HOSPITAL MORBIDITY SPECTRUM AMONG CHILDREN 0-17 YEARS IN ROMANIA

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CONTEXT: *At the hospitals level, a large volume of resources is consumed, and efficient allocation of resources must be done based on valid and scientific evidence. As these resources are complex and vary for different categories of the population, the analysis of needs by age groups can support decision-making and the development of appropriate policies.*

The purpose of this analysis was to identify patterns of hospital morbidity among children 0-17 years and to provide evidence that can support the decision making process in the field of efficient allocation of resources.

METHOD: *Cross-sectional study performed on data on hospital activity at patient level, in the year 2019. The DRGNational 2019 database was interrogated and data on the level of hospital morbidity in children 0-17 years were extracted. Indicators were calculated, for measuring the level of hospital activity, such as: number of hospitalization episodes, proportion of hospitalizations in total hospitalizations, density of hospitalizations among children. Data were analyzed by age categories 0-1 years, 1-4 years, 5-9 years, 10-14 years and 15-17 years; data were aggregated at national level, and for certain aspects, the data were also aggregated at county level.*

RESULTS: *The analysis of the spectrum of pathologies highlights major differences between the age groups within the category of children 0-17 years, both in terms of their frequency in the top of pathologies for each major age category and in terms of their proportion of total hospitalizations. The spectrum of pathologies among children 0-17 years old hospitalized in Romanian hospitals is dominated by respiratory and digestive diseases, parasitic diseases and ENT diseases, and for each age group there are specificities of the hospitalization model.*

CONCLUSIONS: *The evidence from this study shows that there are large variations between pediatric hospital morbidity models identified, and these variations require in-depth analysis, on each population segment, in order to provide valid evidence to support decisions on efficient allocation of hospital resources in territorial profile.*

Keywords: major diagnosis categories, pediatric, Romania, morbidity

INTRODUCTION

Similar to the pathologies encountered in adults, the spectrum of pediatric pathologies includes the same common pathologies that occur at any age, but also a set of pathologies specific in children, which do not occur beyond the age of 18 years.

A number of features of the population segment <18 years are derived or are focused on the conditions around birth and postnatal or those of infancy and growth and development that are particular to different age subgroups; these particularities are manifested in the form of differences in statutory growth and weight, in physical and neuropsychic development, in the specific nutritional needs of each age subsegment, and implicitly in the form of differences that could be highlighted in morbidity patterns.

If we take into account the fact that most often a newborn begins his life in a hospital and a careful hospital care is required in the vast majority of diseases of the newborn, but also if we consider that pediatric symptoms are not so well expressed among children, we can appreciate that pediatric hospitalization is a common process for resolving pediatric pathologies, especially of the newborn and young child.

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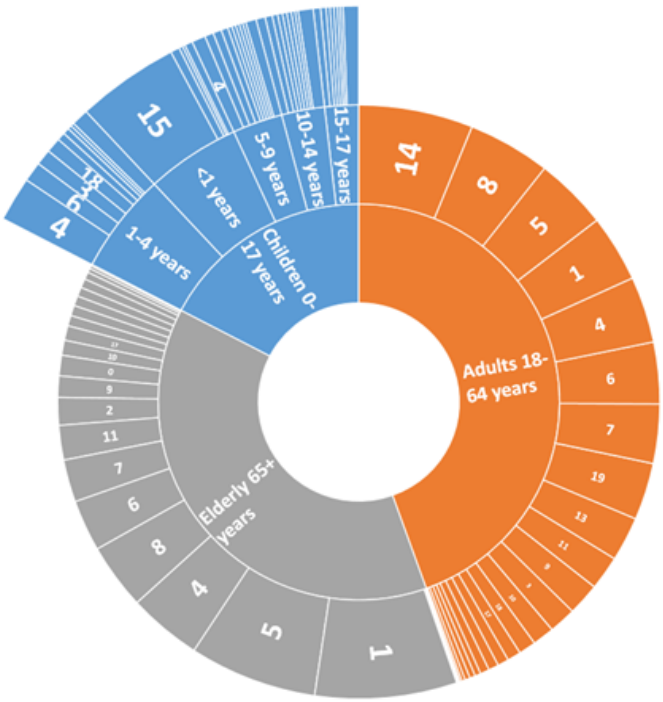
RESULTS

