

DESCRIPTIVE STUDY ON THE SITUATION OF HOSPITALIZATION EPISODES DUE TO BRONCHIAL ASTHMA IN ROMANIA, IN THE LAST DECADE

Carmen SASU, PH specialist
Marius CIUTAN, PH specialist
Cristina Alexandra STOINA, University of Medicine and Pharmacy "Carol Davila" Bucharest

Bronchial asthma, the most common chronic condition among the young population, but also quite common among adults, remains according to the Global Asthma Initiative a significant public health challenge with economic consequences, through the burden of disease, in terms of deaths prematurity and reduced quality of life. Sustained effort to diagnose and treat this condition has produced measurable results in reducing the negative impact in many regions of the globe, but much less so in areas of low economic development.

Keywords: bronchial asthma, hospitalization, Romania

INTRODUCTION

Asthma is one of the important non-communicable diseases affecting both adults and children, representing the most common chronic condition among the young population, and despite efforts, according to the Global Asthma Initiative, this condition remains the burden of disease in terms of premature deaths and reduced quality of life, a significant public health challenge with economic consequences [1]. In 2019, according to the WHO, 262 million people were affected, with the disease causing the death of 455,000, with most of these deaths occurring in low and middle-income/capita countries, generally due to underdiagnosis and lack of specific treatment [1]. In 2019 the worldwide prevalence of the disease was 262.41 million cases, with an age-standardized prevalence of 3415.53/100000 inhabitants, down 24% compared to 1990. Global mortality was estimated in 2019 at 461,07 thousand, with an age-standardized mortality rate of 5.8 deaths/100,000, also down 51% compared to 1990. From the point of view of the disease burden, it was estimated as a value for 2019 of 21,55 thousand DALYs, with an age-standardized rate of 273.63/100,000, also decreasing compared to 1990 by 42.55% [2]. In terms of prevalence, the highest values are observed in the southern region of Asia (39.87 million) and North America (35.61), Western Europe registering a value of 27.04 million, while in the East European prevalence value was 5.36 million. The age-standardized prevalence rate is highest in North America (9848.14/100,000) versus a global average of 3415/100,000) and Australasia (8393.25/100,000), while in Western Europe the value of was 5893.41, and in Eastern Europe 2712.03/100,000 inhabitants. The only region where there was an increase in the age-standardized prevalence rate in 2019 compared to 1990 is the North American region, an increase of 9.59%. In Eastern Europe, a 42.64% rate reduction was observed.

The regions with the most deaths from asthma are South Asia (232.19 thousand) and Southeast Asia (72.06 thousand), Eastern Europe having a value of 2.33 thousand, and the age-standardized mortality rate is highest in Oceania (46.76/100,000 population) and sub-Saharan Africa (20.63/100,000 population), with Eastern Europe having a value of 0.7/100,000 population. The smallest reduction in the age-standardized mortality rate is recorded in Oceania, only 31.17%, and in Eastern Europe the reduction was 83.43% compared to 1990. The highest DALY value is recorded in 2019 in Central Africa Sub-Saharan

(479.54 thousand), in Eastern Europe a value of 260.77 thousand, the lowest value being found in Western Europe (1.15 thousand), while the highest age-standardized rate is observed in Oceania (1102.21/100,000 people), in Eastern Europe the value is 124.09/100,000 people. Compared to 1990, there is an increase in the rate by 2.82% in North America, in Eastern Europe the reduction is of 56.99% [2]. In Romania, according to the Romanian Pneumology Society, 6% of the entire population suffers from bronchial asthma, between 800,000 and 1 million people [3]. From the point of view of the age-standardized prevalence value, Romania belongs to the group of countries with average values, between 4000-6000/100,000 inhabitants, and in terms of the age-standardized mortality rate, it belongs to the group of countries with low values between 0-20/100,000 inhabitants [2]. The incidence of cases in Romania was 150.4‰ inhabitants in 2016, in an upward trend, double the value compared to 2007. The counties with the highest values were: Botoșani (416.6‰ inhabitants), Covasna (392, 2‰ inhabitants), Hunedoara (387.7‰ inhabitants), Alba (323.5‰ inhabitants), Arad (304.2‰ inhabitants), and as development regions the highest values were recorded in the Center Region 235.7‰ inhabitants and the West Region, with the value of 209.0‰ inhabitants [4]. Given the serious consequences of non-diagnosis and lack of treatment, it is necessary to know the dynamics of the population's degree of affect, and the study/analysis of the frequency of hospitalization episodes, therefore of the cases requiring tertiary medical care, best reflects the extent of the phenomenon. The present study analyzes the evolution of episodes of bronchial asthma, which required hospitalization, in the last ten years, the results being presented below

