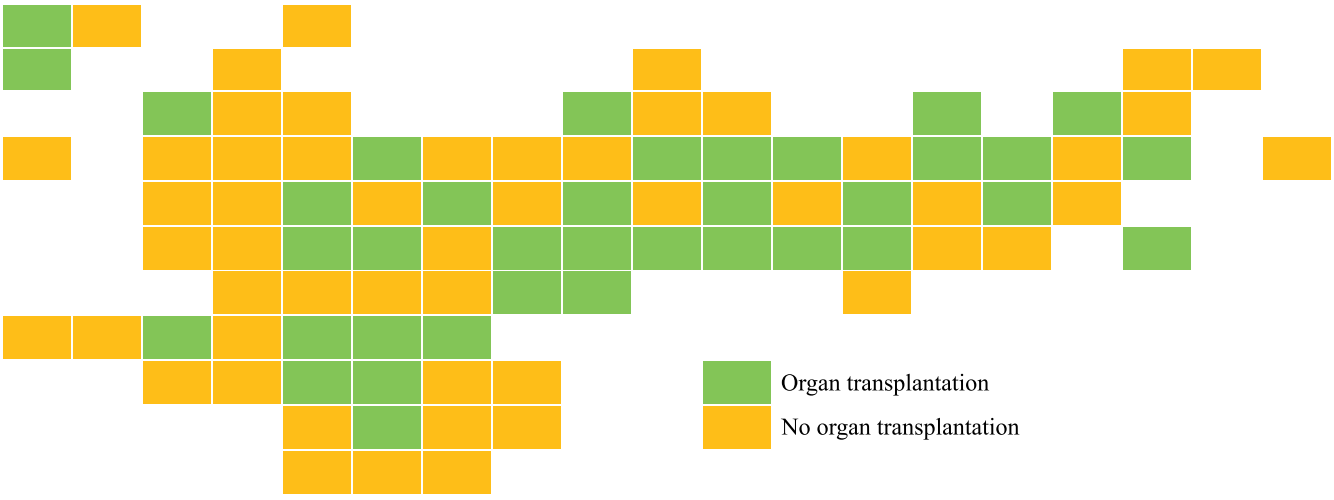

Fig. 1. Geographic distribution of organ transplant centers in Russia in 2022

Based on data obtained from the Federal Registry for High-Tech Medical Care, 2,186 (85.5%) organ transplant surgeries were performed in 2022, using funds from the compulsory medical insurance system that were allocated for provision of high-tech medical care for organ transplantation; there were 2,052 (88.5%) of such surgeries in 2021; see Fig. 3. Another 369 (14.5%) organ transplants were performed using funds from the federal subjects of the Russian Federation and from the federal budget.

Since 2010, when funding was included in the Registry as an indicator, the number of organ transplants performed using the funds allocated for provision of high-tech medical care for organ transplant has increased 2.7-fold. Meanwhile, the proportion of organ transplants performed using these funds has increased by 27.5%.

The financial costs per unit of high-tech medical care for transplantation in 2022 were approved by the Government of the Russian Federation on December 28, 2021 via Resolution No. 2505.

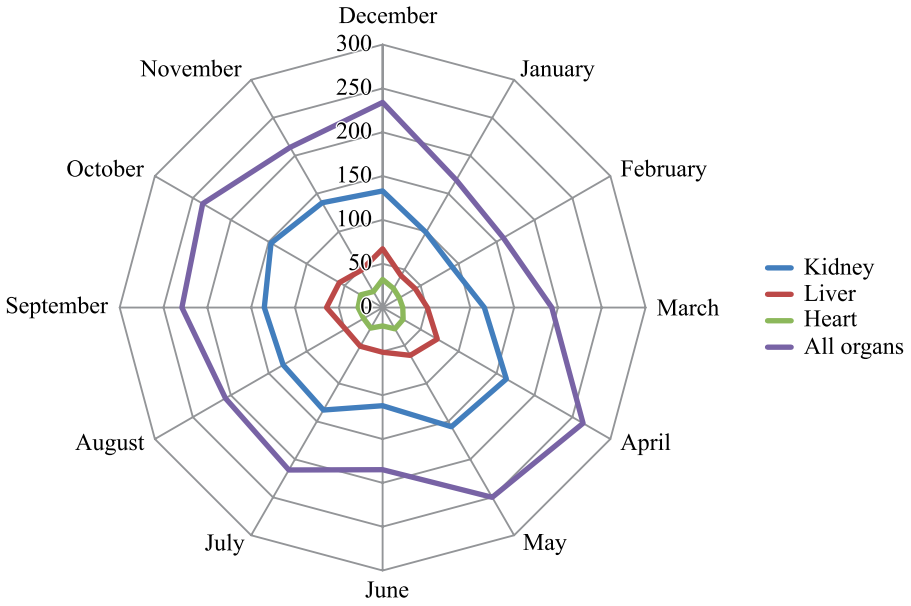

Fig. 2. Organ transplantation by month in 2022

Table 2

Transplant activity in the Russian Federation in 2022

№	Transplant center, region, federal district	Total	Kidney (total)	Kidney (cadaver)	Kidney (living related)	Liver (total)	Liver (cadaver)	Liver (living related)	Heart	Pancreas	Lungs	Heart-lungs	Small intestine
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.1	Shumakov National Medical Research Center of Transplantology and Artificial Organs, **Moscow, Central Federal District**	**654**	**266**	171	95	**159**	63	96	**212**	**5**	**10**	**2**	**0**
1.2	Volzhsky Branch of Shumakov National Medical Research Center of Transplantology and Artificial Organs, **Volzhsky, Southern Federal District**	**45**	**36**	20	16	**7**	7	0	**2**	**0**	**0**	**0**	**0**
2	Lopatkin Research Institute of Urology and Interventional Radiology, a branch of the National Medical Research Center for Radiology, **Moscow, Central Federal District**	**50**	**50**	43	7	**0**	0	0	**0**	**0**	**0**	**0**	**0**
3	Russian Children's Clinical Hospital, **Moscow, Central Federal District**	**32**	**32**	25	7	**0**	0	0	**0**	**0**	**0**	**0**	**0**
4	Petrovsky National Research Centre of Surgery, **Moscow, Central Federal District**	**38**	**25**	6	19	**13**	0	13	**0**	**0**	**0**	**0**	**0**

Continuation table 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14
5	Burnazyan Federal Medical and Biophysical Center, **Moscow, Central Federal District**	**48**	**13**	11	2	**35**	11	24	**0**	**0**	**0**	**0**	**0**
6	Bakulev Scientific Center of Cardiovascular Surgery, **Moscow, Central Federal District**	**2**	**0**	0	0	**0**	0	0	**2**	**0**	**0**	**0**	**0**
7	National Medical Research Center for Children's Health, **Moscow, Central Federal District**	**18**	**18**	8	10	**0**	0	0	**0**	**0**	**0**	**0**	**0**
8	Botkin Hospital, **Moscow, Central Federal District**	**149**	**108**	107	1	**41**	41	0	**0**	**0**	**0**	**0**	**0**
9	Sklifosovsky Research Institute of Emergency Care, **Moscow, Central Federal District**	**369**	**251**	250	1	**107**	105	2	**4**	**3**	**4**	**0**	**0**
10	Moscow Clinical Scientific Center, **Moscow, Central Federal District**	**24**	**0**	0	0	**24**	24	0	**0**	**0**	**0**	**0**	**0**
11	Vladimirsky Moscow Regional Research and Clinical Institute, **Moscow Oblast, Central Federal District**	**62**	**39**	38	1	**23**	23	0	**0**	**0**	**0**	**0**	**0**
12	Federal Clinical Center for High Medical Technologies, Federal Biomedical Agency (119), **Moscow Oblast, Central Federal District**	**20**	**20**	16	4	**0**	0	0	**0**	**0**	**0**	**0**	**0**
13	St. Joasaphus Belgorod Regional Clinical Hospital, **Belgorod, Central Federal District**	**13**	**9**	9	0	**4**	4	0	**0**	**0**	**0**	**0**	**0**
14	Voronezh Regional Clinical Hospital No. 1, **Voronezh, Central Federal District**	**7**	**7**	6	1	**0**	0	0	**0**	**0**	**0**	**0**	**0**
15	Tula Regional Clinical Hospital, **Tula, Central Federal District**	**4**	**4**	3	1	**0**	0	0	**0**	**0**	**0**	**0**	**0**
16	Ryazan Regional Clinical Hospital, **Ryazan, Central Federal District**	**12**	**11**	10	1	**1**	1	0	**0**	**0**	**0**	**0**	**0**
17	Stavropol Regional Clinical Hospital, **Stavropol, North Caucasian Federal District**	**3**	**0**	0	0	**3**	3	0	**0**	**0**	**0**	**0**	**0**
18	Ochapovsky Regional Clinical Hospital No. 1, **Krasnodar, Southern Federal District**	**48**	**31**	29	2	**9**	9	0	**8**	**0**	**0**	**0**	**0**
19	Volzhsky Regional Center of Urology, **Volzhsky, Southern Federal District**	**7**	**7**	3	4	**0**	0	0	**0**	**0**	**0**	**0**	**0**
20	Rostov Regional Clinical Hospital, **Rostov-on-Don, Southern Federal District**	**56**	**34**	34	0	**16**	16	0	**5**	**1**	**0**	**0**	**0**
21	Russian Research Center of Radiology and Surgical Technologies, **St. Petersburg, Northwestern Federal District**	**16**	**0**	0	0	**16**	16	0	**0**	**0**	**0**	**0**	**0**
22	Almazov National Medical Research Centre, **St. Petersburg, Northwestern Federal District**	**28**	**0**	0	0	**0**	0	0	**28**	**0**	**0**	**0**	**0**
23	Pavlov University, **St. Petersburg, Northwestern Federal District**	**45**	**35**	32	3	**10**	10	0	**0**	**0**	**0**	**0**	**0**
24	St. Petersburg Research Institute of Emergency Medicine, **St. Petersburg, Northwestern Federal District**	**24**	**24**	24	0	**0**	0	0	**0**	**0**	**0**	**0**	**0**
25	Mariinskaya Hospital, **St. Petersburg, Northwestern Federal District**	**16**	**16**	14	2	**0**	0	0	**0**	**0**	**0**	**0**	**0**
26	St. Luke's Clinical Hospital, **St. Petersburg, Northwestern Federal District**	**7**	**7**	5	2	**0**	0	0	**0**	**0**	**0**	**0**	**0**
27	Kirov Military Medical Academy, **St. Petersburg, Northwestern Federal District**	**18**	**0**	0	0	**18**	17	1	**0**	**0**	**0**	**0**	**0**
28	Leningrad Regional Clinical Hospital, **St. Petersburg, Northwestern Federal District**	**33**	**33**	33	0	**0**	0	0	**0**	**0**	**0**	**0**	**0**
29	Volosevich First City Clinical Hospital, **Arkhangelsk, Northwestern Federal District**	**3**	**3**	2	1	**0**	0	0	**0**	**0**	**0**	**0**	**0**

