

Morbidity, incidence and 5-year survival of patients with colorectal cancer in the Kujawsko-Pomorskie province in 2005–2011 based on data from the National Health Fund (NHF)

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ABSTRACT:

Introduction: Incidence, morbidity and 5-year survival rates illustrate the epidemiological situation of colorectal cancer and assess effectiveness of the treatment. In Poland, the National Health Fund is the payer of services. The data related to morbidity, incidence, and 5-year survival may be supplementary to the epidemiological data of the National Cancer Registry.

Objective: Analysis of services granted by NHF in Bydgoszcz to persons with diagnosed colorectal cancer in 2006–2011 including the assessment of incidence, morbidity and 5-year survival of the population in the Kujawsko-Pomorskie province. Material and methods: The study analyzed the services recorded in the database of the National Health Fund in Bydgoszcz in 2006–2011 given to patients with colorectal cancer. The Kaplan-Meier method and the gambling rate were used to determine the probability of survival.

Results: In 2006–2011, men were offered 10.1% more services than women. The most frequent services regarded colorectal cancer (48.9%), rectal cancer (43.8%) and esophageal cancer (7.2%). In total, 50410 services were provided. Despite increase in the number of women in the population, 388 more men died than women. The probability of survival was 46.8 % and 42.6% for men and women, respectively, furthermore 41.8%, 44.2% and 48.9% for colon cancer and esophageal and rectal folds cancer, respectively.

Conclusions: In the Kujawsko-Pomorskie province during the period of 2006–2011, the number of diagnosed colorectal cancers increased as did the overall number of services provided. There was also a downward trend for the total number of services granted in relation to the increase in the number of new diagnosed cases. Incidence and morbidity rates were variable, gradually increasing in subsequent years and amounted to 59/100000 and 67/100000, 355/100000 and 408/100000 in 2010 and 2011, respectively. The probability of 5-year survival was 45.2%. Diagnosis of a disease in patients above 69 years of age increased the likelihood of death.

KEYWORDS:

colorectal cancer, incidence, morbidity, 5-year survival

Data provided by GLOBOCAN (WHO) indicate that there are approximately 1.2 million new cases of colorectal cancer (CRC) in the world throughout the year, which is 11.3% of all new cancer cases. In 2008, 333,000 new cases and 148,000 deaths due to CRC were registered in the European Union [1].

Currently in Poland, CRC, in terms of incidence of malignant neoplasms takes third place in men, and the second in women. According to the National Cancer Registry (NCR) data, in 2013, there were 17,180 diagnoses for both genders (9,461 men and 7,719 women) and 11,052 deaths (6,103 men and 4,949 women) [2].

Five-year survival of colon cancer patients between 1995 and 1999 in Poland amounted to 38.7%, and rectal cancer 30.9%, 54.5 and 49.2% in Western Europe, respectively [3]. For comparison, the percentage of 5-year survival for patients diagnosed with CRC in the years 1978–1989 in Poland was 25% and 47% in Europe [4]. Indicators of 5-year relative survival in patients with colon cancer in Poland, according to NCR, in general increased from 44.3 to 48.8% in men, and from 44.6 to 48.8% in women. The same trend is observed in the analysis of 5-year survivals for rectal cancer, where in men, this percentage increased from 43.6 to 46.9%, and from 43.6 to 47.7% in women [5].

Poland is one of the few countries where there are two centralized and common systems for registering cancer-related events. These is the National Cancer Registry, which gathers data on incidences for epidemiological analysis and the National Health Fund (NHF) collecting data on medical interventions for patients diagnosed with cancer. Cooperation of the NCR with the NHF in the field of obtaining and gathering information would provide tangible services for both institutions, but above all would systematize the state of knowledge about cancer and its treatment in Poland [5].

Due to the demographic changes in Poland and in the world regarding the increase in the percentage of elderly people, average life expectancy and the increasing incidence of colorectal cancer, analysis of this information is a priority task of modern Health Care. Therefore, an attempt was made to analyze data of the Kujawsko-Pomorskie Provincial Department of the National Health Fund in Bydgoszcz in the years 2006–2011 for CRC among the population of the Kujawsko-Pomorskie Province.

PURPOSE OF WORK

The purpose of the work was analysis of medical services and eval-

uation of incidence, morbidity and probability of 5-year survival of colorectal cancer patients in the population of the Kujawsko-Pomorskie province in 2005-2011 based on data of the Provincial Department of the National Health Fund (PD NHF).