OBJECTIV

Identification at the national, regional and local level of the geographical distribution of hospitalization episodes for patients diagnosed with bronchial asthma, as well as the temporal evolution of their number, in the period 2014-2023.

METHODOLOGY

Using data from the National DRG base, a descriptive, retrospective study was carried out, the data

being reported in the continuous hospitalization regime by died. Romanian hospitals in a contractual relationship with the National Health Insurance House. In accordance with the provisions of Order no. 1782/576/2006 regarding the registration and statistical reporting of patients who receive medical services under continuous hospitalization and day hospitalization, with subsequent additions and changes, National Institute of Health Management Services (NIHMS) collects and processes the minimum set of data at patient level for cases treated under continuous and day hospitalization.

The study used data that were reported in the period 2014-2023, aiming at the analysis of data on hospitalization episodes for patients with bronchial asthma in Romania, in the hospitals (admissions under continuous hospitalization regime). The data were selected using the ICD-10-AM classification, the records from the observation sheets were extracted and analyzed, which had as the main diagnosis at discharge one of the codes: J45-Asthm, Excludes: severe acute asthma (J46), chronic asthmatic (obstructive) bronchitis (J44.-), chronic obstructive asthma (J44.-), eosinophilic asthma (J82), lung diseases due to external agents (J60-J70), status asthmaticus (J46); J45.0- Asthma with allergic predominance Allergic: bronchitis NOS, rhinitis with asthma, Atopic asthma, Extrinsic allergic asthma, Hay fever with asthma; J45.1- Nonallergic asthma, Idiosyncratic asthma, Intrinsic nonallergic asthma; J45.8-Associated asthma Association of conditions listed in J45.0 and J45.1; J45.9- Asthma, unspecified, Asthmatic bronchitis NOS, Late-onset asthma; J46- Asthmatic mal-state Acute severe asthma.

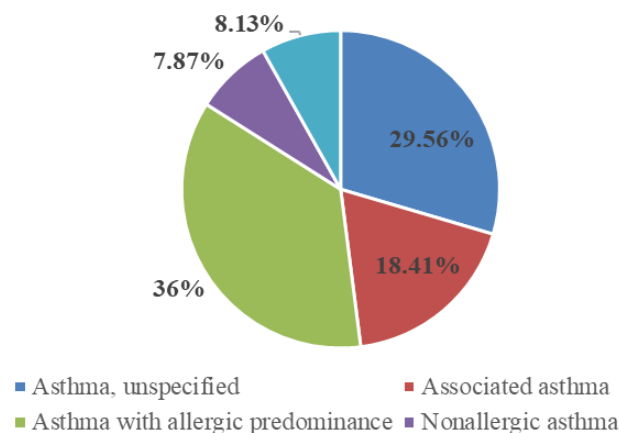
In accordance with the provisions of Law 190/2018 and Art. 13 of EU Regulation no. 679/2016, personal data are deleted at the time of transmission to INMSS, and the identification of persons for the purpose of analysis is based on encrypted individual numeric code. The age of the patients was calculated in completed years, as the difference between the date of admission and the date of birth. The data were processed using the software program SQL Server Management Studio Express 2005, the subsequent processing and analysis was carried out using the SPSS and Excel programs. The analysis was performed according to a series of demographic and socioeconomic variables, such as sex, age, residential environment, length of hospitalization, discharge status, etc., information included in the minimum data set reported in the DRG system by hospitals. The data interpretation is presented as tables and graphs.

