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STAFFING OF THE CLINICAL LABORATORY SERVICE OF SAINT PETERSBURG IN PRIMARY HEALTH CARE DELIVERY

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ABSTRACT. The growing importance of laboratory diagnostics in the primary health care delivery increases requirements regarding the staffing of the clinical laboratory service and determines the need for its examination. An analysis of the staffing of the clinical laboratory service in Saint Petersburg in primary health care delivery demonstrated that it largely corresponds to all-Russian and global trends, such as the predominance of mid-level professionals in the structure, reduction in the number of laboratory physicians and mid-level laboratory professionals, and a shortage of medical technologists. In general, the development of the personnel potential of the clinical laboratory service in primary health care delivery of Saint Petersburg in 2016–2021 can be considered favorable due to the increase in the staffing level of full-time rates of laboratory physicians and mid-level health professionals, raise in the number of positions and staff, as well as the staffing level of higher education (non-medical) professionals and a reduction in the part-time rate among laboratory physicians. At the same time, there is one of the lowest ratios of laboratory physicians and mid-level health professionals among the Russian regions, which requires the adoption of organizational measures to train mid-level laboratory professionals. An increase in the staffing level of higher education (non-medical) professionals is important for organizing high-tech research, which is significant in the context of the transformation to value-based healthcare and the laboratory monitoring of patients with chronic diseases.

KEY WORDS: personnel; clinical laboratory diagnostics; primary health care; staffing; provision.

КАДРОВОЕ ОБЕСПЕЧЕНИЕ СЛУЖБЫ КЛИНИЧЕСКОЙ ЛАБОРАТОРНОЙ ДИАГНОСТИКИ САНКТ-ПЕТЕРБУРГА ПРИ ОКАЗАНИИ ПЕРВИЧНОЙ МЕДИКО-САНИТАРНОЙ ПОМОЩИ

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РЕЗЮМЕ. Возрастающая значимость лабораторных данных при оказании первичной медико-санитарной помощи предъявляет повышенные требования к кадровому обеспечению лабораторной службы и определяет необходимость его изучения. Анализ кадрового состава службы клинической лабораторной диагностики Санкт-Петербурга показал, что обеспечение специалистами при оказании первичной медико-санитарной помощи во многом соответствует общероссийским и мировым тенденциям, таким как преобладание в структуре среднего медицинского персонала, сокращение числа врачей и среднего медицинского персонала, дефицит медицинских технологов. В целом развитие кадрового потенциала службы клинической лабораторной диагностики Санкт-Петербурга при оказании первичной медико-санитарной помощи в 2016–2021 гг. можно считать благоприятным за счет роста укомплектованности штатных врачебных ставок и ставок среднего медицинского персонала физическими лицами, увеличения числа должностей и физических лиц, а также укомплектованности должностей специалистов с высшим немедицинским образованием и сокращения коэффициента совместительства среди врачей клинической лабораторной диагностики. Вместе с тем в кадровой структуре обращает на себя внимание одно из самых низких среди регионов соотношение врачей и среднего медицинского персонала, что требует принятия организационных мер по подготовке специалистов лабораторной службы со средним медицинским образованием. Рост укомплектованности должностей специалистов с высшим немедицинским образованием является важным с точки зрения организации высокотехнологичных исследований, значимых в условиях формирования ценностно-ориентированной системы здравоохранения и обеспечения лабораторного мониторинга больных с хроническими заболеваниями.

КЛЮЧЕВЫЕ СЛОВА: кадры; клиническая лабораторная диагностика; первичная медико-санитарная помощь; укомплектованность; обеспеченность.

Importance of laboratory diagnostics in primary health care (PHC) in the context of value-based healthcare increases, which leads to changes in the role of medical laboratory specialists in the treatment and diagnostic process [23].