MATERIAL AND METHOD

Organization of research

On the basis of an application to the Minister of Health for access to data from the RUM-NFZ system, permission was obtained for the use of IT resources (MZ-UZ-PR-074-27879-1/AKL/12). After positive assessment of the Bioethical Commission of Collegium Medicum in Bydgoszcz on September 11, 2012, the request was directed to the Director of the Kujawsko-Pomorskie Provincial Department of the National Health Fund in Bydgoszcz for access to data necessary to conduct the research. Consent (02 NFZ/ABI/072-7/13) was obtained on March 12, 2013.

On March 12, 2014, data from the years 2005-2011 were obtained from the information base of the Kujawsko-Pomorskie PD NHF. In addition, it was reported that the ward does not have sufficient information on dates and causes of deaths for CRC patients. In order to determine 5-year survival, it was necessary to obtain dates of deaths. After many attempts and refusals, once again, a request was made to provide data on the date of patients' deaths from the PESEL collection to the City Hall, Department of Civil Affairs in Bydgoszcz. A positive response and data on this subject were received on October 31, 2016.

MATERIALS

The work uses IT database resources of K-P PD NHF in Bydgoszcz. A total of 74,280 records were obtained on services provided to patients with CRC, divided into „first”, „next” and „last”. The „first” service is one that was registered for CRC for the first time, the „next” is the service provided to a patient during the treatment process (may be one or more), the „last” is the service provided to the patient for the last time due to cure, death or cessation of treatment. A large discrepancy in the number of registered CRC services in 2005 was observed in relation to subsequent years. After analysis and consultations with representatives of K-P PD NHF, reasons for the situation were related to the change of payer for health fund services (1997-2003) to NHF (since 2004) and change of legal regulations concerning the obligation of registration and reporting in the scope of financing health services. Data from 2005 were excluded from further analysis. Information on incidence of colon cancer registered in 2005-2011 for ICD10: C-18, C-19, C-20 were contained in four files:

- „incidence, year of birth, sex” - number of PESELS, year of birth, sex of patient;
- „first time in service” - number of PESELS, sex and scope in which the patient was provided the service for the first time;
- „incidence in service” - number of PESELS, sex, scope in which the patient was provided the service;
- „deaths” - number of PESELS, death - which occurred before January 1, 2012.

Files containing summaries with the word „scope” included all registered CRC-related services in the database of KP PD NHF in Bydgoszcz given in the field of diagnosis and treatment by: outpatient specialist care, hospital care, long-term care, palliative and hospice care, basic health care, nursing and care services, health services contracted separately, services provided by another PD NHF, others - no information that would enable precise specification of the type of services provided.

Information obtained in the files included real data for all the analyzed years, which were registered for CRC under ICD 10 codes for diagnoses: C18 -malignant neoplasm of colon:C18.0 – cecum, C18.1 – appendix, C18.2 – ascending colon, C18.3 – hepatic flexure, C18.4 – transverse colon, C18.5 – splenic flexure, C18.6 – descending colon, C18.7 – sigmoid colon, C18.8 – other specified sites of large intestine, C18.9 – colon, unspecified, C19 – malignant neoplasm of rectosigmoid junction, C19.1 – malignant neoplasm of colon and rectum C19.2 – malignant neoplasm of sacral flexure of sigmoid colon, C20 – malignant neoplasm of rectum: C20.1 – malignant neoplasm of rectal ampulla, in accordance with the International Statistical Classification of Diseases and Related Health Problems.

After initial verification of data, it was decided to exclude cases of other malignant colorectal cancers than CRC. An analysis was made in terms of incidence, morbidity and survival probability in CRC for ICD10: C18 -neoplasm of cecum, C19 -malignant neoplasm of rectosigmoid junction and C20 -malignant neoplasm of rectum.

STATISTICAL METHODS

The descriptive analysis of the results contained in the work includes tables, which were used to present the number and percentage. The mean was also calculated with the standard deviation. The relationship between the two variables was calculated using Spearman Rank-Order Correlation coefficient. The work includes non-parametric Kruskal-Wallis test by ranks, used to compare many independent samples (groups), as well as chi-square statistic. The null (H_0) hypothesis was assumed, such that there is no difference in the examined groups. A p value below 0.05 was considered statistically significant.

