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CROSS-SECTIONAL STUDY ON HOSPITAL ADMISSION FOR ASTHMA PATIENTS IN ROMANIA, 2008-2018

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Cross-Sectional Study on Hospital Admission for Asthma Patients in Romania, 2008-2018

Cristian VLADESCU[1], Marius CIUTAN[2], Raluca SFETCU[3]

Abstract

The current article looks on the hospital admission rates variance for asthma in the years following Romanian admission to EU. For this aim a *c*ross-sectional study for period 2008-2018 was carried out, focused on the activity of Romanian hospitals reporting primary data at the patient level in the DRG National Database. Descriptive and comparative analyses were used in order to identify the profile and trend in number of cases and rate of asthma inpatient stays. For comparison (with a probability of 95%) on Asthma Inpatient Stays Rates, a step of standardization of the crude rate and standardized ratio computation was planned. The results show that in the last ten years there is a clear tendency of decreasing hospital morbidity by asthma in number, crude rate or standardized rate and this descendent trend is statistical significant for all categories of patients related to different patient characteristics such as: age groups, sex, residence, territorial administrative units, etc. In conclusion, asthma represents an important condition for the hospitalized pathology in Romania. Hospital admissions for asthma are an indirect indicator not only for the severe asthma burden, but also for the efficacy of health care system, as good outpatient care can potentially prevent the need for hospitalization; in this respect the significant decrease of asthma hospital episodes in the last 10 years proves the importance of the introduction of the new valid diagnostic and treatment methods, even if they are more expensive initially.

Keywords: hospitalized asthma rate, avoidable hospitalization, regional health disparities.

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Introduction

Asthma is a common non-communicable chronic disease with acute episodes that is estimated to affect about 339 million people worldwide. Its prevalence in developed countries has increased over the last decades, reaching current values of 10-15% in adults and 15% in children. The incidence of the disease is steadily increasing in (with about two-thirds of asthmatic patients experiencing their first crisis during childhood). The increasing incidence of asthma is associated with an increase in the prevalence of atopy and other allergic diseases, a large proportion of people suffering from asthma having a genetic predisposition. Asthma is a cause of substantial burden of disease, including both premature death and reduced quality of life, in people of all ages in all parts of the world. Globally, asthma is ranked 16th among the leading causes of years lived with disability and 28th among the leading causes of burden of disease, as measured by disability adjusted life years (DALYs). Asthma continues to be a major source of global economic burden in terms of both direct and indirect costs. Strategies to improve access and adherence to evidence-based therapies can be effective in reducing the economic burden of asthma in both developed and developing countries (Global Asthma Network, 2018).

Data on asthma in Romania are few and they are not based on general population surveys. In Romania, there are about 1,000,000 people suffering from asthma, and 10% of them have severe asthma - according to the data provided by the Romanian Society of Pneumology (2019). As for the children, the incidence of bronchial asthma in is estimated to be 5-7% after some studies (Leru, 1999). According to The Global Asthma Report 2018, Romania is situated in the last quartile regarding both asthma symptoms and severe asthma prevalence in children 13-14 years (The Global Asthma Network, 2018). There is no recent study on burden of asthma, but multiple benefits can be brought by analyzing the burden of the disease amongst the population (including in-depth reviews of hospitalization, the level of education and work absenteeism, consumption levels, costs, complex indicators that measure the burden of the disease etc.) and by comparing data on the burden of the disease with other European countries (Torio & Andrews, 2014). Asthma hospitalized cases are considered to represent, in many cases, avoidable hospitalization, and from this perspective can give an image of the efficacy and efficiency of the ambulatory specialized system (Fingar & Washington, 2015). On asthma hospitalization rates, Romania has a lack of analysis, although data recorded at patient level are usually reported, the present paper trying to cover (some of) this unexplored area.

Methodology

Scope

The aim of this analysis is to provide valid and scientific evidence on asthma hospital episodes, which could be the basis for health decision-making regarding the efficient management of asthma and the efficient allocation of resources both at hospital level, but also at pre-hospital level (ambulatory care and community care) in different regions of Romania.

Method

This analysis is a cross-sectional study about the activity of hospitals reporting primary DRG data at the patient level in the period 2008-2018. Romania started using for hospital reporting the US DRG mechanism from 2003 (Radu, Chiriac, & Vladescu, 2010), switching towards an Australian system, and today is using a Romanian version, using the same International Classification of the Diseases, fact that made the data compatible for analysis and comparison for the entire period of time (Vladescu & Astarastoae, 2012).

