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First Results from the Analysis of the Activity of the Cancer Service of the Northwestern Federal District of the Russian Federation Based on Its Created Population Cancer Register

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Abstract—The fully formed database of the Population Cancer Registry (PCR database) of the Northwestern Federal District of the Russian Federation in February 2019 has significantly expanded the ability to assess objectively the activities of the cancer service on the more reliable basis of analytical materials. In Russia, it was possible for the first time to conduct epidemiological studies of malignant tumors for rare tumor locations for all age groups and on calculations of patient survival rates. The PCR database has more than 1 million observations and includes all of the headings and subheadings of ICD-10 for class II—codes C00–96. The article presents the dynamics of morbidity and mortality of the population of the Northwestern Federal District of the Russian Federation in comparison with the national average, the reliability of the recorded numbers, and the survival of patients with malignant tumors. It was established that the cancer incidence in the Northwestern Federal District of the Russian Federation increased by 10.4% according to standardized indicators over 8 years, and the population mortality in the district decreased by 11.4% according to the same indicators. The dynamics of the 5-year observed survival rate of patients from Northwestern Federal District of the Russian Federation has been calculated according to account age groups. The reliability of the PCR database of the Northwestern Federal District of the Russian Federation is confirmed by the fact that the materials of three administrative territories are included in the IARC monograph Cancer Incidence in Five Continents. Vol. XI (St. Petersburg, Arkhangelsk oblast and the Republic of Karelia).

Keywords: Northwestern Federal District of the Russian Federation, malignant tumors, morbidity, mortality, reliability of accounting, survival of patients, stages of the disease, age characteristics, dynamic series

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INTRODUCTION

Some of the most difficult problems in the study of malignant tumors include the accumulation of data on the primary registered patients, the in-depth study of the prevalence of malignant tumors, the analysis of the dynamics of mortality, and the implementation of mass prevention of the contraction of tumors. There are a great number of scientific works on the methodology of these studies [1–5, 7–13, 17–19, 21–23]. More and more attention is paid to this problem every year. Many countries have established population cancer registries (PCRs) as the basis for epidemiological research. The publication of more and more extensive monographs by the International Agency for Research on Cancer (IARC) contributes to an objective assessment of the oncological situation on the planet. Starting with 32 cancer registries in 1966, which covered 29 countries at that time, the IARC monograph (Cancer Incidence in Five Continents, Volume XI) now summarizes the materials of more than 450 cancer registries on all continents [14–16, 24–29].

For many years, only one PCR was presented from the Soviet Union—that of Leningrad, then St. Petersburg. Four more PRRs were added to the XI volume due our accumulated experience: the Republic of Karelia and the Arkhangelsk, Samara, and Chelyabinsk oblasts (Figs. 1, 2).

At present, the range of standardized malignant-tumor incidence rates for the male population is from 50.9 in India to 616.6 per 100000 in Brazil; the minimum and maximum incidence rates for the female population in the same countries are from 51.5 to 502.9‰ [25].

Table 1 shows the rank distribution of standardized malignant-tumor incidence rates for cancer registries in a number of Russian territories included in the 11th volume of the IARC edition Cancer Incidence in Five Continents (CI5). In addition, we thought it possible to add for comparison the average data for Russia and the Northwestern Federal District (NWFD) of the Russian Federation. The standardized indicators of malignant-tumor incidence were taken as of 2010,

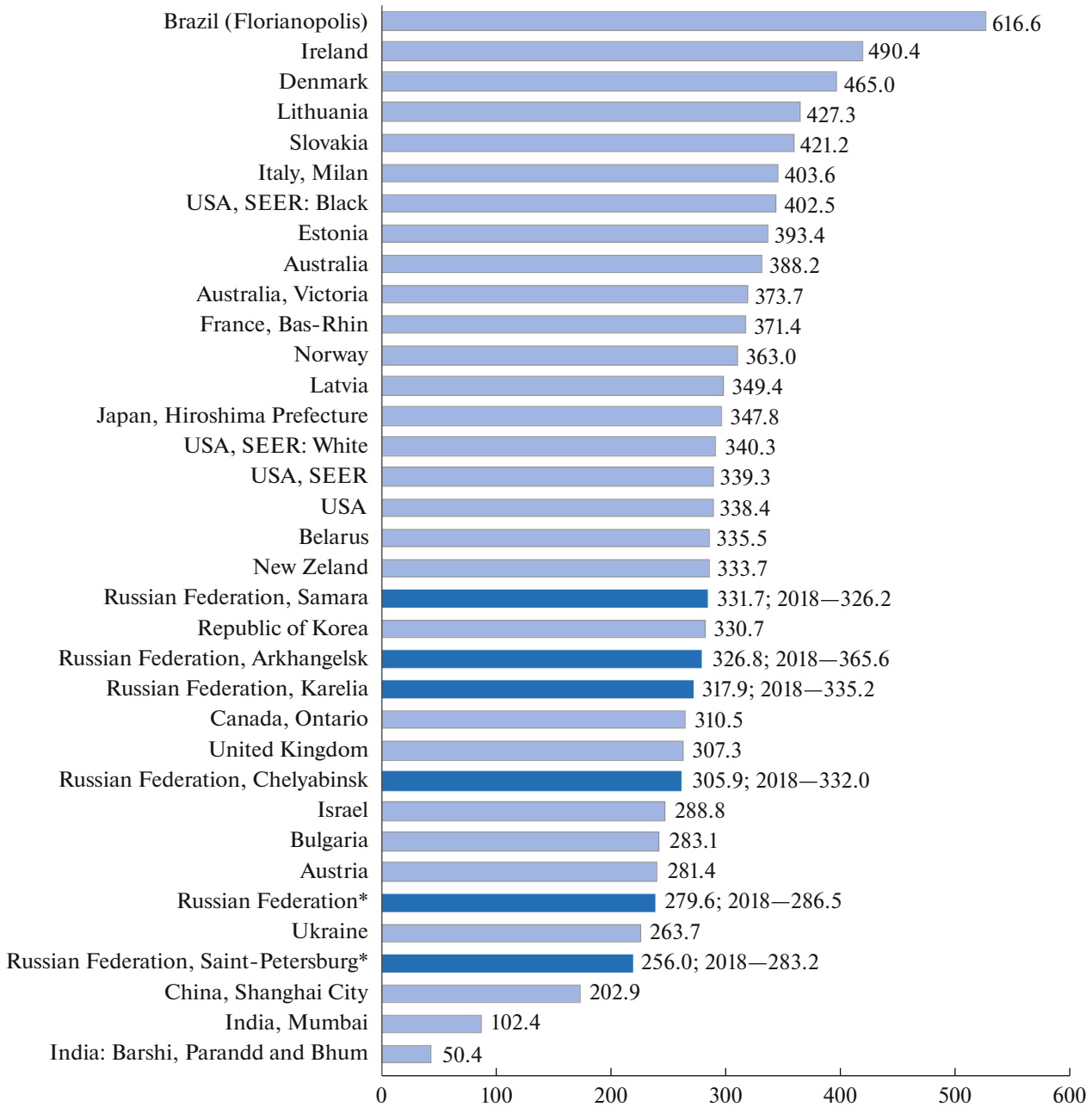

Fig. 1. Malignant-tumor morbidity in men in some countries of the world, total (C00–96), 2008–2012. (IARC Cancer Incidence in Five Continents, Vol. XI) [25].

