

TUMOR HOSPITALIZATION EPISODES IN 0-18 YEARS OLD CHILDREN, GEOGRAPHICAL AND TEMPORAL DISTRIBUTION IN ROMANIA, IN THE LAST 5 YEARS

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The tumors incidence in children is increasing, although far below the incidence of adult cancer, but the survival rate in children is much better. Nevertheless, survival is being undermined by a number of factors (the type of neoplasia, the economic development of the country, the access of the population to health system facilities, especially modern therapies). In Romania, daily 1-2 children are hospitalized due to cancer. The main types of tumors were benign and the most common malignant tumor class were malignant tumors of lymphoid, haematopoietic and related tissue. In general, a pattern can be made for hospitalized children suffering from cancer (male children, 0-1 years old, from urban areas), but additional evidence is needed to identify the current problems and supports the development of effective interventions to improve early diagnosis, specialized healthcare services and interventions among population.

Keywords: children health, cancer, Romania.

BACKGROUND

As with adults, tumors are an important cause of morbidity and mortality in children worldwide. From the point of view of child mortality, neoplastic diseases tend to overcome infectious diseases as a determining cause of death, being among the first causes of non-accidental mortality at this time of life, both in developed countries and in a growing number in developing countries (with an average income / capita). In terms of incidence, according to IARC (2015), the number of newly diagnosed cases has been steadily increasing, from 165,000 cases per year to 215,000 for children under 14 years old and 85,000 for children aged between 15 and 19 years. This number is probably underestimated given the lack of cancer registers in many countries. [1]

Although the incidence of the disease is rising, however, it is far inferior to the incidence of adult cancer and the survival rate in children is clearly higher, for example in developed countries, reaching 84% (compared to a survival rate of 5 years of 60% in the 1970s), the value of the indicator being improved lately even in less economically developed areas, where 80-90% of children with cancer live according to international statistics. Nevertheless, survival is affected by a number of factors, depending on the type of neoplasia, and especially on the economic development of the country and the access of the population to health system facilities, especially modern therapies for treating the disease. [2]

Given the seriousness/importance of this problem, the National School of Public Health, Management and Professional Development has conducted an analysis of the situation of continuous hospitalization (one day hospitalization excluded) of children from Romania who have been diagnosed with this condition and treated in public hospitals in the last 5 years, the results are presented below.

OBJECTIVE OF THE STUDY

Identification at national, regional and local level of the geographical distribution of hospitalization episodes due to the main classes /categories of tumors in children (0-18 years), as well as the evolution of their number during 2013-2017.

METHODOLOGY

A descriptive, retrospective study was carried out using data from the National DRG Database, data reported under continuous hospitalization by Romanian hospitals in a contractual relationship with the National Health Insurance House. According to the law, the data are also reported monthly to the National School of Public Health, Management and Professional Development in Bucharest.

The analysis of the data on hospitalization episodes by tumors in children in Romania in the mentioned hospitals (episodes of hospitalization under continuous hospitalization) was studied, the study period being 2013-2017. The data were selected using the ICD-10-AM classification, the records relating to the Tumori diagnostic class were extracted and analyzed based on the diagnosis name and the subclass name, the diagnostic codes between C00.0-C96.9 and D00.0, D48.9. The diagnostic subclass included the following: malignant tumors of the lip, mouth and throat (C00-C14), primary malignant tumors located in the digestive organs (C15-C26), malignant tumors of the respiratory and intrathoracic organs (C30-C39), malignant tumors of bones and joint cartilage (C40-C41), melanoma and other malignant skin tumors (C43-C44), malignant breast tumors (C50), malignant mesothelial and soft tissue tumors (C45-C49), malignant genital females →

(C51-C58), male genital malignancies (C60-C63), malignant urinary tract tumors (C64-C68), malignant tumors of the eye, brain and other parts of the central nervous (C69-C72), malignant tumors of lymphoid, haematopoietic and related tissues (C81-C96), malignant tumors of the thyroid and other endocrine glands (C73-C75), malignancies with defined, secondary and unspecified malignant tumors (C76-C80), tumors in situ (D00- D09), benign tumors (D10-D36), unpredictable or unknown behaviors tumors (D37-D48). The episodes of hospitalization for patients below 18 years of age have been studied.

The data were processed using the SQL Server Management Studio Express 2005 software, further processing and analysis was performed using SPSS and Excel programmes. The analysis was based on a series of demographic and socio-economic variables such as the patient's gender, age, residence, length of stay, etc., included in the minimum data set reported in the DRG system by hospitals. Interpretation and presentation was done in the form of tables and graphs.

RESULTS

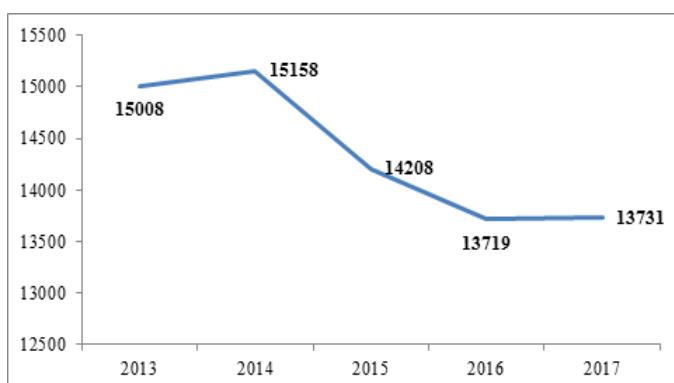
The interpretation of the results was carried out in relation to the same demographic variables and socio-economic characteristics (gender, age, residence, hospitalization length of stay, in-hospital mortality rate, discharge status) following geographical distribution and temporal evolution of hospitalization episodes due to the main types of tumors diagnosed in children, in hospitals in Romania during 2013-2017.