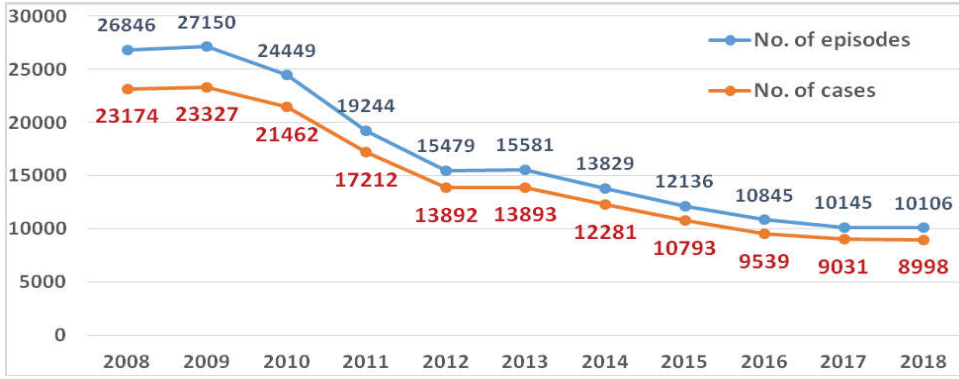
Data from the National DRG Data Base are reported monthly to the National School of Public Health, Management and Professional Development. The data on asthma hospitalization episodes in Romania were analyzed for patients with the main diagnosis included in the category of Bronchial Asthma according to the ICD-10-AM classification: J45.0 Asthma Praedominanter allergicum, J45.1 Asthma non-allergicum, J45.8 Asthma mixtum J45.9 Asthma non-specificatum; to these for specific codes we decided to include for the current analisys the patient with the code J46 Status Asthmaticus, that represent the most severe form of asthma. Data were aggregated and analysed to the hospital episodes level (no. of episodes), patient level (no. of person). Some demoFigureic aspect were analized (age, gender, patient region, hospital region, type of admission, discharge status) in order to identify pattern in utilization of hospital resources, respectively a profile of the person with hospitalized asthma. Comparisons on Asthma Inpatient Stays Rates were possible after a step of standardization of the crude rate and after computing the standardized ratio for asthma Inpatient rates that allow comparison with a probability of 95%.

Results

Trend analysis of hospital morbidity and inpatients stays rates by Asthma

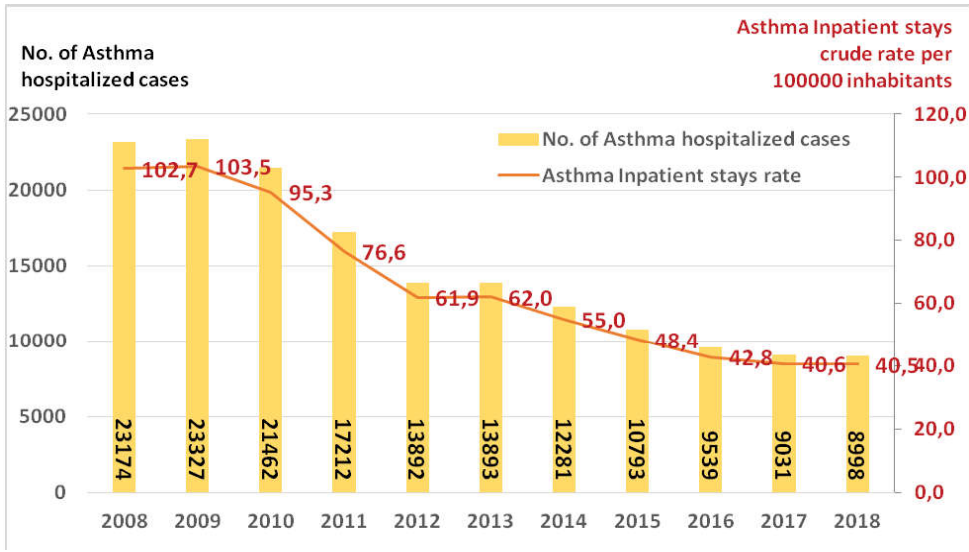
During the analyzed period, i.e. 2008-2018, the total number of asthma hospital episodes experienced a significant decrease, from 26 846 episodes to 10 106 episodes.

The same descendent trend is recorded also for persons hospitalized with asthma as main diagnostic, this indicator presenting a significant and continuous decrease: from 23174 cases in 2008 to 8998 cases in 2018 (see Figure 1), so that the cumulative change in rate, between 2008 and 2018 is about 60.5% (table 1).



