

Long-term analysis of occurrence of malignant lip, oral cavity and pharyngeal cancer in Poland

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Introduction. The aim of our study was to analyze the number and structure of patients diagnosed and treated due to cancers of lips, mouth and throat in Poland between 2008 and 2015.

Material and methods. Secondary statistical analysis of data obtained from the Polish National Cancer Registry (KRN) and Polish National Health Fund (NFZ), concerning patients diagnosed for the first time between 2008 and 2015.

Results. Based on the available data, in total there were 30 800 new cases of cancers in population of Poland, and 29 800 people starting their treatment financed from the National Health Fund.

Discussion. Cancers of the discussed locations, considered individually, are often rare diseases, with the incidence counted in hundreds of people per year in the entire Polish population. Due to the etiology and course, however, they should be analyzed together, which means that they become a significant group.

Conclusions. In recent years, the annual incidence of these tumours was about 4000 cases, 70% of them were men. There is an approximately 10% difference in the number of registered cases of these cancers in NFZ databases. The creation of a medical register, including administrative, epidemiological and clinical data, would significantly improve the observation of the population of patients with these tumours.

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Introduction

Neoplasms of the head and neck (H&N) are classified together, due to their similar aetiology, anatomical pathology and clinical course. It is estimated that they form around 6% of all cases of cancer and are the reason of 5% of deaths. Approximately 600 000 of new diagnoses of cancer from this group are made worldwide [1–3]. The Cancer Incidence in Five Continents

(CI5) studies demonstrate a worrying increase of incidence in Central Europe [4]. According to the National Cancer Registry (KRN) in Poland, 4389 persons were diagnosed in 2015: 3140 men and 1249 women. The peak incidence is observed at the seventh decade of life, in women it remains at a constant level, starting in the seventh decade of life. According to KRN, the incidence in Poland is higher than average for the other

European Union countries, approximately 1.4 times higher for men and 1.2 times higher for women. Another source of incidence data for Poland is the National Health Fund (NFZ). This institution is responsible for financing practically all the oncology treatments in Poland. Moreover, it is notified about all the services used by patients both in outpatient and hospital treatment. The goal of the conducted analysis was to compare the incidence and prevalence of head and neck cancers in Poland with health care services utilisation, based on NFZ data from the years 2008–2017.

Materials and methods

The method used is the secondary statistical analysis of data reported to the national payer – the National Health Fund (NFZ) by medical institutions with an indicated diagnosis of lip, oral cavity and pharyngeal cancer in the years 2008–2017 based on ICD-10 classification of diseases. This method has been already used for similar analyses [5–8]. The analysis included all the reported information on interventions in patients undergoing therapy after a diagnosis of lip, oral cavity and pharyngeal cancer (according to ICD-10 = C00.X – C14.X [9, 10] as the main reason for the intervention; the NFZ databases record all patients whose therapy was financed from the public funds). In order to observe the rules for processing sensitive data, such as personal ID (in Poland PESEL – Universal Electronic System for Registration of the Population), the data were anonymised during the analysis, obtaining the results by processing data sets without sensitive personal data (according to the General Data Protection Regulation) [11]. Indicators of incidence and annual and long-term prevalence were calculated (in the years 2008–2017 – 10-year prevalence and indicator of 10-year prevalence per 100 000 inhabitants; in this case the average number of inhabitants of Poland in the years 2008–2017 was used as the denominator). Demographical data (as of 31 December of the given year) used in order to standardise the incidence

and prevalence indicators was downloaded from the Central Statistical Office (GUS) website, separately for each year [12].

Additionally, the obtained results were compared to the data established by the National Cancer Registry (KRN – last available KRN report on cancers refers to the year 2015), confirming the treatment of cancer using verification algorithms operating in the NFZ's internal tool – the Disease Treatment Registry (RLC). The principles on which the verification algorithms operate are presented in table I. This has established the level of overdiagnosis of lip, oral cavity and pharyngeal cancer in Poland, this method was already used in analyses [13]. SQL (structured query language) tools were used to extract the data, using a filter in accordance with the ICD-10 diagnoses specified in the assumptions.