i.e., the middle of the interval of collected data from the IARC monograph (2008–2012). The total number of PCRs included in the XI volume of IARC CI5 was 456. In the rank distribution by the level of standardized indicators of the malignant-tumor incidence, the PCRs of Russia for the male population occupy from the 230th to the 285th place, and those for women occupy from the 286th to the 298th place. Among all countries, Russia may take the 325th place for men and the 233rd place for women in this indicator. In the previous editions of IARC, Russia and St. Petersburg occupied the 300th places [25], which may be largely due to the undercounting of patients: some research institutes of oncology and medical facilities of head institutions do not send extracts from medical records to oncological dispensaries at the place of patient residence. In addition, in many territories, we are witnessing an excess of the number of deaths over the initially recorded patients, especially in localizations with a high mortality rate, mainly in older age groups.

There is an urgent need for personnel and financial strengthening of the Russian PCRs, the issuance of

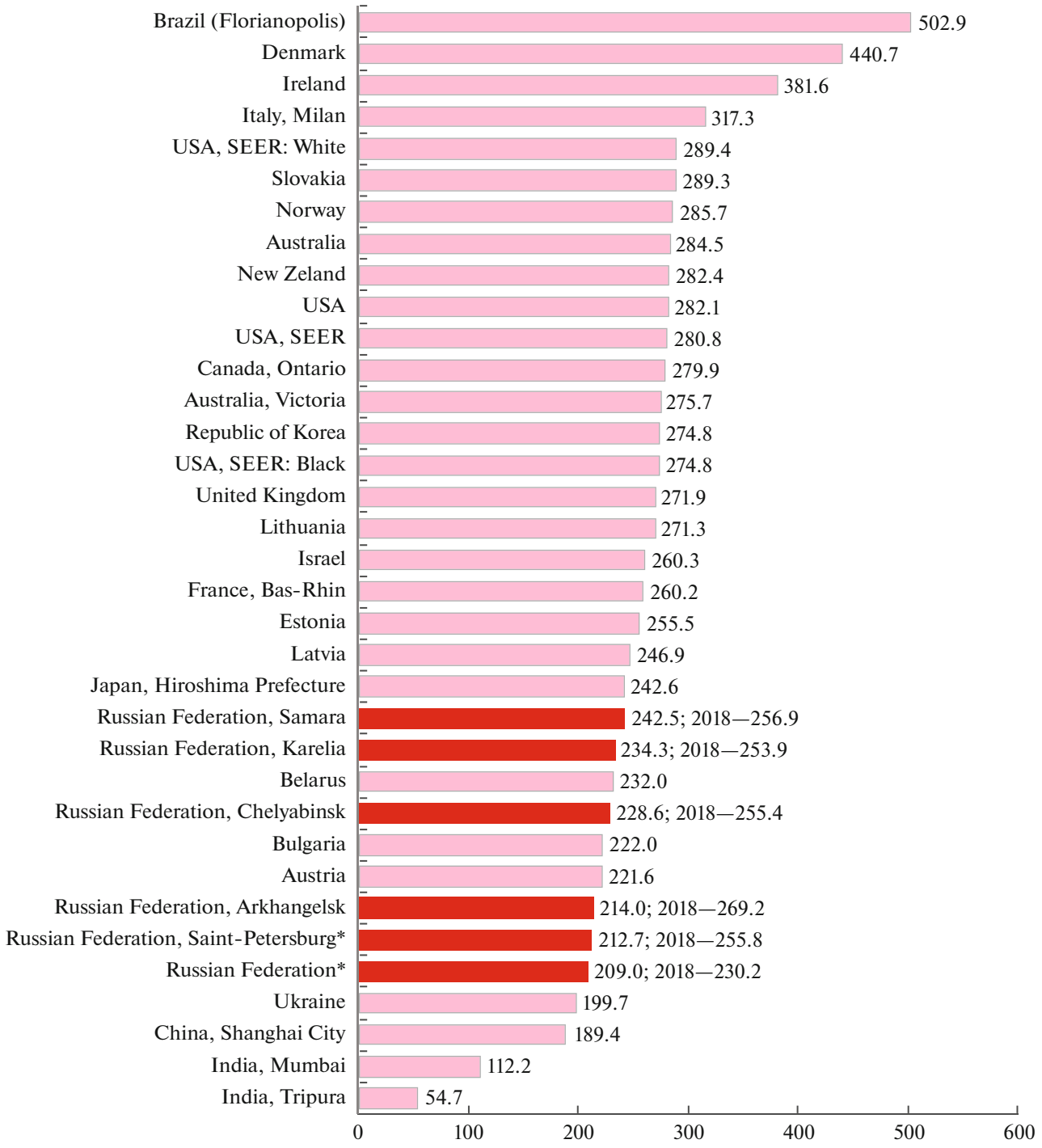

Fig. 2. Malignant-tumor morbidity in women in some countries of the world, total (C00–96), 2008–2012. (IARC Cancer Incidence in Five Continents, Vol. XI) [25].

new orders on strict discipline for the preparation of documents, the obligation to send extracts from medical records to territorial cancer registries, and a more active involvement of territories in work with the World Organization of Cancer Registries. It is important to note that the United States presented for the first time the entire RCR database for the country in Volume XI CI5. The average U.S. standardized incidence rate is 203rd for males and 156th for females. The cancer registries of other countries that fully cover the territory of the state (in rank distribution) include New Zealand (222nd and 155th, respectively), Republic of Korea (232nd and 186th), Great Britain (282th and 197th), and Israel (311th and 246th).

Table 1. Rank distribution of standardized malignant-tumor incidence rates among cancer registries of the territories of Russia included in the IARC monograph Cancer Incidence in Five Continents, Vol. XI (2008–2012) in comparison with the average Russian indicators

Territory	Ordinal number of rank distribution	Value of the standardized indicator, ‰
Male population		
Samara oblast	230th	331.7
Arkhangelsk oblast	244th	326.8
Republic of Karelia	265th	317.9
Chelyabinsk oblast	285th	305.9
Russian Federation*	325th	279.6
NWFD*	329th	274.1
St. Petersburg*	349th	256.0
Female population		
Samara oblast	286th	242.5
Republic of Karelia	308th	228.6
Chelyabinsk oblast	326th	214.0
Arkhangelsk oblast	298th	234.3
St. Petersburg*	374th	209.0
Russian Federation*	371th	212.7
NWFD*	373th	210.2

* 2010 for comparison with other territories of cancer registries of the IARC monograph, Vol. XI.