Data sources: National Institute of Statisctics (Tempo online database: http://statistici.insse.ro:8077/tempo-online/) and data reported by hospitals in DRGNational Database

Figure 1: Trend in no. of episodes and cases with asthma as main diagnosis, 2008-2018, Romania



Data sources: DRG National Database (data reported by hospitals)

Figure 2: Trend in Asthma Inpatient stays crude rate, 2008-2018, Romania

Table 1: Crude Rate of inpatient stays for asthma by patients and hospital characteristics, Romania, 2008-2018

	Population (no. of inhabitants*)			**No. of cases with asthma admitted in hospital****			**Crude rate Inpatient stays per 100000 inhabitants for asthma*****			
Year	Female	Male	Total	Female	Male	Total	Female	Male	Total	% Cumm. change in asthma crude rate ******
2008	11536037	11025649	22561686	13837	9337	23174	120	85	102.71	0
2009	11529429	11012512	22541941	13962	9365	23327	121	85	103.48	-0.74 ↑
2010	11519955	10996049	22516004	12729	8733	21462	110	79	95.32	7.19 ↑
2011	11505629	10974970	22480599	10502	6710	17212	91	61	76.56	25.45 ↑
2012	11483479	10950262	22433741	8576	5316	13892	75	49	61.92	39.71 ↑

2013	11462147	10928831	22390978	8687	5206	13893	76	48	62.05	39.59 ↑
2014	11439527	10906651	22346178	7653	4628	12281	67	42	54.96	46.49 ↑
2015	11421321	10891566	22312887	6885	3908	10793	60	36	48.37	52.90 ↑
2016	11400776	10872533	22273309	6024	3515	9539	53	32	42.83	58.30 ↑
2017	11381773	10854381	22236154	5920	3111	9031	52	29	40.61	60.45 ↑
2018	11368134	10845419	22213553	5866	3136	8998	52	29	40.51	60.56 ↑

** according to data from National Institute of Statisctics (Tempo online database: http://statistici.insse.ro:8077/tempo-online/)*

*** according to data reported by hospitals in DRGNational Database*

**** Inpatient stays per 100000 inhabitants for asthma = No. of cases with asthma admitted in hospital x 100000/No. of inhabitants*

***** %Cummulative change in asthma crude rate = 100-(Inpatient stays per 100000 inh. for asthma in the certain year*100/ Inpatient stays per 100000 inh. for asthma in the year 2008); the year 2008 was chosen as reference for comparison.*

Also in terms as *standardized rates*, this descendent trend is visible through the values of this indicator for the relevant characteristics related to the patient. If the values of crude rates cannot allow us to compare the two levels (2018 vs 2008), instead the standardized rates represents the main method to compare morbidity rates by calculating estimations of specific morbidity rates when keeping the same structure (by age and or sex) as reference. For our analysis, the standard was chosen the year 2018 and we used for standardization the indirect method.

Also, the standardized ratio for Asthma Inpatient stays was calculated in order to identify the statistical significance of the observed differences. As we can notice from Table 2, the tendency of decreasing values for Asthma Inpatient stays rate is also recorded after standardization. The lowest change in standardized rates is for patients aged 65+ years (24% decreasing 2018 vs 2008) while the highest decreasing is recorded for children aged 0-9 years (76-77% decreasing).

Table 2: Standardized Rate of pediatric and adult inpatient stays for asthma by patient and hospital characteristics, Romania, 2008-2018

				Asthma Inpatient stays Rates per 100000 inhabitants				
Characteristic		Crude rate		Standardized rate		Cummulative change in standardized rate, 2008-2018, %	Standardized ratio for Asthma Inpatient Stays*	Statistical Significance **
		2008	2018	2008	2018			
Age group	Children 0-17 years	147.0	40.2	3171	801	74.74	5.20	p=0.05
	<5	220.3	54.7	1262	284	77.53	4.03	p=0.05
	5-9 years	195.7	48.6	1133	272	76.00	4.03	p=0.05
	10-14 years	92.7	28.7	546	164	69.87	3.23	p=0.05
	15-17 years	55.5	23.8	230	81	64.74	2.42	p=0.05
	Adults 18+ years	92.3	40.6	8561	3843	55.11	3.15	p=0.05
	18-64 years	85.0	29.9	6372	2185	65.71	2.84	p=0.05
	65+ years	125.7	84.0	2189	1658	24.26	1.50	p=0.05
Sex	Male	84.68	28.91	5325	3130	60.9	2.30	p=0.05
	Female	119.94	51.6	6017	2349	41.2	2.50	p=0.05
Residence	Rural	97.31	141.20	453	248	45.15	2.60	p=0.05
	Urban	33.10	37.99	509	220	56.73	2.90	p=0.05

* *Standardized ratio for Asthma Inpatient Stays = No. of cases observed/No. of cases expected*