In the year 2019, there were recorded about 4,150,631 hospitalizations in Romania. Of this total, over half of the cases were registered among children (0-17 years) - 17.3% and the elderly (65+ years) - 38.1%. Thus, at the level of one year (in this case, the year 2019), in the Romanian hospitals were registered 719717 hospitalization episodes of children 0-17 years, respectively almost 1 hospitalization episode in 5 children 0-17 years, on average (with about 18.2 hospitalization episodes in 100 children 0-17 years). (Table 1, Graph 1)

Table 1. The situation of hospitalizations by large age groups, Romania, 2019

	Hospitalization		Hospitalization rate	
	No	%	No. of population	No. of hospitalizations/population
Age group	a	b	c	a*100/c
0-17 year	719717	17.34%	3944199	18.2%
18-64 ani	1848220	44.53%	14587604	12.7%
65+ ani	1582424	38.13%	3672704	43.1%
All	4150361	100.00%	22204507	18.7%

Graph 1. Proportion of hospitalizations of the total, by major age category



The spectrum of pathologies for each major age group, analyzed in the light of the major diagnostic categories (MDC) from the list presented in the box 1 shows major differences between the three major age categories, both in terms of their frequency in the top pathologies in each major age group, as well as their proportion of total hospitalizations.

Therefore, if for the major age category of children 0-17 years, MCD 15 Newborns and other neonates (in children under 1 year) and MCD 04 Diseases and disorders of the respiratory system (in children over 1 year) are in the top of pathologies, we notice also that the top 3 of pathologies consists of MCD 14 Pregnancy, birth and childbirth, MCD 08 Diseases and disorders of the musculoskeletal system and connective tissue and MCD 05 Diseases and disorders of the circulatory system; in the elderly (major age group over 65 years), in the top 3 of the most common pathologies we find MCD 01 Diseases and disorders of the nervous system, MCD 05 Diseases and disorders of the circulatory system and MCD 04 Diseases and disorders of the respiratory system.

From this analysis we can observe, for example only for the major age group 0-17 years that the spectrum of these pathologies also differs within this major age group, depending on the age subcategory. Next, the analysis focused on identifying the most common pathologies in children 0-17 years and the particularities of each subgroup.

Hospital morbidity among children 0-17 years in Romanian hospitals, 2019

Number of hospitalization episodes

By far, most hospitalization episodes among children were registered for the category of children aged 0-1 years (210771 hospitalizations) and 1-4 years (225994 hospitalizations), which together account for over 60% of hospitalizations in Romanian hospitals among children 0-17 years (table 2 and graph 2).

The density of hospitalizations among children 0-1 years was the highest, just over 1 hospitalization at least for every child 0-1 years, while for the other age subgroups there were lower values of this indicator: 27 hospitalizations per 100 children 1-4 years, 11 hospitalizations per 100 children 5-9 years, 9 hospitalizations per 100 children 10-14 years and 12 hospitalizations per 100 children 15-17 years. It can be concluded that, among children, the greatest need for hospital services (measured both in terms of the absolute number of hospitalizations and the density of hospitalizations in the population) is among children 0-1 years, followed by the group of children 1-4 years. Resource allocation policies should be supported by evidence on the values of these indicators, and the dynamic analysis of these indicators, complemented by in-depth territorial analyzes can focus on the real need for pediatric hospital care at the territorial level.