End of table 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14
30	Meshalkin National Medical Research Center, **Novosibirsk, Siberian Federal District**	**10**	**0**	0	0	**1**	1	0	**9**	**0**	**0**	**0**	**0**
31	State Novosibirsk Regional Clinical Hospital, **Novosibirsk, Siberian Federal District**	**78**	**35**	27	8	**43**	24	19	**0**	**0**	**0**	**0**	**0**
32	Research Institute for Complex Issues of Cardiovascular Diseases, **Kemerovo, Siberian Federal District**	**11**	**0**	0	0	**0**	0	0	**11**	**0**	**0**	**0**	**0**
33	Belyaev Kemerovo Regional Clinical Hospital, **Kemerovo, Siberian Federal District**	**75**	**75**	72	3	**0**	0	0	**0**	**0**	**0**	**0**	**0**
34	Regional Clinical Hospital for Emergency Medical Care, **Kemerovo, Siberian Federal District**	**7**	**0**	0	0	**7**	7	0	**0**	**0**	**0**	**0**	**0**
35	Irkutsk Regional Clinical Hospital, **Irkutsk, Siberian Federal District**	**35**	**18**	18	0	**16**	16	0	**1**	**0**	**0**	**0**	**0**
36	Altai Regional Clinical Hospital, **Barnaul, Siberian Federal District**	**21**	**19**	19	0	**2**	2	0	**0**	**0**	**0**	**0**	**0**
37	Federal Center for Cardiovascular Surgery, **Krasnoyarsk, Siberian Federal District**	**20**	**18**	15	3	**2**	2	0	**0**	**0**	**0**	**0**	**0**
38	Krasnoyarsk Regional Clinical Hospital, **Krasnoyarsk, Siberian Federal District**	**31**	**18**	18	0	**9**	9	0	**4**	**0**	**0**	**0**	**0**
39	Sverdlovsk Regional Clinical Hospital No. 1, **Yekaterinburg, Ural Federal District**	**30**	**20**	19	1	**7**	6	1	**3**	**0**	**0**	**0**	**0**
40	Chelyabinsk Regional Clinical Hospital, **Chelyabinsk, Ural Federal District**	**22**	**15**	14	1	**4**	4	0	**3**	**0**	**0**	**0**	**0**
41	Regional Clinical Hospital No. 1, **Tyumen, Ural Federal District**	**33**	**30**	29	1	**1**	1	0	**2**	**0**	**0**	**0**	**0**
42	District Clinical Hospital, **Khanty-Mansiysk, Ural Federal District**	**8**	**5**	4	1	**2**	2	0	**1**	**0**	**0**	**0**	**0**
43	Samara State Medical University, **Samara, Volga Federal District**	**43**	**41**	39	2	**2**	2	0	**0**	**0**	**0**	**0**	**0**
44	Saratov State Medical University, **Saratov, Volga Federal District**	**7**	**7**	0	7	**0**	0	0	**0**	**0**	**0**	**0**	**0**
45	Regional Clinical Hospital, **Saratov, Volga Federal District**	**4**	**4**	4	0	**0**	0	0	**0**	**0**	**0**	**0**	**0**
46	Volga Regional Medical Center, **Nizhny Novgorod, Volga Federal District**	**24**	**14**	11	3	**9**	7	2	**0**	**1**	**0**	**0**	**0**
47	Republican Clinical Hospital, **Kazan, Volga Federal District**	**138**	**83**	80	3	**55**	55	0	**0**	**0**	**0**	**0**	**0**
48	Interregional Clinical Diagnostic Center, **Kazan, Volga Federal District**	**8**	**0**	0	0	**0**	0	0	**8**	**0**	**0**	**0**	**0**
49	Republican Clinical Hospital, **Ufa, Volga Federal District**	**49**	**39**	39	0	**10**	10	0	**0**	**0**	**0**	**0**	**0**
50	Republican Cardiology Clinic, **Ufa, Volga Federal District**	**5**	**0**	0	0	**0**	0	0	**5**	**0**	**0**	**0**	**0**
51	Perm Regional Clinical Hospital, **Perm, Volga Federal District**	**3**	**3**	2	1	**0**	0	0	**0**	**0**	**0**	**0**	**0**
52	Municipal Clinical Hospital for Emergency Medical Care No. 1, **Orenburg, Volga Federal District**	**16**	**16**	11	5	**0**	0	0	**0**	**0**	**0**	**0**	**0**
53	Republican Hospital No. 1 – National Center of Medicine, **Yakutsk, Far Eastern Federal District**	**2**	**2**	2	0	**0**	0	0	**0**	**0**	**0**	**0**	**0**
54	Semashko Republican Clinical Hospital, **Ulan-Ude, Far Eastern Federal District**	**3**	**3**	0	3	**0**	0	0	**0**	**0**	**0**	**0**	**0**
55	Primorsky Regional Clinical Hospital No. 1, **Vladivostok, Far Eastern Federal District**	**15**	**12**	12	0	**3**	3	0	**0**	**0**	**0**	**0**	**0**
56	Regional Clinical Hospital No. 1, **Khabarovsk, Far Eastern Federal District**	**2**	**2**	0	2	**0**	0	0	**0**	**0**	**0**	**0**	**0**
Total		**2551**	**1558**	**1334**	**224**	**659**	**501**	**158**	**308**	**10**	**14**	**2**	**0**

ORGAN DONATION

In 2022, donor programs were implemented in 34 federal subjects of the Russian Federation.

Over the past year, new donor programs were launched in 2 federal subjects of the Russian Federation:

– in Khabarovsk Krai, from a living donor;
– in Perm Krai, from a deceased donor.

The rate of increase in donor activity in the Russian Federation in 2021 was higher by 17.3% than planned by the departmental target program "Organ Donation and Transplantation in the Russian Federation", approved by executive order No. 365 of the Russian Ministry of Health dated June 4, 2019.

In 2022, the proportion of effective deceased organ donors >60 years of age was 16.0% (see Fig. 4). Male donors were 63.3%, females were 36.7%.

Donor activity per population of the regions implementing donor programs (100.0 million) amounted to 7.6 p.m.p. (see Tables 4 and 5).

Moscow posted the highest donor activity – 26.3 p.m.p. (23.7 in 2021). In Kemerovo Oblast, donor activity exceeded 15.0 effective donors p.m.p. (15.8). In two more federal subjects of the Russian Federation, Republic of Tatarstan and the Tyumen Oblast, donor activity exceeded 10.0 p.m.p.

In 2022, an increase in donor activity was observed in 20 federal subjects of the Russian Federation; Kemerovo Oblast, the Republic of Tatarstan, Tyumen Oblast, Leningrad Oblast, St. Petersburg, Irkutsk Oblast, Altai Krai, Primorsky Krai, and Chelyabinsk Oblast showed the most dynamic growth (by ≥40.0%).