Table 2. Malignant-tumor morbidity of in the population of the Northwestern Federal District of the Russian Federation from 2010 to 2018, both sexes [6, 20]

Indicator	2010	2018	Increase, %
Abs. number	50746	63389	24.9
"Rough" indicator	377.55	454.01	20.3
Standardized indicator (world standard)	228.91	252.76	10.4

Table 3. Mortality from malignant tumors in the population of the Northwestern Federal District of the Russian Federation from 2010 to 2018, both sexes [6, 20]

Indicator	2010	2018	Increase, %
Abs. number	30874	31957	3.5
"Rough" indicator	229.77	228.88	–0.4
Standardized indicator (world standard)	131.38	116.44	–11.4

Tables 2 and 3 present data on the morbidity and mortality of the population of the Northwestern Federal District of the Russian Federation from malignant tumors from 2010 to 2018. It was established that the number of initially registered patients reached 63400 cases in 2018 (50700 in 2010). Over 8 years, the standardized morbidity rates of the population of the Northwestern Federal District of the Russian Federation increased by 10.4%, and the mortality rate decreased by 11.4% [6, 20].

We analyzed the changes in the oncopathological structure of the region from 2000 to 2017 over three large periods, taking into account the age characteristics. The main changes in the localization structure of the male population under 60 years of age (130160 observations) were associated with localizations of malignant tumors outside the sixth place: the indicators for the prostate gland increased in this age group from 2.1 to 5.4%, and those for the bladder increased from 3.2 to 4%. The incidence rates also increased for skin melanoma, testicular cancer, and, especially, thyroid cancer. The proportion of the cancer of the larynx and esophagus decreased. The oncopathological structure of men under 60 years of age from liver cancer has remained at the same proportion (Table 4).

Let us consider the features of the rank redistribution of malignant tumors in the male population aged 60 years or older in the Northwestern Federal District of the Russian Federation (235060 observations) (Table 5). Lung cancer retained first place in the oncopathological structure in older men; its proportion significantly decreased from 2000–2005 to 2012–2017 from 22.9 to 15.7%. The share of stomach cancer also decreased from 13.2 to 9.1%; it moved to fourth place. Second place was taken by prostate cancer, which increased from 9.3 to 17.6%. The proportion of malignant tumors of the skin, colon, and rectum, systemic neoplasms of lymphatic and hematopoietic tissue and kidney, and melanoma of the skin, brain, thy-

Table 4. Structure of malignant tumors in men under 60 years of age in the Northwestern Federal District of the Russian Federation (PCR database)

No.	Localization	ICD-10	2000–2005		2012–2017		2000–2017	
			abs. number	%	abs. number	%	abs. number	%
1	Lung	C33, 34	8197	20.6	7042	16.0	24009	18.3
2	Stomach	C16	4606	11.6	3556	8.0	12853	9.9
3	Lymphatic and hematopoietic tissue	C81–96	3226	8.1	4165	9.4	11119	8.5
4	Kidney	C64	2396	6.0	3056	6.9	8460	6.5
5	Skin (except melanoma)	C44	1790	4.5	2580	5.8	6756	5.2
6	Rectum	C19–21	1779	4.5	2264	5.1	6289	4.8
7	Colon	C18	1853	4.7	2212	5.0	6276	4.8
8	Prostate	C61	838	2.1	2374	5.4	5121	3.9
9	Bladder	C67	1261	3.2	1758	4.0	4783	3.7
10	Larynx	C32	1581	4.0	1420	3.2	4657	3.6
11	Esophagus	C15	1375	3.5	1350	3.0	4332	3.3
12	Pancreas	C25	1327	3.3	1417	3.2	4235	3.3
13	Brain and other parts of the nervous system	C70–72	1151	2.9	1362	3.1	3868	3.0
14	Gums, oral cavity, palate, other malignant tumors of the oral cavity	C03–06, 09	987	2.5	1113	2.5	3111	2.4
15	Skin melanoma	C43	899	2.3	1101	2.5	3082	2.4
16	Testicle	C62	723	1.8	908	2.0	2441	1.9
17	Tongue	C01–02	550	1.4	684	1.5	1824	1.4
18	Thyroid	C73	355	0.9	831	1.9	1685	1.3
19	Liver	C22	528	1.3	598	1.3	1668	1.3
20	Without specifying localization	C80	512	1.3	457	1.0	1636	1.3
21	Laryngopharynx	C12, 13	477	1.2	570	1.3	1513	1.2
22	Other		3290	8.3	3524	7.9	10442	8.0
Total			39701		44342		130160	

roid gland increased. The proportion of malignant tumors of the pancreas, esophagus, larynx, and skin melanoma decreased. The proportion of malignant tumors of the tongue remained at 0.7%.

The female population under 55 years of age in the Northwestern Federal District revealed the following change in the structure of the malignant-tumor incidence (130805 observations) (Table 6). The first place is confidently retained by breast cancer, although its share in the total structure of oncological pathology of the female population has decreased from 29.2 to 27.4%. In second place is cervical cancer, which increased from 10.5 to 12.5%, and thyroid cancer moved from sixth to third place (from 4.2 to 7.4%).

Table 5. Structure of malignant tumors in men of 60 years of age or older in the Northwestern Federal District of the Russian Federation (PCR database)

No.	Localization	ICD-10	2000–2005		2012–2017		2000–2017	
			abs. number	%	abs. number	%	abs. number	%
1	Lung	C33, 34	15852	22.9	14028	15.7	44019	18.7
2	Prostate	C61	6450	9.3	15760	17.6	33331	14.2
3	Stomach	C16	9119	13.2	8142	9.1	25839	11.0
4	Skin (except melanoma)	C44	4853	7.0	8536	9.5	19710	8.4
5	Colon	C18	5211	7.5	6889	7.7	18024	7.7
6	Rectum	C19–21	4693	6.8	5595	6.3	15461	6.6
7	Bladder	C67	3522	5.1	4913	5.5	12618	5.4
8	Lymphatic and hematopoietic tissue	C81–96	2532	3.7	3851	4.3	9298	4.0
9	Kidney	C64	2429	3.5	3746	4.2	9057	3.9
10	Pancreas	C25	2157	3.1	2614	2.9	7078	3.0
11	Esophagus	C15	2118	3.1	2272	2.5	6487	2.8
12	Larynx	C32	1639	2.4	1895	2.1	5145	2.2
13	Liver	C22	1057	1.5	1106	1.2	3086	1.3
14	Skin melanoma	C43	671	1.0	1348	1.5	2991	1.3
15	Without specifying localization	C80	829	1.2	820	0.9	2633	1.1
16	Gums, oral cavity, palate, other malignant tumors of the oral cavity	C03–06, 09	729	1.1	956	1.1	2374	1.0
17	Brain and other parts of the nervous system	C70–72	411	0.6	797	0.9	1824	0.8
18	Tongue	C01–02	471	0.7	663	0.7	1635	0.7
19	Laryngopharynx	C12, 13	417	0.6	654	0.7	1456	0.6
20	Thyroid	C73	191	0.3	431	0.5	872	0.4
21	Testicle	C62	83	0.1	78	0.1	233	0.1
22	Other		3769	5.3	4332	4.8	11889	5.1
Total			69203		89426		235060	

The proportion of uterine body cancer and systemic neoplasms of the lymphatic and hematopoietic tissue, skin, lungs, and bladder increased, and the proportion of cancers of the rectum and colon, stomach, kidney, brain and pancreas decreased. The proportion of liver cancer remained unchanged (0.5%).