Results

Based on the data for the population of Poland in the years 2008–2017, a total of 120 752 diagnoses of lip, oral cavity and pharyngeal cancer were established in men and women. Men constituted a significantly higher percentage of this group – 64%. A total of 46 038 patients underwent hospital treatment, of which approx. 72% were men. The number of patients

Table I. Principles of verification algorithms used in the Disease Treatment Registry (RLC) for oncology

Data on patients diagnosed with a malignant neoplasm by the RLC system are analysed for:	
1.	Repeatability of the given diagnosis = in order to consider a diagnosis established it has to dominate with a given patient and be indicated at least 3 times
2.	Indicated diagnostic/therapeutic activities which confirm a cancer is a situation where a patient with a diagnosed cancer underwent
3.	Surgery: Radiotherapy Chemotherapy

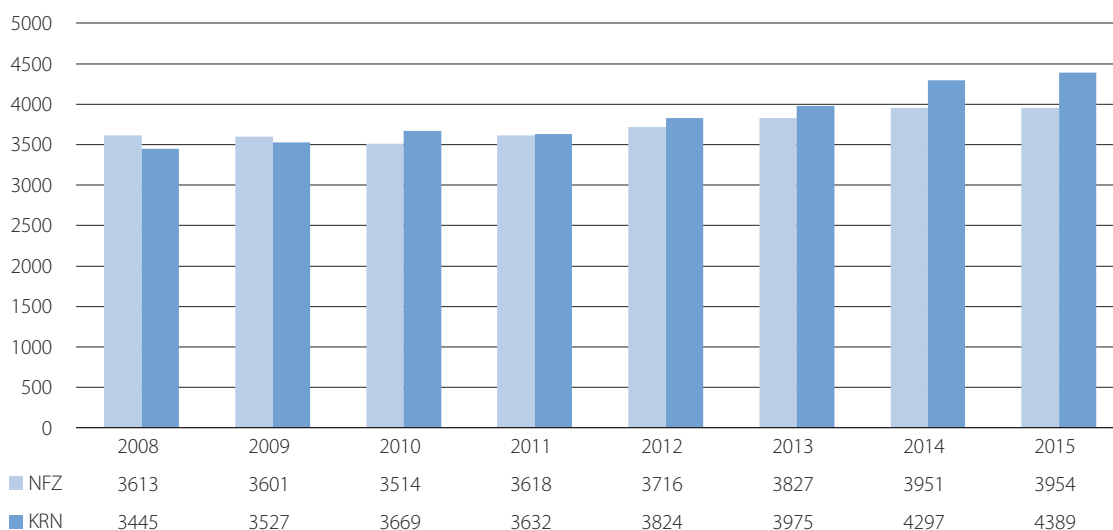


Figure 1. Number of patients registered in KRN and commencing treatment according to RLC

Table II. Number of patients reported in individual years with a diagnosis of a malignant neoplasm, taking into account their sex and selected type of health care services

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Number of patients in all types of services										
10-year; men	78 048									
10-year; women	42 704									
men	14 413	15 347	15 218	15 147	15 378	15 609	15 942	15 702	15 978	15 928
women	7519	8288	7847	7910	7976	8008	8279	8236	8206	8412
Number of patients in hospital treatment										
10-year; men	33 094									
10-year; women	12 944									
men	4357	4141	4094	3801	3706	3772	3861	4627	4897	4833
women	1698	1655	1554	1425	1478	1565	1506	1774	1874	2004
Number of patients in specialist outpatient care										
10-year; men	52 546									
10-year; women	25 859									
men	10 604	10 706	10 817	11 109	11 440	11 763	12 227	12 107	12 501	12 616
women	5309	5358	5353	5644	5738	6002	6317	6182	6326	6568

Table III. Comparison of KRN and NFZ data for individual types of services

	2008	2009	2010	2011	2012	2013	2014	2015
KRN	3445	3527	3669	3632	3824	3975	4297	4389
ALL	21 932	23 635	23 065	23 057	23 354	23 617	24 221	23 938
AOS	15 913	16 064	16 170	16 753	17 178	17 765	18 544	18 289
SZP	6055	5796	5648	5226	5184	5337	5367	6401

KRN – National Cancer Registry, ALL – the number of patients diagnosed with head and neck cancer (ICD10) in all types of services, AOS – number of patients in specialist outpatient care, SZP – number of patients in hospital treatment

Table IV. Percentage of patients undergoing causal treatment compared to the number of patients reported by medical institutions to the NFZ

	2008	2009	2010	2011	2012	2013	2014	2015
ALL	15.7%	14.9%	15.9%	15.8%	16.4%	16.8%	17.7%	18.3%
AOS	21.6%	22.0%	22.7%	21.7%	22.3%	22.4%	23.2%	24.0%
SZP	56.9%	60.9%	65.0%	69.5%	73.8%	74.5%	80.1%	68.6%

ALL – the number of patients diagnosed with head and neck cancer (ICD10) in all types of services, AOS – number of patients in specialist outpatient care, SZP – number of patients in hospital treatment

indicated in hospital treatment forms 27–28% of the general number of patients declared by medical institutions, whereas specialist outpatient treatment has registered 78 405 patients of patients, including approx. 67% men. The number of patients indicated in specialist outpatient treatment amounted to approx. 74% of all indicated patients (Tab. II).