RESULTS

The data extracted from the national DRG database were processed, analyzed and interpreted in relation to a series of demographic variables and socioeconomic characteristics (sex, age, place of residence, duration of hospitalization, in-hospital mortality rate, status at discharge) following the geographical and temporal evolution history of hospitalization episodes for patients with bronchial asthma, from hospitals in our country, in the period 2014-2023.

1. Total number of hospitalization episodes for patients with bronchial asthma, registered in Romania, in the period 2014-2023

Graph no. 1 Total number of hospitalization episodes by the type of main diagnosis at discharge, in patients with bronchial asthma, recorded in 2014-2023, at national level

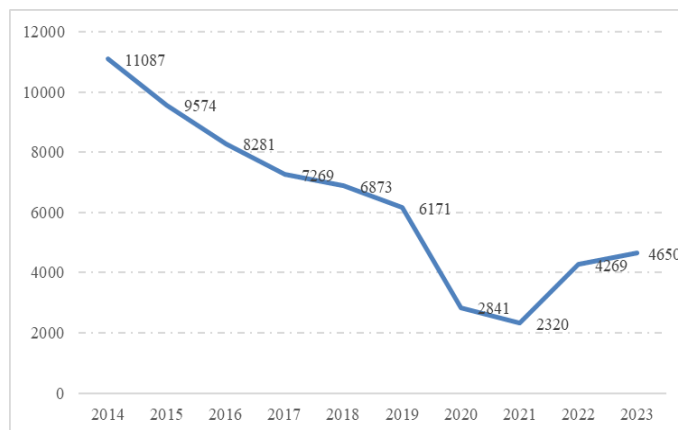


The total number of continuous hospitalization episodes for patients with bronchial asthma registered in Romania, in the period 2014-2023, was 63,335 episodes, most of which were coded as asthma with an allergic predominance (36%) or unspecified asthma (30%), and almost a fifth as associated asthma (18.4%) - graph no. 1.

2. Temporal evolution in terms of hospitalization episodes of patients with bronchial asthma, in Romania, in 2014-2023

The temporal evolution of hospitalization episodes of patients with bronchial asthma during this period can be seen in graph no. 2. It is noted that the situation of hospitalizations was also downward in the period before the coronavirus pandemic, in 2020 there is already a reduction of almost 4 times compared to the initial year of the study period. In the years 2020 and 2021, hospitalizations decreased approximately 2 times compared to 2019, starting from 2023 increasing values were recorded again, however lower than the pre-pandemic years.

Graph no. 2 Evolution of hospitalization episodes in patients with bronchial asthma, recorded in 2014-2023, at national level



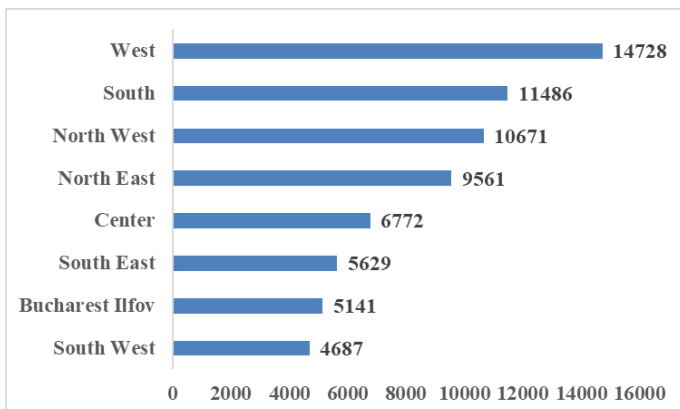
3. Distribution of hospitalization episodes of patients with bronchial asthma, by the discharge department

The most episodes of hospitalization for patients with bronchial asthma were registered in pulmonology (43% of the total), internal medicine (27%) and pediatrics (24%) departments.