** *Significant difference at a significance threshold of 5% if value 1 is in the range between Upper Limit and Lower Limit calculated for standardized ratio*

Analysis of hospitalizations with Asthma as main diagnosis by patient and hospital characteristics

Analysis by patient characteristics highlights the descendent trend visible among all subsets of patients with different characteristics; in this regard, the cumulative change (2018 versus 2008) in no. of cases with asthma as main diagnosis ranged between 28-78%. The highest change appears among children aged 0-4 years with a 78% decrease, respectively among children aged 5-9 years with a 76% decrease. The lowest change is recorded among patients aged 65+ years with 28% decrease. By regions, the highest change is in the region C (Centre) with 71-73% decrease and the lowest in the region V (West) with 41-43% decrease, respectively in the region SE with 45-48% decrease. A lower decrease was recorded among women compared with men (57% vs. 66%), but also among patients with rural residence compared to urban (55% vs. 65%) (*Table 3*).

Table 3: No. of hospital cases for asthma by patient and hospital characteristics, Romania, 2008-2018

Characteristic		**Asthma**		
	No. of hospital cases		Cummulative change in no., 2008-2018, %	
	2008	2018		
Overall total		23174	8998	60.56
Age group	Children 0-17 years	6317	1594	74.77
	<5	2514	564	77.57
	5-9 years	2254	541	76.00
	10-14 years	1089	327	69.97
	15-17 years	460	162	64.78
	Adults 18+ years	16854	7405	56.06
	18-64 years	12742	4369	65.71
	65+ years	4112	3032	26.17

Sex	Male	9337	3136	66.41
	Female	13837	5862	57.61
Residence	Rural	9485	4243	55.27
	Urban	13689	4755	65.23
Patient region	BI	1894	640	66.21
	C	2561	751	70.68
	NE	3685	1210	67.16
	NV	3693	1148	68.91
	S	3635	1768	51.36
	SE	2133	1108	48.05
	SV	2984	965	67.66
	V	2589	1408	45.46
Hospital region	BI	3166	1042	67.09
	C	2507	677	73.00
	NE	3569	1161	67.47
	NV	3926	1217	69.00
	S	2939	1608	45.29
	SE	1932	1055	45.39
	SV	2658	833	68.66
	V	2477	1405	43.12

** Rates were adjusted by age and sex using the total population in 2018, Romania; for analysis by age, the rates were adjusted by sex;*

for analysis by sex, the rates were adjusted by age.

Stratified rates are per each category in age group, sex, patient region or hospital region and is expressed at 100000 inhabitants

*** Significant = if 100 is in the range between Upper Limit and Lower Limit of Standardized report for Inpatient stays*

Note: the cumulative change is presented between the two ends of the last ten years period; a linear decreasing trend is recorded for all categories for the period 2008-2018

By age group

In the year 2018, the average age recorded for these 10.106 hospitalized episodes is 56 years; children aged 0-17 years represent 17%, while adults 18+ years represent 82.3%; in comparison with the year 2008, the % structure by age groups is changed in the sense that the proportion of adults 18+ increased with 9.5% (from 72.7% in 2008 to 82.3% in 2018) and the proportion of children aged 0-17 years decreased with the same percentage (from 27.3 in 2008 to 17.7% in 2018).

Corroborating these percentages with the absolute no. of hospital cases and with the values calculated for standardized ratio for asthma inpatient stays, a significant decrease in children aged 0-9 years (five times smaller in 2018) can be observed as well as a stagnation in the number of cases aged 65+ years (only a slight decrease); also a direct correlation between standardized ratio for asthma inpatient stays and age groups was identified (Spearman corr= -0.82; p-value<0.005) and this correlation shows the decrease being highest in children and smallest in elderly.

Table 4: No. and % of hospital cases for asthma by age group, Romania, 2008-2018

	No. of hospital cases		**Decreasing in no.**	**% of hospital cases**		**Difference % 2008-2018**	**Decreasing in %**
YEAR	2008	2018		2008	2018	2008-2018	2008-2018
Children 0-17 years	6317	1594	↓↓↓	27.3	17.7	9.5	↓
<5	2514	564	↓↓↓↓↓	10.8	6.3	4.6	↓
5-9 years	2254	541	↓↓↓↓↓	9.7	6.0	3.7	↓
10-14 years	1089	327	↓↓↓	4.7	3.6	1.1	↓
15-17 years	460	162	↓↓↓	2.0	1.8	0.2	↓
Adults 18+ years	16854	7405	↓	72.7	82.3	-9.5	↑
18-64 years	12742	4369	↓↓↓	55.0	48.5	6.4	↓
65+ years	4112	3032		17.7	33.7	-16.0	↑
	23171	8999		100.0	100.0		