Assuming that the patient's path starts with a suspicion of cancer leading to specialist diagnostics, and then enhanced diagnostics and therapy in hospital treatment, from all patients diagnosed with ICD-10 diagnosis of lip, oral cavity and pharyngeal cancer approx. 74% end in specialised outpatient care (specialised diagnostics), and approx. 27–28% end up in hospital treatment (enhanced diagnostics and therapy). Over 10 years the analysed data on the number of patients are highly stable, and the 10-years dynamics is positive and amounts to

approx. 1–2%. A comparison of the number of patients indicated for all types of services, in specialist outpatient care (AOS) and in hospital treatment (SZP) to the number of confirmed cases (KRN) is presented in table III.

The reference source of incidence data in Poland is the KRN, figures of which were compared with the number of new patients treated due to H&N cancers (Fig. 1). In order to establish the category of "new treated patients" and to enable comparison of the NFZ data with the KRN ones, verification algorithms has been prepared (Tab. I).

Comparison of KRN data and the number of confirmed tumours according to NFZ demonstrates that the data sets are highly conforming. The highest conformity (practically 100%) occurred in 2011. The data difference between the sets in 2015 amounts to approx. 10%. Verification algorithms created

Table V. The annual and periodical (10-year) prevalence indicator for patients reported in individual years with the diagnosis of lip, oral cavity and pharyngeal cancer taking into account sex, undergoing hospital treatment per 100 000 province inhabitants

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
10-year; men	463									
10-year; women	236									
men	24	22	22	20	20	20	21	25	26	26
women	9	8	8	7	7	8	8	9	9	10

in order to confirm the electronic databases data enable the estimation of the number of patients treated for H&N cancer with a confirmed diagnosis. By comparing the KRN data and the data reported by medical entities, we can assess the percentage of patients reported to NFZ for whom the occurrence of cancer was confirmed and causal treatment (therapy) was commenced (Tab. IV).

The percentage of patients with a confirmed malignant neoplasm compared to all the patients reported by medical institutions with a H&N neoplasm demonstrates a growth tendency. This trend is observed both as a total for all types of services, in specialist outpatient care and in hospital treatment. In hospital treatment the highest percentage of patients have a confirmed diagnosis of a malignant neoplasm or commenced therapy (in 2014 this was over 80% of the patients). Due to the highest compatibility of data between the data reported for hospital treatment and KRN, the standardised indicators and further analyses were calculated based on this type of services (Tab. III). Proportions of 10-year prevalence indicators by gender indicate increased prevalence among 2.73 (men): 1 (women) (Tab. V).

Annual prevalence indicators demonstrate high stability, average per year over the examined period for hospital treat-

ment amount to 23/100 000 M (men); 8/100 000 W (women). Prevalence divided into individual groups of diagnoses under hospital treatment is presented in table VI.

Dynamics of the number of reported patients in all types of cancer under analysis since 2012 demonstrates a decreasing tendency. Over the analysed period, the highest number of patients were diagnosed with a malignant neoplasm of other and unspecified parts of the tongue (C02.X = 791.3). At the second place in the analysed group there is a malignant neoplasm of the floor of the mouth (C04.X = 740.8), in case of this tumour the dynamics is upwards over the entire analysed period. The third most frequent tumour is the malignant neoplasm of tonsil (C09.X = 724.9). The least frequently diagnosed was the malignant neoplasm of gum (C03.X = 173.9) and a malignant neoplasm with other and unspecified large glands (C08.X = 175.9). Standardisation of data based on the population enables the assessment of the frequency of occurrence of a given neoplasm within the area of Poland and the comparison of the frequency of occurrence of H&N neoplasms (Tab. VII). Standardised prevalence indicators for the tumours: C00.X from 1.73 (2008) to 1.42 (2017); C11.X from 1.01 (2008) to 0.93 (2017); C14.X from 1.04 (2008) to 0.55 (2017) have a decreasing tendency. Other neoplasms with a high

Table VI. Number of patients in individual years taking into account the ICD-10 group as a part of hospital treatment

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average
C00	659	582	564	545	496	481	474	520	544	544	540.9
C01	445	419	406	388	325	325	337	394	422	420	388.1
C02	744	771	749	653	675	745	738	884	960	994	791.3
C03	183	147	134	156	159	168	169	222	195	206	173.9
C04	687	732	726	679	637	602	683	871	876	915	740.8
C05	283	283	285	235	209	234	223	286	291	284	261.3
C06	361	354	353	349	389	387	369	429	507	526	402.4
C07	418	371	367	317	350	363	342	406	437	417	378.8
C08	194	198	188	120	152	158	153	202	180	214	175.9
C09	755	657	595	563	588	637	645	893	979	937	724.9
C10	621	574	586	511	458	476	447	579	589	568	540.9
C11	385	449	375	337	319	326	305	301	390	359	354.6
C12	158	155	189	192	148	163	181	222	249	272	192.9
C13	741	629	628	609	602	634	614	724	761	743	668.5
C14	396	316	317	260	244	223	236	241	228	211	267.2

