Trends in postgraduate education of doctors in oncology in Poland in 2010-2020 in the face of demographic and epidemiological challenges

Trendy kształcenia podyplomowego lekarzy w dziedzinach onkologicznych w Polsce w latach 2010-2020 wobec wyzwań demograficznych i epidemiologicznych

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KEYWORDS:

- onkology
- postgraduate education
- Poland

ABSTRACT

Introduction: The system of specialization training in oncology is subject to constant shifts in response to the changing health needs in Poland. Both the specialization programs and the training mode have evolved, and the system's ability to train more specialists has increased. Epidemiological trends in cancer diseases indicate a further increase in the incidence and mortality. Moreover, the advancement at diagnosis is likely to be higher in the coming years due to neglect during the COVID-19 pandemic. Treatment of advanced neoplasms will require the availability of more specialists in oncological disciplines, especially conservative ones, as well as specialists supporting oncological care.

Aim of the study: The study aimed to determine the quantitative changes taking place in the system of specialist education of doctors in oncological fields between 2010 and 2020 and to assess the trends of changes in relation to the growing demand and challenges of the pandemic.

Material and methods: The material for the analysis was the data of the register of doctors undergoing specialization training conducted by the Centre of Postgraduate Medical Education of Warsaw in 2010-2020. The material analysis was quantitative.

Results: The conducted analysis shows the constant development of specialization education in the fields of oncology in 2010-2020, aimed at covering the demand for specialists in the studied fields. The pace of growth may prove insufficient in the long term in view of the aging of the population and the associated increasing incidence and prevalence of neoplastic diseases. Worryingly, the newly formed specialists will have to deal in the near term with the post-pandemic wave of patients with advanced cancers who require more frequent treatment combined with careful palliative care during and after treatment. Detailed results are presented in Tables 1-7 and 8 in the Annex.

Conclusions: The conducted analysis shows the constant development of specialization education in the fields of oncology in the years 2010-2020, aimed at covering the demand for specialists in the studied fields.

SŁOWA KLUCZOWE:

- onkologia
- studia podyplomowe
- Polska

STRESZCZENIE

Wprowadzenie: System szkolenia specjalizacyjnego w dziedzinach onkologicznych podlega ciągłym zmianom w odpowiedzi na zmieniające się potrzeby zdrowotne w Polsce. Ewoluowały zarówno programy specjalizacji, jak i tryb szkolenia oraz wzrosła zdolność systemu do kształcenia większej liczby specjalistów. Trendy epidemiologiczne chorób nowotworów wskazują na dalszy wzrost zapadalności i umieralności z ich powodu. Ich zaawansowanie w momencie rozpoznania będzie zapewne wyższe w najbliższych latach ze względu

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ISSN 2657-9669/
Published and financed by Centre of Postgraduate Medical Education; https://doi.org/10.36553/wm.121.

na zaniedbania w trakcie pandemii COVID-19. Leczenie postaci zaawansowanych nowotworów będzie wymagało dostępności większej liczby specjalistów w dyscyplinach onkologicznych, szczególnie zachowawczych, oraz specjalistów wspierających opiekę onkologiczną.

Cel pracy: Celem pracy było określenie ilościowych zmian zachodzących w systemie kształcenia specjalizacyjnego lekarzy w dziedzinach onkologicznych między 2010 a 2020 rokiem oraz ocena trendów zmian w stosunku do rosnącego zapotrzebowania i wyzwań pandemii.

Materiał i metody: Materiał do analiz stanowiły dane rejestru lekarzy odbywających kształcenie specjalizacyjne prowadzonego przez Centrum Medyczne Kształcenia Podyplomowego w latach 2010-2020. Analiza materiału miała charakter ilościowy.

Wyniki: Przeprowadzona analiza wskazuje na stały rozwój kształcenia specjalizacyjnego w dziedzinach onkologicznych w latach 2010-2020, zmierzający w kierunku pokrycia zapotrzebowania na specjalistów w badanych dziedzinach. Tempo wzrostu może okazać się niewystarczające długofalowo wobec starzenia się społeczeństwa i połączonej z tym zwiększającej się zapadalności i chorobowości na choroby nowotworowe. Co niepokojące, nowo ukształtowani specjaliści będą musieli się zmierzyć w bliskiej perspektywie z po pandemiczną falą chorych z zaawansowanymi nowotworami, wymagających częstszego leczenia skojarzonego z uważną opieką paliatywną w trakcie i po zakończeniu leczenia.