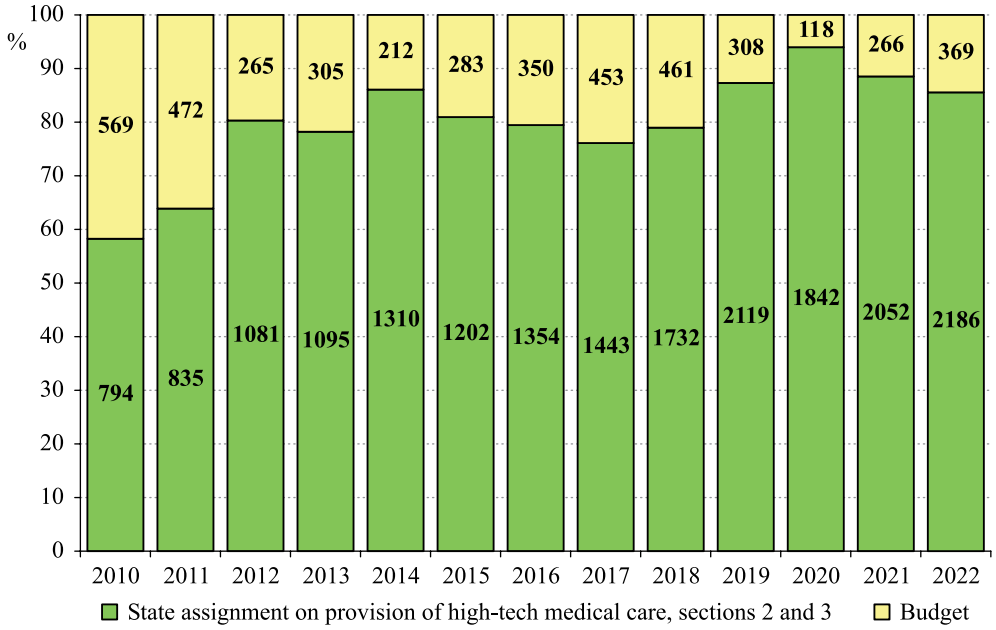

Fig. 3. Funding for organ transplantation in the Russian Federation in 2010–2022

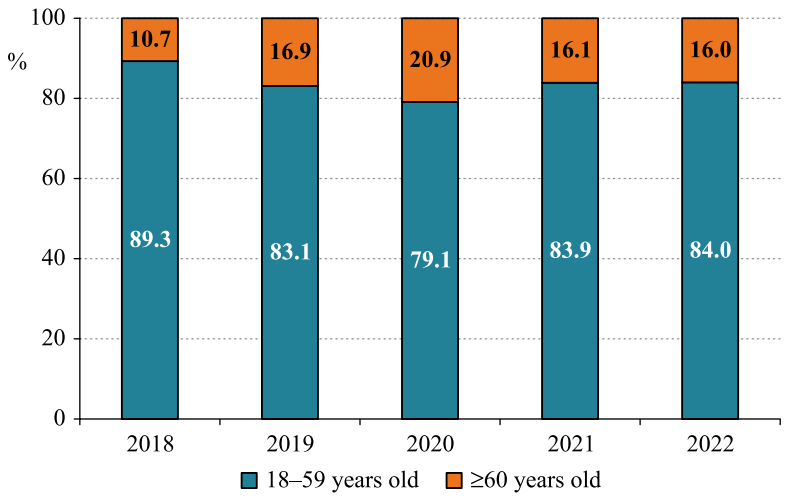

Fig. 4. Age structure of effective organ donors in 2018–2022

Eleven federal subjects of the Russian Federation witnessed a drop in donor activity; donor activity in Ryazan Oblast, Sverdlovsk Oblast and Stavropol Krai was worse than in other regions (≥30% decrease).

Moscow and Moscow Oblast alone accounted for 47.4% (362) of effective donors in 2022.

There were 725 effective brain-dead donors, accounting for 95.0% of the total pool of effective donors (see Fig. 5). In 26 federal subjects of the Russian Federation, the centers worked only with brain-dead donors.

In Kemerovo Oblast, the share of effective donors diagnosed with brain death increased, but still remains lower than in other federal subjects (70.7% in 2022 and 64.3% in 2021).

There were 562 multi-organ procurements in 2022, accounting for 73.6% of the total number of procurements. In 17 federal subjects, the share of multi-organ procurements was ≥70.0%.

The donor resource is underutilized in Ryazan Oblast, Voronezh Oblast, Kemerovo Oblast, Tyumen Oblast, Samara Oblast, Saratov Oblast, Primorsky Krai – the share of multi-organ donors is <50.0%).

Moscow and Moscow Oblast alone accounted for 294 multi-organ donors (38.5% of the total number of multi-organ donors) in the country in 2022.

The average number of organs procured from one donor in 2022 was 2.8 (3.0 in 2021). Donor kidney utilization rate was 87.4% (90.7% in 2021).

In 2022, the number of organs (kidney, part of the liver) procured from living related donors reached 386 – 33.6% of the total number of procurements (1,149).

Table 3

Indicators associated with organ donation activity in the regions of the Russian Federation in 2022

S/N	Region	Organ Donation Coordinating Center	Population (million)	Number of active donor bases	Effective donors (absolute, per million population)		including brain-dead donors (absolute, %)		including multi-organ donors (absolute, %)	
1	2	3	4	5	6	7	8	9	10	11
1	Moscow	Botkin Hospital	12.6	21	332	26.3	313	94.3	268	80.7
2	Moscow Oblast	Vladimirsky Moscow Regional Research Clinical Institute	7.8	13	30	3.8	30	100.0	26	86.7
3	Belgorod Oblast	St. Joasaphus Belgorod Regional Clinical Hospital	1.5	1	5	3.3	5	100.0	4	80.0
4	Voronezh Oblast	Voronezh Regional Clinical Hospital No. 1	2.3	3	3	1.3	3	100.0	0	0.0
5	Tula Oblast	Tula Regional Clinical Hospital	1.4	1	3	2.1	3	100.0	3	100.0
6	Ryazan Oblast	Ryazan Regional Clinical Hospital	1.1	1	7	6.4	6	85.7	3	42.9
7	Krasnodar Krai	Ochapovsky Regional Clinical Hospital No. 1	5.7	1	17	3.0	16	94.1	15	88.2
8	Volgograd Oblast	Volzhsky Branch of Shumakov National Medical Research Center of Transplantology and Artificial Organs	2.5	3	8	3.2	8	100.0	7	87.5
9	Rostov Oblast	Rostov Regional Clinical Hospital	4.2	1	21	5.0	21	100.0	19	90.5
10	Stavropol Krai	Stavropol Regional Clinical Hospital	2.8	1	3	1.1	3	100.0	2	66.7
11	St. Petersburg	St. Petersburg Research Institute of Emergency Medicine	5.4	6	43	8.0	43	100.0	36	83.7
12	Leningrad Oblast	Leningrad Regional Clinical Hospital	1.9	1	17	8.9	17	100.0	14	82.4
13	Arkhangelsk Oblast	Volosevich First City Clinical Hospital	1.1	1	3	2.7	3	100.0	3	100.0
14	Novosibirsk Oblast	State Novosibirsk Regional Clinical Hospital	2.8	4	19	6.8	18	94.7	18	94.7
15	Kemerovo Oblast	Belyaev Kemerovo Regional Clinical Hospital	2.6	10	41	15.8	29	70.7	19	46.3
16	Irkutsk Oblast	Irkutsk Regional Clinical Hospital	2.4	2	15	6.3	15	100.0	9	60.0
17	Altai Krai	Altai Regional Clinical Hospital	2.3	1	10	4.3	10	100.0	5	50.0
18	Krasnoyarsk Krai	Krasnoyarsk Regional Clinical Hospital	2.9	3	10	3.4	10	100.0	10	100.0
19	Sverdlovsk Oblast	Sverdlovsk Regional Clinical Hospital No. 1	4.3	2	10	2.3	10	100.0	6	60.0
20	Chelyabinsk Oblast	Chelyabinsk Regional Clinical Hospital	3.4	1	9	2.6	9	100.0	7	77.8

End of table 3

1	2	3	4	5	6	7	8	9	10	11
21	Tyumen Oblast	Regional Clinical Hospital No. 1	1.5	3	16	10.7	16	100.0	5	31.3
22	Khanty-Mansi Autonomous Okrug – Yugra	District Clinical Hospital	1.7	3	3	1.8	3	100.0	2	66.7
23	Samara Oblast	Samara State Medical University	3.1	4	23	7.4	22	95.7	4	17.4
24	Saratov Oblast	Regional Clinical Hospital	2.4	1	7	2.9	7	100.0	2	28.6
25	Nizhny Novgorod Oblast	Volga Regional Medical Center	3.2	4	7	2.2	7	100.0	6	85.7
26	Republic of Tatarstan	Republican Clinical Hospital	3.9	3	52	13.3	52	100.0	44	84.6
27	Republic of Bashkortostan	Kuvatov Republican Clinical Hospital	4.0	6	20	5.0	20	100.0	12	60.0
28	Orenburg Oblast	Municipal Clinical Hospital for Emergency Medical Care No. 1	1.9	2	5	2.6	5	100.0	5	100.0
29	Primorsky Krai	Primorsky Regional Clinical Hospital No. 1	1.9	1	7	3.7	7	100.0	2	28.6
30	Perm Krai	Perm Regional Clinical Hospital	2.5	1	1	0.4	1	100.0	0	0.0
31	The Republic of Sakha (Yakutia)	Republican Hospital No. 1, National Center of Medicine	1.0	1	1	1.0	1	100.0	0	0.0
32	Departmental program of the Federal Biomedical Agency of the Russian Federation	Burnazyan Federal Medical and Biophysical Center	–	2	2	–	2	100.0	2	100.0
33	Departmental program of the Federal Biomedical Agency of the Russian Federation	Federal Siberian Research and Clinical Center	–	3	13	–	10	76.9	4	30.8
		Total	**145.5**	**111**	**763**	**5.2**	**725**	**95.0**	**562**	**73.7**

Table 4

Rating of regions by donor activity in 2022

S/N	Federal Subject of the Russian Federation (Region)	Population in 2022 (million)	Number of effective donors (per million population)	
			2022	2021
1	Moscow	12.6	26.3	23.7
2	Kemerovo Oblast	2.6	15.8	10.8
3	Republic of Tatarstan	3.9	13.3	9.0
4	Tyumen Oblast	1.5	10.7	5.3
5	Leningrad Oblast	1.8	8.9	6.3
6	St. Petersburg	5.4	8.0	4.6
7	Samara Oblast	3.2	7.4	7.7
8	Novosibirsk Oblast	2.8	6.8	5.4
9	Ryazan Oblast	1.1	6.4	10.0
10	Irkutsk Oblast	2.4	6.3	3.3
11	Republic of Bashkortostan	4.1	5.0	5.3
12	Rostov Oblast	4.2	5.0	5.0
13	Altai Krai	2.3	4.3	3.0
14	Moscow Oblast	7.7	3.8	4.7
15	Primorsky Krai	1.9	3.7	1.6
16	Krasnoyarsk Krai*	2.9	3.4	4.1
17	Belgorod Oblast	1.5	3.3	1.3
18	Volgograd Oblast	2.5	3.2	4.0

