

# DESCRIPTIVE STUDY ON THE SITUATION OF HOSPITALIZATION EPISODES IN THE CASE OF PATIENTS INFECTED WITH HUMAN IMMUNODEFICIENCY VIRUS IN ROMANIA

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## INTRODUCTION

Human immunodeficiency virus infection is one of the most serious public health problems worldwide, with AIDS being one of the sixth deadliest infectious diseases in the world as the leading cause of death. [1] According to UNAIDS, in 2019 there were about 38 million HIV-positive people worldwide, of which 36.2 million adults and 1.8 million children. Incident cases in 2019 were 1.7 million, of which 1.5 million were adults, with 23% less compared with year 2010. The countries with the highest share of HIV-positive people are those with medium or low economic levels, for example, in 2019, 54% of the positive lived in East and South Africa, 13% in Central and West Africa, 15% in Asia and the Pacific region and 6% in Western, Central and North America. Mortality due to this infection has decreased compared to the high level in 2004, by 60%. In 2019, 69,000,000 deaths were registered, much less than in 2010, for example, when 1.1 million deaths were registered. [2]

In Europe too, the transmission of the virus, although preventable, continues, the statistical data for 2018 show 141552 incident cases in 50 of the 53 countries in the European region, including 26164 new cases in the European Union, which represents a gross rate of 16.2/100,000 inhabitants. The distribution of the number of cases differs from one region to another, the eastern regions recorded higher values, 44.8/100,000 inhabitants and the West and the European Union lower (6, respectively 5.6/100,000 inhabitants). In the Central European region, the value of the rate was the lowest, 3.3/100,000 inhabitants. Compared to 2009, the trend in reporting new cases of infection has been slightly declining, in many European Union countries this is confirmed, but in other countries, rates of diagnosed cases have increased - for example they have doubled in Malta, increased by 50% in Bulgaria, Croatia, Cyprus, Hungary, Iceland and Slovakia. Regarding the newly diagnosed cases of the disease, AIDS was diagnosed in 14,227 people in 48 countries of the European Region, with a rate of 2/100000 inhabitants. Of these, 76% were diagnosed in the East, where the rate was 10.5/100,000 inhabitants, 18% in the West with a rate of 0.6/100,000 and 6% in the

**Infection with the human acquired immunodeficiency virus, one of the most serious public health problems worldwide, AIDS being one of the most lethal infectious diseases, was also a problem for the Romanian society and medical system. At present, there is a decreasing trend in our country, but the incidence values, especially for young people aged 20-49, are still high, imposing more energetic measures to combat this scourge.**

**Keywords: HIV, trend, Romania**

Center with a rate of 0.4/100,000 inhabitants. The rate of newly diagnosed AIDS cases between 2009-2018 remains stable as a whole, but with regional variations, almost double in the East (from 6 to 11/100000 inhabitants). [3] In 2016, Romania was among the countries with an incidence between 2 and 5%000, along with countries such as Norway, Sweden, Finland, Germany, Denmark, the Netherlands, Poland, Austria, Slovakia, the Czech Republic, Hungary, Croatia and Bulgaria, a low value compared to countries such as Estonia, Latvia, Ireland and Portugal which recorded figures between 10 and 20%000. The overall trend was slightly decreasing over the period 2007-2016. A factor with a negative impact found both in our country and in Lithuania was the presence of HIV/TB coinfection, compared to the European average prevalence of 17%, in Romania registering values greater than double of it. In 2018, the prevalence of the disease was 0.1%, a number of 16,000 people being HIV-positive. The incidence of the disease was 660 new cases, 0.03%000, and the incidence of HIV/TB coinfection was 1.9%000. The mortality due to AIDS was less than 200 people that year. The trend of diseases was decreasing compared to 2010, the number of new cases decreasing from 730 to 660. And the number of cases of HIV/TB coinfection decreased from 4.1%000 incidence in 2007 to 1.9%000 incidence in 2016, due to the reduction of the number of TB cases in Romania. The highest number of cases was registered in men, in the age group 25-29 years, the most cases in 2017 being observed in Ilfov (252 adults and 3 children), Constanța (37 adults), Mureș (23), Cluj and Argeș (21 cases each), Timiș (18) and Iași (16 adults and 1 child). [4] From the perspective of the fact that HIV infection, although registering a decreasing trend globally, is a serious one, with negative implications on the health and well-being of the individual, but also society, NSPHMPDB conducted a study on the situation of hospitalization episodes of HIV-positive patients in Romania-2019, the results will be presented below.