Wnioski: Przeprowadzona analiza wskazuje na stały rozwój kształcenia specjalizacyjnego w dziedzinach onkologicznych w latach 2010-2020 zmierzający w kierunku pokrycia zapotrzebowania na specjalistów w badanych dziedzinach.

Introduction

Globally, we noted a trend towards another epidemiological transformation – replacing leading diseases into the leading cause of death leadership. Age is the most powerful risk factor for cardiovascular disease and cancer. However, the cancer burden in highly developed countries has exceeded that of cardiovascular disease. Lower cumulative rates of cancer incidence in the oldest population reflect reduced detection rather than a reduced risk of death. An undiagnosed neoplasm may be the initial cause of death overlapping with comorbid disease decompensation. We can then note the current acute disease as the cause of death. Lower respiratory tract infections constituted a significant, but not competing with the above-mentioned, causes of death. The COVID-19 pandemic is currently taking a significant toll, especially among the elderly and/or those with cancer. However, the long-term COVID-19 mortality does not appear to lead to a significant shift in demographic and epidemiological trends. However, an increase in mortality from cancer is expected in the near future. This is related to the shift of attention of the healthcare system to the treatment of COVID-19 patients. Restrictions on access to the healthcare system delay the diagnosis of cancer to an advanced stage. This will result in a parallel and sequential wave (known as the "pandemic tail") of patients requiring advanced oncology care, with the participation of specialists in more conservative than surgical disciplines. It is difficult to assess whether the set of specialists resulting from the development of education in the field of oncology will meet this challenge.

Doctors and dentists, on the basis of the Act on the Professions of Physician and Dentist and the Code of Medical Ethics, are required to constantly improve their professional skills (1, 2). A physician may fulfill this obligation by implementing a specialization program, participating in domestic or foreign medical courses, congresses, symposia or scientific congresses, and many others (3). The most common method of professional development chosen by doctors and dentists in Poland is specialist training: out of 185,333 professionally active doctors, 171,695 have specializations (also doctors with 1st degree of specialization were included) (4). A physician who applies to commence specialization training must complete a postgraduate internship, be licensed to practice and obtain a positive result of the Final Medical Examination / Medical-Dental Final Examination or have a 1st/2nd degree specialization or the title of a specialist (2). Doctors can undertake training in 77 medical specialties and in 9 medical and dental specialties (5). The duration of the training is 4-10 years for doctors and 3-6 years for dentists (5).

Specialization schools can take place in two modes: residential and non-resident. As part of the residency, the doctor undergoes specialization training based on an employment contract. It is concluded with the entity that conducts the specialization training – for the period specified in the specialization program. The number of residency places is determined by the Minister of Health and announced for each qualification procedure (October and March of each calendar year). The training of a doctor in the residential mode is financed from public funds (1). In non-residence mode, the doctor may undergo specialization training, as part of vacant training places, in entities that conduct specialization training on the basis of: employment contract, civil law contract, as part of paid training leave or as part of extending the curriculum of full-time doctoral studies (1) non-resident places are determined by the voivode and announced for each qualification procedure.

Specialization training may be conducted only by organizational units that meet the conditions set out in the Act on the Professions of Physician and Dentist and have been accredited for specialization training. Confirmation of accreditation is entry on the list of accredited bodies for conducting specialization training in a given field (2). Completion of specialization training is confirmed by the specialization manager, and verified by:

1) in formal terms, the competent voivode,
2) in terms of content, a national consultant in a given field.

A physician obtains the title of a specialist in a given field after obtaining a positive result of the National Specialization Examination or another examination recognized as equivalent (the list of equivalent examinations is specified by the minister of health by ordinance) (1).