In women aged 55 years or older (Table 7), breast cancer and skin cancer (except for melanoma) retained the first two places. Their share in the oncopathological structure of the population of the Northwestern Federal District of the Russian Federation changed from 17.3 to 19.4% and from 10.9 to 14.7%, respectively. Colon cancer came in third place, ahead of stomach cancer. The proportion of cancer of the uterine body, kidney, thyroid gland, melanoma of the skin, bladder, and brain increased. The proportion of cancers of the rectum, ovary, lungs, pancreas, cervix and liver decreased. The proportion of malignant tumors of lymphatic and hematopoietic tissue remained unchanged.

Table 6. Structure of malignant tumors in women under 55 years of age in the Northwestern Federal District of the Russian Federation (PCR database)

No.	Localization	ICD-10	2000–2005		2012–2017		2000–2017	
			abs. number	%	abs. number	%	abs. number	%
1	Breast	C50	11755	29.2	12304	26.9	36434	27.8
2	Cervix	C53	4239	10.5	5863	12.9	15740	12.0
3	Ovary	C56	3120	7.7	3122	6.9	9559	7.3
4	Uterine body	C54	2531	6.3	2934	6.5	8467	6.5
5	Lymphatic and hematopoietic tissue	C81–96	2482	6.2	2955	6.5	8191	6.3
6	Thyroid	C73	1678	4.2	3342	7.4	7619	5.8
7	Skin (except melanoma)	C44	1895	4.7	2367	5.2	6505	5.0
8	Colon	C18	1594	4.0	1470	3.2	4765	3.6
9	Stomach	C16	1884	4.7	1228	2.7	4722	3.6
10	Skin melanoma	C43	1334	3.3	1478	3.3	4282	3.3
11	Rectum	C19–21	1313	3.3	1234	2.7	3823	2.9
12	Kidney	C64	1094	2.7	1084	2.4	3347	2.6
13	Lung	C33, 34	852	2.1	986	2.2	2828	2.2
14	Brain and other parts of the nervous system	C70–72	816	2.0	965	2.1	2791	2.1
15	Pancreas	C25	497	1.2	471	1.0	1463	1.1
16	Bladder	C67	200	0.5	273	0.6	734	0.6
17	Liver	C22	207	0.5	212	0.5	634	0.5
18	Without specifying localization	C80	205	0.5	171	0.4	632	0.5
22	Other		2566	6.4	2980	6.6	8269	6.3
Total			40262		45439		130805	

Table 7. Structure of malignant tumors in women of 55 years of age or older in the Northwestern Federal District of the Russian Federation (PCR database)

No.	Localization	ICD-10	2000–2005		2012–2017		2000–2017	
			abs. number	%	abs. number	%	abs. number	%
1	Breast	C50	16306	17.4	26643	19.2	64170	18.4
2	Skin (except melanoma)	C44	10274	10.9	20116	14.7	45294	13.1
3	Colon	C18	9657	10.2	12435	9.1	33424	9.7
4	Stomach	C16	9887	10.5	8413	6.1	27913	8.1
5	Uterine body	C54	5840	6.2	10250	7.5	23756	6.9
6	Rectum	C19–21	6236	6.6	7366	5.4	20568	6.0
7	Lymphatic and hematopoietic tissue	C81–96	4020	4.3	6388	4.7	15354	4.4
8	Ovary	C56	3887	4.1	5318	3.9	13706	4.0
9	Lung	C33, 34	3900	4.1	5221	3.8	13470	3.9
10	Kidney	C64	3120	3.3	4880	3.6	11920	3.5
11	Pancreas	C25	3347	3.6	4236	3.1	11316	3.3
12	Cervix	C53	2639	2.8	3425	2.5	9031	2.6
13	Thyroid	C73	1386	1.5	3825	2.8	7479	2.2
14	Skin melanoma	C43	1734	1.8	3111	2.3	7324	2.1
15	Bladder	C67	1325	1.4	2130	1.6	5082	1.5
16	Liver	C22	1154	1.2	1248	0.9	3428	1.0
17	Brain and other parts of the nervous system	C70–72	691	0.7	1425	1.0	3211	0.9
18	Without specifying localization	C80	959	1.0	1026	0.7	3173	0.9
22	Other		7879	8.4	9711	7.1	25876	7.5
Total			94241		137167		345495	