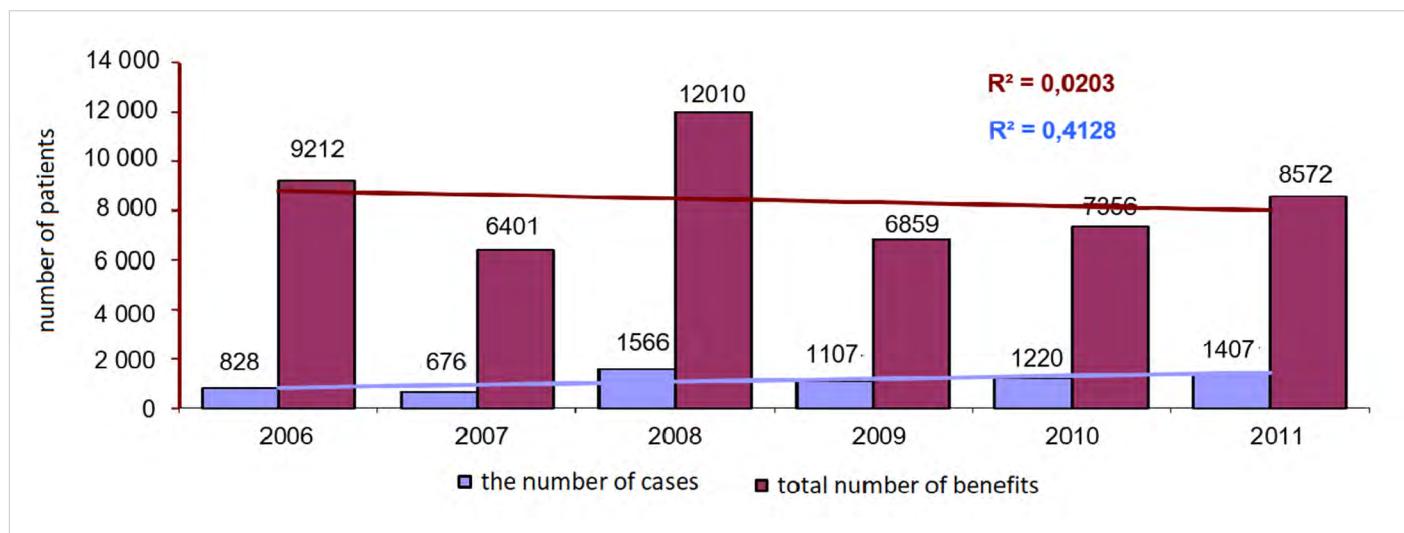
The incidence rate described in the paper refers to the frequency of new cases reported for the first time in a given year. On the other hand, the morbidity coefficient was determined by adding together the number of ill people and newly identified cases in a given year depending on the size of population living in the Kujawsko-Pomorskie province in 2006-2011 based on data of the Central Statistical Office in Bydgoszcz. These coefficients were calculated per 100,000 inhabitants. The Kaplan-Meier estimator was used to determine probability of survival. The likelihood of survival in terms of gender and site of CRC were compared using the log-rank test. All calculations and figures were made in the Statistica 10.0 program and Microsoft Excel spreadsheet using standard functions.

RESULTS

- Registered services for CRC patients by K-O PD NHF in Bydgoszcz in 2006-2011.

Tab. I. Number of all services provided by K-O OW NHF in Bydgoszcz in 2006-2011.

YEAR	TOTAL	FEMALES	MALES	P	SERVICE		
		N/%			FIRST N/%	NEXT N/%	LAST N/%
2006	9 212/18.3	4 091/44.4	5 121/55.6	0.001	828/9.0	7 549/81.9	835/9.1
2007	6 401/12.7	2 852/44.6	3 549/55.4	0.001	676/10.6	5 294/82.7	431/6.7
2008	12 010/23.8	5 518/45.9	6 492/54.1	0.001	1 566/13.0	9 299/77.4	1 145/9.5
2009	6 859/13.6	3 061/44.6	3 798/55.4	0.001	1 107/16.1	4 942/72.1	810/11.8
2010	7 356/14.6	3 272/44.5	4 084/55.5	0.001	1 221/16.6	5 224/71.0	911/12.4
2011	8 572/17.0	3 853/44.9	4 719/55.1	0.001	1 406/16.4	4 774/55.7	2 392/27.9
Total	50 410/100	22 647/44.9	27 763/55.1	0.001	6 804/13.5	37 082/73.6	6 524/12.9

**Fig. 1.** Trajectories of colon cancer and NHF services provided in the years 2006-2011.

The total number of services amounted to 50,410 given in the years 2006-2011 for patients with CRC, and differences in the type of services in women and men were significant ($p = 0.001$). The highest number of services was provided in 2008 - 12,010 (23.8%) and 9,212 (18.3%) in 2006. The least - 6,859 (13.6%) in 2009 and 6,401 (12.7%) in 2007. In the years 2006-2011, men were provided 27,763 (55.1%) services, 5,116 (10.1%) more than women. The largest difference in the number of services occurred in 2006 and 2010 - 1,030 (11.2%) and 812 (11.0%), respectively, while the lowest was in 2011 by 866 (10.1%) and 974 (8.1%) in 2008. In the period from 2006 to 2011, there were the most - 37,082 (73.6%) „next” services, and the least - 6,524 (12.9%) „last” services. The number of „last” services in subsequent years increased, while that of the „next” decreased. In 2006, „first” services amounted to 828 (9%) and over the years, their number increased to 1,406 (16.4%) in 2011 (tab. I).