S/N	Federal Subject of the Russian Federation (Region)	Population in 2022 (million)	Number of effective donors (per million population)	
			2022	2021
19	Krasnodar Krai	5.6	3.0	2.3
20	Saratov Oblast	2.4	2.9	2.5
21	Arhangelsk Oblast	1.1	2.7	0.9
22	Orenburg Oblast	1.9	2.6	2.1
23	Chelyabinsk Oblast	3.5	2.6	0.9
24	Sverdlovsk Oblast	4.3	2.3	3.3
25	Nizhny Novgorod Oblast	3.2	2.2	2.2
26	Tula Oblast	1.4	2.1	2.9
27	Khanty-Mansi Autonomous Okrug – Yugra	1.7	1.8	1.2
28	Voronezh Oblast	2.3	1.3	1.3
29	Stavropol Krai	2.8	1.1	1.8
30	The Republic of Sakha (Yakutia)	1	1.0	0.0
31	Perm Krai	2.5	1.0	0.4
	Russia (85 federal subjects of the Russian Federation)	145.5	5.2	4.5

Note: The donor program of the Federal Siberian Research and Clinical Center, Krasnoyarsk is excluded.

Table 5

Deceased organ donors (effective donors) in 2006–2022

S/N	Region	2006	2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		2022	
		Number of effective donors	Number of effective donors	Year-over-year change (abs.)	Number of effective donors	Year-over-year change (abs.)	Number of effective donors	Year-over-year change (abs.)	Number of effective donors	Year-over-year change (abs.)	Number of effective donors	Year-over-year change (abs.)	Number of effective donors	Year-over-year change (abs.)	Number of effective donors	Year-over-year change (abs.)	Number of effective donors	Year-over-year change (abs.)	Number of effective donors	Year-over-year change (abs.)	Number of effective donors	Year-over-year change (abs.)	Number of effective donors	Year-over-year change (abs.)	Number of effective donors	Year-over-year change (abs.)	Number of effective donors	Year-over-year change (abs.)	Number of effective donors	Year-over-year change (abs.)	Number of effective donors	Year-over-year change (abs.)	Number of effective donors	Year-over-year change (abs.)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
1	Moscow	87	126	+39	135	+9	136	+1	151	+15	135	–16	111	–24	125	+14	151	+26	142	–9	183	+41	195	+12	218	+23	277	+59	263	–14	298	+35	332	+34
2	Moscow Oblast	24	45	+21	59	+14	52	–7	71	+19	82	+11	61	–21	56	–5	51	–5	44	–7	39	–5	75	+36	68	–7	41	–27	21	–20	36	+15	30	–6
3	Belgorod Oblast		2	+2	3	+1	2	–1	5	+3	6	+1	3	–3	1	–2	2	+1	5	+3	4	–1	4	0	4	0	4	0	2	–2	2	0	5	+3
4	Voronezh Oblast	6	2	–4	8	+6	2	–6	0	–2	1	+1	6	+5	6	0	5	–1	7	+2	4	–3	1	–3	8	+7	8	0	4	–4	3	–1	3	0
5	Tula Oblast																										2	+2	3	+1	4	+1	3	–1
6	Ryazan Oblast																								2	+2	13	+11	6	–7	11	+5	7	–4
7	Ivanovo Oblast																														1	+1	0	–1
8	Krasnodar Krai						3	+3	39	+36	52	+13	42	–10	41	–1	23	–18	25	+2	24	–1	19	–5	20	+1	23	+3	13	–10	13	0	17	+4
9	Volgograd Oblast	5	0	–5	11	+11	15	+4	16	+1	17	+1	19	+2	15	–2	18	+3	8	–10	8	0	9	+1	9	0	10	+1	10	0	10	0	8	–2
10	Rostov Oblast																		1	+1	7	+6	13	+6	19	+6	21	+2	18	–3	21	+3	21	0
11	Stavropol Krai																								2	+2	3	+1	13	+10	5	–8	3	–2
12	St. Petersburg	30	45	+15	47	+2	47	0	41	–6	34	–7	22	–12	13	–9	23	+10	31	+8	29	–2	31	+2	34	+3	53	+19	25	–28	25	0	43	+18
13	Leningrad Oblast	12	8	–4	11	+3	11	0	13	+2	10	–3	10	0	10	0	9	–1	7	–2	12	+5	11	–1	15	+4	7	–8	11	+4	12	+1	17	+5
14	Arkhangelsk Oblast																								5	+5	5	0	1	–4	1	0	3	+2
15	Novosibirsk Oblast	17	11	–6	18	+7	29	+11	35	+6	25	–10	20	–4	17	–3	11	–6	14	+3	9	–5	14	+5	17	+3	23	+6	15	–8	15	0	19	+4
16	Kemerovo Oblast	16	13	–3	18	+5	18	0	22	+4	12	–10	26	+14	26	0	31	+5	28	–3	34	+6	22	–12	30	+8	40	+10	27	–13	28	+1	41	+13
17	Irkutsk Oblast				4	+4	6	+2	10	+4	9	–1	8	–1	6	–2	9	+3	4	–5	3	–1	2	–1	7	+5	16	+9	16	0	8	–8	15	+7
18	Omsk Oblast	10	15	+5	13	–2	19	+6	19	0	14	–5	11	–3	14	+3	16	+2	11	–5	4	–7	4	0	3	–1	2	–1	2	0	0	–2	0	0
19	Altai Krai														3	+3	5	+2	4	–1	4	0	8	+4	8	0	8	0	9	+1	7	–2	10	+3
20	Krasnoyarsk Krai																3	+3	6	+3	18	+12	27	+9	16	Note	13	–3	10	–3	12	+2	10	–2
21	Sverdlovsk Oblast	14	13	–1	12	–1	13	+1	14	+1	15	+1	14	–1	18	+4	23	+5	18	–5	15	–3	22	+7	24	+2	24	0	6	–18	14	+8	10	–4

End of table 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
22	Chelyabinsk Oblast								6	+6	2	–4	7	+5	6	–1	10	+4	9	–1	11	+2	8	–3	4	–4	4	0	3	–1	3	0	9	+6
23	Tyumen Oblast																						4	+4	13	+9	13	0	5	–8	8	+3	16	+8
24	Khanty-Mansi Autonomous Okrug – Yugra																						3	+3	4	+1	5	+1	3	–2	2	–1	3	+1
25	Samara Oblast	4	17	+13	24	+7	18	–6	20	+2	21	+1	19	–2	21	+2	20	–1	18	–2	26	+8	28	+2	23	–5	25	+2	24	–1	24	0	23	–1
26	Saratov Oblast														4	+4	7	+3	7	0	7	0	7	0	8	+1	10	+2	0	–10	6	+6	7	+1
27	Nizhny Novgorod Oblast						7	+7	11	+4	12	+1	10	–2	8	–2	12	+4	10	–2	11	+1	10	–1	12	+2	12	0	5	–7	7	+2	7	0
28	Republic of Tatarstan		3	+3	1	–2	3	+2	12	+9	16	+4	9	+7	6	–3	6	0	4	–2	1	–3	3	+2	4	+1	15	+11	21	+6	35	+14	52	+17
29	Republic of Bashkortostan								2	+2	7	+5	14	+7	18	+4	19	+1	14	+5	20	+6	22	+2	20	–2	24	+4	18	–6	21	+3	20	–1
30	Orenburg Oblast																		3	+3	8	+5	9	+1	8	–1	11	+3	1	–10	4	+3	5	+1
31	The Republic of Sakha (Yakutia)																				2	+2	4	+2	4	0	3	–1	0	–3	0	0	1	+1
32	Primorsky Krai																														3	+3	7	+4
33	Perm Krai																																1	+1
34	Burnazyan Federal Medical and Biophysical Center, Moscow														6	+6	11	+5	14	+3	16	+2	9	–7	5	–4	1	–4	1	0	3	+2	2	–1
35	Burnazyan Federal Medical and Biophysical Center, Krasnoyarsk																								24	Note	16	–8	8	–8	10	+2	13	+3
	TOTAL in the Russian Federation	**225**	**300**	**+75**	**364**	**+64**	**381**	**+17**	**487**	**+106**	**470**	**–17**	**412**	**–58**	**420**	**+8**	**465**	**+45**	**434**	**–31**	**499**	**+53**	**565**	**+78**	**639**	**+74**	**732**	**+93**	**564**	**–168**	**652**	**+88**	**763**	**+111**

Note: The donor activity of the Federal Siberian Research and Clinical Center, Krasnoyarsk is presented as a separate program.

In 2021, the number of organ procurements from living related donors was 364–35.8% of the total number of procurements (1,016).

KIDNEY TRANSPLANTATION

In 2022, a total of 1,562 KiT were performed (see Fig. 6).

Compared to the year 2021, the number of KiT increased by 12.9% (+178).

A new KiT program was launched in Khabarovsk Krai (Regional Clinical Hospital No. 1, Khabarovsk).

In 2022, there were 1,334 deceased-donor KiT and 228 living-related-donor KiT (see Fig. 6).

Table 6 and Fig. 7 show KiT centers that performed the highest number of KiT in 2022.