Box 1. List of the analyzed major diagnosis categories (MDC)

1 MDC 01 Diseases and disorders of the nervous system
2 MDC 02 Eye diseases and disorders
3 MDC 03 Diseases and disorders of the ear, nose, mouth and throat
4 MDC 04 Diseases and disorders of the respiratory system
5 MDC 05 Diseases and disorders of the circulatory system
6 MDC 06 Diseases and disorders of the digestive system
7 MDC 07 Diseases and disorders of the hepatobiliary system and pancreas
8 MDC 08 Diseases and disorders of the musculoskeletal system and connective tissue
9 MDC 09 Diseases and disorders of the skin, subcutaneous tissue and breast
10 MDC 10 Endocrine, nutritional and metabolic diseases and disorders
11 MDC 11 Diseases and disorders of the kidney and urinary tract
12 MDC 12 Diseases and disorders of the male reproductive system
13 MDC 13 Diseases and disorders of the female reproductive system
14 MDC 14 Pregnancy, birth and childbirth
15 MDC 15 Newborns and other neonates
16 MDC 16 Diseases and disorders of the blood and hematopoietic organs and immunological disorders
17 MDC 17 Neoplastic disorders (hematological and solid neoplasms)
18 MDC 18 Infectious and parasitic diseases
19 MDC 19 Mental illness and disorder
20 MDC 20 Alcohol / drug use and organic alcohol / drug induced mental disorders
21 MDC 21 Accidents, poisoning and toxic effects of drugs
22 MDC 22 Burns
23 MDC 23 Factors influencing health status and other contacts with health services
24 DRG deviation
0 Pre-MDC

Table 2. The situation of hospitalizations by age groups, Romania, 2019

Age category	No. of hospitalisations	% of hospitalisations	Population	Hospitalisations*100/population
0-1 an	210771	29.3%	204849	102.89
1-4 ani	225994	31.4%	837435	26.99
5-9 ani	111633	15.5%	1085156	10.29
10-14 ani	95857	13.3%	1148426	8.35
15-17 ani	75462	10.5%	668333	11.29
Total of hospitalization 0-17 ani	**719717**	**100.0%**	**3944199**	**18.25**

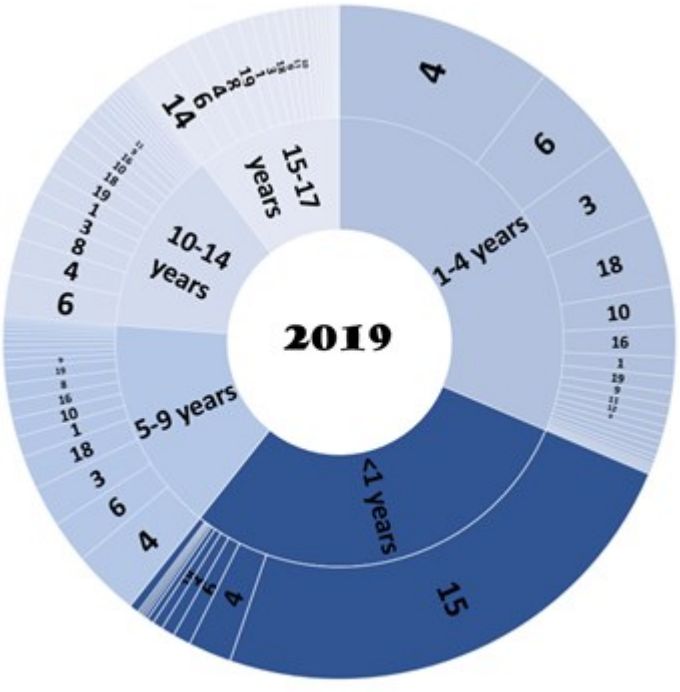
The spectrum of pathologies among children 0-17 years old hospitalized in Romanian hospitals, 2019

As can be seen in Figure 2, the hospitalized pathologies (major diagnosis categories MDC) are encountered with different frequencies within different age groups among children.

For all age subgroups, two pathologies are encountered with high frequency and are found in the top 3 of the pathologies within each age subgroup, respectively MDC 04 Diseases and disorders of the respiratory system and 6 MDC 06 Diseases and disorders of the digestive system. There are also some notable differences for each age group, and these are due to the specificities of that age group. Thus, MDC 15 Newborns and other neonates appears on the first place in the top of pathologies for the subgroup 0-1 year, and in the subgroup 15-17 years appears in the top MDC 14 Pregnancy, birth and childbirth.