Training in the field of oncology can be undertaken by a physician in 7 areas: 6 of which, i.e., oncological surgery, pediatric oncology and hematology, clinical oncology, hematology, pathomorphology, and oncological radiotherapy have been identified as priority areas of medicine (5, 6). Oncological gynecology has not been included in the catalog of priority areas since 2018 (6, 7). In recent years, specialization training programs have undergone numerous modifications, including introduction of modular specializations aimed at faster introduction of highly qualified medical staff into the health care system (5, 8, 9). Currently, the number of doctors specializing in oncology is as follows: oncological surgery – 991, oncological gynecology – 356, hematology – 574, pediatric oncology and hematology – 238, clinical oncology – 1086, pathomorphology – 880, oncological radiotherapy – 885 (4).

Objective of the article

The aim of the study was to describe the changes that took place in education in the fields of oncology in 2010-2020, demographic and quantitative changes among specializing doctors, changes in the availability of training, as well as an initial attempt to assess the results and trends of education in relation to the changing needs caused by demographic and epidemiological changes, both in the short and long term.

Material and methods

The material for the analysis was the data of the register of doctors undergoing specialization training conducted by the Centre of Postgraduate Medical Education of Warsaw from 2010 to 2020. Seven specializations in oncology were analyzed: oncological surgery, oncological gynecology, hematology, pediatric oncology and hematology, clinical oncology, pathomorphology and oncological radiotherapy. The analyzed data concerned the number of people undergoing specialization, broken down by sex, mode of specialization, and average age of doctors. The availability of specialized training was also assessed in terms of the number of training places and accredited units.

Results

In 2020, a total of 1,324 doctors specialized in oncology, which means an increase by 54.7% compared to 2010. Most doctors specialized in clinical oncology (32%), the least in pediatric oncology and hematology (5.2%). There has been an increase in the number of specialist physicians in six out of seven areas. The largest increase was recorded in hematology – by 127.5%, followed by (in descending order): oncological surgery (by 123.2%), pathomorphology (by 58.7%), pediatric oncology and hematology (by 52.2%), clinical oncology (by 51%), oncological gynecology (by 1.1%). The number of doctors specializing in radiotherapy decreased by 14.6%.

In six out of seven analyzed areas, the percentage of doctors specializing in residency increased significantly compared to 2010. The highest increase in the percentage of doctors specializing in residency was recorded in hematology – by 47.8 pp, and the smallest in clinical oncology – by 25.4 pp. In the field of oncological gynecology, there was no increase in the proportion of residents between 2010 and 2020. The highest percentage – 91.9% – of doctors training as part of residency was found in the field of pathomorphology, and the lowest in gynecological oncology – 1.1%.

In the observed period (2010-2020), the number of women specializing in oncology fields increased, both in absolute numbers and as a percentage of all doctors undergoing training in five out of seven analyzed specializations. In oncological surgery by 15.6 pp, oncological gynecology by 23.7 pp, in pediatric oncology and hematology by 2.3 pp, in clinical oncology by 2.5 pp, in pathomorphology by 13.8 pp.

In five out of seven described areas, women constitute over 50% of doctors, the largest number in pediatric oncology and hematology (84.1%) and clinical oncology (75.4%). In oncological surgery (27.2%) and oncological gynecology (43.5%), women are a minority.

The average age of a person undergoing specialization in six out of seven analyzed specializations was lower in 2020 than in 2010. The largest decrease was recorded for pediatric oncology and hematology (by 7.5 years), hematology (by 6.7 years) and oncological surgery (by 4.8 years). The highest average age was found in oncological gynecology (40.1) and the lowest in pathology (30.5).

In all analyzed areas, both the number of training places and the number of entities conducting specialization increased. In 2010, 1,522 seats were made available, while in 2020 2,273 seats, which is an increase by 49.3%. The largest number of training places is available for physicians specializing in clinical oncology (700) and the smallest for physicians specializing in pediatric oncology and hematology (114). Compared to 2010, the highest increase in the number of training places was observed in hematology (by 106.5%) and the lowest in gynecology oncology (by 21.3%). The number of entities increased by 63.8% – 232 entities in 2010 and 380 entities in 2020. The highest increase in the number of training units was found in oncological surgery (by 124.2%), and the lowest in pediatric oncology and hematology (by 21.4%).