1. Total number of continuous hospitalization tumor episodes in children 0-18 years, registered during 2013-2017, at national level

During the analyzed period, a total number of 71824 episodes of hospitalization due to tumors was recorded in children aged 0-18 years.

In terms of distribution per year, most of these episodes were recorded in 2013 and 2014 (15008 and 15158 - approximately 21% of the total), then the number dropped to

Graph no 1. Number of tumor hospitalization episodes in children 0-18 years, during the period 2013-2017



13719, the lowest value in 2016. The reduction is a minor one, the number of hospitalization episodes decreasing by only 2% compared to the previous years - graph no.1.

2. Types of tumors that caused 0-18 years children hospitalization, during 2013-2017

Most of the tumors, as can be seen in Figure 2, were benign tumors 38% of the total, followed by an important percentage (25.2%) of malignant tumors of lymphoid, haematopoietic and related tissues (C81 -C96). Less than 10% or less were tumors with unpredictable or unknown behavior (D37-D48) or malignant tumors of the eye, brain and other parts of the central nervous system (C69-C72), and percentages around 3-4% experienced malignant tumors of the urinary tract (C64-C68), malignant bone tumors and articular cartilage (C40-C41), or malignant mesothelial and soft tissue tumors (C45-C49).

Following the evolution over time of the main types of tumors that caused hospitalization episodes, it was found that in most situations the number of cases was lower in 2017 than the number observed in 2013, the trend being downward during the study period or after a slight increase in the next years to reach 2017 at a lower value than the initial one. The exceptions were the tumors with unpredictable evolution or unknown behavior (D37-D48) who had a 30% increase over 2013, malignant tumors of the bones and joint cartilage (C40-C41), malignant tumors of mesothelial and soft tissues (C45-C49) and melanoma and other malignant skin tumors (C43-C44), with minor increases - Table 1.

The most frequent cases were hospitalization episodes in which, as a diagnosis at admission, appear the ones specified in table 2.

3. Distribution of hospitalization episodes in children, at regional and local level, during 2013-2017

Analyzing the distribution of the number of hospitalization episodes at national level, during the study period, the highest number was observed in the North-East (15.5% of the national total) and South (14%), while the regions with the most reduced numbers were South West (9%) and South East (11%). In the Bucharest Ilfov region there were 8857 episodes, representing 12% of the national total - Figure 3.

The overall trend in development regions was downward, so for all regions except for two, the number of hospital episodes decreased in 2017 as compared to 2013. The exceptions regions were the North East and Bucharest Ilfov region, but also the increases were minor.

In the development regions with the highest number of hospitalization episodes during the study period, the most frequent types of tumors requiring hospitalization include benign tumors (D10-D36) with 5627 episodes and malignant tumors of lymphoid, haematopoietic and

Figure 2. Main types of tumors that caused hospitalization episodes in children aged 0-18, in Romania, during 2013-2017.