4. Distribution of hospitalization episodes for patients with bronchial asthma, at regional and local level, 2014-2023

From the point of view of residential environment where the patients with this diagnosis come from, the most episodes of hospitalization were recorded for patients from the urban area (54%). At the regional level, the most episodes of hospitalization for patients with bronchial asthma were registered during the study period in the western regions, more than a third of the hospitalizations came from

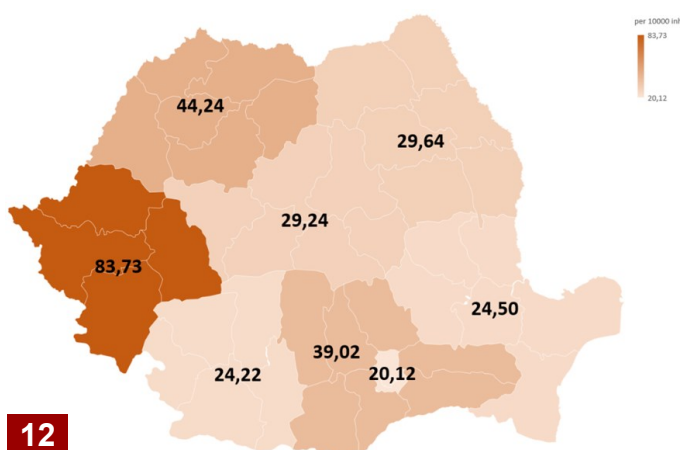
Graph no. 3. Distribution of hospitalization episodes for patients with bronchial asthma, at regional level in Romania, 2014-2023



the West region (21% of the national total) and North West region (16 %), but a large percentage is also observed in the case of the South Muntenia region (17%). The South-West, Bucharest Ilfov and South East regions, with approximately 7-8%, had the fewest hospitalizations - graph no. 3.

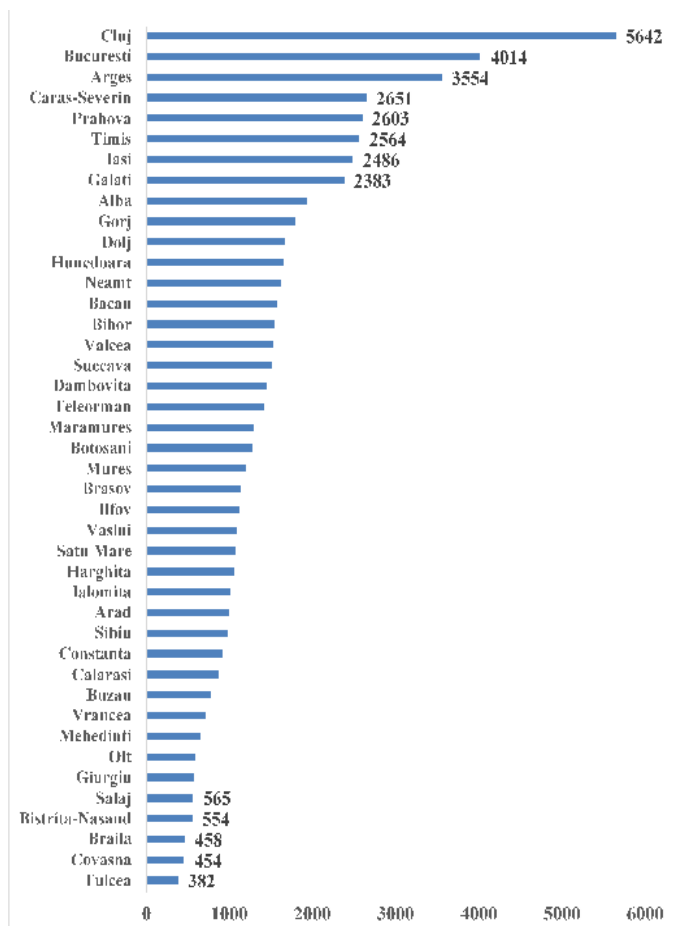
By the number of inhabitants (the average population of the last 10 years in each region), the descending order of the regions that recorded episodes of hospitalization of patients with bronchial asthma was: West region (83.72

Graph no. 4 Distribution of hospitalization episodes for patients with bronchial asthma, by population (10-year average) at regional level, in Romania, between 2014-2023



episodes/10,000 inhabitants), North West region (44.24 episodes/10,000 inhabitants), South (39 episodes/10,000 inhabitants), North East (29.6 episodes/10,000 inhabit-

Graph no. 5. Distribution of hospitalization episodes for patients with bronchial asthma, at local/county level, in Romania, in 2014-2023



ants), Center region (29.2 episodes/10,000 inhabitants), South East region (24.5 episodes/10,000 inhabitants), South West (24.2 episodes/10,000 inhabitants) and the Bucharest Ilfov region (20.1 episodes/10,000 inhabitants) - graph no. 4.