In the analyzed period, the use of training places, as expressed by the indicator – the number of people undergoing specialization to the number of training places – was different for individual fields and changed over time. Significantly increased use of training places was found in oncological surgery from 0.6 in 2010 to 0.7 in 2020, while for oncological radiotherapy the use was reduced from 0.6 to 0.4 in 2020.

Based on the statistical data of the Medical Exams Center (22), a high rate of passing the National Specialization Examination was found in all oncology specializations in the analyzed period. The average highest percentage is 100% for pediatric oncology and hematology and the lowest 90.3% for pathology. The lowest success rate in all years is 68.2% (pathomorphology) and the highest is 100% (oncological gynecology, pediatric oncology and hematology, oncological radiotherapy, hematology, pathomorphology). The results from 2019 and 2020 were not analyzed due to the lack of data in the CEM statistics.

Discussion

The above study is a continuation of the work entitled "Specialization education system in Poland in 2011-2018 according to the data of the register kept by the Centre of Postgraduate Medical Education of Warsaw" from 2018 (10). It extends the scope of the analysis to include oncological fields and covers 7 out of 77 medical specializations.

In the analyzed period, the number of doctors training in oncology increased by more than a half (by 54.67%). This was undoubtedly due to the increase in the number

of residences by the Ministry of Health (11, 12). It is not without significance that oncological fields are included in the list of priority fields of medicine (6). The number of doctors specializing in oncological gynecology decreased by 34.3% compared to 2018. In 2018, oncological gynecology ceased to be a priority field (7). Due to the forecasts of an increase in both the incidence and mortality due to cancer, it seems appropriate to steadily increase the number of doctors educating in the fields of oncology (13, 14).

In the current situation in Poland, compared to countries leading in oncological care, there are long delays in cancer diagnosis and high-stage diagnosis. As a result, the burden of treatment and care is shifted towards conservative areas and is more palliative than conservative. The pandemic tail of delayed diagnosis and care delays will additionally increase the demand for the work of clinical oncologists, radiotherapists and palliative medicine specialists (not analyzed here). It is disturbing then that the number of trained radiotherapists is falling. This is not related to the shortage of training places, in fact, these places are hardly used. The development of the availability of radiotherapeutic devices, new methods of precise high-energy photon radiotherapy, and in the near future of hadron therapy in our country creates opportunities for a professional career, also financially satisfactory. The lack of prospects for professional development after completing the specialization does not seem to be a limiting circumstance here. Further analysis should be given to why there is less interest in education in radiotherapy.

For years, we have been recording a decline in the number of pathology specialists. In fact, the day-to-day care of a patient, a delay of several weeks and sometimes months in the pathomorphological diagnosis, even in the best centers, significantly affects the fate of patients. It becomes all the more overwhelming in view of the fact that contemporary precise pathomorphological diagnosis, according to the canons of personalized oncology, is becoming more and more complex, requires the use of many methods, including complex molecular ones, and requires the introduction of molecular biology specialists to the system. We are therefore glad to see the increase in all education indicators in this discipline. It should be carefully analyzed whether it is sufficient in the face of the rapidly growing needs in this field.

Due to the forecasts of an increase in both the incidence and mortality due to neoplasms, the direction of a steady increase in the number of doctors educating in the field of oncology seems to be right (13, 14). In order to reverse the unfavorable trends in mortality dependent on late diagnosis, it is now necessary to create paths of satisfactory professional development towards providing human resources for early diagnosis of cancer – screening. It seems that the training of specialists in clinical oncology, apart from specialists in diagnostic disciplines, should include tools improving their skills in this area. Moreover, it seems justified to equip oncologists with the skills that allow specialists in other disciplines (genetics, health promotion, lifestyle medicine) to run programs aimed at primary cancer prevention. It is up to the organizers of the health care system to create programs that enable satisfactory professional implementation.

In the analyzed period (2010-2020), a general decrease in the average age of people undergoing specialization was observed, especially in pediatric oncology and hematology, hematology and oncological surgery, which was most likely due to the introduction of modular specializations. Lowering the average age of a specialist seems to be a good direction, especially in the context of an increased demand for specialists in oncological fields (14), as well as bearing in mind that the average age of these specialists ranges from 50.1 years (clinical oncology) to 56 years (pathomorphology) (15).