## **OBJECTIV.**

Identifying at national, regional and local level the geographical distribution of hospitalization episodes of HIV-infected patients, as well as the temporal evolution of their number, in the period 2015-2019.

## **METHODOLOGY.**

A descriptive, retrospective study was performed, which used data from the National DRG Database, data reported in a continuous hospitalization by Romanian hospitals in a contractual relationship with the National Health Insurance House. In accordance with the provisions of the Order. no. 1782/576/2006 on the registration and statistical reporting of patients receiving medical services in continuous and day hospitalization, with subsequent completions and modifications, NSPHMPDB collects and processes the minimum set of patient-level data for cases treated in continuous and day hospitalization.

The data used in this study were reported in the period 2015-2019. The aim was to analyze the data on the hospitalization episodes of HIV-positive patients in Romania, in the previously mentioned hospitals (hospitalizations in continuous hospitalization). The data were selected using the ICD-10-AM classification, the records were extracted and analyzed from the observation sheets that most frequently had one of the following codes as the main diagnosis: B20 (Human immunodeficiency virus [HIV] diseases associated with other infectious and parasitic diseases), B22 (human immunodeficiency virus [HIV] associated with other specified diseases), B23.8 (HIV associated with other specified diseases), B24 (human immunodeficiency virus [HIV] unspecified). In addition, a number of other codes of other main diagnoses of infectious, malignant, fractured, etc. diagnoses presented by HIV-positive patients were included in the analysis, for which they were hospitalized. In accordance with the provisions of Law 190/2018 and of Art. 13 of EU Regulation no. 679/2016, the personal data are deleted at the time of transmission to NSPHMPDB, and the identification of persons for the purpose of analysis is made on the basis of encrypted personal identification number. The age of the patients was calculated in years of age, as the difference between the date of hospitalization and the date of birth. The data were processed using the SQL Server Management Studio Express 2005 software, further processing and analysis was performed using SPSS and Excel. The analysis was performed according to a series of demographic and socioeconomic variables, such as the patient's sex, age, length of hospitalization, etc., information included in the minimum set of data reported in the DRG system by hospitals. The interpretation and presentation were done as tables and graphs.

## **RESULTS**

Following the processing and analysis of data from the DRG, the data were interpreted in relation to a series of demographic variables and socioeconomic characteristics (sex, age, length of hospital stay, in-hospital mortality rate, discharge status) following the geographical distribution and temporal evolution of hospitalization episodes. of HIV-positive patients in hospitals in our country during 2015-2019.

### **1. Total number of hospitalization episodes of HIV positive patients, registered in Romania, in the period 2015-2019.**

The total number of continuous hospitalization episodes for HIV-infected patients registered in Romania in the period 2015-2019 was 343518 episodes, representing approximately 1.7% of the total number of hospitalization episodes nationwide during this period. The total number of infected patients who were hospitalized during the study period was 25609, the average number of hospitalization episodes/patient being 13.4 episodes in the five years of observation.

### **2. The temporal evolution of the hospitalization episodes of HIV positive patients in Romania, in the period 2015-2019**

The temporal evolution of the hospitalization episodes of HIV positive patients during this period can be observed in chart no.1. The trend was a decreasing one, except for 2017, when there was an increase of about 2% higher than the number recorded in 2015. In 2019 the number of hospitalization episodes decreased by about 8% compared to the initial year.