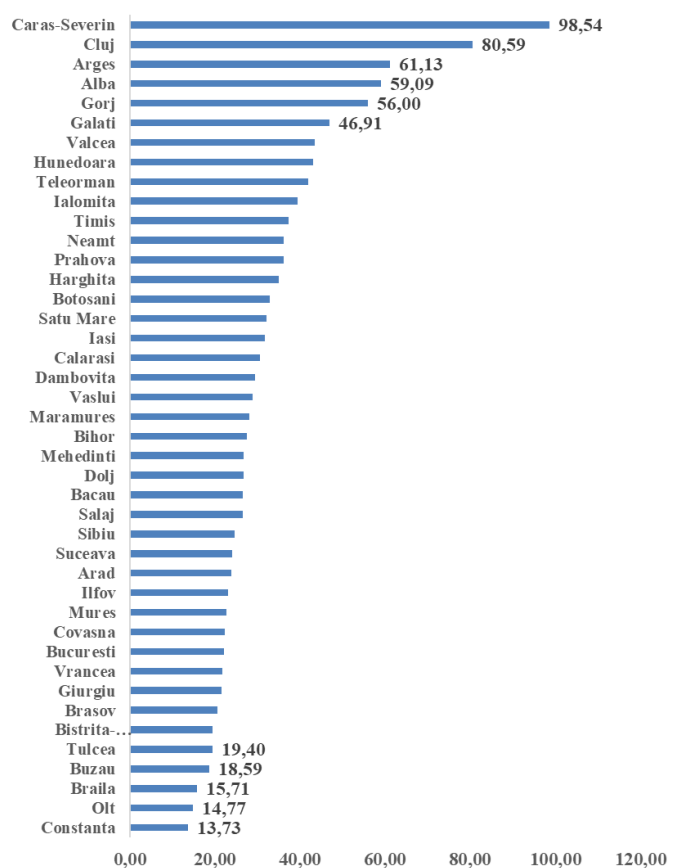
At the local level, the most episodes of hospitalization were recorded between 2014-2023 in Cluj, Bucharest municipality and Argeş county. The last places are occupied by the counties of Tulcea, Covasna and Brăila - graph no. 5.

Compared to the population of each county (calculated as the 10-year average), graph no. 6 shows a change in the ranking, with first places Caras Severin counties (98.54 episodes/10,000 inhabitants), Cluj (80.59 episodes/ 10,000 inhabitants) and Argeş (61.13 episodes/10,000 inhabitants), and the last places the counties of Constanța, Olt and Brăila.

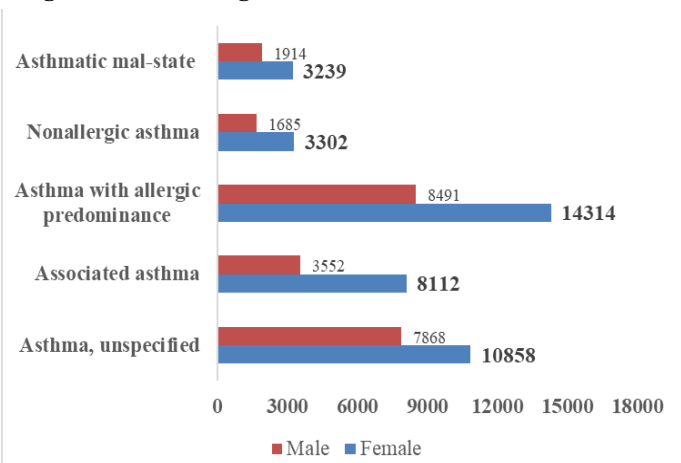
5. Distribution of hospitalization episodes for patients with bronchial asthma, by patient's gender