In most cases, services were received by - 24,673 (48.9%) patients with colon cancer. The smallest group to receive services - 3,633 (7.2%) were patients affected by neoplasm of rectosigmoid junction. Most often, services were given to men with colon cancer - 12,937 (46.6%) and 12,844 (46.3%) with rectal cancer. Similarly, in the group of women, the most numerous group were colon cancer patients - 11,736 (51.8%) and 9,260 (40.9%) patients with rectal cancer. Both in the group of women and men, the least number of services was given to patients with diagnosed rectosigmoid junction cancer, 1,651 (7.3%) and 1,982 (7.1%) respectively in women and men. Generally, more often, services in sites of colon and rectum CRC were given to men ($p = 0.001$) (Tab. II).

- New diagnoses of colon cancer in the Kujawsko-Pomorskie province in the years 2006-2011.

In the years 2006 -2011, there were 6,804 new CRC diagnoses registered.

The highest number of diagnoses was made in 2008 - 1,566 (23%), followed by - 1,407 (20.7%) in 2011. The least - 828 (12.2%) were registered in 2006 and 676 (9.9%) in 2007. In the years 2006-2011 men were more often diagnosed with CRC, in total 3,596, which constituted 52% of new diagnoses ($p < 0.002$). The biggest difference in the number of new diagnoses in terms of sex was recorded in 2006 and 2009, 96 and 77, respectively; there were only 28 women more in 2008. A comparable difference occurred in 2007, 2010 and 2011, respectively, 66, 60 and 61 with a predominance of men (tab. III).

In general, the average age of CRC patients in 2006-2011 was 66.3 years and was similar in all years. The average age of women and men differed and amounted to 67.1 and 65.5 ($p = 0.001$), respectively. In individual years, women were older than men. Especially in 2007 - on average by 3 years ($p = 0.005$), in 2008 and 2011 on average by 2 years ($p = 0.002$ and $p = 0.001$) tab. III.

In years 2006-2011, the most - 3,844 (56.5%) patients were diagnosed with colon cancer, followed by - 2,417 (35.5%) rectum and 543 (8%) rectosigmoid junction. There were differences in the number of cases in women and men regarding the location of cancer in the large intestine. There was only a significantly higher number of cases of men

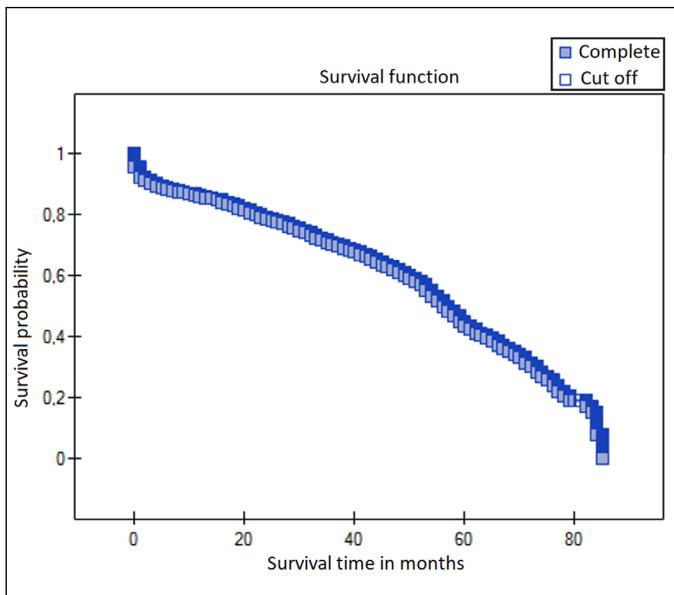


Fig. 2. Probability of 5-year survival of patients with colorectal cancer in the Kujawsko-Pomorskie province in 2006-2011.

Tab. II. Number of benefits for CRC patients in particular sites.

SITE	OVERALL N/%	FEMALES N/%	MALES N/%	P
colon cancer	24 673/48.9	11 736/51.8	12 937/46.6	0.001
cancer of the rectosigmoid junction	3 633/7.2	1 651/7.3	1 982/7.1	0.408
rectal cancer	22 104/43.8	9 260/40.9	12 844/46.3	0.001
Total	50 410/100	22 647/100	27 763/100	0.001

in particular sites in 2009 and 2011 ($p = 0.0008$ and $p = 0.0044$). The same number of cases for both sexes was found in 2009 - 313 colon cancers and in 2011 - 59 cancers of rectosigmoid junction tab. IV.