The rating primarily demonstrates the leadership and sustainability of the transplant programs at leading transplant centers in Moscow, which in turn is a result of the effective work by the Moscow Coordinating Center for Organ Donation.

The positive dynamics of transplant programs in the Republic of Tatarstan and Kemerovo Oblast, the sustainability and volume of KiT programs in Samara Oblast, Republic of Bashkortostan and Moscow Oblast, and further development of pediatric KiT program at Shumakov National Research Center (Moscow) and

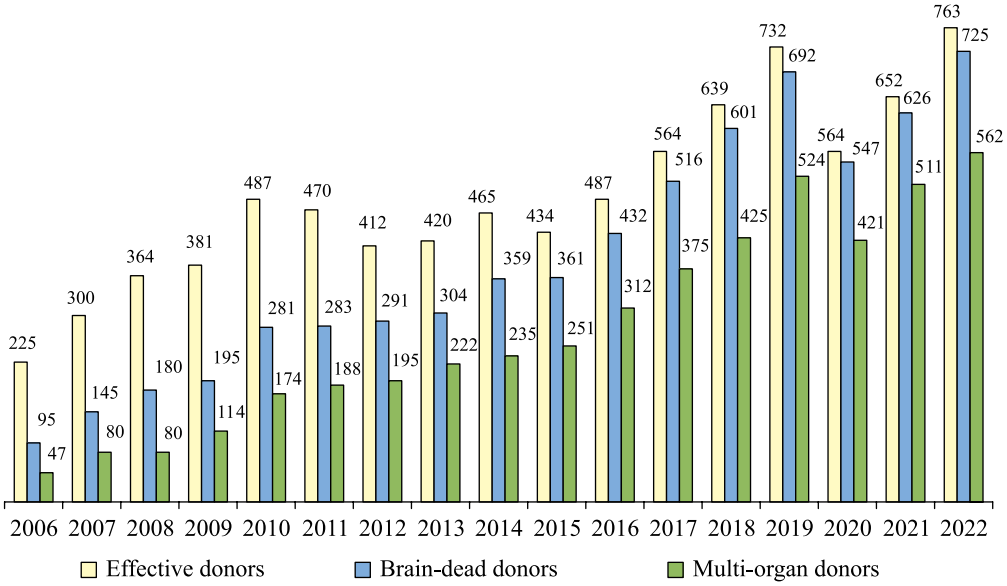

Fig. 5. Structure of effective organ donors in the Russian Federation in 2006–2022

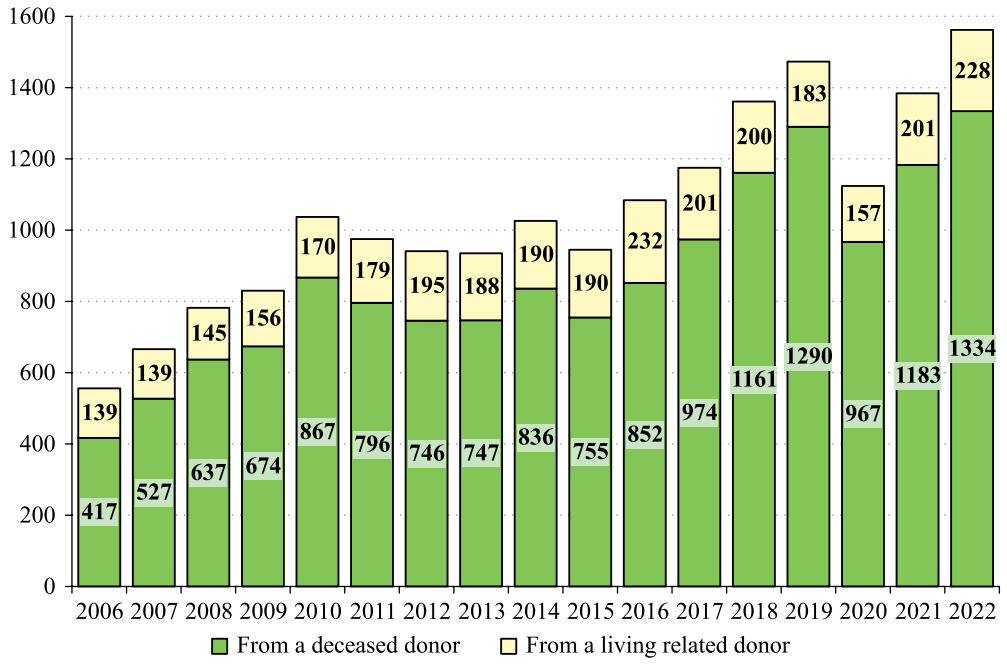

Fig. 6. Kidney transplantation in the Russian Federation in 2006–2022

Russian Children's Clinical Hospital (Moscow) should be noted. Shumakov National Medical Research Center of Transplantology and Artificial Organs, Moscow (Shumakov Center) plays a leading role in the living-related KiT program, performing 111 transplants (49.5% of the total number of related KiT in Russia).

In 2022, 6 KiT centers performed more than 50 surgeries during the year: Shumakov Center (302), Sklifosovsky Research Institute of Emergency Care (251), Botkin Hospital (108), Republican Clinical Hospital, Kazan (83), Belyaev Kemerovo Regional Clinical Hospital (75), and Research Institute of Urology (50). Lopatkin Research Institute of Urology (50). Ten transplant centers performed from 30 to 49 operations during the year; another 12 centers performed from 15 to 29.

In 2022, 35 transplant centers (76.1%) performed related-donor KiT, with a total of 228 transplants performed. The average utilization of living kidney donation

Table 6

Leaders by number of kidney transplants performed

Rank	Leaders in terms of number of kidney transplants performed	Number of kidney transplants in 2022
1	Shumakov National Medical Research Center of Transplantology and Artificial Organs, Moscow	266
2	Sklifosovsky Research Institute of Emergency Care, Moscow	251
3	Botkin Hospital, Moscow	108
4	Republican Clinical Hospital, Kazan	83
5	Belyaev Kemerovo Regional Clinical Hospital, Kemerovo	75
6	Lopatkin Research Institute of Urology and Interventional Radiology, a branch of the National Medical Research Center for Radiology, Moscow	50
7	Samara State Medical University, Samara	41
8	Kuvatov Republican Clinical Hospital, Ufa	39
9	Vladimirsky Moscow Regional Research and Clinical Institute, Moscow Oblast	39
10	Volzhsky Branch of Shumakov National Medical Research Center of Transplantology and Artificial Organs, Volzhsky	36
	TOTAL	**988**
	63.4% of the total number of kidney transplants performed in the Russian Federation (1,558)	

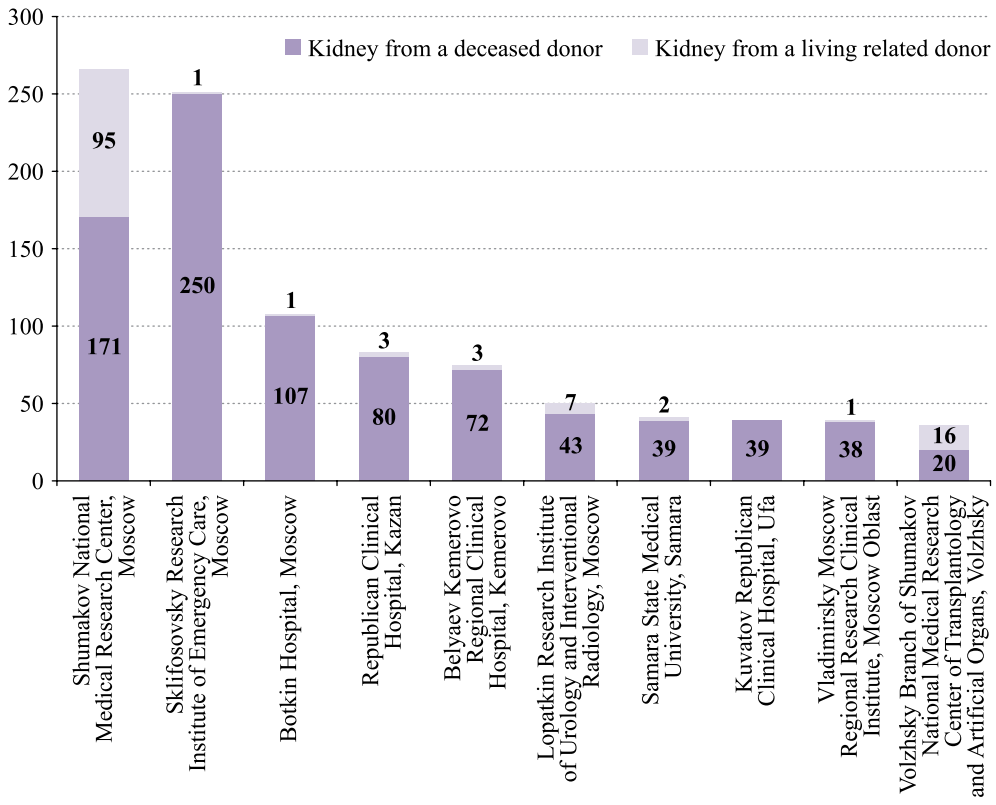

Fig. 7. Leaders by number of kidney transplants performed

in 2022 was 14.6% of the total number of KiT (14.5% in 2021).

Pediatric KiT (minors ≤17 years of age) in 2022 were performed at 8 centers, and a total of 118 transplants were performed. Among the institutions performing it were Shumakov Center (56), Russian Children's Clinical Hospital (32), and National Medical Research Center for Children's Health (18); see Fig. 8.