MDC 18 Infectious and parasitic diseases is found in the top positions in children under 10 years, so that they go down good positions in children over 10 years, while MDC 03 Diseases and disorders of the ear, nose, mouth and throat occurs on leading positions in children under 15 years and then later, in children 15-17 years to go down good positions in the top.

Graph 2. The spectrum of pathologies in children 0-17 years old hospitalized in Romanian hospitals, 2019



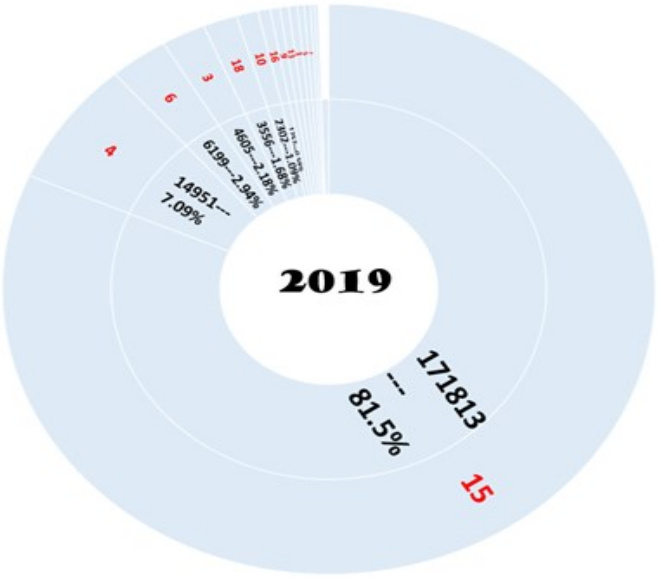
At a first analysis, it can be stated that the spectrum of pathologies among children 0-17 years hospitalized in Romanian hospitals is dominated by respiratory and digestive diseases, followed by parasitic diseases and ENT diseases, and pathological specificities are found for each age group specific. (Graph 2)

The spectrum of pathologies among children 0-1 years

Over 81.5% of the hospitalizations of children 0-1 years old, respectively 171813 hospitalizations were for pathologies included in MDC 15 Newborns and other neonates, and about 90% of the hospitalizations of children 0-1 years old were included in the category of New- born and other neonates and Diseases and disorders of the respiratory system.

The remaining 10% of hospitalizations had various pathologies in the category of Digestive Diseases, Parasitic and Infectious Diseases, ENT Diseases and other diseases (Graph 3).

Graph 3. The spectrum of pathologies in children 0-1 year old hospitalized in Romanian hospitals, 2019



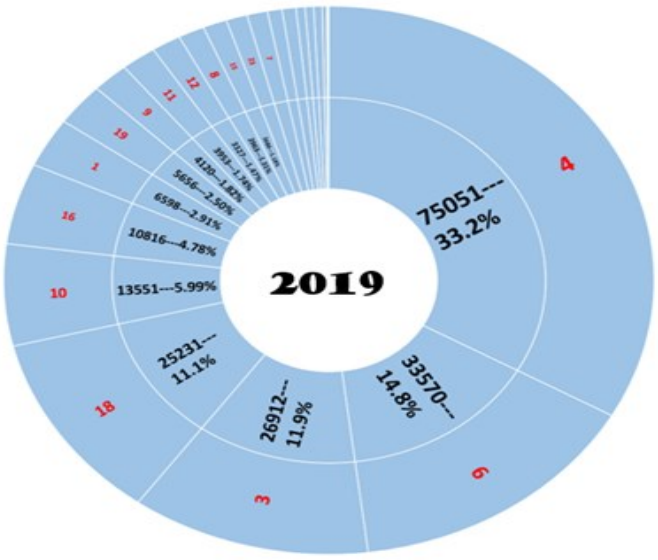
The spectrum of pathologies among children 1-4 years

One third (33.2%) of hospitalizations of children 1-4 years, respectively 75051 hospitalizations were with pathologies included in MDC 04 Diseases and disorders of the respiratory system, and over three quarters (77%) of hospitalizations of children 1-4

years were classified in the diagnostic categories of:
-Respiratory diseases and disorders;
- Diseases and disorders of the digestive system;
- Diseases and disorders of the ear, nose, mouth and throat;
- Infectious and parasitic diseases;
- Endocrine, nutritional and metabolic diseases and disorders.