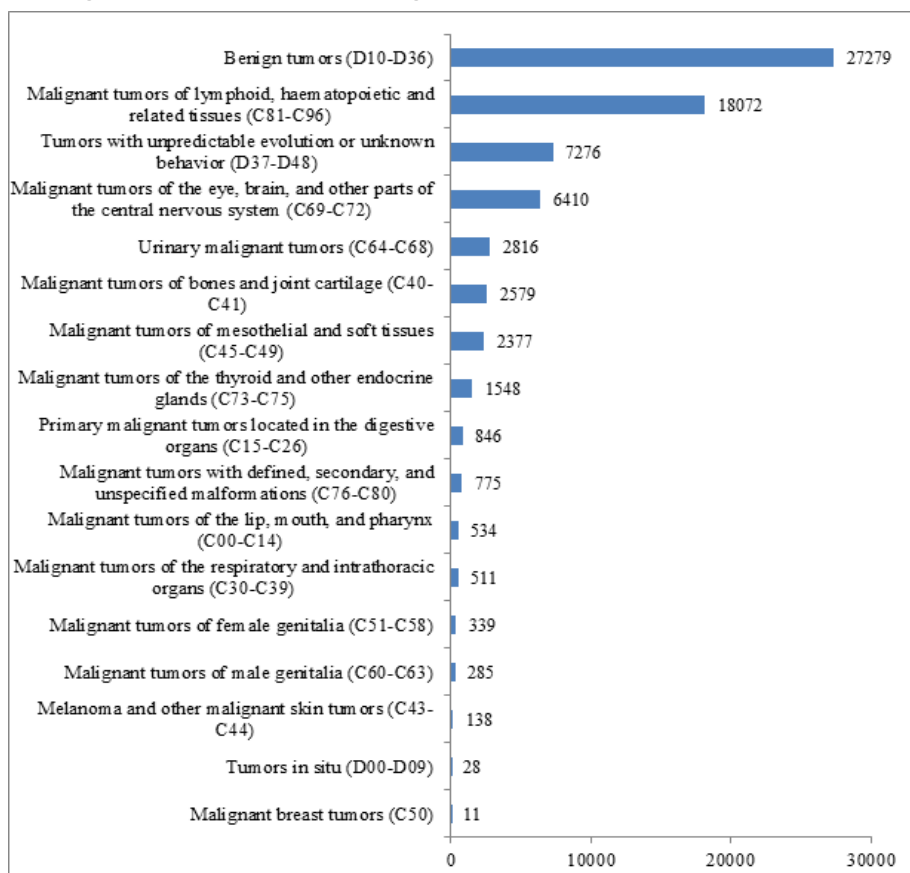


Table 1. Number of tumor hospitalization episodes in children, in 2013-2017

Year	2013	2014	2015	2016	2017	Total
Benign tumors (D10-D36)	5439	5524	5424	5609	5283	27279
Malignant tumors of lymphoid, haematopoietic and related tissues (C81-C96)	4337	4174	3455	3006	3100	18072
Tumors with unpredictable evolution or unknown behavior (D37-D48)	1207	1240	1604	1612	1613	7276
Malignant tumors of the eye, brain, and other parts of the central nervous system (C69-C72)	1360	1375	1232	1180	1263	6410
Urinary malignant tumors (C64-C68)	660	663	506	450	537	2816
Malignant tumors of bones and joint cartilage (C40-C41)	453	572	549	499	506	2579
Malignant tumors of mesothelial and soft tissues (C45-C49)	417	523	505	441	491	2377
Malignant tumors of the thyroid and other endocrine glands (C73-C75)	337	306	321	279	305	1548
Primary malignant tumors located in the digestive organs (C15-C26)	200	222	152	126	146	846
Malignant tumors with defined, secondary, and unspecified malformations (C76-C80)	148	191	159	150	127	775
Malignant tumors of the lip, mouth, and pharynx (C00-C14)	117	82	104	112	119	534
Malignant tumors of the respiratory and intrathoracic organs (C30-C39)	141	155	77	66	72	511
Malignant tumors of female genitalia (C51-C58)	86	48	52	98	55	339
Malignant tumors of male genitalia (C60-C63)	73	63	44	56	49	285
Melanoma and other malignant skin tumors (C43-C44)	24	12	14	32	56	138
Tumors in situ (D00-D09)	6	5	7	2	8	28
Malignant breast tumors (C50)	3	3	3	1	1	11
	15008	15158	14208	13719	13731	71824

related (C81-C96) with 1992 episodes in the North East region and in the South region the same types but more frequent than benign tumors (2,680 episodes) were malignant tissues of lymphoid, haematopoietic and related (C81-C96) - 2964 episodes. For the other regions, the most common types were: in the Center, West, North West and Bucharest Ilfov region, the same types with the predominance of benign tumors, while in the South West and South East regions there were more malignant tumors of lymphoid tissues, hematopoietic and related (C81-C96) - Table 3.

The analysis of the distribution of episodes of hospitalization due to tumors in children at the local level indicates, on the first positions as frequencies, counties like Timiș, Iași, Brașov and Bucharest, while at the opposite pole there are counties like Tulcea or Botosani – Figure 4

In the counties with the highest number of hospitalization episodes, the most frequent registered types of tumors were: in Timis County benign tumors (D10-D36) - 75% of the total per county, malignant tumors of lymphoid tissues, hematopoietic and related (C81-C96) -9%, and tumors with unpredictable or unknown behavior (D37-D48) -6.6%. In Iasi County, episodes of hospitalization were most frequently due to benign tumors (D10-D36) - 64.7% of the total county, malignant tumors of the lymphoid, hematopoietic and related tissues (C81-C96)-15%, malignancies of the eye, brain, and other parts of the central nervous system (C69-C72) -7.5%. In Brașov County the most frequent hospitalizations were caused by tumors such as benign tumors-63.5%, malignant tumors of the lymphoid, hematopoietic and related tissues (C81-C96)-19.2% and tumors with unpredictable evolution or unknown behavior (D37 -D48) - 5.1%. In Bucharest, benign tumors (D10 -D36) -33.1%, followed by malignant tumors of the lymphoid, haematopoietic and related tissue (C81-C96)-29.5% and tumors with unpredictable evolution or unknown behavior D37-D48) 12.8%.

In the period of time studied in the majority of counties there is a reduction in the number of these hospitalization episodes, with a few exceptions,

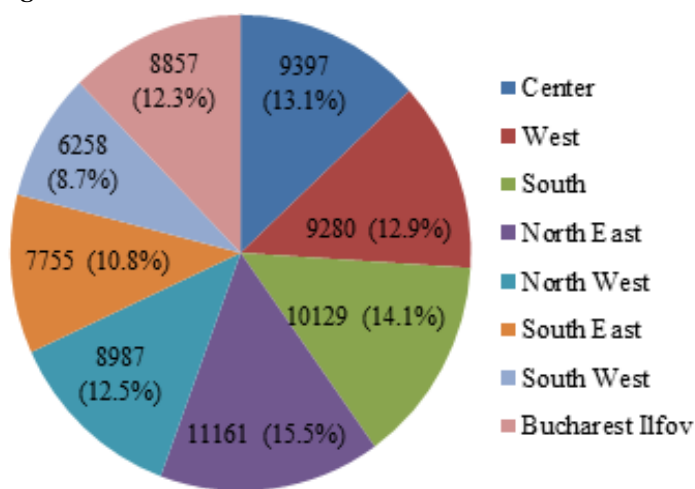
Table 2. Distribution of tumor episodes hospitalization in children 0-18 years, depending on the name of the diagnosis at admission, during 2013-2017

Admission diagnosis	Episodes number
Hemangioma, unspecified location	12645
Acute lymphoblastic leukemia, in remission	5856
Acute lymphoblastic leukemia, without mentioning remission	5099
Hemangioma, skin and subcutaneous tissue	2693
Malignant tumor of the kidney, with the exception of the renal pelvis	2614
Malignant tumor of small brain	1641
Tumor malignant long bones of lower limbs	1244
Hodgkin's disease nodular sclerosis	1154
Malignant tumor of brainstem	947
Mixed cellular Hodgkin's disease	943