EXTRARENAL ORGAN TRANSPLANTATION

In 2022, there were 308 HT, of which 10 were pediatric transplants and 2 heart-lung transplants (at Shumakov Center).

Heart transplants were performed in 16 centers. New HT programs were launched in 2 federal subjects of the Russian Federation:

– Volgograd Oblast (at the branch of Shumakov Center in Volzhsky),
– Irkutsk Oblast (at Irkutsk Regional Clinical Hospital in Irkutsk).

Shumakov Center (Moscow) accounts for 69.7% (216, including 2 heart-lung transplants) of the total number of HT in the Russian Federation. The HT program in this center continues to drive the level of availability of this type of transplant care in the country.

Apart from the Shumakov Center, more than 10 heart transplants in Russia were performed at Almazov National Medical Research Centre (28) and at the Research Institute for Complex Issues of Cardiovascular Diseases (11). Another 5 transplant centers performed from 5 to 9 HT heart transplants: Ochapovsky Regional Clinical Hospital No. 1 (Krasnodar), Rostov Regional Clinical Hospital (Rostov-on-Don), Meshalkin National Medical Research Center (Novosibirsk), Interregional Clinical Diagnostic Center (Kazan), and Republican Clinical Hospital (Ufa). The remaining 8 (50.0%) performed less than 5 HT in the year.

LnT in 2021 were performed at 2 transplant centers. A total of 13 LnT and 2 heart-lung transplants were performed: 10 lung and 2 heart-lung transplants at Shumakov Center, 4 LnT at Sklifosovsky Research Institute of Emergency Care.

Table 7 and Fig. 9 show the thoracic organ transplant centers that performed the highest number of heart-lung transplants in 2022.

In 2022, a total of 659 liver transplants were performed, including 129 pediatric transplants. LiT were performed in 31 centers.

Two new liver transplantation programs were launched in 2022 – at Samara State Medical University, Samara and at Primorsky Regional Clinical Hospital No. 1, Vladivostok.

In 2022, 2 transplant centers performed more than 100 liver transplants: Shumakov Center (166) and Sklifosovsky Research Institute of Emergency Care (107). Six other transplant centers performed 20 or more LiT each: Republican Clinical Hospital, Kazan (55), State Novosibirsk Regional Clinical Hospital, Novosibirsk (43), Botkin Hospital (41), Burnazyan Federal Medical and Biophysical Center (35), Moscow Clinical Scientific Center (24), and Vladimirsky Moscow Regional Research Clinical Institute (23).

Table 8 and Fig. 10 show the liver transplant centers where the largest number of LiT were performed in 2022.

The rating primarily demonstrates the leadership and sustainability of the transplant programs at leading transplant centers in Moscow, which in turn is a result of the effective work by the Moscow Coordinating Center for Organ Donation and the use of the technology of transplantation of a part of the liver from a living related donor. The positive dynamics of transplant programs in the Republic of Tatarstan and Novosibirsk Oblast, and the leading role of pediatric living related LiT at Shumakov Center (Moscow) should all be noted.

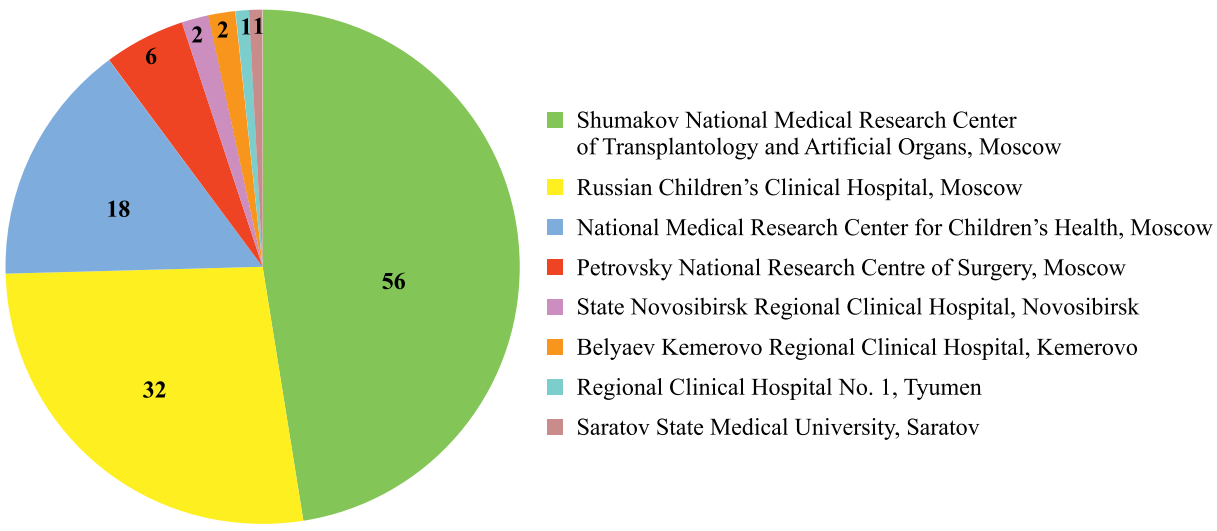

Fig. 8. Pediatric kidney transplantation in the Russian Federation in 2022

Related LiT were performed at 8 centers; living-related transplants accounted for 24.0% (158 transplant surgeries).

In 2022, 129 pediatric LiT were (mostly in tender-age children). Pediatric LiT were performed in 3 centers: in Shumakov Center (111), Petrovsky National Research Centre of Surgery (13), and State Novosibirsk Regional Clinical Hospital in Novosibirsk (5).

Pancreas transplants in 2022 were performed at 4 transplant centers: Shumakov Center (5), Sklifosovsky Research Institute of Emergency Care (3), Rostov Regional Clinical Hospital, Rostov-on-Don (1), and Volga Regional Medical Center, Nizhny Novgorod (1). A total of 10 pancreas transplant surgeries were performed (10 in 2021), all of them being kidney-pancreas transplants.

Thus, there were 993 extrarenal transplants performed in 2022 or 38.9% of the total number of 2,555 (934, 40.3% in 2021). Transplant centers in Moscow and Moscow Oblast alone accounted for 64.8% (644) of extrarenal organ transplants in 2022.

Table 7

Medical institutions that performed ≥5 heart transplants

Rank	Centers that performed ≥5 heart transplants	Number of heart transplants in 2022
1	Shumakov National Medical Research Center of Transplantology and Artificial Organs, Moscow	216*
2	Almazov National Medical Research Centre, St. Petersburg	28
3	Research Institute for Complex Issues of Cardiovascular Diseases, Kemerovo	11
4	Meshalkin National Medical Research Center, Novosibirsk	9
5	Ochapovsky Regional Clinical Hospital No. 1, Krasnodar	8
6	Interregional Clinical Diagnostic Center, Kazan	8
7	Rostov Regional Clinical Hospital, Rostov-on-Don	5
8	Republican Cardiology Clinic, Ufa	5
	TOTAL	**290**
	93.5% of the total number of heart transplants performed in the Russian Federation (310)	

* including two heart-lung transplants.

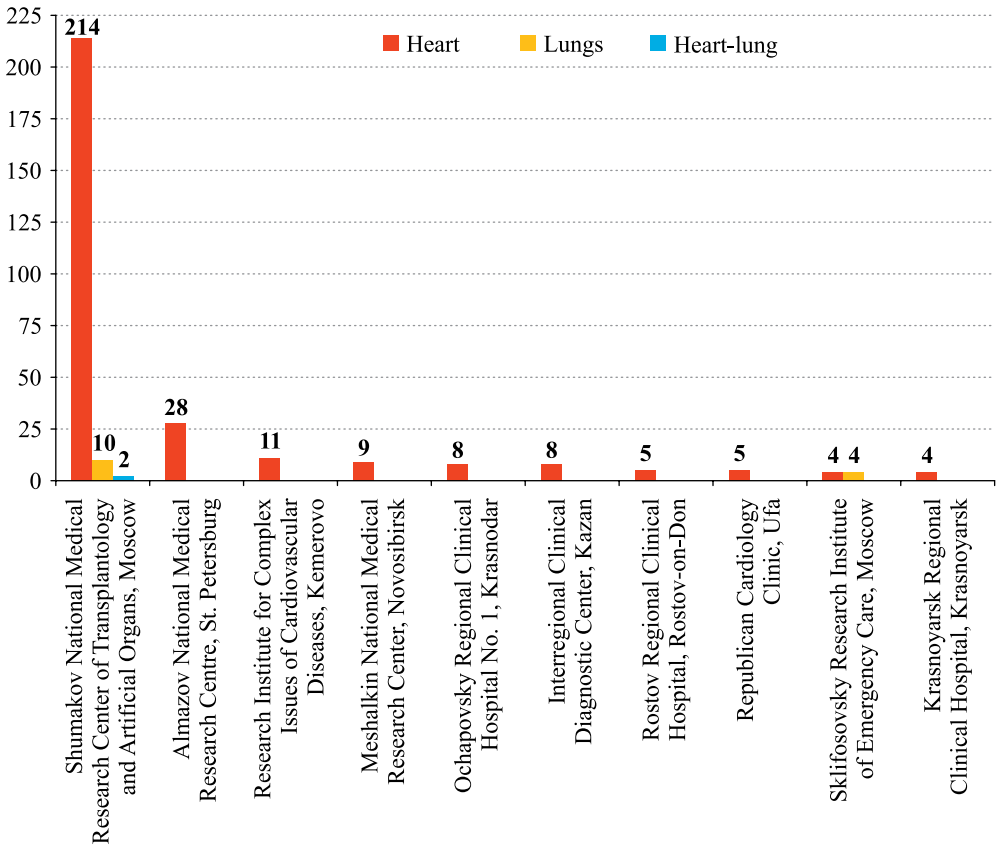

Fig. 9. Medical institutions that performed ≥5 heart transplants

During the follow-up period from 2006, the number of extrarenal organ transplants in the Russian Federation increased by 887 (9.4-fold); see Figs. 11 and 12.