The remaining 23% of hospitalizations had various pathologies included in the category of Diseases and disorders of the blood and hematopoietic organs and immunological disorders (about 5%), Diseases and disorders of the nervous system (about 3%), Mental diseases and disorders (about 2.5%) and other conditions with less than 2% share of hospitalizations (graph 4).

Graph 4. The spectrum of pathologies in children 1-4 years old hospitalized in Romanian hospitals, 2019



The spectrum of pathologies among children 5-9 years

In the subgroup of children 5-9 years old, the distribution of hospitalized pathologies is somewhat more uniform, in the sense that the first three CMDs registering less than half (46%) of the hospitalized pathologies in this age category:

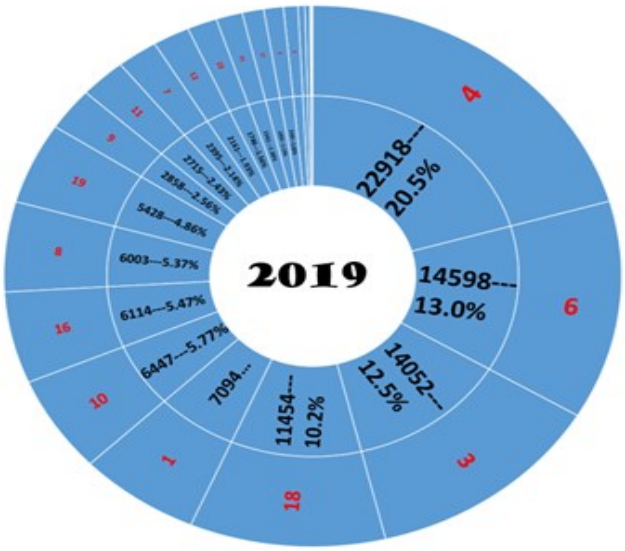
- Respiratory diseases and disorders 20.5%;
- Diseases and disorders of the digestive system 13%;
- Diseases and disorders of the ear, nose, mouth and throat 12.5%.

The spectrum is completed by Infectious and Parasitic Diseases, Endocrine, Nutritional and Metabolic Diseases and Disorders, Blood and Hematopoietic Diseases and Immune Disorders (about 5%), Nervous System Diseases and Disorders, Endocrine, Nutritional and Metabolic Diseases and Disorders and other conditions (graph 5).

The spectrum of pathologies among children 10-14 years

As age increases, it can be seen how the spectrum of pathologies becomes more uniform, so that the first four pathologies register less than half (46.2%) of hospitalizations in the age group 10-14 years, and the top places are reversed:

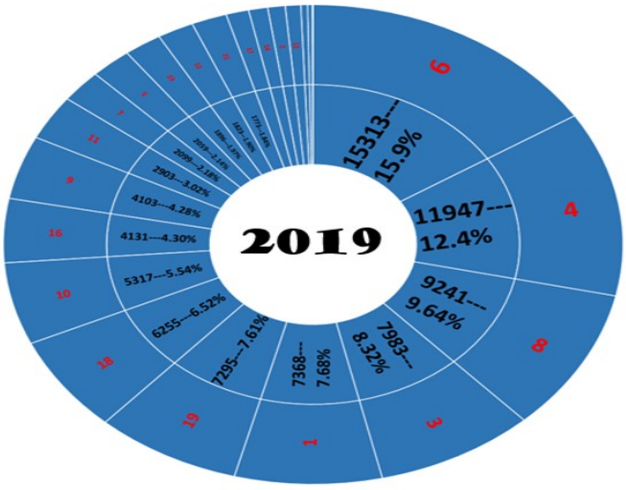
Graph 5. The spectrum of pathologies in children 5-9 years old hospitalized in Romanian hospitals, 2019



- Diseases and disorders of the digestive system 15.9%;
- Diseases and disorders of the respiratory system 12.4%;
- Diseases and disorders of the musculoskeletal system and connective tissue 9.6%;
- Diseases and disorders of the ear, nose, mouth and throat 8.3%.