Of the total number of hospitalization episodes with this type of main diagnosis at discharge, recorded during the →

Graph no. 6. Distribution of hospitalization episodes for patients with bronchial asthma, at local/county level, by population (10-year average) of each county, in 2014-2023



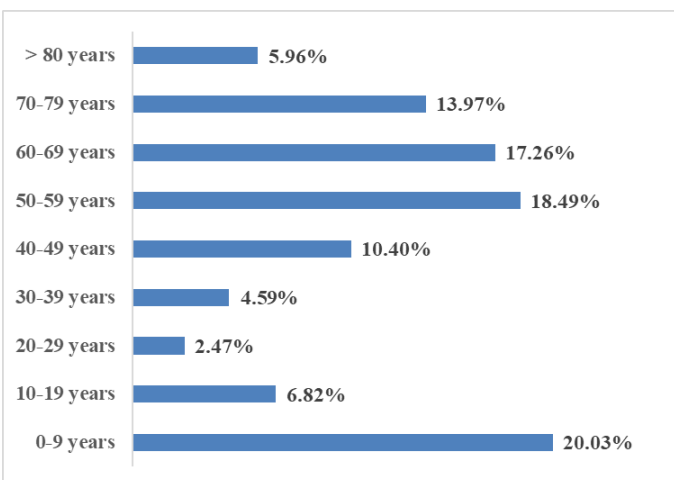
Graph no. 7. Hospitalization episodes in patients with bronchial asthma, by patient's gender and the type of diagnosis at discharge, in 2014-2023, at national level



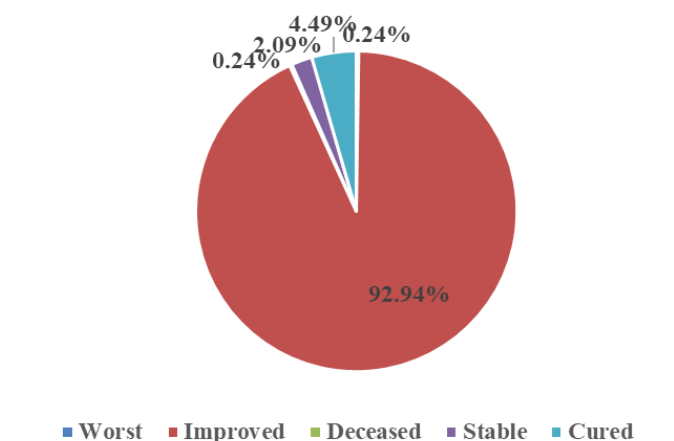
study period, most belonged to women, approximately 63%, and the distribution of cases according to the type of diagnosis at discharge and gender can be seen in the graph no. 7.

6. Distribution of hospitalization episodes in patients with bronchial asthma, by patient's age

Graph no. 8. Hospitalization episodes in patients with bronchial asthma, by patient's age in 2014-2023, at national level



Graph no. 9 Hospitalization episodes for patients with bronchial asthma, by patients' discharge status, in Romania, in 2014-2023



The analysis of the data by age groups shows that for the entire study period, most episodes of hospitalization were registered in adults over 40 years old (66% of the total), but the highest percentage is observed in children 0-9 years old – graph no. 8. The average age of those hospitalized during this period was 45.3 years, and within the age group that recorded the most episodes of hospitalization, 0-9 years, the average age was 4.3 years. By type of diagnosis, the average age values were the lowest in patients diagnosed with unspecified asthma (38.15 years), asthmatic mal-state (42.81 years) or allergic asthma (44.53 years).

7. Distribution of hospitalization episodes in patients with bronchial asthma, by average duration of hospitalization

The average length of hospitalization in patients with bronchial asthma in continuous hospitalization was in the period 2014-2023 of 6.13 days, varying throughout the study period, values above the average of the period being recorded between the years 2014-2018, the

maximum value in 2015 (6.50 days). The lowest value is observed in the year 2023 – 5.18 days. The highest average values of the duration of hospitalization were recorded in patients discharged with the diagnosis of associated asthma (6.86 days) or nonallergic asthma (6.74 days).