Table 3. The evolution over the period 2013-2017 of tumor hospitalization episodes number in children 0-18 years, by development regions

Year	2013	2014	2015	2016	2017	Total
North East	2052	2071	2538	2424	2076	11161
South	2229	2129	2034	1665	2072	10129
West	1992	1668	1756	2062	1919	9397
North West	1888	2363	1647	1778	1604	9280
Buchares-tIlfov	2113	2081	1837	1470	1486	8987
South East	1826	1875	1702	1576	1878	8857
South West	1544	1593	1472	1603	1543	7755
Total	1364	1378	1222	1141	1153	6258
Total	15008	15158	14208	13719	13731	71824

Figure 3. Structure according to number of hospitalization episodes in children, registered by development regions, during 2013-2017



namely: counties in the center-Covasna, Harghita, Mures, counties in the southwest-Hunedoara and Mehedinti, in the northwest-Maramureş County, but also from the south-Argeş, Ialomiţa and Dâmboviţa, as well as from the south-eastern region Galaţi and Vrancea counties. The highest

increase is registered by Iasi County (over 50% compared to the value in 2013) - Table 4.

4. Distribution of hospitalization episodes in children, depending on the patient gender

From the point of view of the patient's gender, close numbers of episodes of hospitalization were recorded during the study period in both boys and girls, with a slight predominance of boys (36,771 episodes) than girls (35053 episodes).

As time progresses, there is a reduction in the number of hospitalization episodes in 2017 as compared to 2013, the reduction being more important for male sex (11% reduction compared to 2013) compared to female (5.6% reduction %) – Figure 5.

The most frequent types that caused hospitalization episodes in girls during the study period were benign tumors (D10-D36) - 15021 representing 43% of the total, malignant tumors of lymphoid, hematopoietic and associated (C81-C96) - 7317-20.9%, tumors with unpredictable evolution or unknown behavior (D37-D48) - 4051 episodes of about 11.6%, malignant tumors of the eye, brain and other parts of the central nervous system C69-C72) - 2744 episodes, 7.8% and urinary malignant tumors (C64-C68) - 1607 episodes, 4.6%.

For the male gender, the most common episodes of hospitalization were due to benign tumors (D10-D36) -12258 episodes, representing 33% of the total of boys, lymphoid, haematopoietic and related tissue malignancies (C81-C96) -10755 episodes, 29.2%, malignant tumors of the eye, brain and other parts of the central nervous system (C69-C72) -3666 episodes, 9.9% and tumors with unpredictable evolution or unknown behavior (D37-D48) - 3225 episodes, 8.8% -table 5.

5. Distribution of tumors hospitalization episodes in children, depending on the age of the patient

Analyzing the structure of hospitalization episodes according to patients age groups it is noted that the highest values are observed in the small age group, 0-1 year, about one quarter of the total hospitalization episodes during this period and in the group 6-10 years, about 22% of the total – Figure 6.

Table 6 shows that the trend of the number of hospitalization episodes in all age groups except for the 0-1 year group was one decreasing, the most significant

Figure 4. Distribution of hospitalization episodes according to the patient's residence county

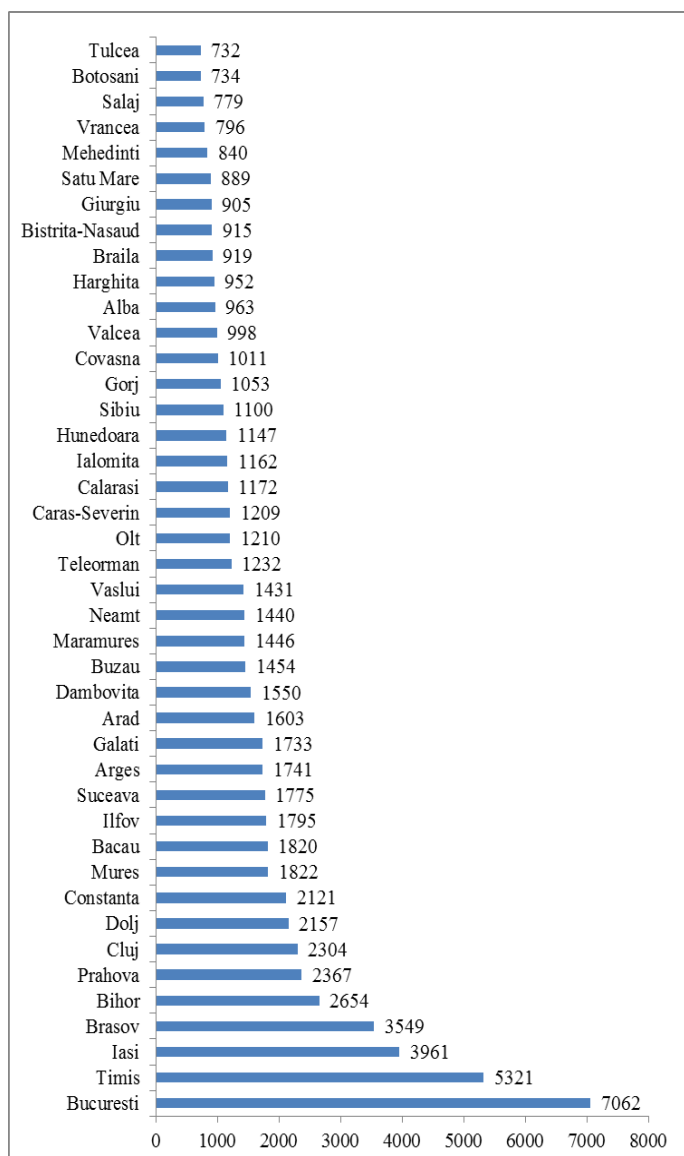


Table 4. Evolution of hospitalization episodes in children during the study period, depending on the patient's county of residence