In the years 2006–2011, the number of new CRC diagnoses increased (increasing trend of $R^2 = 0.4128$ $p = 0.002$), while the number of services granted decreased (downward trend $R^2 = 0.0203$ $p = 0.872$) (Fig. 1).

- Incidence and morbidity rates for colorectal cancer in the Kujawsko-Pomorskie province in 2006-2011.

In the years 2006-2011, there were more women than men who lived in the territory of the Kujawsko-Pomorskie province. The percentage rate for women oscillated between 51.7 in 2006 and 51.5 in 2011, whereas for men, it was lower and remained within 48.3 in 2006 to 48.5 in 2011 ($p = 0.001$).

Crude incidence-specific coefficients for CRC for the population of the Kujawsko-Pomorskie province based on K-P PD NHF data until 2009 were variable. Among women, these rates were lower, systematically increasing since 2009 and amounted to 48.08; 54.13 and 62.23 respectively in 2009, 2010 and 2011. Among men, there were higher 59.3; 64.2 and 72.1 and, like in the case of women, have been increasing since 2009. There was no significant difference in crude incidence rates for men and women ($p = 0.298$) (tab. V.).

In 2006-2009, crude morbidity rates were characterized by instability for both women and men. In 2006 and 2008, in the case of

women, they amounted to 382.7 and 515.4, respectively, and 513.5 and 651 for men. The crude morbidity rates for CRC for both sexes, starting from 2009, decreased to 285.8 for women and 380.6 for men. In subsequent years, they increased, reaching the index of 356.5 and 464.1 in 2011 ($p = 0.1128$) (tab. V).

The crude incidence rates of rectal cancer were unstable for both sexes. For women in 2006, the coefficient amounted to 12.25 and in the following year fell to 9.4, then in 2008, it increased again to 27, after which in the following year, it again decreased to 14.9, and then increased to 18.8, and was equal in 2010 and 2011. For men, incidence rates of 2006 decreased from 18.4 to 13.3 in 2007 and again increased to 31 in 2008. In 2009, they fell again to 22.5 and to 25.7 in 2011. Starting from 2009, crude incidence rates for colon cancer have stabilized for both sexes ($p = 0.229$) (tab.VI).

The morbidity incidence rates of colon cancer in 2006-2011 were lower among women. For both sexes, the highest were in 2008 and amounted to 259 for women and 295.4 for men, while the lowest were in 2007 and amounted to 122.9 for women and 144.7 for men ($p = 0.231$). The morbidity rates for rectosigmoid junction were unstable for both sexes. In 2006, they amounted to 30.3 and 36.9 respectively for women and men, then decreased respectively to 19.9 and 23.6 in 2007. In 2008, there was another increase - 36.9 and 42.7 for women and men and decreased to 21.8 and 29.3 in 2009. Starting from 2009, there was a systematic increase in the crude morbidity rate ($p = 0.187$). Crude morbidity rates of rectal cancer among populations residing in the Kujawsko-Pomorskie province of 2009 were stable, increased from year to year and amounted in 2009, 2010, 2011, 104.0; 110; 132.7 for women and 159.9; 167.2; 193.5 for men ($p = 0.066$) (tab. VI).

- Probability of 5-year survival of patients with colorectal cancer in the Kujawsko-Pomorskie province in 2006-2011.

Probability of 5-year survival in patients with colorectal cancer was 45.2% (Fig. 2). Probability of survival was similar to 46.8% and 42.6% for women and men. Probability of survival for colon cancer was 41.81%, for rectosigmoid junction - 44.2% and - 48.99% for rectal cancer.

In the period from 2006 to 2011, the largest number of patients who died was in the group of colon cancer 2,037 (53%), rectosigmoid junction cancer 273 (50.3%) and 1,146 (47.4%) with rectal cancer. The average age was higher in the group of patients who died - 69.3 years, and those who lived - 63.2 years ($p = 0.001$). The average age of all patients was 66.3 years, therefore diagnosis of CRC at the age of 66 and above increased the probability of death.

DISCUSSION

In the years 2006-2011, the number of all services provided to patients suffering from colorectal cancer by K-P PD NHF in Bydgoszcz amounted to almost 51 thousand. The number of services provided was different, in 2007 it fell, and in subsequent years it gradually increased. The highest number of services was given to patients with colon cancer, followed by rectal cancer and rectosigmoid junction cancer. Similarly as in the total number of services, also in individual sites men were given services more often than women.