The spectrum is completed by MDC 01 Diseases and disorders of the nervous system and MDC 19 Diseases and mental disorders with about 8% of the hospitalizations of this age group (graph 6).

Graph 6. The spectrum of pathologies in children 10-14 years old hospitalized in Romanian hospitals, 2019

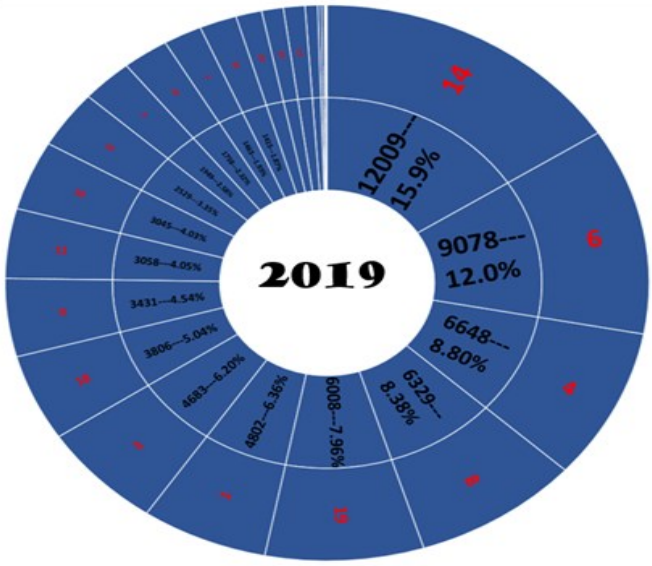


The spectrum of pathologies among children 15-17 years

The same tendency of uniformity of the spectrum is observed for this age category, as well as the maintenance on leading positions of Diseases and disorders of the nervous system and Diseases and mental disorders. Specifically, on the first position of the top appears the pathologies included in MDC 14 Pregnancy, birth and childbirth

(12009 hospitalizations, representing 15.9% of hospitalizations within the age group 15-17 years) - graph 7.

Graph 7. The spectrum of pathologies in children 15-17 years old hospitalized in Romanian hospitals, 2019



At county level, these pregnancy-related pathologies are unevenly distributed, so the analysis highlights there is a predominance of hospitalizations with this MDC in rural areas compared to urban areas (2:1), the proportion in rural areas being 42% (in Tulcea county) up to 87.9% (in the county Argeș) - table 3.

CONCLUSIONS

In Romania, about 18% of hospitalizations are registered among children 0-17 years, the number of hospitalizations being 719717 hospitalization episodes, respectively almost 1 episode of hospitalization in 5 children 0-17 years, on average. Most hospitalizations among children were registered for the categories aged 0-1 years (210771 hospitalizations) and 1-4 years (225994 hospitalizations), which together account for over 60% of hospitalizations in Romanian hospitals among children 0-17 years.

The density of hospitalizations among children 0-1 years is over 1 hospitalization per child 0-1 years, while for the other age groups lower values of this indicator were registered: 27 hospitalizations per 100 children 1-4 years , 11 hospitalizations per 100 children 5-9 years, 9 hospitalizations per 100 children 10-14 years and 12 hospitalizations per 100 children 15-17 years.

The analysis of the spectrum of pathologies highlights major differences between the age groups within the category of children 0-17 years, both in terms of their frequency in the top of pathologies for each major age category and in terms of their proportion of total hospitalizations. The spectrum of pathologies among children 0-17 years old hospitalized in Romanian hospitals is dominated by respiratory and digestive diseases, parasitic diseases and ENT diseases, and for each age group there are specificities of the hospitalization model.