County	2013	2014	2015	2016	2017	Total
Alba	203	252	195	130	183	963
Arad	409	375	277	252	290	1603
Argeş	357	387	351	267	379	1741
Bacău	403	405	363	334	315	1820
Bihor	666	546	486	413	543	2654
Bistrița-Năsăud	178	279	196	141	121	915
Botoşani	142	172	166	149	105	734
Braila	193	189	201	172	164	919
Braşov	829	551	578	856	735	3549
Bucureşti	1438	1489	1342	1285	1508	7062
Buzău	320	279	255	282	318	1454
Călăraşi	258	251	231	209	223	1172
Caraş-Severin	229	281	226	265	208	1209
Cluj	596	529	446	381	352	2304
Constanța	417	504	365	421	414	2121
Covasna	178	151	210	243	229	1011
Dimbovița	322	273	301	256	398	1550
Dolj	493	529	445	362	328	2157
Galați	343	275	362	406	347	1733
Giurgiu	213	192	153	152	195	905
Gorj	214	253	224	186	176	1053
Harghita	192	179	175	203	203	952
Hunedoara	231	233	194	244	245	1147
Ialomița	213	207	281	207	254	1162
Iași	505	568	926	1087	875	3961
Ilfov	388	386	360	291	370	1795
Maramureş	265	328	325	249	279	1446
Mehedinți	154	154	151	195	186	840
Mureş	360	350	366	380	366	1822
Neamț	290	309	429	205	207	1440
Olt	234	264	256	226	230	1210
Prahova	578	527	451	400	411	2367
Sălaj	178	227	182	121	71	779
Satu Mare	230	172	202	165	120	889
Sibiu	230	185	232	250	203	1100
Suceava	373	336	352	399	315	1775
Teleorman	288	292	266	174	212	1232
Timiș	1019	1474	950	1017	861	5321
Tulcea	132	159	157	151	133	732
Vaslui	339	281	302	250	259	1431
Vâlcea	269	178	146	172	233	998
Vrancea	139	187	132	171	167	796
Total	15008	15158	14208	13719	13731	71824

Figure 5. Evolution of hospitalization episodes in children, between 2013-2017, by patient gender

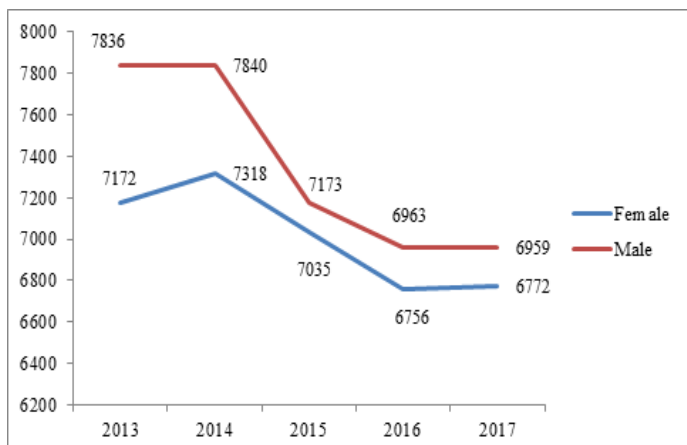


Figure 6. . Structure of hospitalization episodes by age group, in the period 2013-2017

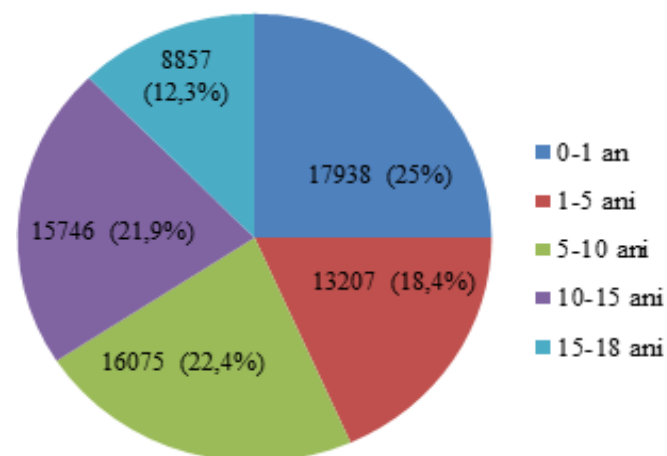


Table 5. Types of tumors that caused hospitalization episodes during the study period, depending on the patient's gender