8. Distribution of hospitalization episodes in patients with bronchial asthma, by patient's discharge status and in-hospital mortality rate

Depending on the patient's condition at discharge, the data analysis indicates that of the total number of episodes reported in continuous hospitalization for patients with bronchial asthma, most of them were discharged in an improved condition (93% of the total). Very small percentages were discharged as stable or cured and a small percentage died (0.24%) - graph no. 9

The calculated rate of in-hospital mortality was 0.24% throughout the study period, its values oscillating between 0.14% in 2015 and 0.63 in 2020. Most of the deceased are from the elderly (average age 69.7 years) diagnosed with Asthmatic mal-state (34% of the total deceased) or Asthma, unspecified (26%).

CONCLUSIONS

Following the analysis of the data from the period 2014-2023 regarding the hospitalization of patients with bronchial asthma, the following conclusions can be drawn:

- The total number of hospitalization episodes for patients diagnosed with bronchial asthma in the period 2014-2023 was 63,335 episodes;
- The temporal evolution of the number of episodes of hospitalization due to bronchial asthma is also downward in the period before the coronavirus pandemic, in 2020 there is already a reduction of almost 4 times compared to the initial year of the study period, and compared to 2019 during the pandemic due to coronavirus, hospitalizations have been reduced by approximately 2 times;
- Most hospitalizations were recorded in pneumology, internal medicine and pediatrics departments;
- From the point of view of the main diagnosis at discharge, the most episodes were recorded for asthma with an allergic predominance or unspecified asthma, around a third of the cases for each, and almost a fifth as associated asthma;
- More than half of those hospitalized come from the urban residence;
- The analysis of the spatial distribution of hospitalizations by this type of diagnosis indicates a predominance in terms of the absolute frequency of cases in the western regions, around a fifth of the total in the West and North West, but a large percentage is also observed in the region South Muntenia (17%), the same observations being valid for the values related to the population of each region;

- On a local level, the highest absolute frequencies of the number of hospitalizations were recorded in Cluj, Bucharest municipality and Argeş county, and by population of each county, Caraş Severin, Cluj and Argeş counties were in first place;
- Most hospitalizations due to bronchial asthma belonged to women, nonallergic and associated asthma recording the biggest differences between the sexes;
- From the point of view of the age of the patients, admissions were mostly for adults over 40 years old (66% of the total), but the highest percentage per age category is observed in children 0-9 years old (a fifth of the total). The average age of those hospitalized during this period was 45.3 years, and in the age group that recorded the most episodes of hospitalization, 0-9 years, the average age was 4.3 years. By type of diagnosis, the average age values were the lowest in patients diagnosed with unspecified asthma (38.15 years), asthmatic mal-state (42.81 years) or allergic asthma (44.53 years);
- The average length of hospitalization for these patients was 4.24 days, with a maximum of 6.50 days in 2015, with variations above the average for the period between 2014-2018. The highest average values of the duration of hospitalization were recorded in patients discharged with the diagnosis of associated asthma (6.86 days) or nonallergic asthma (6.74 days);
- Most of the patients were discharged in an improved condition (93% of the total), and very small percentages were discharged as stable or cured and a small proportion died (0.24%), the in-hospital mortality rate oscillating between 0.14% in the year 2015 and 0.63 in the year 2020. Most of the deceased come from the elderly (average age 69.7 years) diagnosed with Asthmatic "mal" condition or Asthma, unspecified, both around of a third of the total of those who

References

1. <https://www.who.int/news-room/fact-sheets/detail/asthma>
2. <https://respiratory-research.biomedcentral.com/articles/10.1186/s12931-023-02475-6>
3. <https://www.medicub.ro/stiri/6-din-romani-sufera-de-astm-bronsic-id-1643-cmsid-2>
4. http://insp.gov.ro/download/cnepss/stare-de-sanatate/rapoarte_si_studii_despre_starea_de_sanatate/starea_de_sanatate/starea_de_sanatate/RAPORTUL-NATIONAL-AL-STARIILOR-DE-SANATATE-A-POPULATIEI-%25E2%2580%2593-2017.pdf