Laboratory specialists were considered to be responsible only for the qualitative performance of tests prescribed by physicians for a long time. Thier participation in diagnostic processes was often regarded as interference in the professional activities of clinical practitioners [2]. Recent studies have shown that active development and introduction of the latest laboratory technologies often creates uncertainty among primary care physicians in relation to ordering and interpretation of laboratory results [24], and requires timely assistance from laboratory professionals [1]. In this regard, laboratory personnel become an equal participant in clinical diagnostic processes. Completeness and speed of patient examination, diagnosis and laboratory monitoring in the course of treatment significantly depend on laboratory specialists.

AIM

To analyze the staffing of the clinical laboratory diagnostic services (CLDS) of St. Petersburg in the course of primary health care.

MATERIALS AND METHODS

The study was conducted on the basis of the Federal State Budgetary Educational Institution of Higher Education “Pavlov First Saint Petersburg State Medical University” of the Ministry of Health of the Russian Federation.

Data on staffing were obtained by analyzing tables 1100 “Positions and individuals of a medical organization” of federal statistical observation forms N 30 “Information about a medical organization” (for the positions (specialties) “Clinical Laboratory Diagnostics”, “Laboratory Doctor”, “Biologist”, “Expert Chemist”, “Laboratory Technician”, “Medical Laboratory Technician”, “Medical Technologist”). The tables were provided by the St. Petersburg Medical Information and Analytical Center (forms approved by Rosstat [15–19]), for St. Petersburg as a whole and in the context of Interdistrict Centralized Clinical and Diagnostic Laboratories (ICCDL), which ensure that 85% of tests are performed in outpatient settings [6].

Data on the resident population of St. Petersburg were obtained from the statistical yearbook of the Department of the Federal State Statistics Service for St. Petersburg and the Leningrad Region [8].

In order to analyze the staffing, the structure and a number of specialists of the clinical laboratory diagnostics service were assessed. Indicators of staffing with medical personnel were calculated as well (staffing of full-time positions and the compatibility coefficient). There have been performed the assessment of provision of the population with laboratory staff. The ratio of CLD doctors and nursing staff for 2016–2021 was determined.

Generally accepted formulas were used to calculate the indicators of coverage with CLD specialists [5, 10, 12].

Database creation, analysis and statistical processing of the results were carried out by using Microsoft Office Excel.

RESULTS AND DISCUSSION

Studying the staff composition of the clinical laboratory diagnostics service of St. Petersburg showed that the number of employees in the units providing medical care in outpatient settings has a steady downward trend. Over the period 2016–2021, the total number of main employees in occupied positions decreased by 12.5% (Fig. 1). At the same time, the number of individuals of CLD physicians decreased by 9.6%, specialists with secondary medical education — by 15.7%, while the number of specialists with higher non-medical education increased by 20% over the same period.

Nursing staff (63.0–65.5% during 2016–2021) dominates among all specialists of the service, which corresponds to the world and national standards. According to recommended staffing standards of a clinical diagnostic laboratory (department, division), there should be at least three positions of nursing staff per one position of a doctor (biologist/laboratory physician/expert chemist) [11]. In addition, the requirements of the professional standard assign this group of specialists to perform the most mass and frequently prescribed laboratory diagnostic tests (tests of the first and second categories of complexity) [14].

The wide range of duties assigned to the nursing staff of clinical diagnostic laboratories requires the necessary number of such workers, which can be determined by the staffing coverage level. In 2017–2020, laboratory coverage with nursing staff in outpatient units increased and ranged from 81.9–83.8% (employed rates) and 49.4–56.2% (individuals), respectively