### **3. Distribution of hospitalization episodes for HIV-positive patients, by discharge department and primary diagnosis at hospital discharge**

Most hospitalization episodes for HIV-positive patients were recorded in the HIV/AIDS (60%) or infectious (31%) wards, the rest going to the other types of wards, the most frequently observed being the obstetrics and gynecology wards (pregnancy testing), pneumophthysiology, acute psychiatric wards, child infectious diseases and chronic diseases wards. As the main diagnosis at discharge, the following were most commonly observed: HIV disease associated with other specified conditions (38%), Diseases due to human immunodeficiency virus [HIV] associated with other infectious and parasitic diseases (36.5%), Human immunodeficiency virus [HIV] diseases associated with other specified diseases (13%), Human immunodeficiency virus [HIV] diseases unspecified (3.5%).

### **4. Distribution of hospitalization episodes in case of HIV positive patients, at regional and local level, in the period 2015-2019**

At the regional level, most hospitalization episodes for HIV-positive patients were recorded during the study period in the regions of Bucharest-Ilfov (26% of the national total), South-East (17%) and North-East (15% of national total). The South-West and West regions recorded the fewest hospitalization episodes through this main diagnosis, below 7% each - chart no.2. Compared to the number of inhabitants, the descending order of the regions that registered most hospitalization episodes of HIV-positive patients was: Bucharest-Ilfov region (39.14 episodes/ 1000 inhabitants), South East region (24.59 episodes/1000 inhabitants), North East region (16.4 episodes/1000 inhabitants), Center region (15.97 episodes/1000 inhabitants), South region (13.39 episodes/1000 inhabitants), West region (12.68 episodes/1000 inhabitants), South West region ( 9.69 episodes /1000 inhabitants) and North West region (9.64 episodes/1000 inhabitants) chart no.3.

Chart no.1 Evolution of the total number of episodes reported in continuous hospitalization, in HIV positive patients, registered in the period 2015-2019, at national level

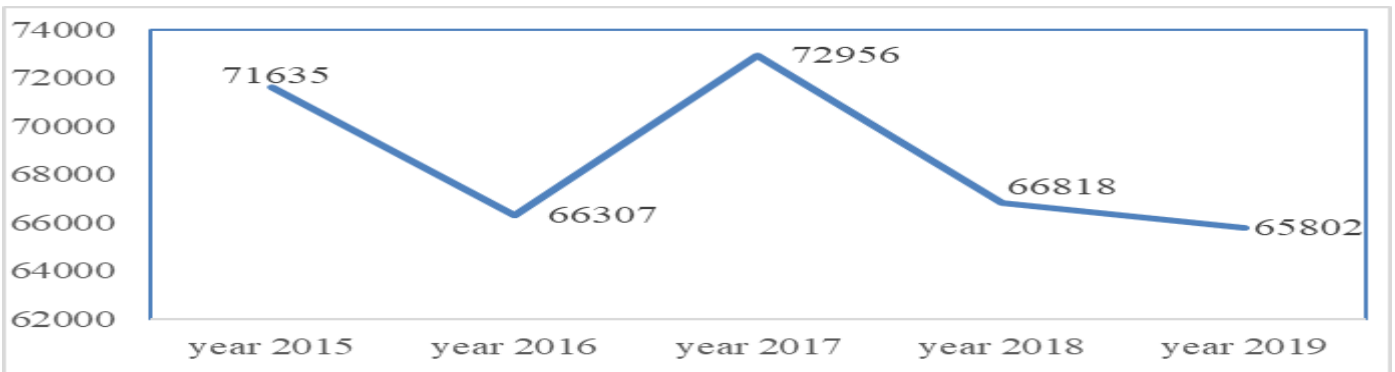


Chart no.2 Distribution of hospitalization episodes in case of HIV positive patients, at regional level in Romania, in the period 2015-2019