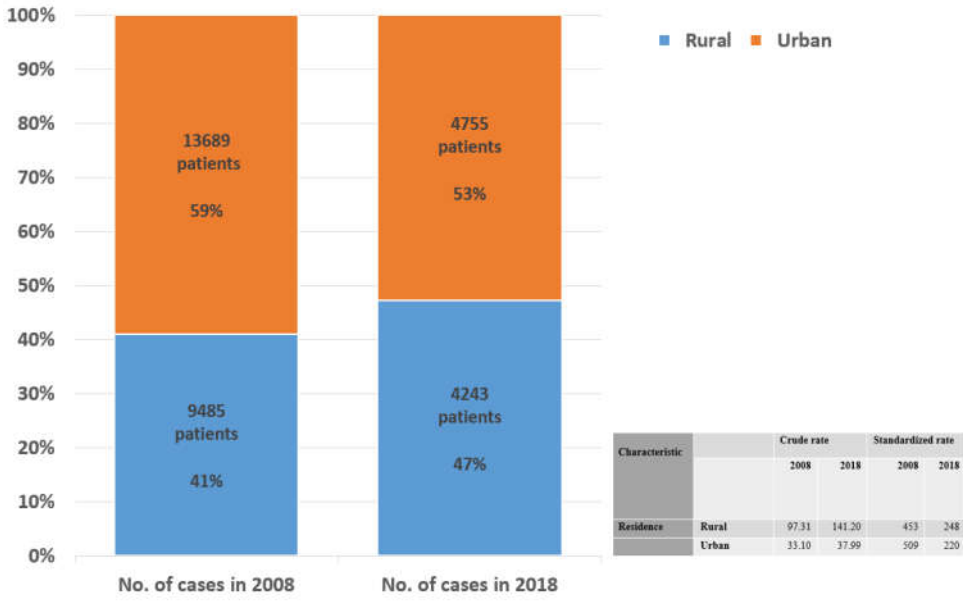
By residence

About 4243 patients in rural areas and 4755 patients in urban areas were admitted to the hospital with Asthma as main diagnosis, in the year 2018. In comparison with the year 2008, the situation shows a decreasing from 9485 patient in rural areas and from 13689 patients in urban areas.

Adjusted by total inhabitants, the crude rate values highlight the existence of a predominance of rural patient as opposed to urban ones (141 patients from 100 000 inhabitants in rural, respectively 38 patients from 100 000 inhabitants in urban, in the year 2018). In comparison, in 2008, about 97 patients from 100 000 inhabitants in rural, respectively 33 patients from 100 000 inhabitants in urban were admitted in hospital with asthma as main diagnosis.

One explanation of this finding could be the existence of high inequalities in distribution of health resources in rural versus urban areas (Vladescu, Astarastoae, & Scintee, 2010). That situation leads to an increased proportion of asthma patients which cannot receive proper asthma treatment outside the hospital. Other explanation could be a different structure of population in the two residence areas (by age and sex) and this assumption is sustained by the values of standardized rates for asthma inpatient stays by residence.

The values show the difference in population structure by age and sex have a great influence on the expected hospitalized cases with asthma of patients living in rural and urban areas. After standardization, the rates changed so that the differences have diminished greatly, the values of standardized rates for the year 2018 being: 248 patients per 100000 inhabitants in rural versus 220 patients per 100000 inhabitants in urban, still maintaining the rural/urban divide but at lower degree (*Figure 3*).



Characteristic		Crude rate		Standardized rate	
		2008	2018	2008	2018
Residence	Rural	97.31	141.20	453	248
	Urban	33.10	37.99	509	220

Figure 3: Comparative situation of indicators for Asthma Inpatient stays by patient residence, Romania, 2008 vs. 2018

The territorial profile of hospitalized episodes with asthma as the main diagnosis