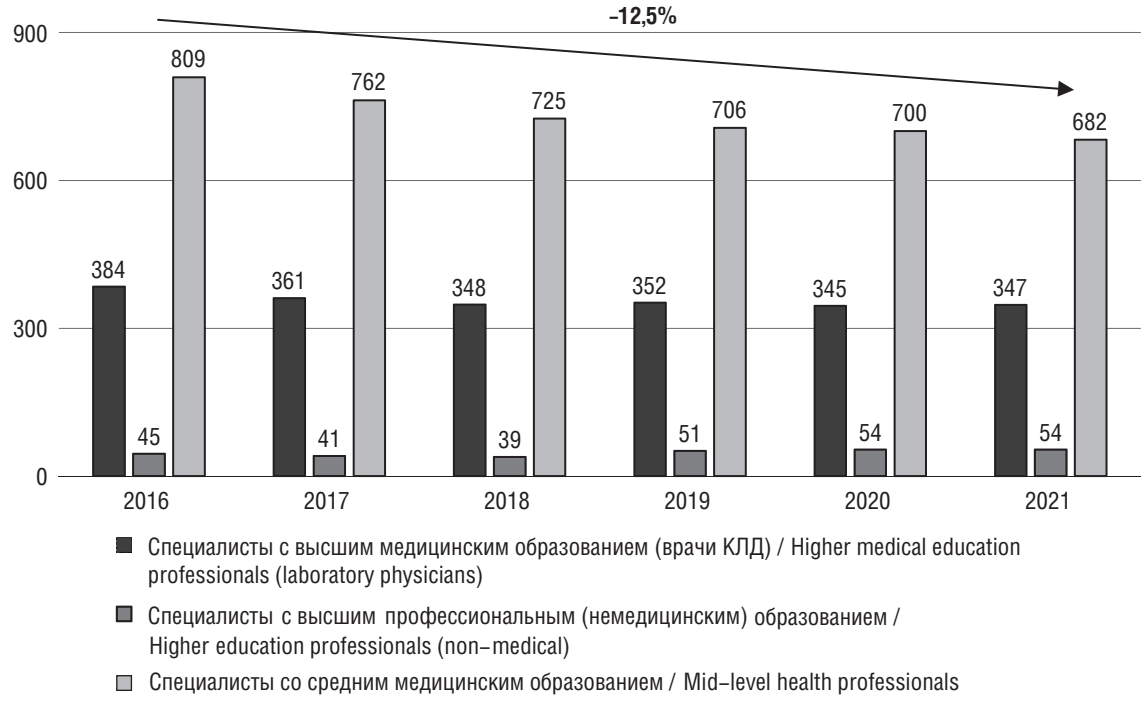

Fig. 1. Dynamics of the personnel structure of the clinical laboratory service in Saint-Petersburg in outpatient settings

Рис. 1. Динамика кадрового состава службы клинической лабораторной диагностики Санкт-Петербурга в подразделениях, оказывающих медицинскую помощь в амбулаторных условиях

(Table 1). In 2021, there was a decrease in the staffing ratios for both employed rates and individuals by 6 and 7.1%, respectively, as compared to the previous year, due to a decrease in employed rates (by 1.4%) and individuals (by 2.6%) against an increase in the number of staff positions (by 4.9%). Thus, in 2021, an outflow of nursing staff was observed due to the spread of coronavirus infection (COVID-19), and therefore, workload of laboratory staff increased.

Nursing coverage is largely achieved due to compatibility. The average value of the indicator for the Russian Federation is 1.33–1.39 [4, 20]. St. Petersburg shows a fairly high level of compatibility, which in 2016–2021 varied in the range of 1.5–1.7. The compatibility rate was even higher in the context of individual positions: 1.8 — for laboratory technicians and medical technologists in 2021. At the same time, the staffing of laboratory technicians steadily decreased. In 2021 the coverage with nursing staff reached the lowest rate (58.5% of occupied positions). The high coefficient of compatibility among medical technologists allowed to ensure high staffing levels (95.5% in 2021), nevertheless, their share in the structure of the average medical staff of the laboratory service traditionally remains the lowest, and the issue of training nationwide is the most acute [21].