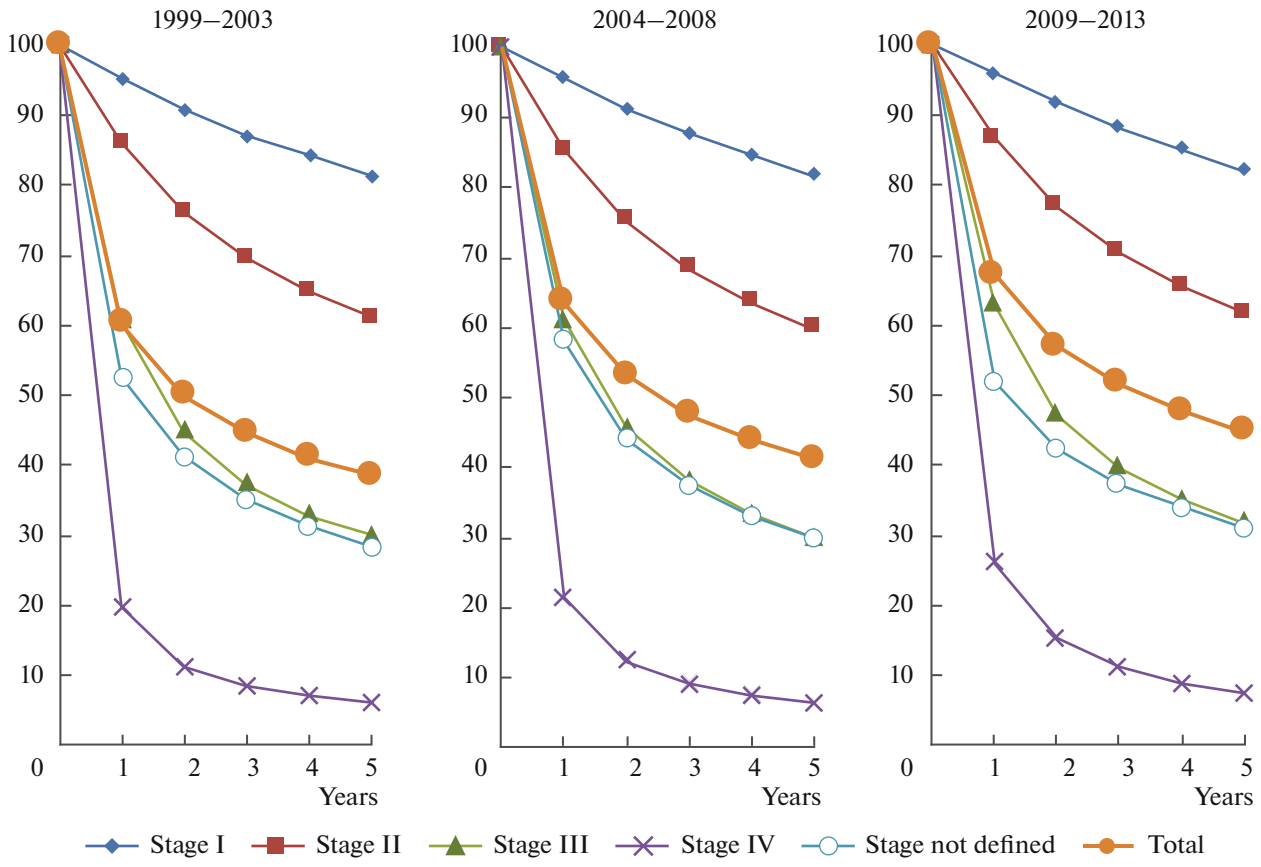

Fig. 3. Distribution of malignant tumors (C00–96) in the Northwestern Federal District of the Russian Federation by stages and the 5-year survival rate of patients (database of the PCR of the Northwestern Federal District of the Russian Federation), both sexes.

SURVIVAL RATE

Figure 3 and Table 8 show the dynamics of the 5-year survival rate of cancer patients in the Northwestern Federal District of the Russian Federation and their distribution by disease stage for three observation periods for both sexes. Attention is drawn to the fact that the survival rates by stage over the three observation periods practically did not change. The maximum rates of 1-year survival reached 96% in patients with stage I of the disease and 86.8% in those with stage II. Only the general indicator increased noticeably (from 38.5 to 44.9%), which may have happened due to a significant change in the oncopathological structure—a decrease in the proportion of tumor localizations with a high mortality rate and an increase in the proportion of patients with low mortality. The share of early stages did not exceed 47%. Since the maximum 5-year survival rates achieved in these parameters were 82.1 and 61.7%, respectively, this value in reality is somewhat lower.

Let us consider the specifics of the 5-year survival rate of cancer patients in the Northwestern Federal District of the Russian Federation separately for the male and female population, taking into account two age groups: the preretirement and retirement ages. The 5-year observed survival rate for men under 60 years of age increased over the three observation periods from 33.1 to 38.5%, and the rate for men aged 60 years or older increased from 24.8 to 31.3%. In women under 55, the 5-year survival rate improved from 62.7 to 68.5%, and the rate for those aged 55 years or older increased from 40.7 to 48.1%. In all of the compared groups, the survival rates are noticeably higher in younger people (Figs. 4–7).

CONCLUSIONS

Thus, the conducted research showed the following.

—There was a gradual improvement in the quality of the formation of PCR databases in the Russian Federation, which made it possible to include four new administrative territories (the Republic of Karelia and the Arkhangelsk, Samara, and Chelyabinsk oblasts) in the IARC monograph Cancer Incidence in Five Continents.

—The standardized malignant-tumor incidence rates in the population of the Northwestern Federal District of the Russian Federation increased by only

Table 8. Five-year survival rate of patients with malignant tumors (C00–96) in the Northwestern Federal District of the Russian Federation by stages (PCR database), %

Period		Stage					Total
		I	II	III	IV	stage not defined	
1999–2003	Abs. number	27789	40372	46756	44162	30238	189317
	%	14.7	21.3	24.7	23.3	16.0	100
	1 year	95.5	86.1	60.6	19.7	52.6	60.3
	2 years	91	76.2	44.8	11.1	41.2	49.9
	3 years	87.3	69.7	37.3	8.4	35.3	44.6
	4 years	84.3	64.8	32.9	7	31.3	41.1
	5 years	81.5	61	29.9	6.2	28.5	38.5
2004–2008	Abs. number	39834	48067	51793	47242	28672	215608
	%	18.5	22.3	24.0	21.9	13.3	100
	1 year	95.8	85.4	61.1	21.4	58.2	63.7
	2 years	91.4	75.2	45.7	12.4	44.2	53.2
	3 years	87.8	68.5	38.1	9.2	37.5	47.6
	4 years	84.6	63.6	33.3	7.6	33.1	43.9
	5 years	81.8	59.9	30	6.6	29.9	41.2
2009–2013	Abs. number	51500	53651	51796	45227	21559	223733
	%	23.0	24.0	23.2	20.2	9.6	100
	1 year	96	86.8	63	26.1	52.1	67.2
	2 years	91.8	76.9	47.2	15.3	42.2	57
	3 years	88.3	70.5	39.7	11.1	37.3	51.6
	4 years	85.2	65.6	35	8.8	34	47.8
	5 years	82.1	61.7	31.9	7.4	30.9	44.9

10.4% in 8 years, and the mortality from malignant tumors decreased by 11.4%.

—The oncopathological structure in persons of younger age groups (men under 60 years of age, women under 55 years of age) was restructured in the male population over the three periods of observation outside the sixth rank. A significant increase in the incidence of prostate and bladder cancer was revealed. The structural distribution in the female population was mainly preserved, and an increase in the incidence of thyroid cancer was revealed: it moved from the sixth to the third place.

—In men aged 60 years or older, the proportion of lung cancer significantly decreased, from 22.9 to 18.7%. The proportion of cancer of the stomach, pancreas, esophagus, and larynx, and skin melanoma increased over three observation periods, and prostate cancer increased significantly from 9.3 up to 17.6%. In women aged 55 years or older, breast and skin cancer (without melanoma) retained the first two places. The proportion of malignant tumors of the colon, uterine body, kidney, thyroid gland, and brain and skin melanoma increased, and the proportion of cancer of the stomach, rectal, pancreas, liver, lungs, cervix, and ovary decreased.

The study did not reveal significant changes in the 5-year survival rate of cancer patients in the Northwestern Federal District of the Russian Federation by disease stage; only the value of the general indicator increased noticeably, from 38.5 to 44.9%. The 5-year survival rate over the three observation periods increased in young and elderly patients; the survival rate increased markedly more in younger patients.

FUNDING

There were no grants or any financial support.