Tab. III. Number and average age of men and women suffering from colorectal cancer.

YEAR	OVERALL N/%	FEMALES N/%	MALES N%	P	GENDER	AGE AVERAGE /YEARS/	DIFFERENCE	P
2006	828/12.2	366/44.2	462/55.8	0.001	females	66.9	0.762	0.338
					males	66.2		
2007	676/9.9	305/45.1	371/54.9	0.011	females	68.7	2.868	0.005
					males	65.8		
2008	1 566/23	769/49.1	797/50.9	0.476	females	66.9	2.071	0.002
					males	64.9		
2009	1 107/16.3	515/46.5	592/53.5	0.020	females	66.6	1.152	0.083
					males	65.4		
2010	1 220/17.9	580/47.5	640/52.5	0.081	females	66.9	0.885	0.074
					males	66.1		
2011	1 407/20.7	673/47.8	734/52.2	0.116	females	67.2	2.028	0.001
					males	65.2		
Total	6 804/100	3 208/47.1	3 596/52.9	0.002	females	67.1	1.603	0.001
					males	65.5		

Tab. IV. Number of women and men diagnosed with colorectal cancer depending on site.

SITE	2006	2007	2008	2009	2010	2011	YEAR	TOTAL
							N/%	
total	Colon cancer	452/54.6	393/58.1	857/54.7	626/56.5	691/56.6	825/58.6	3 844/56.5
	Cancer of the recto-sigmoid junction	62/7.5	49/7.2	111/7.1	96/8.7	107/8.8	118/8.4	543/8.0
	Rectal cancer	314/37.9	234/34.6	598/38.2	385/34.8	422/34.6	464/33.0	2 417/35.5
P		0.063	0.717	0.558	0.008	0.887	0.044	-
females	Colon cancer	216/47.8	178/46.5	427/49.8	313/50.0	331/47.9	411/49.8	1876/58.5
	Cancer of the recto-sigmoid junction	19/30.6	26/53.1	53/47.7	42/43.8	48/44.9	59/50.0	247/7.7
	Rectal cancer	131/41.7	101/43.2	289/48.3	160/41.6	201/47.6	203/43.8	1085/33.8
males	Colon cancer	236/52.2	215/53.5	430/50.2	313/50.0	360/52.1	414/50.2	164 4/46.1
	Cancer of the recto-sigmoid junction	43/69.4	23/46.9	58/52.3	54/56.3	59/55.1	59/50.0	296/8.3
	Rectal cancer	183/58.3	133/56.8	309/51.7	225/58.4	221/52.4	261/56.3	1628/45.6

During this period, almost 7,000 new CRC diagnoses were registered, more in men than in women. The highest number of cases was recorded in 2008. Starting from 2009, the number of incidences increased for both sexes. The data contained in NCR's reports differ in a similar way, with less than 5,000 new diagnoses registered in the reporting period, including more in men. The number of cases since 2006 has been systematically increasing for both sexes, the exception is 2008, where the number is 9% higher than in 2009 [6, 7]. The difference in the number of new cases registered in the K-P PD NHF compared to NCR was large and amounted in 2006 to 95, 2008 - 727, 2009 - 337, 2010 - 355 and 2011 - 424 cases. The exception was 2007, with 60 more cases of CRC registered in NCR. Starting from 2009, the NCR has been achieving satisfactory results in terms of completeness of cancer registration (89%, an increase of 4 percentage points) [8].

Underestimation of registration may cause discrepancies between NCR and K-P PD NHF data in Bydgoszcz in terms of incidence and morbidity of CRC among people residing in the Ku-

Tab. V. Raw morbidity- and incidence-specific coefficients for colorectal cancer.

YEAR	RAW MORBIDITY-SPECIFIC COEFFICIENTS			RAW INCIDENCE-SPECIFIC COEFFICIENTS		
	OVERALL	FEMALES	MALES	OVERALL	FEMALES	MALES
2006	40.07	34.23	46.33	445.8	382.7	513.5
2007	32.72	28.52	37.22	309.8	266.7	356.1
2008	75.73	71.83	79.92	580.8	515.4	651.0
2009	53.50	48.08	59.32	331.5	285.8	380.6
2010	59.00	54.13	64.23	355.4	305.4	409.2
2011	67.03	62.26	72.09	408.7	356.5	464.1
p	-	0.298		-	0.128	

jawsko-Pomorskie province. In total, the incidence rate on the basis of data from K-P PD NHF in 2006-2011 was 54 (nearly 50 for women and 54 for men). In contrast, data from the National Cancer Registry show a lower rate, which is 40 (for women over 34, and less than 46 for men) (6). According to NCR, the crude

Tab. VI. Raw morbidity- and incidence-specific coefficients for colon cancer depending on site.