By Patient District

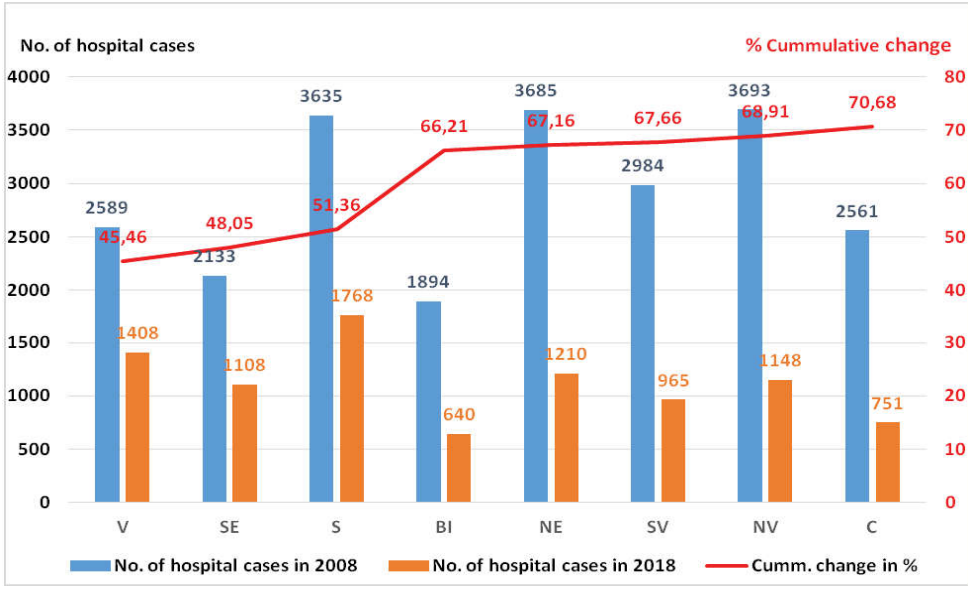
For the year 2018, in absolute figures, in the districts placed in the south of the country (Prahova, Bucuresti, Arges, Constanta, Gorj) have recorded the most frequent episodes of hospitalization by asthma. But, in order to adjust the influence given by the big number of population in some districts, a rate of hospitalization was calculated by dividing the admissions to the population in each district. In rate figures, situation is changed, in the sense that the highest values of the rate is recorded in districts like: Hunedoara, Gorj, Prahova, Caras-Severin, Arges, Alba; Bucuresti district is ranged on the 34 position with 25.7 episodes/100000 inhabitants from the patient district.

By regions

For the year 2008, in absolute figures, the highest no. of cases admitted in hospital with asthma as main diagnosis is encountered in the regions in north (region NV with 3693 cases, region NE with 3695 cases) and south of the country (region S with 3635 cases) – Figure 4. The smaller no. of cases was recorded in region BI (1894 cases) and SE (2133 cases).

For the year 2018, the situation in territorial profile is completely different, the only one similarity being that in all the 8 regions of the country, the number of cases has decreased.

This observed decrease has been more pronounced in regions such as C, NV, SV, NE, while in the other regions (V, SE, S, BI), the decreasing was high (see *Figure 4*).



*Note: % Cummulative change in no. of hospital cases = 100-(No. of hospital cases with asthma in the year 2018 *100/ No. of hospital cases with asthma in the year 2008); the year 2008 was chosen as reference for comparison*

Figure 4: No. of hospital cases with Asthma by patient region, Romania, 2008 vs. 2018

In the year 2018, the highest no. of cases are in the region S (1768 cases with hospitalized asthma), V (1408 cases with hospitalized asthma), NE (1210 cases with hospitalized asthma) and NV (1148 cases with hospitalized asthma), while the smaller no. of cases are in regions such as: BI (640 cases with hospitalized asthma), C (751 cases with hospitalized asthma) and SV (965 cases with hospitalized asthma).

By adjusting these figures by the number of inhabitants in each region, for the year 2018, we have identified regions where rates are higher than rate for Romania (BI, C, NE, SE), respectively regions where the rates are smaller than the rate for Romania (V, SV,S) - table 5 In. conclusion, in 2018 patients with residence in regions in South and West of the country were admitted more frequently in hospital for Asthma, in comparison with patients in regions in North and East of the country.

Table 5: Crude rate for Asthma Inpatient stays by region, Romania, 2008-2018

	Population		No. of hospitalized cases with Asthma		Crude rate for Asthma Inpatient stays		Comparison with Romania*
REGION	Year 2008	Year 2018	Year 2008	Year 2018	Year 2008	Year 2018	
BI	2458918	2536859	1894	640	77.0	25.2	↓↓
C	2651116	2633402	2561	751	96.6	28.5	↓↓
NE	3894241	3958248	3685	1210	94.6	30.6	↓
NV	2851206	2835510	3693	1148	129.5	40.5	
S	3390514	3219020	3635	1768	107.2	54.9	↑
SE	2950418	2844235	2133	1108	72.3	39.0	↓
SV	2315536	2179006	2984	965	128.9	44.3	↑
V	2049737	2007273	2589	1408	126.3	70.1	↑↑
ROMANIA	22561686	22213553	23174	8998	102.7	40.5	

**↓=the crude rate is significantly lower compared to the crude rate of Romania; ↑ = he crude rate is significantly higher compared to the crude rate of Romania (test by chi square)*