The general increase in the percentage of women among doctors is consistent with the trend observed for several years, both in Poland and in the world (16, 17). Currently, women constitute 62.78% of the number of all doctors in Poland (17).

In 2010-2020, the number of training places (by 49.3%) and accredited units for training (by 63.8%) increased significantly. The increase in the number of training places means that more and more units meet the criteria for obtaining accreditation, i.e., they develop their teaching base, increase the number of existing ones or undertake new procedures, acquire new teaching staff, doctors specializing in the relevant field. Increasing the number of training places is a good response to staff shortages, especially in the priority areas of oncology.

The number of specialists in the field of oncology per 100,000 inhabitants is; for clinical oncology – 2.3, for oncological surgery – 2.1, for pathomorphology and oncological radiotherapy – 2.0, for hematology – 1.2, for pediatric oncology and hematology – 0.5 (14). The overall number of oncologists is 2.4 per 100,000 inhabitants (18).

In the analyzed period, the use of training places, expressed as the number of people undergoing specialization in relation to the number of training places, showed a greater number of training places in relation to the number of training physicians. This is probably due to the fact that the pool of training places, both in the residential and non-resident mode, is not fully used. Despite the fact that in 2012-2015 residencies were granted by the Ministry of Health for 100% of vacancies in pathology, over 90% remained unused (14). Both the reasons for this and the proposed solutions require an in-depth analysis.

Conclusions

The conducted analysis indicates the constant development of specialization education in oncology in the years 2010-2020 aimed at covering the demand for specialists in the researched fields. An increase in most of the observed parameters was found:

- an increase in the number of doctors specializing in oncology,
- an increase in the percentage of doctors studying as part of residency,
- increase in the number of training places,
- an increase in the number of entities conducting specialization.

There was also a decrease in the average age of people undergoing specialization.

Despite some differences in the course of specialization training (e.g., duration, method of confirming qualifications), all Member States of the European Union and the European Free Trade Association consider individual training programs to be equivalent (19, 20). Moreover, in some fields of medicine, the Ministry of Health allows for obtaining the title of a specialist after completing a specialization training in Poland and successfully passing the exam organized by European scientific societies without the necessity to pass the National Specialization Exam (21).

The data from the register kept by the Centre of Postgraduate Medical Education of Warsaw are a valuable source of knowledge about the changes taking place in the specialization training system, also allowing for the assessment

of the satisfaction of health needs in terms of the number of educated medical staff.

In view of the dynamically changing demographic and epidemiological trends, including the turmoil in oncological care caused by the COVID-19 pandemic, it is necessary to carefully analyze the possibilities of satisfying health needs in the tsunami wave of late diagnosed cancer cases by newly educated in a larger number of oncology specialists, especially in conservative disciplines. In the longer term, the system of holistic care should be rebuilt and expanded, from primary prevention, through precise diagnosis and combined treatment in line with the principles of personalized oncology. We will not do this without emphasizing the creation of incentive mechanisms, specialization learning tools and the acquisition of targeted skills, and the creation of satisfactory career paths. Our ability to predict epidemiological trends determines the success of many years of shaping medical personnel precisely, according to the needs of the future. The reactive organization of education, "filling in the generation holes" creates staff shortages that threaten an immediate and long-term reduction in the survival rate of patients in this particularly sensitive area of treatment of neoplastic diseases.

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Annex

Table 1. Data from the CPME register on specialization in oncology – oncological surgery.

Oncological surgery	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total number of people completing their specialization	112	153	151	162	184	209	228	225	244	263	250
Including the number of residents	5	13	9	3	11	49	53	59	66	77	84
% of residents	4.5	8.5	6.0	1.9	6.0	23.4	23.2	26.2	27.0	29.3	33.6
Including the number of women	13	19	25	21	22	37	48	47	58	69	68
% of women	11.6	12.4	16.6	13.0	12.0	17.7	21.1	20.9	23.8	26.2	27.2

Oncological surgery	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Average age	41.0	42.2	41.7	42.3	42.6	39.2	39.3	39.4	38.5	37.8	36.2
Number of training places	189	194	202	221	235	239	332	297	336	345	360
Number of entities conducting the specialization	33	35	37	41	46	47	56	59	67	69	74
Number of people specializing in the number of training places	0.6	0.8	0.7	0.7	0.8	0.9	0.7	0.8	0.7	0.8	0.7

Table 2. Data from the CPME register on specialization in oncology – oncological gynecology.