Type of the tumor	Female	Male	Total
Melanoma and other malignant skin tumors (C43-C44)	66	72	138
Benign tumors (D10-D36)	15021	12258	27279
Tumors with unpredictable evolution or unknown behavior (D37-D48)	4051	3225	7276
Tumors in situ (D00-D09)	16	12	28
Malignant tumors of the lip, mouth and pharynx (C00-C14)	192	342	534
Urinary malignant tumors (C64-C68)	1607	1209	2816
Malignant tumors of bones and articular cartilage (C40-C41)	1111	1468	2579
Malignant tumors of the eye, brain, and other parts of the central nervous system (C69-C72)	2744	3666	6410
Malignant tumors of female genitalia (C51-C58)	339		339
Malignant tumors of male genitalia (C60-C63)		285	285
Malignant tumors of the respiratory and intrathoracic organs (C30-C39)	172	339	511
Malignant breast tumors (C50)	11		11
Malignant tumors of lymphoid, haematopoietic and related tissues (C81-C96)	7317	10755	18072
Malignant tumors of mesothelial and soft tissues (C45-C49)	960	1417	2377
Malignant tumors of the thyroid and other endocrine glands (C73-C75)	712	836	1548
Malignant tumors with definite, secondary, unspecified locations (C76-C80)	359	416	775
Primary malignant tumors located in the digestive organs (C15-C26)	375	471	846
Total	35053	36771	71824

Table 6. Distribution of hospitalization episodes by patients age, in 2013-2017

Age (years)	2013	2014	2015	2016	2017	Total
0	2572	2814	2799	3330	3053	14568
1	633	706	735	683	613	3370
2	571	583	507	555	709	2925
3	780	663	506	524	584	3057
4	966	825	684	519	578	3572
5	857	907	747	641	501	3653
6	765	885	741	593	592	3576
7	672	712	709	604	674	3371
8	757	647	640	464	561	3069
9	717	653	557	574	532	3033
10	685	561	630	450	700	3026
11	548	652	479	615	473	2767
12	699	540	617	446	538	2840
13	590	683	578	746	538	3135
14	672	651	664	662	784	3433
15	733	742	804	645	647	3571
16	924	950	861	804	719	4258
17	867	984	950	864	934	4599
+/Total	15008	15158	14208	13719	13731	71824

decrease being recorded in the group 1-5 years. Within the 0-1 year age group, the trend of episodes was increasing only for children under 1 year of age. Other situations where an increasing trend is observed have been seen in children aged 2 years, those aged 10 years, 14 and 17 years, the most significant being at age 2 and in children under 1 year of age.

In the age group with the highest number of hospitalization episodes, the most frequent cause of hospitalization was

benign tumors (D10-D36) -89.6% of the total at this age, followed by tumors with unpredictable development or unknown behavior (D37-D48) -3.2%. In the age group of 5-10 years, which was the second most affected age group, hospitalizations due to malignant tumors of the lymphoid, haematopoietic and related tissues (C81-C96) -41% of all episodes of hospitalization by tumors at this age, then benign tumors (D10-D36) -16% and malignant tumors of the eye, brain and other parts of the central nervous system (C69-C72) -14.5%.

6. Distribution of hospitalization episodes in children, depending on the patient's residence

The evolution of the number of these episodes throughout the study period was generally declining, a greater difference between the number of hospitalization episodes registered in 2013 and that observed in 2017 was noted for urban hospitalized children (10.3% compared to 2013) – Figure 7.

The most common hospitalization episodes in urban patients were benign tumors (D10-D36) -39% of all episodes in children in this home environment, followed by malignant tumors of lymphoid, haematopoietic and related tissue (C81-C96) -27% and tumors with unpredictable or unknown behavior (D37-D48) - 10.3%. Patients in the rural area presented mostly benign tumors (D10-D36) - 36.7% of all children in this environment, malignant tumors of the lymphoid, hematopoietic and related (C81-C96) -24.5% and malignant tumors in eye, brain, and other parts of the central nervous system (C69-C72) -10.5%.

7. Distribution of hospitalization episodes in children, depending on the length of stay in hospital, during 2013-2017

The duration of hospitalization in children during the period 2013-2017 amounted to 477225 days, with the largest number being in 2013, compared to the lowest in 2017, the tendency being one decreasing, with one exception, the value in 2016.

The average hospitalization in children with tumors was 6.64 days in this period. The average length of hospitalization per year was the highest in 2013 of 6.7 → **14**

Figure 7. Evolution of hospitalization episodes due to tumors in children in the period 2013-2017, depending on the patient's residence

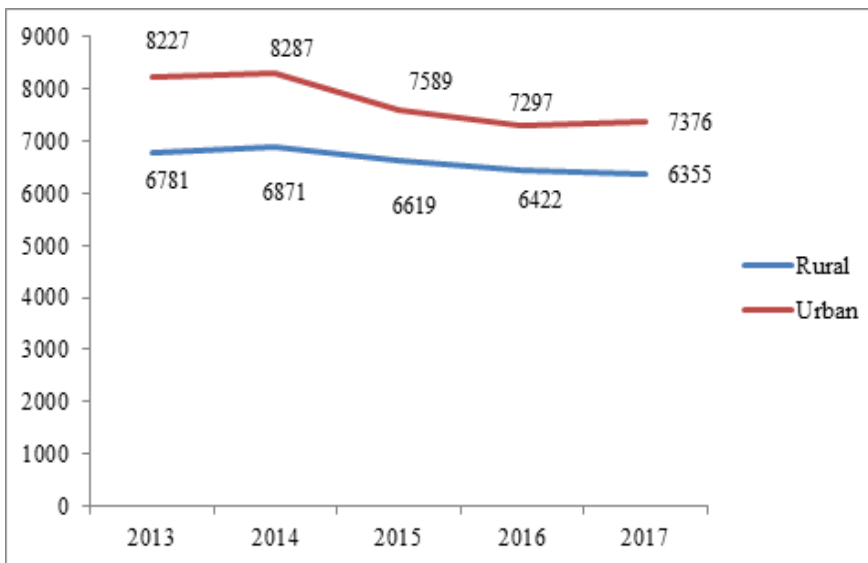


Figure 8. Patient discharge status following hospitalization episodes in children, during 2013-2017