YEAR	SITE								
	COLON CANCER MORBIDITY/INCIDENCE			CANCER OF THE RECTOSIGMOID JUNCTION MORBIDITY/INCIDENCE			RECTAL CANCER MORBIDITY/INCIDENCE		
	OVERALL	FEMALES	MALES	OVERALL	FEMALES	MALES	OVERALL	FEMALES	MALES
2006	21.9/195.6	20.2/213.9	23.7/213.9	3/33.5	1.8/30.3	4.3/36.9	15.2/216.7	12.3/173.8	18.4/262.7
2007	19.0/133.4	17.5/122.9	21.6/144.7	2.4/21.7	2.4/19.9	2.3/23.6	11.3/154.7	9.4/123.9	13.3/187.8
2008	41.4/276.6	39.9/259	43.1/295.4	5.4/39.7	4.95/36.9	5.8/42.7	28.9/264.5	27/219.5	31/312.8
2009	30.3/175.2	29.2/160	31.4/191.4	4.6/25.4	3.9/21.8	5.4/29.3	18.6/131	14.9/104	22.5/159.9
2010	33.4/193.2	30.9/175.9	36.2/211.7	5.2/24.6	4.5/19.4	5.9/30.3	20.4/137.6	18.8/110	22.1/167.2
2011	39.3/216.1	38.0/198.1	40.6/235.4	5.6/30.4	5.5/25.7	5.8/35.3	22.1/162.1	18.8/132.7	25.7/193.5

incidence rate in Poland in 2005-2010 is lower, in total it is 38, in women it exceeds 30 and 43 in men [9, 10]. Other data show that the incidence rates of colorectal cancer in Poland in 2011 are similar to those reported by NCR and amount to nearly 20 for women and nearly 40 for men [11]. Starting from 2009, a systematic increase in crude incidence rates for both sexes has been observed. For women in 2010, the increase was by over 12%, and in 2011 by 15% more. For men, the increase was lower and in 2010, it amounted to just over 8% and 9% in 2011. Similar upward trends may be observed in the area of NCR data. This increase in 2010 and 2011 is 6% and 14% for women and 19% and 16% respectively for men [10]. The systematic increase in the number of cases is comparable for all provinces of Poland, but also for European Union countries [10, 11].

Considering the site of CRC, there were the most cases of colon cancer and rectal cancer, with the least for rectosigmoid junction cancer. Our data confirm epidemiological data on incidence of CRC in particular sites [9].

The average age of patients at the time of CRC diagnosis was higher in women than in men amounting to approx. 66 years. The risk of falling ill increased with age in both sexes. This is confirmed by another study, where 94% of patients with CRC were after 50 years of age. [11]. According to the NCR, more than 60% of cases of CRC affect older people over 65, with the highest number of cases falling into the seventh and eighth decade [12]. Similarly, in another study, in which the majority of patients with diagnosed CRC are older than 60 years [13].

The crude morbidity rate for CRC in the Kujawsko-Pomorskie province in years 2006-2011 was variable, in total it was around 400 and was higher in men. The highest was 580.8 in 2008. Starting from 2009, in the following years, its growth was stable for both sexes. The morbidity rate was similar to the incidence rate in the scope of CRC site, the highest for colon and rectal cancer, and the lowest for rectosigmoid junction cancer. In the available literature, the topic of morbidity is rarely addressed. The average 5-year morbidity for CRC for the years 2006-2011 in the Kujawsko-Pomorskie province amounted to over 8,401 people, for women 3,774 and 4,627 for men. 5-year morbidity assessment was undertaken by researchers based on data from NCR in a publication from 2011, carrying out an analysis regarding the year 2006 [12]. Results presented by the authors indicate that in 2006, there were about 320,000 oncological patients in Poland, including colon cancer, about 19,000 women and 22,000 men (data determined jointly for C18, C19, C20 and C21) [13].

In the years 2006-2011, we observed an unstable rate of both incidence and morbidity up to 2008. Starting from 2009, incidence and morbidity rates for colorectal cancer in women and men increased steadily. These differences may have been caused by incompleteness of registration of services provided due to legal conditions regarding the payer and collection of data. A similar problem concerning completeness of data in the NHF database was suggested in the work, where the authors seek the cause for the existent situation in the emerging NHF reporting and IT system [5].