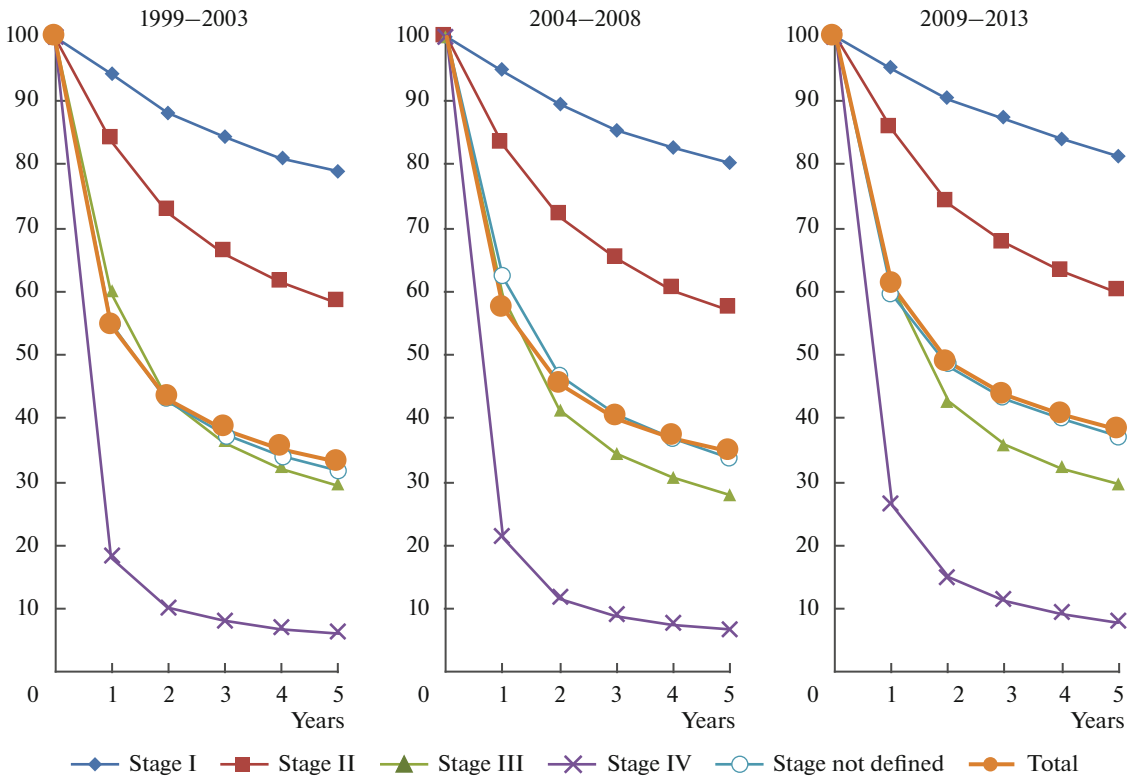

Fig. 4. Five-year survival rate of men under 60 years of age with malignant tumors (C00–96) in the Northwestern Federal District, taking into account the stage of the disease (database of the PCR of the Northwestern Federal District of the Russian Federation).

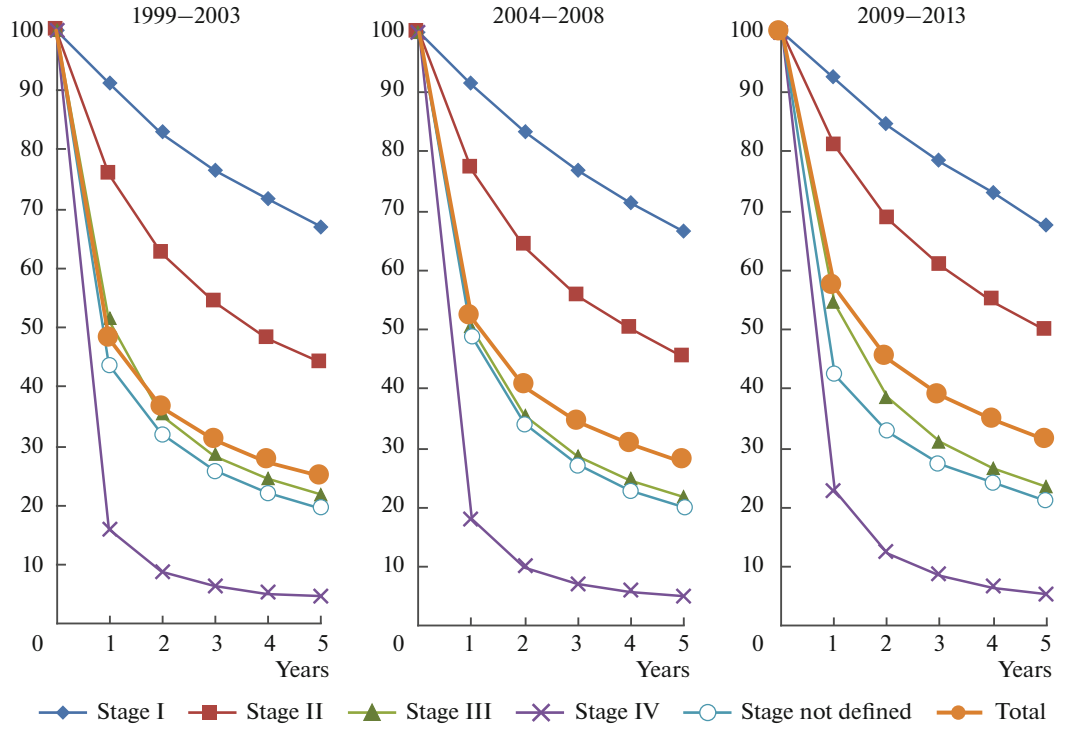

Fig. 5. Five-year survival rate of men of 60 years of age or older with malignant tumors (C00–96) in the Northwestern Federal District, taking into account the stage of the disease (database of the PCR of the Northwestern Federal District of the Russian Federation).