Interdistrict Centralized Clinical and Diagnostics Laboratory (ICCDL) of St. Petersburg showed higher level of nursing coverage in comparison with the city average (83.4–91.4% in 2016–2021), however, it was also largely achieved due to part-time staffing (1.89 in 2021).

The high compatibility rate and inadequate nursing coverage results in a high workload for nursing staff, which can have negative consequences for the quality of medical laboratory services and their availability in РНС ПМСП. In such circumstances, the workload is often redistributed to workers with higher qualifications, primarily physicians.

An analysis of human resource potential of doctors in the clinical laboratory diagnostics service showed a decrease in the number of full-time positions of CLD doctors — from 784.8 in 2016 to 618.0 in 2021. (visibility indicator — 78.75%, rate of decline — 21.25%), including employed positions — from 658 to 490 (visibility indicator — 74.5%, rate of decline — 25.5%), and individuals — from 384 in 2016 to 347 in 2021 (visibility indicator — 90.4%, rate of decline — 9.6%). At the same time, in 2021, after a four-year decline, the number of full-time posts of doctors as well as nursing staff increased by 1.3%, which may be associated with the spread of a new coronavirus infection (COVID-19), since the laboratory service plays a significant role in its detection. At the same time, the increase in the number of full-time jobs did not lead to expected growth in the

Table 1

Dynamics of staffing level for the positions of mid-level health professionals of the clinical laboratory service in Saint-Petersburg in outpatient settings

Таблица 1

Динамика показателей укомплектованности должностей среднего медперсонала службы клинической лабораторной диагностики Санкт-Петербурга в амбулаторных условиях оказания медицинской помощи

Годы / Years	Укомплектованность должностей / Staffing level				Коэффициент совместительства / Coefficient of spare-time work	
	занятыми ставками / employed rates		физическими лицами / natural persons			
	%	темп прироста / rate of change, %	%	темп прироста / rate of change, %	коэффициент / coefficient	темп прироста / rate of change, %
2016	82,9	–	49,4	–	1,68	–
2017	81,9	–1,3	50,9	3,0	1,61	–4,2
2018	82,2	0,4	52,3	2,6	1,57	–2,1
2019	82,6	0,5	53,8	3,0	1,54	–2,4
2020	83,8	1,4	56,2	4,4	1,49	–2,9
2021	78,8	–6,0	52,2	–7,1	1,51	1,2

number of employed positions, which showed the highest rate of decline (by 7.5%) during the same period. This fact indicates that working in an outpatient sector under the current conditions is not enough attractive for CLD physicians.

In 2021, the number of employed positions decreased compared to 2020, while the staffing coverage by physicians in clinical diagnostic laboratories increased insignificantly. It may be assumed that physicians of CLD refused from part-time work under the conditions of increased labor intensity due to a great number of COVID-19 tests, and a resultant increase in remuneration.

Full-time staffing coverage by CLD physicians with employed rates decreased by 5.4% between 2016 and 2021, and amounted to 79.3% in 2021 (Table 2). Herewith, the staffing of physician positions by individuals increased by 14.7% over the same period. CLD physician staffing ratios decreased positively from 1.7 in 2016 to 1.4 in 2021.

In 2016–2021, taking into account employed positions, the ICCDL coverage by physicians was higher than the average coverage in other laboratories of the city, and ranged from 84.4–94.5%. However, high levels of staffing coverage, including nursing staff coverage, were provided by compatibility (compatibility ratio 1.66 in 2021).

No significant differentiation is observed in staffing levels of physicians and nurses, taking into account the employed rates and individuals, as well as the compatibility coefficients. Nevertheless, the coverage by physicians is slightly higher and the compatibility rate is lower.

The ratio between laboratory physicians and nursing staff in outpatient settings in St. Petersburg is one of the lowest in the Russian Federation (1:1.97 in 2021) [4, 20]. At the same time, in 2016–2021, this indicator was lower in ICCDL than in all laboratory departments of St. Petersburg providing medical care in outpatient settings (Fig. 2). Over the 5 years, the ratio between physicians and nursing staff of the ICHDL has decreased by 13.2%.