Oncological gynecology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total number of people completing their specialization	91	116	118	122	134	139	139	143	140	93	92
Including the number of residents	1	4	3	2	0	1	1	1	1	1	1
% of residents	1.1	3.4	2.5	1.6	0.0	0.7	0.7	0.7	0.7	1.1	1.1
Including the number of women	18	32	32	40	40	42	43	47	45	36	40
% of women	19.8	27.6	27.1	32.8	29.9	30.2	30.9	32.9	32.1	38.7	43.5
Average age	43.4	43.4	43.8	43.5	43.2	42.4	42.4	42.8	42.7	42.5	40.1
Number of training places	150	154	154	167	175	183	204	191	186	183	182
Number of entities conducting the specialization	31	32	31	34	38	45	55	54	57	57	58
Number of people specializing in the number of training places	0.6	0.8	0.8	0.7	0.8	0.8	0.7	0.7	0.8	0.5	0.5

Table 3. Data from the CPME register on specialization in oncology – pediatric oncology and hematology.

Pediatric oncology and hematology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total number of people completing their specialization	33	46	50	54	56	56	57	57	62	61	69
Including the number of residents	2	2	1	0	6	19	21	22	24	28	30
% of residents	6.1	4.3	2.0	0.0	10.7	33.9	36.8	38.6	38.7	45.9	43.5
Including the number of women	27	36	40	46	49	48	47	48	52	51	58

Pediatric oncology and hematology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% of women	81.8	78.3	80.0	85.2	87.5	85.7	82.5	84.2	83.9	83.6	84.1
Average age	40.3	40.0	39.3	39.1	37.2	34.3	33.9	34.6	34.5	33.6	32.8
Number of training places	83	88	98	98	101	101	102	102	110	111	114
Number of entities conducting the specialization	14	14	14	14	15	15	15	15	18	17	17
Number of people specializing in the number of training places	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6

Table 4. Data from the CPME register on specialization in oncology – clinical oncology.

Clinical oncology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total number of people completing their specialization	280	414	432	446	491	489	463	465	499	433	423
Including the number of residents	146	240	276	301	336	358	346	340	368	327	328
% of residents	52.1	58.0	63.9	67.5	68.4	73.2	74.7	73.1	73.7	75.5	77.5
Including the number of women	204	306	322	333	362	361	335	344	366	327	319
% of women	72.9	73.9	74.5	74.7	73.7	73.8	72.4	74.0	73.3	75.5	75.4
Average age	33.6	33.6	33.4	33.4	33.0	32.4	32.4	33.2	33.1	32.9	32.2
Number of training places	499	519	539	570	583	627	687	668	682	666	700
Number of entities conducting the specialization	58	60	61	62	64	72	81	75	78	76	81
Number of people specializing in the number of training places	0.6	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.6

Table 5. Data from the CPME register on specialization in oncology – oncological radiotherapy.

Oncological radiotherapy	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total number of people completing their specialization	157	172	186	186	183	177	172	166	164	141	137
Including the number of residents	74	91	109	121	133	136	131	124	131	111	108
% of residents	47.1	52.9	58.6	65.1	72.7	76.8	76.2	74.7	79.9	78.7	78.8
Including the number of women	101	108	115	113	107	99	93	90	85	80	82

Oncological radiotherapy	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% of women	64.3	62.8	61.8	60.8	58.5	55.9	54.1	54.2	51.8	56.7	59.9
Average age	31.7	31.7	32.0	31.8	31.7	31.7	32.0	32.8	32.2	32.1	31.3
Number of training places	253	258	262	265	265	270	283	276	315	315	320
Number of entities conducting the specialization	28	29	29	30	30	29	33	31	38	38	40
Number of people specializing in the number of training places	0.6	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.5	0.4	0.4

Table 6. Data from the CPME register on specialization in oncology – hematology.