The access to the specialized hospital services was analyzed by calculating, for the year 2018, the percentage of patient with residence in the same district with the district of hospital where patient is hospitalized. This indicator could approximate the capacity of the local health care system to treat asthma patients in the same district. In this regard, table 7 shows a high capacity of managing cases with asthma in districts with university centers (Bucuresti, Cluj, Iasi, Timis, Mures) where the number of hospitalization for asthma is 1.2-2 times bigger than the hospitalizations of patient with residence in the same district. The highest figure is recorded in Bucuresti for Asthma non-allergicum (338% hospital episodes).. At the opposite pole is Bistrita-Nasaud where only 16 episodes from all 67 episodes of the persons with the residence in Bistrita-Nasaud were admitted in hospitals from this district. The rest of 51 persons were forced to go in other districts for hospitalization.

Table 7: Percentage of patient admitted in hospitals in the same district with the district of patient (ordered by Total), Romania, 2018

District	Admission episodes by Patient District (a)	Admission episodes by Hospital District (b)	% of Patient admitted in hospitals in the same district with the district of patient						% of Patient residenced in different district than hospital district 100-a*100/b (%)
			J45.0 (%)	J45.1 (%)	J45.8 (%)	J45.9 (%)	J46 (%)	Total (%)	
BUCURESTI	546	1087	183.9	338.2	143.1	181.4	180.0	199.1	49.8
CLUJ	420	621	147.9	154.1%	143.1	152.3	108.3%	147.9	32.4
IASI	392	495	127.6	104.8	132.4	125.2	150.0	126.3	20.8
TIMIS	339	404	149.2	108.3	100.0	117.8	104.2	119.2	16.1
MURES	192	211	111.1	100.0	116.1	106.2	100.0	109.9	9.0
PRAHOVA	760	805	107.0	94.4	103.7	113.2	92.3	105.9	5.6
HUNEDOARA	757	792	77.6	109.6	108.4	100.0	66.7	104.6	4.4
GALATI	375	383	103.0	100.0	100.0	103.2	60.0	102.1	2.1
CONSTANTA	436	438	98.8	91.7	100.7	102.3	100.0	100.5	0.5
VILCEA	230	231	100.0	72.7	91.7	110.5	111.1	100.4	0.4
BIHOR	311	312	96.4	100.0	101.1	101.5	100.0	100.3	0.3
GORJ	430	430	100.0	33.3	103.7	92.3	96.4	100.0	0.0
DOLJ	225	224	94.9	128.6	94.6	94.6	120.0	99.6	-0.4
BRAILA	164	160	72.7	0.0	100.0	100.0	102.5	97.6	-2.5
BACAU	275	266	96.0	12.5	86.7	103.6	91.7	96.7	-3.4
SIBIU	76	73	86.2	83.3	109.1	103.6	100.0	96.1	-4.1
COVASNA	48	46	93.8	100.0	87.5	100.0	100.0	95.8	-4.3
BRASOV	151	142	93.8	92.3	105.0	87.1	100.0	94.0	-6.3
MARAMURES	247	232	99.2	100.0	93.2	79.6	100.0	93.9	-6.5
ARGES	452	422	97.4	81.2	97.3	91.0	97.0	93.4	-7.1
NEAMT	240	213	88.7	83.3	69.6	95.0	100.0	88.8	-12.7
HARGHITA	132	117	100.0	100.0	52.9	87.5	96.3	88.6	-12.8
MEHEDINTI	90	78	83.9	0.0	94.3	86.4	-	86.7	-15.4
IALOMITA	154	132	75.7	46.2	103.2	91.2	80.0	85.7	-16.7
VRANCEA	80	68	100.0	0.0	50.0	85.2	50.0	85.0	-17.6
CARAS-SEVERIN	279	232	54.1	83.3	74.2	83.7	96.8	83.2	-20.3
TELEORMAN	168	139	69.2	26.7	96.4	90.5	75.0	82.7	-20.9
SATU MARE	138	113	75.9	70.0	87.1	76.0	105.6	81.9	-22.1
BOTOSANI	158	124	62.3	66.7	93.1	83.8	100.0	78.5	-27.4
GIURGIU	124	93	77.6	100.0	81.8	62.5	100.0	75.0	-33.3
ARAD	199	142	61.8	69.6	29.7	92.9	108.3	71.4	-40.1
CALARASI	146	104	74.5	28.6	84.4	66.7	50.0	71.2	-40.4
SUCEAVA	142	100	73.6	40.0	74.1	43.8	100.0	70.4	-42.0
DIMBOVITA	185	129	56.4	11.1	74.5	66.7	106.8	69.7	-43.4
BUZAU	105	73	41.4	0.0	50.0	85.5	100.0	69.5	-43.8