The current correlation between specialists in St. Petersburg may be caused by five specialized departments which trained medical specialists in laboratory diagnostics. At the same time, only one educational institution (St. Petersburg State Budgetary Educational Institution "Medical College N 3") trained nursing staff. However, the current ratio of CLD physicians and nurses in St. Petersburg does not correspond to the world practice (1:4 or more) [7], leads to an increase in the workload of physicians and requires additional measures to train laboratory service specialists with secondary medical education [20].

The clinical laboratory diagnostics service is characterized by the presence of specialists with higher professional (non-medical) education (doctors-laboratorians, biologists, chemists-experts), who are assigned to perform, organize and analytical support of high-tech research (third category of complexity) in accordance

Table 2

Dynamics of staffing level for the positions of laboratory physicians in outpatient settings in Saint Petersburg

Таблица 2

Динамика показателей укомплектованности должностей врачей КЛД в амбулаторных условиях оказания медицинской помощи в Санкт-Петербурге

Годы / Years	Укомплектованность должностей / Staffing level				Коэффициент совместительства / Coefficient of spare-time work	
	занятыми ставками / employed rates		физическими лицами / natural persons			
	%	темп прироста / rate of change, %	%	темп прироста / rate of change, %	коэффициент / coefficient	темп прироста / rate of change, %
2016	83,8	–	48,9	–	1,71	–
2017	82,3	–1,9	48,4	–1,1	1,70	–0,8
2018	82,0	–0,3	49,8	2,8	1,65	–3,1
2019	87,4	6,6	55,4	11,3	1,58	–4,2
2020	86,8	–0,7	56,6	2,0	1,53	–2,7
2021	79,3	–8,7	56,1	–0,7	1,41	–8,0

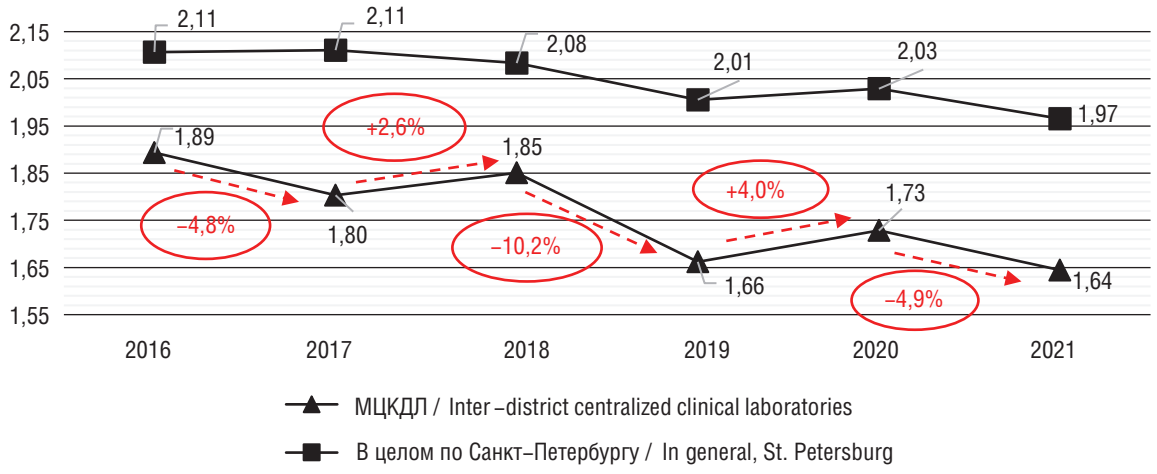

Fig. 2. Dynamics of the 'laboratory physician — mid-level health professionals' ratio of the clinical laboratory service in Saint Petersburg in outpatient settings

Рис. 2. Динамика соотношения численности физических лиц «врач КЛД — средний медперсонал» службы клинической лабораторной диагностики Санкт-Петербурга в амбулаторных условиях

with the professional standard [13]. Thus, the clinical laboratory diagnostics service is partly able to cover the deficiency of medical staffing.