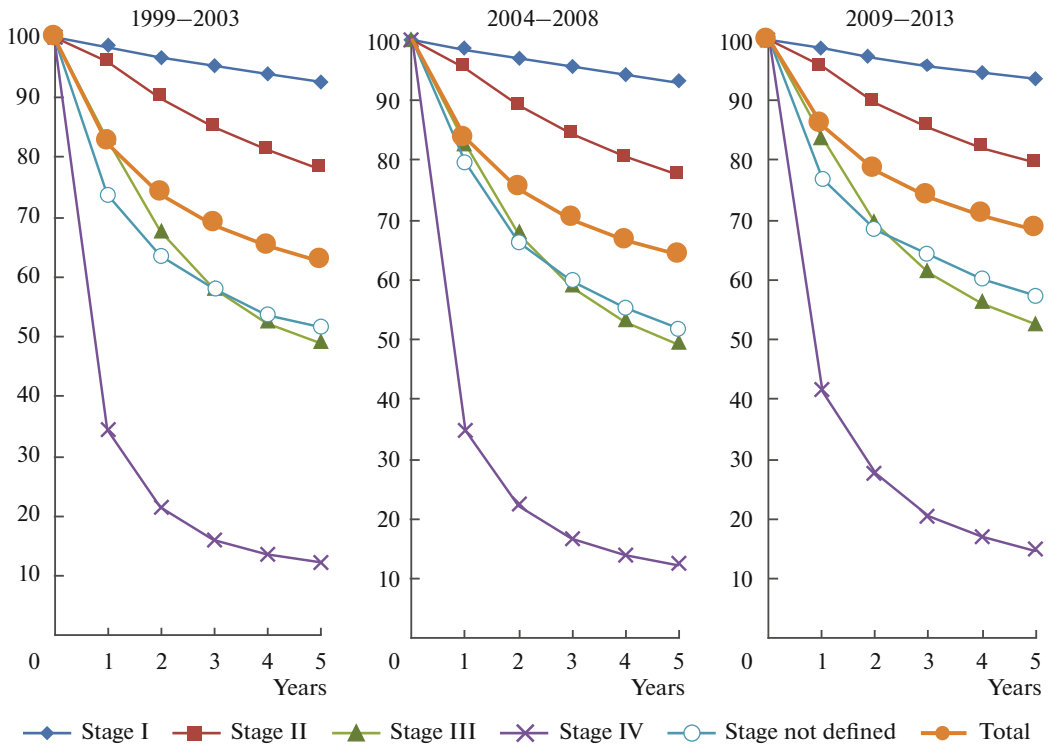

Fig. 6. Five-year survival rate of women under 55 years of age with malignant tumors (C00–96) in the Northwestern Federal District, taking into account the stage of the disease (database of the PCR of the Northwestern Federal District of the Russian Federation).

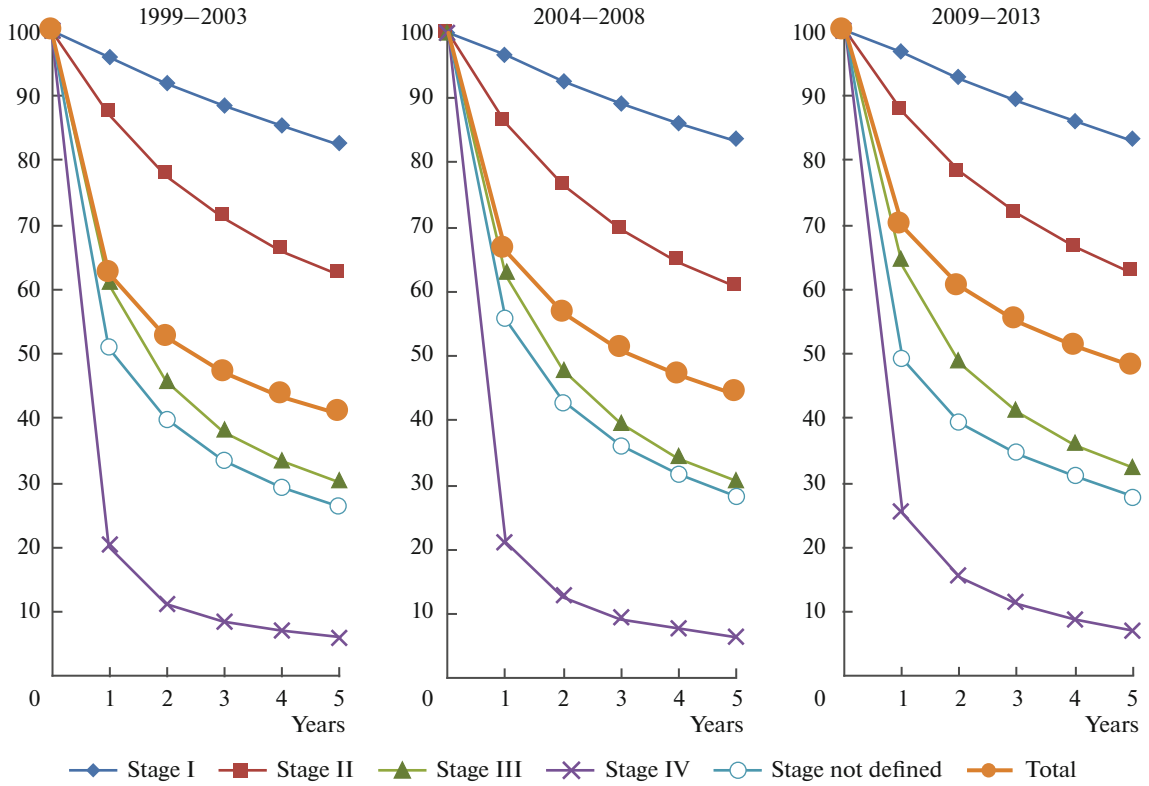

Fig. 7. Five-year survival rate of women of 55 years of age or older with malignant tumors (C00–96) in the Northwestern Federal District, taking into account the stage of the disease (database of the PCR of the Northwestern Federal District of the Russian Federation).

COMPLIANCE WITH ETHICAL STANDARDS

The authors declare that they have no conflict of interest. This article does not contain any studies involving animals or human participants performed by any of the authors.