Current policies also include measures to increase the capacity and activity of pediatric hospitals (new wards, pediatric training, etc.) [1], but the design and implementation of measures must be based on evidence derived from needs assessment studies. Evidence from this study shows that there are large variations between models of pediatric hospital morbidity, and these variations require deepening the analysis, on each population segment, in order to provide valid evidence to support decisions on efficient allocation of hospital resources in territorial profile.

Table 3. The number and proportion of hospitalizations, by residence, in children 15-17 years with pathologies included in MDC 14 Pregnancy, birth and childbirth, Romanian hospitals, 2019

	Rural	Urban	Total	Rural %	Urban %	Total %
BUCUREȘTI	507	328	835	60.7%	39.3%	100.0%
BRASOV	456	206	662	68.9%	31.1%	100.0%
MURES	455	184	639	71.2%	28.8%	100.0%
DOLJ	368	216	584	63.0%	37.0%	100.0%
CONSTANȚA	274	216	490	55.9%	44.1%	100.0%
BIHOR	396	73	469	84.4%	15.6%	100.0%
TELEORMAN	281	147	428	65.7%	34.3%	100.0%
BACAU	322	95	417	77.2%	22.8%	100.0%
PRAHOVA	214	137	351	61.0%	39.0%	100.0%
ARGES	306	42	348	87.9%	12.1%	100.0%
SIBIU	231	113	344	67.2%	32.8%	100.0%
IAȘI	235	101	336	69.9%	30.1%	100.0%
BUZAU	232	90	322	72.0%	28.0%	100.0%
CLUJ	178	117	295	60.3%	39.7%	100.0%
TIMIȘ	181	113	294	61.6%	38.4%	100.0%
SATU MARE	205	75	280	73.2%	26.8%	100.0%
GALAȚI	187	92	279	67.0%	33.0%	100.0%
COVASNA	191	78	269	71.0%	29.0%	100.0%
DÂMBOVIȚA	223	43	266	83.8%	16.2%	100.0%
OLT	168	95	263	63.9%	36.1%	100.0%
SUCEAVA	213	49	262	81.3%	18.7%	100.0%
CALARAȘI	160	79	239	66.9%	33.1%	100.0%
VRANCEA	173	54	227	76.2%	23.8%	100.0%
VILCEA	147	79	226	65.0%	35.0%	100.0%
VASLUI	156	67	223	70.0%	30.0%	100.0%
MARAMUREȘ	111	100	211	52.6%	47.4%	100.0%
IALOMITA	117	90	207	56.5%	43.5%	100.0%
HARGHITA	123	66	189	65.1%	34.9%	100.0%
ALBA	102	84	186	54.8%	45.2%	100.0%
NEAMT	115	65	180	63.9%	36.1%	100.0%
ARAD	111	64	175	63.4%	36.6%	100.0%
MEHEDINTI	110	62	172	64.0%	36.0%	100.0%
CARAȘ-SEVERIN	82	80	162	50.6%	49.4%	100.0%
BOTOSANI	126	30	156	80.8%	19.2%	100.0%
SALAJ	117	34	151	77.5%	22.5%	100.0%
BISTRIȚA	111	34	145	76.6%	23.4%	100.0%
GIURGIU	84	50	134	62.7%	37.3%	100.0%
BRAILA	94	37	131	71.8%	28.2%	100.0%
HUNEDOARA	26	103	129	20.2%	79.8%	100.0%
ILFOV	104	21	125	83.2%	16.8%	100.0%
GORJ	61	47	108	56.5%	43.5%	100.0%
TULCEA	42	58	100	42.0%	58.0%	100.0%
Total	8095	3914	12009	**67.4%**	**32.6%**	100.0%

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1. Ministerul Sănătății, Strategia Națională de Sănătate 2014-2020 -"Sănătate pentru Prosperitate", http://old.ms.ro/upload/Anexa%201%20-%20Strategia%20Nationala%20de%20Sanatate%202014-2020.pdf