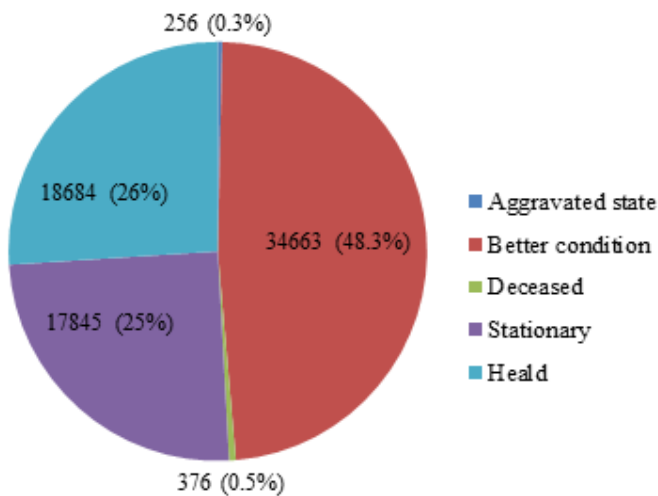
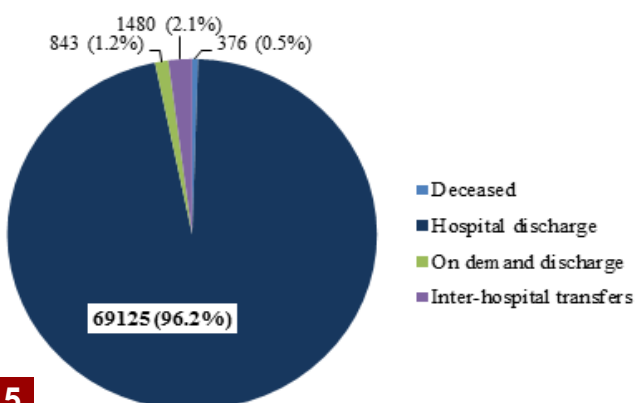


Figure 9. Type of patient discharge in children with tumors, during 2013-2017



days and gradually declined to 6.5 in the last year of the period, after in 2016 saw a slight increase to 6.9 days - Table 7.

By tumor types, the duration of hospitalization was highest for episodes due to malignant tumors of the lymphoid, hematopoietic and related tissue (C81-C96) -180608 days, with an average of approximately 10 days, followed by benign tumors with 110393 days and an average duration of 4 days and tumors with unpredictable evolution or unknown behavior (D37-D48) with 38141 days and an average duration of 5.24 days.

8. Distribution of hospitalization episodes in children, depending on the patient's discharge status and the in-hospital mortality rate

Most of the hospitalized children during the 2013-2017 periods were relieved in a better condition (48.3%), while close weights were dispensed as healed (26%) or stationary (25%). Less than one percent of children were discharged in aggravated state (0.3%) or deceased (0.5%) – Figure 8.

As a development over time, there is a significant reduction over the study period of completed hospitalizations with an aggravated state of health, the number decreasing by more than one third in 2017 as compared to 2013. The same thing is observed in case of hospitalization episodes with deaths, the number decreasing by 25% compared to 2013 – table 8.

96% of the total hospitalization episodes in children were completed with normal discharge, while 2.1% were in-hospital transfers, and 1.2% were discharges on demand - Figure 9.

Compared to the initial year, in the last year of the study period there was an increase, over 65% of cases were inter-hospital transfers and also a lower (approximately 27%) increase in the number of hospitalization episodes completed by an on-demand discharging - table 9.

Table 8 Evolution of the type of discharge in the case of tumor hospitalization episodes in children, during 2013-2017

In the case of the deceased, the most frequent cause of death were malignant tumors of the lymphoid, hematopoietic and related tissues (C81-C96) -44.4%, malignant tumors of the eye, brain and other parts of the central nervous system were caused by (C69-C72) -21.8%, tumors with unpredictable progression or unknown behavior (D37-D48) -6.6% or malignant tumors of mesothelial and soft tissues (C45-C49) -6.3%.

The mortality rate in hospital was 0.5% throughout the range, ranging between 0.55% in 2013 and 0.45% in 2017, with a slight downward trend from year to year.



Table no. 7. Distribution of hospitalization episodes in children, depending on the length of stay in hospital, during 2013-2017

Length of stay	2013	2014	2015	2016	2017	Total
Number of hospitalization days	100544	99876	89722	97926	89157	477225
Average length of stay	6,7	6,6	6,5	6,9	6,49	6,64

Table no. 8. Evolution of hospitalization episodes in children, during the period 2013-2017, depending on the patient state of discharge

Patient state of hospital discharge	2013	2014	2015	2016	2017	Total
Aggravated	66	57	52	40	41	256
Better condition	7289	7611	6525	6637	6601	34663
Deceased	84	82	75	72	63	376
Stationary	3530	3567	3845	3370	3533	17845
Healed	4039	3841	3711	3600	3493	18684
Total	15008	15158	14208	13719	13731	71824

Table 9. Evolution of the type of discharge in the case of tumor hospitalization episodes in children, during 2013-2017

Hospital Discharge	2013	2014	2015	2016	2017	Total
Deceased	84	82	75	72	63	376
Hospital discharge	14548	14704	13651	13121	13101	69125
Hospital discharge on demand	144	182	170	163	184	843
Inter-hospital transfers	232	190	312	363	383	1480
Total	15008	15158	14208	13719	13731	71824

CONCLUSIONS

The analysis, processing and interpretation of DRG data over the last 5 years allows us to draw a synthetic picture of the problem of tumor-induced hospitalization in patients aged 0-18 years.