REFERENCES

1. Aareleid, T.P., Calculation of survival rates of patients with breast cancer in the Estonian SSR for 1968–1981, *Vopr. Onkol.,* 1986, vol. 32, no. 12, pp. 8–12.
2. Belyaev, A.M. and Merabishvili, V.M., Methodological approaches to the analysis of the activities of the cancer service based on the forms of state reporting and the database of the population cancer register of the Northwestern Federal district, Part 1, *Vopr. Onkol.,* 2019, vol. 65, no. 5, pp. 653–663.
3. Berezkin, D.P., *Metody izucheniya vyzhivaemosti onkologicheskikh bol'nykh* (Study Methods of Survival of Patients with Oncological Diseases), Leningrad, 1983.
4. Berezkin, D.P., Analysis of survival rate and individual forecast for patients with malignant tumors, in *Obshchaya onkologiya: Rukovodstvo dlya vrachei* (General Oncology: Guide for Physicians), Napalkov, N.P., Ed., Leningrad: Meditsina, 1989, pp. 608–632.
5. Bessmertnyi, B.S. and Tkacheva, M.N., *Statisticheskie metody v epidemiologii* (Statistical Methods in Epidemiology), Merkov, A.M., Ed., Moscow: Medgiz, 1961.
6. *Zlokachestvennye novoobrazovaniya v Rossii v 2000 godu (zabolevaemost' i smertnost)* (Malignant Neoplasms in Russia in 2000: Morbidity and Mortality Rate), Chissov, V.I. and Starinskii, V.V., Eds., Moscow: Mosk. Nauchno-Issled. Onkol. Inst. im. P.A. Gertsena, 2002.
7. *Zlokachestvennye novoobrazovaniya v Severo-Zapadnom federal'nom okruge Rossii* (Malignant Neoplasms in Northwestern Federal District of Russia), Merabishvili, V.M. and Khanson, K.P., Eds., St. Petersburg: Shrift, 2005.
8. Ivanov, O.A., Sukharev, A.E., Starinskii, V.V., and Egorov, S.N., *Metod obrabotki bazy dannykh onkologicheskikh bol'nykh (vyzhivaemost'): Metodicheskie rekomendatsii no. 97/85* (The Method for Processing the Database of Cancer Patients (Survival Rate): Methodological Recommendations no. 97/85), Moscow: TEA, 1997.
9. Kozlov, P.M., *Sanitarnaya statistika: Posobie dlya sanitarnykh statistikov* (Sanitary Statistics: Manual for Sanitary Statisticians), Moscow: Medgiz, 1955.
10. Merabishvili, V.M., *Vyzhivaemost' onkologicheskikh bol'nykh* (Survival Rate of Oncological Patients), Shcherbuk, Yu.A., Ed., St. Petersburg: Kosta, 2011, no. 2, part 1.
11. Merabishvili, V.M., *Vyzhivaemost' onkologicheskikh bol'nykh* (Survival Rate of Oncological Patients), Shcherbuk, Yu.A., Ed., St. Petersburg: Kosta, 2011, no. 2, part 2.
12. Merabishvili, V.M., *Onkologicheskaya statistika (traditsionnye metody, novye informatsionnye tekhnologii): Rukovodstvo dlya vrachei* (Oncological Statistics: Traditional Methods and New Technologies. Manual for Physicians), St. Petersburg: Kosta, 2011, part 1.
13. Merabishvili, V.M., *Onkologicheskaya statistika (traditsionnye metody, novye informatsionnye tekhnologii): Rukovodstvo dlya vrachei* (Oncological Statistics: Traditional Methods and New Technologies. Manual for Physicians), St. Petersburg: Kosta, 2011, part 2.
14. Merabishvili, V.M., *Zlokachestvennye novoobrazovaniya v Sankt-Peterburge (analiz bazy dannykh rakovogo registra po mezhdunarodnym standartam: zabolevaemost', smertnost', vyzhivaemost')* (Malignant Neoplasms in St. Petersburg: Morbidity, Mortality, and Survival Rate), Belyaev, A.M., Ed., St. Petersburg: Ladoga, 2015.
15. Merabishvili, V.M., *Zlokachestvennye novoobrazovaniya v Severo-Zapadnom federal'nom okruge Rossii (zabolevaemost', smertnost', kontingenty, vyzhivaemost' bol'nykh): Ekspress-informatsiya* (Malignant Neoplasms in Northwestern Federal District of Russia: Morbidity, Mortality, Contingents, and Patient Survival: Express Information), Belyaev, A.M., Ed., St. Petersburg: Izdatel'skie Tekhnologii, 2017, vol. 8, no. 3.
16. Merabishvili, V.M., *Zlokachestvennye novoobrazovaniya v Severo-Zapadnom federal'nom okruge Rossii (zabolevaemost', smertnost', kontingenty, vyzhivaemost' bol'nykh): Posobie dlya vrachei* (Malignant Neoplasms in Northwestern Federal District of Russia: Morbidity, Mortality, Contingents, and Patient Survival: Manual for Physicians), Belyaev, A.M., Ed., St. Petersburg: Izdatel'skie Tekhnologii, 2018, vol. 8, no. 4.
17. Merabishvili, V.M. and Belyaev, A.M., Methodological approaches to the analysis of the activities of the cancer service based on the forms of state reporting and the database of the population cancer register of the Northwestern Federal district, Part 2, *Vopr. Onkol.,* 2019, vol. 65, no. 6, pp. 807–815.
18. Napalkov, N.P. and Berezkin, D.P., Principles and study methods of the survival rate of cancer patients, *Vopr. Onkol.,* 1982, no. 8, pp. 10–13.
19. Reznikova, T.V., Estimation of the survival rate of patients with cancer according to the data of the regional population cancer register, *Materialy Mezhdunarodnogo simpoziuma "Aktual'nye voprosy onkologii," Sankt-Peterburg, 14–17 maya 1996 goda* (Proc. Int. Symp. "Urgent Problems in Oncology," St. Petersburg, May 14–17, 1996), Khanson, K.P. and Merabishvili, V.M., Eds., St. Petersburg, 1996, pp. 48–49.
20. *Sostoyanie onkologicheskoi pomoshchi naseleniyu Rossii v 2018 godu* (The Status of Oncological Help to People of Russia in 2018), Kaprin, A.D, et al., Eds., Moscow: Mosk. Nauchno-Issled. Onkol. Inst. im. P.A. Gertsena, 2019.
21. *Spravochnik sopostavleniya kodov MKB-9 i MKB-10 peresmotrov po klassu novoobrazovanii* (Handbook of Comparison of Codes of ICD-9 and ICD-10 by Class of Neoplasms), Merabishvili, V.M., Ed., St. Petersburg, 1998, 2nd ed.
22. Statistical data of 1979 and 1980, *Vestn. Stat.,* 1981, no. 11, p. 72.

23. *Uchebnoe posobie po meditsinskoi statistike* (Manual on Medical Statistics), Belitskaya, E.Ya., Ed., Leningrad: Meditsina, 1972.

24. Filatov, V.N., Principles and study methods of survival rate as a criterion of effectiveness of treatment of patients with malignant neoplasms, *Doctoral (Med.) Dissertation,* Leningrad: Petrov Res. Inst. Oncol., 1991.

25. Cancer incidence in five continents, vol. 10. http://www.ci5.iarc.fr/C151-IX/C15i-ix.htm. Accessed January 27, 2020.

26. *Cancer Incidence in the USSR,* IARC Scientific Publications no. 48, Napalkov, N. P., Tserkovny, G.F., Merabishvili, V.M., Parkin, D.M., Smans, M., and Muir, C.S., Eds., Lyon: Int. Agency Res. Cancer, 1983, 2nd ed.

27. Sant, M., Aareleid, T., Berrino, F., et al., Eurocare-3: survival of cancer diagnosed 1990–1994—results and commentary, *Ann. Oncol.,* 2003, vol. 14, pp. 61–118. https://doi.org/10.1093/annonc/mdg754

28. Sant, M., Allemani, C., Santaquilani, M., et al., Eurocare-4: survival of cancer patients diagnosed in 1995–1999: results and commentary, *Eur. J. Cancer,* 2009, vol. 45, pp. 931–991. https://doi.org/10.1016/j.ejca.2008.11.018

29. Segi, M., *Cancer Mortality for Selected Cities in 24 Countries (1950–1957),* Tokyo: Dep. Publ. Health, Tohoku Univ. Med., 1960.

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