Table VII. Prevalence indicator per 100 000 inhabitants taking into account diagnoses in all types of medical services

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average
C00	1.73	1.52	1.48	1.41	1.29	1.25	1.23	1.35	1.42	1.42	1.41
C01	1.17	1.10	1.06	1.02	0.85	0.85	0.88	1.03	1.11	1.10	1.02
C02	1.95	2.02	1.96	1.69	1.75	1.94	1.92	2.30	2.50	2.59	2.06
C03	0.48	0.39	0.35	0.40	0.41	0.44	0.44	0.58	0.51	0.54	0.45
C04	1.80	1.92	1.90	1.76	1.65	1.56	1.78	2.27	2.28	2.38	1.93
C05	0.74	0.74	0.75	0.61	0.54	0.61	0.58	0.74	0.76	0.74	0.68
C06	0.95	0.93	0.92	0.91	1.01	1.01	0.96	1.12	1.32	1.37	1.05
C07	0.51	0.52	0.49	0.31	0.39	0.41	0.40	0.53	0.47	0.56	0.46
C08	0.51	0.52	0.49	0.31	0.39	0.41	0.40	0.53	0.47	0.56	0.46
C09	1.98	1.72	1.56	1.46	1.53	1.65	1.68	2.32	2.55	2.44	1.89
C10	1.63	1.50	1.53	1.33	1.19	1.24	1.16	1.51	1.53	1.48	1.41
C11	1.01	1.18	0.98	0.87	0.83	0.85	0.79	0.78	1.01	0.93	0.92
C12	0.41	0.41	0.49	0.50	0.38	0.42	0.47	0.58	0.65	0.71	0.50
C13	1.94	1.65	1.64	1.58	1.56	1.65	1.60	1.88	1.98	1.93	1.74
C14	1.04	0.83	0.83	0.67	0.63	0.58	0.61	0.63	0.59	0.55	0.70

prevalence indicator include: malignant neoplasm of floor of mouth (C.04.X = 1.93) and malignant neoplasm of tonsil (C.09.X = 1.89). Highest value of the indicator amounted to 0.45 patient/100,000 and referred to the malignant neoplasm of gum (C03.X).

Discussion

This analysis groups together neoplasms of the structures of the oral cavity, starting from the lip and ending with the laryngeal and nasal parts of the throat. Individual locations are rare sites of neoplasm development: a few dozen to a few hundred cases annually, however as a group these neoplasms form a large category, over 4000 cases annually. Due to their similar aetiology and natural history, it is rational to consider their epidemiology as a whole.

The basic course of information about the incidence of cancer is the KRN, according to which the number of new diagnoses in the last years has exceeded 4300 cases. The NFZ reports record the health services financed from public funds, and based on these reports approximately 4000 of new cases per year were recorded. The difference, sometimes up to 10%, may be caused by various methods used to create these sets. The differences may also result from the fact that the clinical differentiation of the initial point of the neoplasm may be problematic, in particular when the neoplasm is clinically advanced in a given location. Also blurred categories, like C14 malignant neoplasm of other and ill-defined sites, C06 malignant neoplasm of other and unspecified parts of mouth may be used interchangeably with the codes of more precise categories. Cancers of H&N are much more frequently present in men; approximately over 70% of patients are male. A similar relation of men to women was demonstrated by

studies based on the database of the International Agency for Research on Cancer [14]. Cancer in men more frequently occurs in the structures in the rear of the nose and throat cavity, like laryngeal or mouth part of the throat, the same incidence in men and women occurs only for the neoplasms of large salivary glands. The percentage of patients with whom the therapy is not continued, present on all the levels of care, should be assessed in a positive manner, as a manifestation of the care exhibited by medical professionals related to the suspicion of cancer, however, since this percentage is stable over the entire period under analysis, it seems justified to suggest to medical personnel, in particular to laryngologists, a continuous and ongoing education in the field of cancer diagnostics and therapy.

Conclusions

Despite different methods of data collections and their purpose, both the NFZ and the KRN data demonstrate similar incidence of lip, oral cavity and pharyngeal cancers. In the years 2008–2017, a total of 46 000 cases of lip, oral cavity and pharyngeal cancer were reported in hospital treatment, including approx. 33 000 in men and approx. 13 000 in women; annual average of 4200 men and 1600 women. Men constituted a higher percentage of patients; approx. 64% in all categories in total, in hospital treatment – 72%, in specialist outpatient care – 67%. Of all patients reported by medical institutions with ICD-10 diagnoses of lip, oral cavity and pharyngeal cancer approx. 74% end up in specialist outpatient care (specialised diagnostics) and approx. 27–28% end up in hospital treatment (enhanced diagnostics and therapy).

Conflict of interest: none declared

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