In 2026–2021, the number of this category of laboratory service specialists in St. Petersburg tended to increase against the background of extensive growth of staff units and employed positions. The identified increase in the number of biologists and expert chemists occurred simultaneously with a decrease in the number of laboratory physicians (visibility indicator for staff and employed positions in outpatient settings — 44.5 and 57.6%, respectively, for individuals — 19.2%).

The negative dynamics of the number of laboratory doctors is the result of systematic progressive development of the service, since positions of laboratory doctor had been retained for specialists with higher non-medical education, admitted to this position before 1 October 1999 [9].

However, it should be noted that in 2021 there were 9 specialists with higher non-medical education working as "doctor of clinical laboratory diagnostics" in laboratory departments of St. Petersburg, providing medical care in outpatient clinics. This situation is probably caused by specialists with higher professional (non-medical) education, who previously held the position of "laboratory doctor", being transferred to the position of "doctor of clinical laboratory diagnostics" during 1997–2014 [22]. Such a phenomenon contradicts requirements of the professional standard 'Specialist in the field of clinical laboratory diagnostics and the order of the Ministry of Health and Social Development of Russia from 23.07.2010 N 541n [9, 13], according to which only a specialist with higher education in one of the medical specialties listed in the relevant documents can be appointed to the position of a doctor of clinical laboratory diagnostics.

The current situation requires bringing medical specialists of the laboratory service into compliance with the job description. In 2016–2021, the coverage by specialists with higher non-medical education increased by 10.9 (employed rates) and 18.3% (individuals), which may reflect new technologies which were introduced in laboratory practice. Compatibility ratio decreased by 1.5% compared to 2016 and amounted to 1.25 (Table 3).

At the same time, the ICHDL demonstrates aa reduction of positions and individuals among specialists with higher non-medical education due to elimination of biologist positions. According to available assessments, biologist positions are reduced as laboratory services are developing [3]. Positions of clinical laboratory specialists with non-medical education should correspond to their specialties involving high-tech research.

Population of St. Petersburg is provided by specialists of the clinical laboratory diagnostics

Table 3

Dynamics of staffing level for the positions of higher education (non-medical) professionals of the clinical laboratory service in Saint Petersburg in outpatient settings

Таблица 3

Динамика показателей укомплектованности должностей специалистов с высшим профессиональным (немедицинским) образованием службы клинической лабораторной диагностики Санкт-Петербурга в амбулаторных условиях оказания медицинской помощи

Годы / Years	Укомплектованность должностей / Staffing level				Коэффициент совместительства / Coefficient of spare-time work	
	занятыми ставками / employed rates		физическими лицами / natural persons			
	%	темп прироста / rate of change, %	%	темп прироста / rate of change, %	коэффициент / coefficient	темп прироста / rate of change, %
2016	85,1	–	63,8	–	1,33	–
2017	88,2	3,6	52,4	–17,9	1,68	26,2
2018	87,3	–1,0	54,9	4,8	1,59	–5,5
2019	93,5	7,0	73,9	34,6	1,26	–20,4
2020	94,2	0,7	74,2	0,4	1,27	0,3
2021	94,4	0,3	75,5	1,7	1,25	–1,5