Table 9 presents the number of organ transplants performed in the Russia Federation from 2006 to 2022.

ORGAN TRANSPLANT RECIPIENTS

As of December 2022, there were 21,969 organ transplant recipients in the Russian Federation, excluding the new Russian territories (151.0 p.m.p.); see Table 10.

Over the 9 years of observation, the number of organ recipients in the Russian Federation increased 2.6-fold (by 13,416 patients); the number of kidney recipients is estimated at 13,721 (94.3 p.m.p.); liver recipients, 4,294 (29.5 p.m.p.); heart recipients, 1,916 (13.2 p.m.p.).

CONCLUSION

In 2022, the main objectives and trends in the development of organ donation and transplantation in the federal subjects of the Russian Federation remained the same and did not lose their relevance:

– expanding the geographic footprint and number of transplant centers;

Table 8

Leaders in terms of number of liver transplants performed

Rank	Leaders in terms of number of liver transplants performed	Number of liver transplants in 2022
1	Shumakov National Medical Research Center of Transplantology and Artificial Organs, Moscow	159
2	Sklifosovsky Research Institute of Emergency Care, Moscow	107
3	Republican Clinical Hospital, Kazan	55
4	State Novosibirsk Regional Clinical Hospital, Novosibirsk	43
5	Botkin Hospital, Moscow	41
6	Burnazyan Federal Medical and Biophysical Center, Moscow	35
7	Moscow Clinical Scientific Center, Moscow	24
8	Vladimirsky Moscow Regional Research and Clinical Institute, Moscow Oblast	23
	TOTAL	**487**
	73.9% of the total number of liver transplants performed in the Russian Federation (659)	

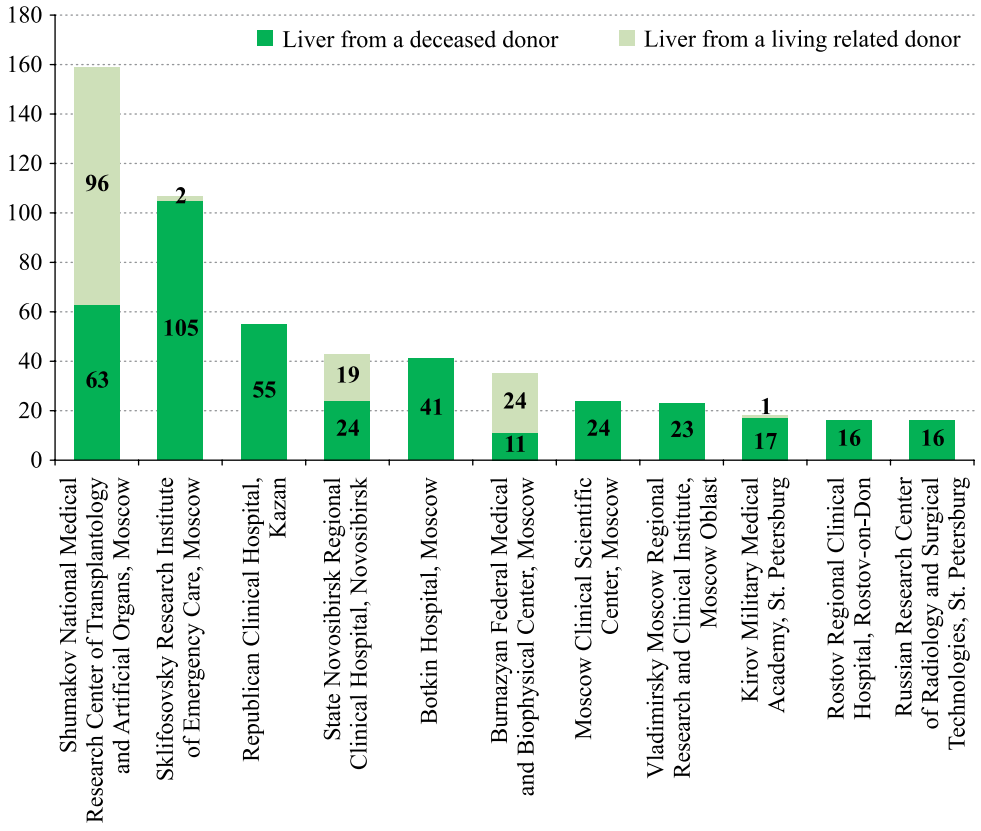

Fig. 10. Leaders in terms of number of liver transplants performed

– effectively identifying patients in need and their inclusion in the organ transplant waiting list;
– increasing the number of deceased organ donors in accordance with the available donor resource, increasing the proportion of brain-dead donors and multi-organ donors;
– increasing the number of organ transplants in accordance with the real need of the population;
– prioritizing the provision of transplantation care to the pediatric population;
– 100.0% coverage of medical monitoring, including drug supply, for transplant recipients.

Five new organ donation and transplantation programs were opened in 2022:

Two living-related-donor kidney transplants were performed in Khabarovsk Krai (Regional Clinical Hospital No. 1, Khabarovsk).

Two heart transplants were performed in Volgograd Oblast (a branch of Shumakov Center in Volzhsky),

A heart transplant was performed in Irkutsk Oblast (Irkutsk Regional Clinical Hospital, Irkutsk).