ALBA	237	162	77.2	33.3	82.4	52.4	90.0	68.4	-46.3
VASLUI	140	95	35.0	0.0	98.3	42.9	91.7	67.9	-47.4
TULCEA	60	39	69.6	0.0	85.0	42.9	-	65.0	-53.8
SALAJ	90	54	13.3	0.0	90.0	61.5	100.0	60.0	-66.7
OLT	195	72	69.8	1.3	88.4	10.3	0.0	36.9	-170.8
ILFOV	151	37	9.5	47.6	61.5	24.4	22.2	24.5	-308.1
BISTRITA-NASAUD	67	16	7.4	0.0	27.3	43.5	100.0	23.9	-318.8
Grand Total	10106	10106	100.0	100.0	100.0	100.0	100.0	100.0	0.0

Conclusion

In the last ten years (2008-2018), there is a decrease tendency for hospital morbidity due to asthma in number, crude rate and standardized rate and this descendent trend is statistical significant for all categories of patients, regardless of age groups, sex, residence, territorial administrative units. The average profile of the patient using the hospital resources for acute episodes of asthma in the last 10 years (2008-2018) could be characterized by: adult 18+ years (73-83%), female (55-65%), admitted for diagnosis and treatment that could not be made in the pre-hospital sector or admitted as emergency (especially for complications of asthma).

The most frequent type of hospitalized asthma is that with allergic component (almost one third), especially among children and women, while status asthmatics (6%) and Asthma non-allergicum (under 10%) are the less frequent type. Hospital admissions for asthma are an indirect indicator for the severe asthma burden and for the efficacy of care, and deaths due to asthma are of serious concern because most of them are preventable (Russo, Jiang, & Barrett 2007). Health policies (including strategic measures for asthma within the respiratory diseases domain) must be based on valid and solid evidence collected by surveys in general population and completed by periodic analysis of the hospital services use. In Romania, the lack of scientific evidence on asthma indicators should encourage health authorities to provide their support in collecting routine data and to monitor trends in asthma over time. Other actions that should be undertaken in Romania are conducting a indirect costs assessment of asthma, especially in terms of its negative impact on productivity or improving access to care and adherence to evidence-based treatment (Global Asthma Network, 2018).

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References

Fingar K., & Washington, R. (2005). *Potentially Preventable Pediatric Hospital Inpatient Stays for Asthma and Diabetes, 2003–2012. HCUP Statistical Brie #192*. Agency for Healthcare Research and Quality, Rockville, MD. http://www.hcup-us.ahrq.gov/reports/statbriefs/sb192-Pediatric-Preventable-Hospitalizations-Asthma-Diabetes.pdf

Global Asthma Network (2018). The Global Asthma report 2018, http://www.globalasthmareport.org/Global%20Asthma%20Report%202018.pdf

Leru, P. (1999). Bronsic asthma - 200 questions and answers. In: *Epidemiology*, 1999 sau online edition in 2000, published with the support of GlaxoSmithKline Romania, http://astmulbronsic.tripod.com/cap0102.htm

Radu, C.P., Chiriac, D,N., Vladescu, C. (2010). Changing Patient Classification System for Hospital Reimbursement in Romania. *Croatian Medical Journal*, *51*(3), 250-258.

Romanian Society of Pneumology (2019). *Press release for launching the health project: It's time to treat asthma differently*. Retrived on https://www.puterea.ro/sanatate/

Russo, C.A., Jiang, H.J., & Barrett, M. (2007). *Trends in Potentially Preventable Hospitalizations among Adults and Children, 1997-2004. HCUP Statistical Brief #36*. Agency for Healthcare Research and Quality, Rockville, MD. http://www.hcup-us.ahrq.gov/reports/statbriefs/sb36.pdf

Torio, C.M. & Andrews, R.M. (2014). *GeoFigureic Variation in Potentially Preventable Hospitalizations for Acute and Chronic Conditions, 2005-2011. HCUP Statistical Brief #178*. Agency for Healthcare Research and Quality, Rockville, MD. http://www.hcup-us.ahrq.gov/reports/statbriefs/sb178-Preventable-Hospitalizations-by-Region.pdf

Vladescu, C. & Astarastoae, V. (2012). Integrating Health Services Within The Health Reform Policy In Romania. *Revista Romana de Bioetica*, *10*(2), 78-90.

Vladescu, C., Astarastoae, V., Scintee, S.G. (2010). A Health System Focused On Citizen's Needs. Romania. Hospital Services, Primary Health Care and Human Resources. Solutions. *Revista Romana de Bioetica*, *8*(4), 89-99.