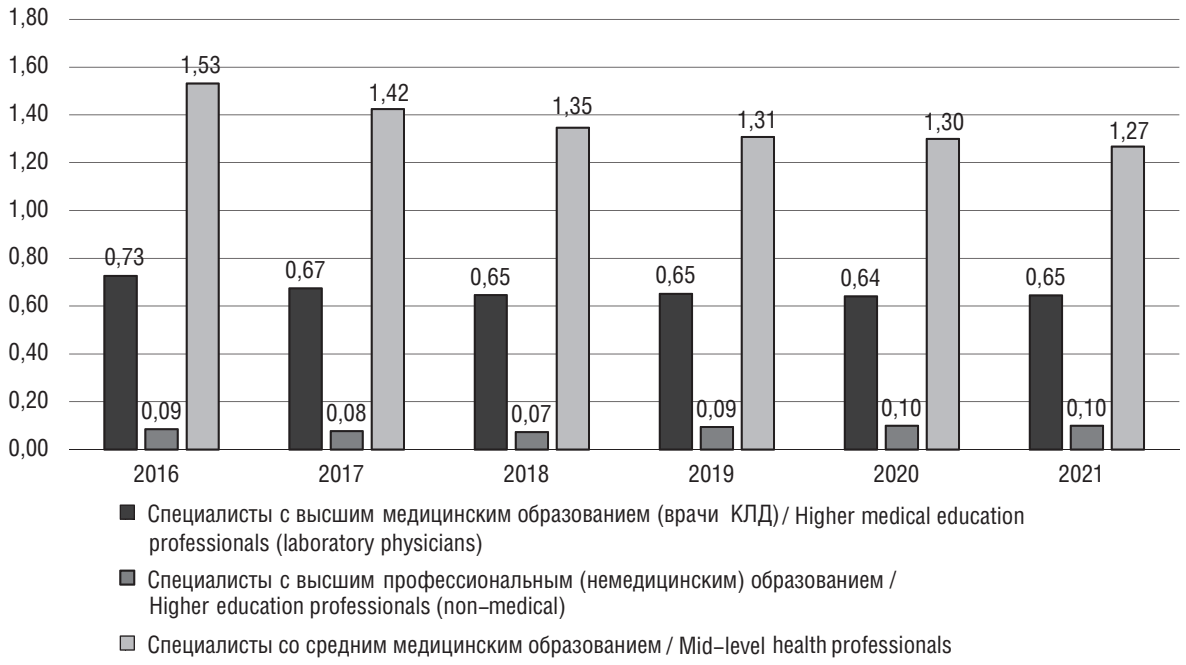

Fig. 3. Dynamics of staffing of the clinical laboratory service in outpatient settings in Saint Petersburg, per 10,000 population

Рис. 3. Динамика обеспеченности населения кадрами службы клинической лабораторной диагностики в амбулаторных условиях в Санкт-Петербурге, на 10 тыс. населения

service in a less degree. In 2021 the availability of clinical laboratory diagnostics specialists in outpatient settings decreased and amounted to 1.27 for nursing staff, 0.65 — for CLD physicians and 0.1 — for biologists, expert chemists and laboratory physicians per 10 thousand population (Fig. 3), which is significantly lower than the average availability of these specialists in all laboratories of the city (similar indicators were 4.2, 1.97 and 0.34 per 10 thousand population, respectively).

At the same time, it is worth noting that there has been no decline in the number of CLD physicians since 2018, which is a positive trend, because physicians have the greatest responsibility

for interacting with primary care physicians and providing primary health and sanitary health care.

CONCLUSION

In general, in 2016–2021, the development of a human resources potential of the clinical laboratory diagnostics service of St. Petersburg concerning provision of primary health care can be considered favorable due to:

- growing staffing levels of regular physician and nurse rates, growing number of positions and individuals, as well as staffing coverage by specialists with higher non-medical education;
- reduction of the compatibility rate among CLD physicians.

At the same time, the ratio of CLD doctors to nursing staff is one of the lowest among the regions, which requires the adoption of organizational measures to train laboratory specialists with secondary medical education. The growth of staffing coverage by specialists with higher non-medical education is important for further high-tech research, which is important within the framework of a value-oriented approach in a health care system. Moreover, it ensures laboratory monitoring of metropolitan patients with chronic diseases in response to a continuing trend of population ageing.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

Competing interests. The authors declare that they have no competing interests.

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