An issue that is equally important to incidence and morbidity in epidemiology of colorectal cancer, is assessment of 5-year survival probability. Survival rates for CRC depend on many factors: biological, demographic, social and economic. The decisive factor, however, is the degree of histopathology of the cancer and the patient's age at the time of diagnosis. The first population-based analysis of cancer survivors in Poland was published in 2010. The paper presents survival results based on new cancer cases reported in the years 2000-2002 to NCR. There are also survival rates for Poland compared to European ones available. In case of five-year relative survivals for people affected by CRC (applies to C18-C21) in 2000-2003, the rate for Poland is slightly over 43% (for women 44 and 43% for men), and above 56% in Europe [14]. The same authors carried out an analysis of experiences of patients who were diagnosed with cancer in the years 2003-2005 based on the NCR database. 5-year survival rates for patients with CRC (C18-C21) amount to as much as 49 and 47% in men and women, respectively [15]. On the other hand, in our study carried out in the years 2006-2011 on the basis of K-P PD NHF data, probability of 5-year survival in patients with CRC in the Kujawsko-Pomorskie province amounted to almost 47% for women and less than 43% for men. The highest probability of 5-year survival in patients with CRC depending on the site was observed in patients with rectal cancer - 49%, rectosigmoid junction cancer - 44% and 42% in colon cancer. It was also found that the probability of 5-year survival for colon cancer is 7 percentage points lower than for rectal cancer, which is different from general epidemiological data. This can be explained by the fact that better survival results for rectal cancer may be related to the existence in the Kujawsko-Pomorskie province of the Clinic of Oncological Surgery of the Oncology Center in Bydgoszcz specializing in treatment of rectal cancer of all levels applying treatment methods available in the world, meeting all „Rectal cancer unit” criteria. According to the Ministry of Health, the average percentage of 5-year survival in 2000-2007 for Poland is 39% and 38.4% for colon cancer and 39% for rectal cancer [9]. These experiences are 10 percentage points lower for rectal cancer and 4 points for colon cancer compared to our data.

In the next study, which presents an analysis of the variability of curability of patients who in 2005–2009 were affected by malignant tumors in Poland, the 5-year survival rate is slightly higher for colon cancer – 50%, and 47% for rectal cancer. The results at this level put Poland in a distant 24th place against the background of European countries, before Slovakia, Bulgaria and Latvia. 5-year survival rates were elaborated for selected provinces: Dolnośląskie, Podkarpackie, Świętokrzyskie and Wielkopolskie, and amounted to 49, 47, 48, 49% and 46, 46, 46, 49% for rectal cancer [16].

The prognosis of patients with diagnosed colorectal cancer both in Poland and to a lesser extent in Europe and in the world is still unsatisfactory. Despite the increase in financial expenditures for prevention programs and broadly understood education, CRC is recognized at an advanced stage. When analyzing available epidemiological data, attention should be paid to the system of financing in Health Care. In the years 2006–2011, applicable performance limits were insufficient in relation to the needs of Oncology, including in the area of prophylaxis, diagnosis and treatment of patients with CRC. It was not until January 2015 that algorithms for diagnostics and treatment of neoplastic diseases, including CRC, were introduced in Poland based on multidisciplinary teams in reference centers and taking into account the time regime. It seems that in the future, one can expect effects in improving the quality of therapy and results of distant experiences. In our opinion, the National Health Fund database is a reliable source of information on incidence, morbidity and probability of 5-year survival in CRC patients with the possibility of obtaining detailed data on the type of services given and centers providing health services to this group of patients.

The available forecasts indicate a continuous increase in CRC. The

presented prognosis of incidence and deaths due to CRC indicates that the number of new diagnoses in 2025 was estimated at over 15,000 in men and 9,000 in women. However, in the next two decades, the number of deaths due to CRC will increase 2-3 times for both sexes, and 80% of these deaths will affect people over 65 [17].

In order to improve the results of CRC treatment, attention should be paid to the implementation of broadly understood public education programs in the prevention of CRC and screening. Diagnosis of the disease at an early stage affects the course and results of treatment. Current systemic solutions, including an oncological card, may affect better results in 5-year survival of CRC patients in the future. Continuous increase of CRC incidence requires dynamic development in the field of prophylaxis, diagnostics and innovative methods of treatment, as well as monitoring of achieved treatment results in order to introduce changes in the scope of services and their financing.

CONCLUSIONS

1. In the Kujawsko-Pomorskie province in the years 2006–2011, the number of diagnosed colorectal carcinomas increases along with the total number of services provided, which have a downward trend to incidence.
2. Incidence and morbidity rates are variable, they increase gradually in subsequent years and in 2010 and 2011, they amounted to 59 and 67, as well as 355 and 408, respectively.
3. The probability of 5-year survival is 45.2%, and diagnosis of a disease above the age of 66 increases the occurrence of death.

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