Hematology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total number of people completing their specialization	91	130	110	114	134	126	140	144	169	179	207
Including the number of residents	4	4	1	0	9	44	54	57	78	87	108
% of residents	4.4	3.1	0.9	0.0	6.7	34.9	38.6	39.6	46.2	48.6	52.2
Including the number of women	63	93	79	86	97	88	92	95	110	113	142
% of women	69.2	71.5	71.8	75.4	72.4	69.8	65.7	66.0	65.1	63.1	68.6
Average age	39.2	39.3	39.2	39.0	37.2	35.3	34.1	34.4	33.9	33.8	32.5
Number of training places	155	158	165	189	199	226	262	259	289	295	320
Number of entities conducting the specialization	24	25	25	26	29	31	33	34	36	36	40
Number of people specializing in the number of training places	0.6	0.8	0.7	0.6	0.7	0.6	0.5	0.6	0.6	0.6	0.6

Table 7. Data from the CPME register on specialization in oncology – pathomorphology.

Pathomorphology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total number of people completing their specialization	92	111	118	127	133	125	136	142	155	136	146
Including the number of residents	60	77	92	102	114	116	122	125	140	125	133
% of residents	65.2	69.4	78.0	80.3	85.7	92.8	89.7	88.0	90.3	91.9	91.1
Including the number of women	44	55	62	74	79	79	82	87	94	81	90
% of women	47.8	49.5	52.5	58.3	59.4	63.2	60.3	61.3	60.6	59.6	61.6

Pathomorphology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Average age	32.6	33.4	33.0	33.0	31.8	30.7	31.2	32.1	31.6	31.4	30.5
Number of training places	193	200	208	208	232	239	253	253	255	259	277
Number of entities conducting the specialization	44	47	49	50	54	57	62	64	65	66	70
Number of people specializing in the number of training places	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.6	0.6	0.5	0.5

Table 8. Data of the Medical Examinations Center on PES pass rate (22).

Statistics on the pass rate of the National Specialization Examination in 2010-2019										
Oncological surgery	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Number of diplomas issued	30	39	49	62	48	53	46	31	44	no data
The number of doctors who reported to NSE in the analyzed period	33	41	50	67	52	57	51	35	53	no data
Passing rate	90.9%	95.1%	98.0%	92.5%	92.3%	93.0%	90.2%	88.6%	83.0%	no data
Oncological gynecology	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Number of diplomas issued	25	30	19	17	32	13	19	26	25	no data
The number of doctors who reported to NSE in the analyzed period	25	32	19	17	32	13	22	27	28	no data
Passing rate	100.0%	93.8%	100.0%	100.0%	100.0%	100.0%	86.4%	96.3%	89.3%	no data
Oncology and hematology in children	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Number of diplomas issued	12	6	12	3	15	14	11	11	10	no data
The number of doctors who reported to NSE in the analyzed period	12	6	12	3	15	14	11	11	10	no data
Passing rate	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	no data
Clinical oncology	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Number of diplomas issued	39	47	61	57	47	75	65	51	50	no data
The number of doctors who reported to NSE in the analyzed period	41	48	64	61	50	78	75	58	58	no data
Passing rate	95.1%	97.9%	95.3%	93.4%	94.0%	96.2%	86.7%	87.9%	86.2%	no data
Oncological radiotherapy	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Number of diplomas issued	28	14	24	17	21	28	31	26	24	no data

Oncological radiotherapy	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
The number of doctors who reported to NSE in the analyzed period	29	15	24	17	23	29	31	28	31	no data
Passing rate	96.6%	93.3%	100.0%	100.0%	91.3%	96.6%	100.0%	92.9%	77.4%	no data
Hematology	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Number of diplomas issued	22	26	31	31	26	36	30	21	22	no data
The number of doctors who reported to NSE in the analyzed period	22	26	32	31	29	36	32	21	23	no data
Passing rate	100.0%	100.0%	96.9%	100.0%	89.7%	100.0%	93.8%	100.0%	95.7%	no data
Pathomorphology	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Number of diplomas issued	17	17	21	15	15	13	15	11	15	no data
The number of doctors who reported to NSE in the analyzed period	18	18	21	15	22	17	16	12	16	no data
Passing rate	94.4%	94.4%	100.0%	100.0%	68.2%	76.5%	93.8%	91.7%	93.8%	no data