Thus, over the past 5 years there have been 71824 episodes of hospitalization due to tumoral diseases, with a daily average of about 1.4 episodes, practically almost every day a child is hospitalized for this cause.

The evolution over time of the number of these hospitalization episodes has been decreasing since 2015, the number of episodes registered in 2017 compared to 2013, representing a decrease of 8,5%

As tumors, infants with benign tumors (more than one-third of admission episodes) and malignant tumors of lymphoid, haematopoietic and related tissue, accounting for about a quarter of the total, were hospitalized most frequently. Smaller percentages were tumors with unpredictable or unknown behavior, or malignant tumors of the eye, brain, and other parts of the central nervous system. The evolution over time of the number of hospitalization episodes through different types of tumors was decreasing,

except for tumors with unpredictable evolution or unknown behavior that had a marked upward trend or tumors such as malignant tumors of bone and joint cartilage, malignant tumors of soft and mesothelial tissues and melanoma and other malignant skin tumors, with much lower increases. Of the most common diagnosis at admission, there are benign tumors such as hemangiomas or malignant tumors such as leukemia, kidney, cerebral or bone tumors, and lymphomas.

The analysis of the spatial distribution of these episodes reveals areas with a higher frequency of occurrence such as the North East and South regions, but at the same time at the local level it is found among the leading counties alongside Iași belonging to the North-East region and counties in less affected regions Timis or Brasov. The trend at regional level was generally downward, with two exceptions - the North-East and Bucharest-Ilfov regions, with unimportant increases here, and the tumor types mainly met benign tumors but also malignant blood, eye, brain and other parts of the central nervous system or tumors with unpredictable evolution or unknown behavior. And at the local level in most counties there was

a reduction in the number of these hospitalization episodes, with a few exceptions: counties in the center region-Covasna, Harghita, Mures, counties in the southwest-Hunedoara and Mehedinti in the northwest Maramureș County, but also from the south region-counties such as Argeș, Ialomița and Dâmbovița, as well as from the southeastern region Galați and Vrancea counties. The highest increase (more than 50% compared to 2013) is registered in Iasi County.

The differences between the two sexes in terms of frequency of hospitalization episodes are small. Male gender prevails, however, there is a more significant reduction in the number of episodes in 2017 compared to 2013 compared to female sex. Both sexes mainly record the same types of tumors: the most frequent are benign tumors, and malignant tumors of lymphoid, hematopoietic and related tissues in females, and malignant tumors of the eye, brain, and other parts of the central nervous system most common in boys, but also tumors with unpredictable evolution or unknown behavior more common in girls.

The group 0-1 years and the group 5-10 years are the most affected age groups each with over one fifth of the

total episodes of hospitalization, and while in all age groups it is remarkable a descending trend, in the 0-1 year group, especially in children under 1 year, the trend is ascending. Benign tumors account for more than 80% of tumors that affect the 0-1 year group, followed by tumors with unpredictable development or behavior in a small percentage. In the age group of 5-10 years, most frequent admissions were based on malignant tumors of lymphoid, haematopoietic and related tissue, but also benign tumors and malignant tumors of the eye, brain and other parts of the central nervous system (in much smaller weight).

More than half of the children with admissions due to tumors in the period 2013-2017 come from the urban environment, with the decreasing trend, the most important one, compared with 2013. Patients in both residential areas were particularly affected by benign tumors and malignant tumors of lymphoid, haematopoietic and related tissue in close proportions. In the urban area, tumors with unpredictable or unknown behavior were encountered in an important percent and also malignant tumors of the eye, brain, and other parts of the central nervous system have been encountered in rural areas.

The duration of hospital admission due to tumors in children during the period 2013-2017 amounted to 477225 days and the average duration of hospitalization was 6.64 days. The highest values were registered in 2013, and the trend was decreasing. The longest duration of hospitalization was noted in malignant tumors of lymphoid, haematopoietic and related tissues (mean duration of approximately 10 days) followed by benign tumors with an average duration of 4 days and tumors with unpredictable evolution or unknown behavior with an average of 5.24 days.

Almost half of the hospitalized children due to the tumors were discharged in a better condition and about a quarter

as healed or stationary. However, very few percentages, below 1%, were aggravated state or deceased, but over time there was a rather significant reduction (over one third) of completed hospitalizations with an aggravated state of health or death (reduction by 25% compared to 2013). Nearly half of the hospitalized episodes of death were due to malignant tumors of the lymphoid, haematopoietic and related tissues, or malignant tumors of the eye, brain, and other parts of the central nervous system (over one fifth). The in-hospital mortality rate was around the entire 0.5% range, ranging from 0.55% in 2013 to 0.45% in 2017, with a slight downward trend from year to year.

Generally speaking, a very brief characterization of the hospitalization of the cases of children suffering from tumoral diseases can be made, but for an effective intervention to improve early diagnosis and specialized health care services, interventions among the population need to be deepened the analysis that leads to the identification of the causes and finding the solutions for the efficient and timely resolution of these cases, avoiding the complications and especially the deaths. The lack of data both at national and international level for making comparisons has been the main impediment to carrying out a more in-depth analysis of the factual situation, the national DRG database being insufficient from this point of view.

References

1. <http://www.internationalchildhoodcancerday.org/>
2. <http://www.internationalchildhoodcancerday.org/Why-Now.html>