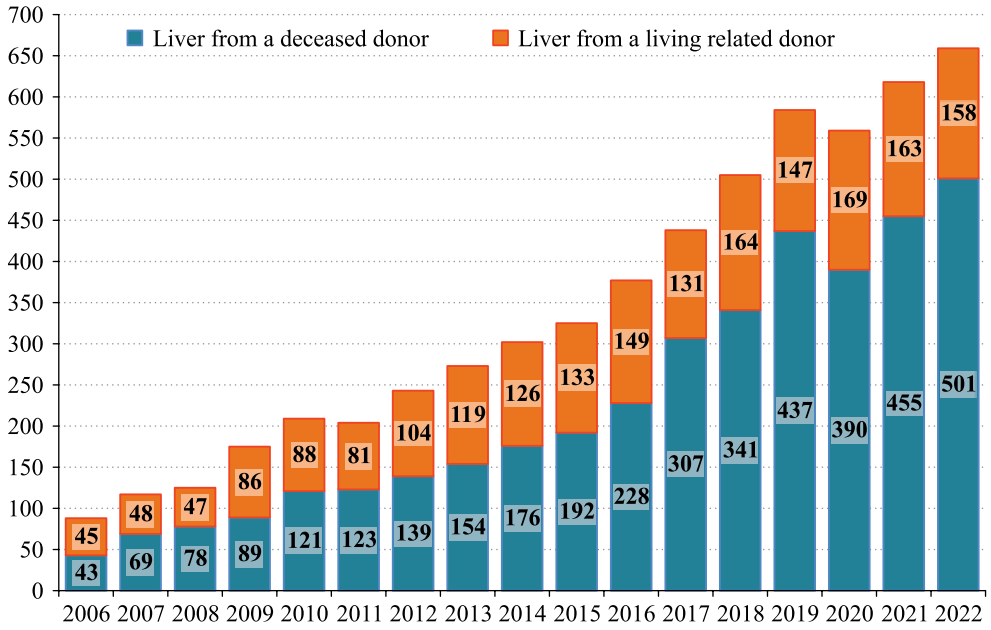

Fig. 11. Heart transplantation in the Russian Federation in 2006–2022

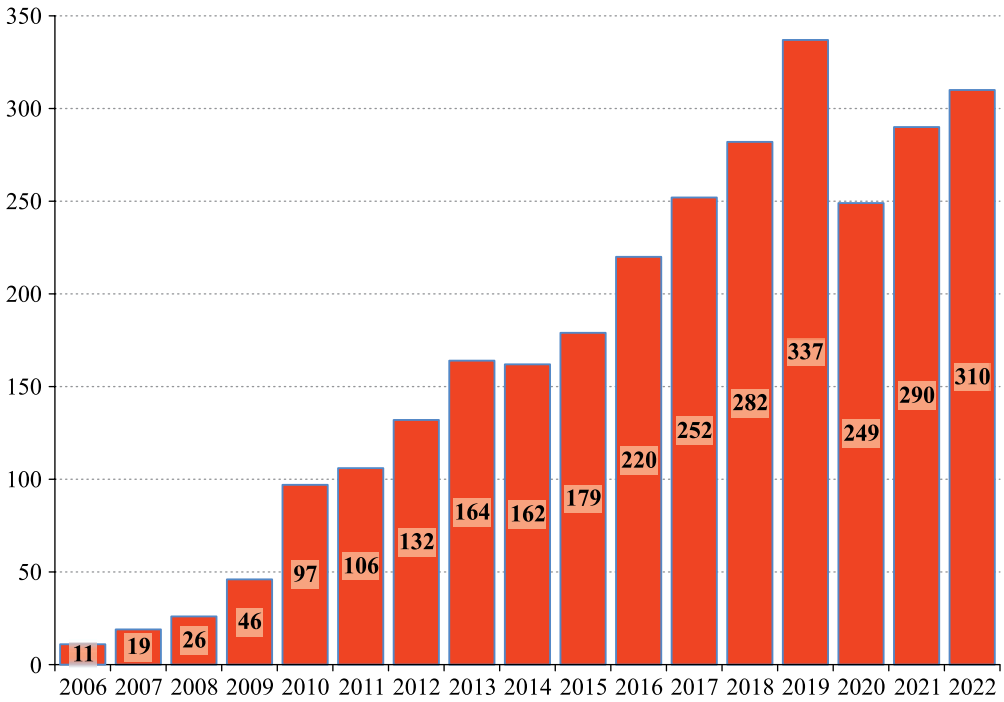

Fig. 12. Liver transplantation in the Russian Federation in 2006–2022

Table 9

Organ transplantation in the Russian Federation in 2006–2022

S/N	Organ	2006	2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		2022	
		Absolute number	Absolute number	Year-over-year change	Absolute number	Year-over-year change	Absolute number	Year-over-year change	Absolute number	Year-over-year change	Absolute number	Year-over-year change	Absolute number	Year-over-year change	Absolute number	Year-over-year change	Absolute number	Year-over-year change	Absolute number	Year-over-year change	Absolute number	Year-over-year change	Absolute number	Year-over-year change	Absolute number	Year-over-year change	Absolute number	Year-over-year change	Absolute number	Year-over-year change	Absolute number	Year-over-year change	Absolute number	Year-over-year change
1	Kidney (total)	556	666	+110	782	+116	830	+48	1037	+207	975	–62	941	–34	935	–6	1026	+91	945	–81	1084	+139	1175	+91	1361	+186	1473	+112	1124	–349	1384	+258	1562	+180
2	*from a deceased donor*	417	527	+110	637	+110	666	+29	867	+201	796	–71	746	–50	747	+1	836	+89	755	–81	852	+97	974	+122	1161	+187	1290	+129	967	–323	1183	+216	1334	+151
3	*from a living related donor*	139	139	0	145	+6	156	+11	170	+14	179	+9	195	+16	188	–7	190	+2	190	0	232	+42	201	–31	200	–1	183	–17	157	–26	201	+44	228	+27
4	Liver (total)	88	117	+29	125	+8	175	+50	209	+34	204	–5	243	+39	272	+29	302	+30	325	+23	378	+53	438	+60	505	+67	584	+79	559	–25	618	+59	659	+41
5	*from a deceased donor*	43	69	+26	78	+9	89	+11	121	+32	123	+2	139	+16	154	+15	176	+22	192	+16	229	+37	307	+78	341	+34	437	+96	390	–47	455	+65	501	+46
6	*from a living related donor*	45	48	+3	47	–1	86	+39	88	+2	81	–7	104	+23	119	+15	126	+7	133	+7	149	+16	131	–18	164	+33	147	–17	169	+22	163	–6	158	–5
7	Heart	11	19	+8	26	+7	46	+20	97	+51	106	+9	132	+26	164	+32	162	–2	179	+17	220	+41	252	32	282	+30	335	+53	249	–86	290	+41	308	+18
8	Pancreas	6	11	+5	9	–2	8	–1	19	+11	14	–5	23	+9	14	–9	19	+5	12	–7	6	–6	6	0	17	+11	10	–7	16	+6	10	–6	10	0
9	Lungs	1	0	–1	0	0	1	+1	1	0	6	+5	5	–1	10	+5	12	+2	14	+2	16	+2	25	+9	25	0	23	–2	9	–14	13	+4	14	+1
10	Heart-lung										2	+2	2	0	1	–1	0	–1	0	0	0	0	0	0	3	+3	2	–1	2	0	2	0	1	–1
11	Small intestine														1	+1	1	0	0	–1	0	0	0	0	0	0	0	0	1	+1	1	0	0	–1
	Total	662	813	+151	942	+129	1060	+118	1363	+303	1307	–56	1345	+38	1400	+55	1522	+122	1485	–37	1704	+219	1896	+192	2193	+297	2427	+234	1960	–467	2318	+358	2555	+237

Table 10

Number of organ transplant recipients in the Russian Federation in 2013–2022

ICD-10 code	Patient count in the Registry (persons)																	
	2013	2014		2015		2016		2017		2018		2019		2020		2021*		2022*	
		Absolute	YoY change (%)	Absolute	YoY change (%)	Absolute	YoY change (%)	Absolute	YoY change (%)	Absolute	YoY change (%)	Absolute	YoY change (%)	Absolute	YoY change (%)	Absolute	YoY change (%)	Absolute	YoY change (%)
Z94.0 Kidney transplant status	6651	7502	12.8	8164	8.8	9063	11.0	9658	6.6	10,851	12.4	11,880	9.5	12,563	5.7	13,059	–	13,721	–
Z94.1 Heart transplant status	416	520	25.0	639	22.9	803	25.7	952	18.6	1164	22.3	1355	16.4	1524	12.5	1725	–	1916	–
Z94.2 Lung transplant status	2	3	50.0	4	33.3	5	25.0	8	60.0	28	250.0	26	–7.1	24	–7.7	–	–	–	–
Z94.4 Liver transplant status	1150	1406	22.3	1649	17.3	1948	18.1	2152	10.5	2632	22.3	3032	15.2	3489	15.1	3902	–	4294	–
Z94.8 Other transplanted organ and tissue status (bone marrow, intestines, pancreas)	334	467	39.8	654	40.0	808	23.5	909	12.5	1135	24.9	1344	18.4	1497	11.4	–	–	–	–
TOTAL	8553	9898	15.7	11,110	12.2	12,627	13.7	13,679	8.3	15,810	15.6	17,637	11.6	19,097	8.3	20,724	8.5	21,969	

* Note. The number of organ transplant recipients is estimated, as it is calculated from the figures of the previous year based on data on the number of organ transplants in 2021, 2022 and data on the average patient survival.

Two deceased-donor liver transplants were performed in Samara Oblast (at Samara State Medical University, Samara);

Three deceased-donor liver transplants were performed in Primorsky Krai (at Primorsky Regional Clinical Hospital No. 1, Vladivostok).

Moscow remains the undisputed leader in the development of organ donation and transplantation in the Russian Federation, demonstrating a high level of donor and transplantation activity in terms of global practice. At the same time, other centers for advanced development of transplant care in the federal subjects of the Russian Federation have been clearly identified in the country, such as the Belyaev Kemerovo Regional Clinical Hospital (Kemerovo), Republican Clinical Hospital (Kazan), Regional Clinical Hospital No. 1 (Tyumen), Irkutsk Regional Clinical Hospital (Irkutsk), Rostov Regional Clinical Hospital (Rostov-on-Don), and the branch of Shumakov Center (Volzhsky).

The number of waitlisted patients at transplant centers remains at approximately the same level, increasing when new centers and organ transplant programs are opened in the federal subjects of the Russian Federation, as well as when transplantation activity at the centers increases. The following are considered as promising tools for effective identification of patients in need and their inclusion in the waiting list of Shumakov Center:

– collaborating with national and regional patient registries;
– interacting with dialysis centers through the compulsory health insurance tariff agreement and, accordingly, the target indicator "number of dialysis patients on the waiting list";
– expanding the indications and increasing the number of telemedicine consultations with Shumakov Center to clarify the indications for organ transplantation and placement on the waiting list;
– activeness and responsibility of the chief freelance nephrologist of the executive authorities of the federal subjects of the Russian Federation in the area of healthcare for related work.

The level of donor activity in Moscow (26.3 p.m.p.), Kemerovo Oblast (15.8 p.m.p.), and the Republic of Tatarstan (13.3 p.m.p.) indicates a high potential for increasing the number of deceased donors in other federal subjects of the Russian Federation with proper organization of this activity, including control by the executive authorities of the federal subjects of the Russian Federation in the field of health care.

The average value for the indicator "proportion of effective brain-dead organ donors" in the Russian Federation is consistently above 90.0%, and above 70.0% for the indicator "proportion of multi-organ donors". This indicates that donor resource utilization in most federal subjects of the Russian Federation involved in medical activities related to organ donation is efficient. Failure to achieve these values in the federal subjects of the Russian Federation (Ryazan Oblast, Tyumen Oblast, Kemerovo Oblast, Samara Oblast) should be considered by managers and health care professionals as an unsatisfactory result of work, and as a basis for developing and implementing a plan of appropriate measures to improve the efficiency of the donor program in the region.

The number of organ transplants in the Russian Federation continues to increase systematically, while the existing capacities of medical organizations, where operations are performed on donors and recipients, make it possible to further increase the volume of transplant care, subject to adequate funding, working with waiting lists and donor support (21 centers perform less than 15 organ transplants per year).

In recent years, the necessary conditions have been created in the Russian Federation to prioritize the provision of transplant care to the pediatric population. All identified children in need of organ transplantation are transplanted as soon as possible, typically at federal centers (Shumakov center, the Russian Children's Clinical Hospital, National Medical Research Center for Children's Health, Petrovsky National Research Centre of Surgery) and a number of regional medical organizations. Further increase in the number of pediatric transplants depends on the efficiency of identifying and routing such patients from the federal subjects of the Russian Federation. The Shumakov Center is constantly interacting with tertiary children's hospitals and with chief freelance pediatricians at executive authorities of the federal subjects of the Russian Federation in the field of health care to address this issue.

In the Russian Federation, all organ recipients are provided with immunosuppressive drugs for life at the expense of the federal budget under the program "14 high-cost nosologies"; a federal registry is in place to implement this program. It is the duty of the health authorities of the federal subjects of the Russian Federation in the field of health care and transplantation centers to provide conditions for regular monitoring of blood immunosuppressant levels in transplanted patients and their counseling by a specialist who has undergone additional training for the management of this patient cohort.

The authors declare no conflict of interest.

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