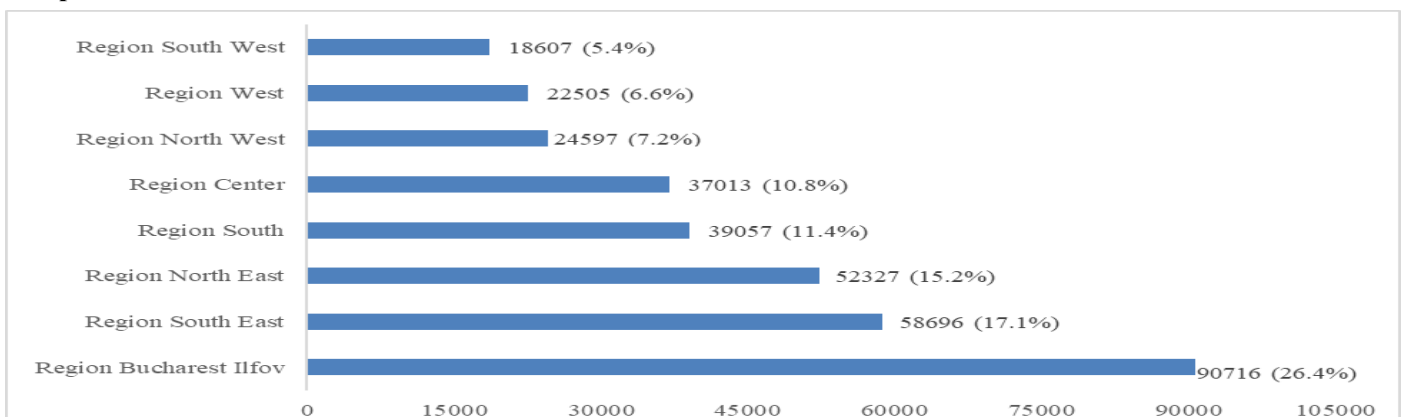
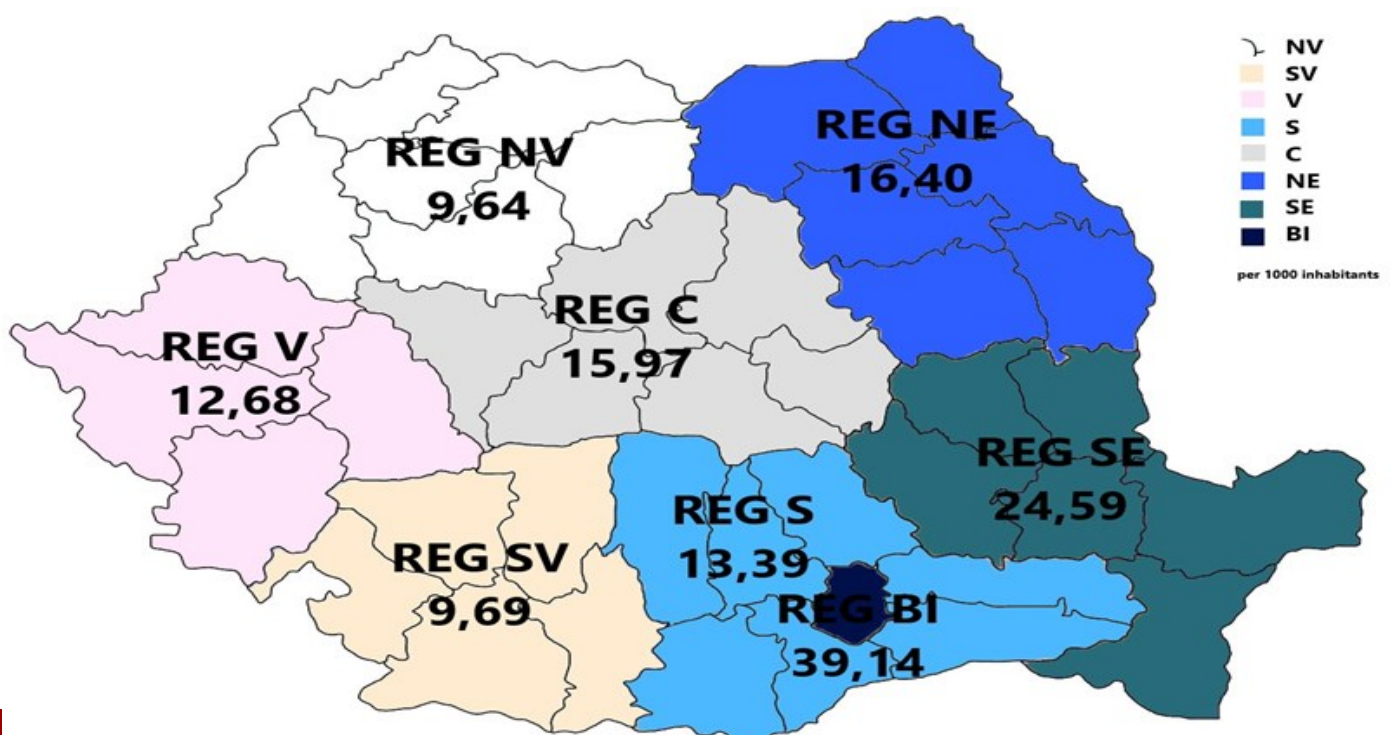
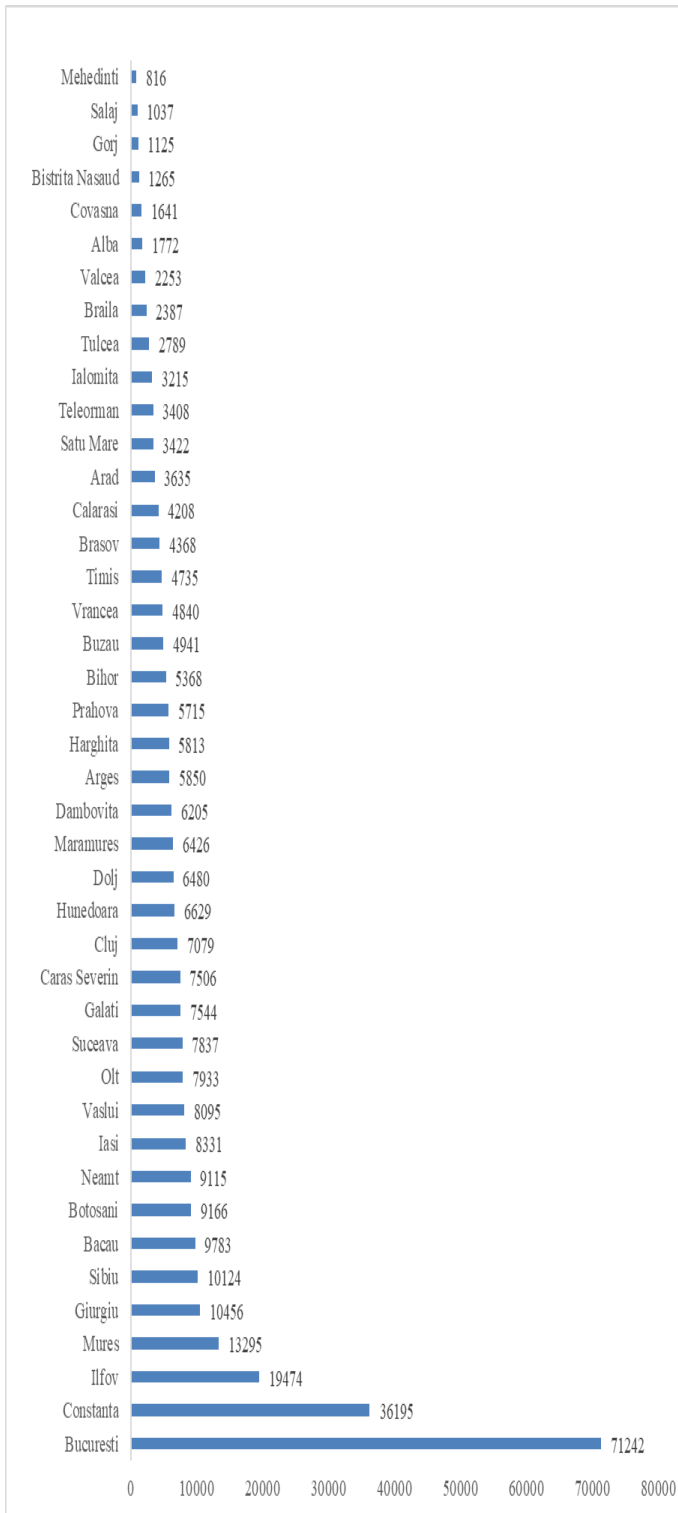


Chart no. 3 Distribution of hospitalization episodes in case of HIV positive patients, by population, in Romania, between 2015-2019

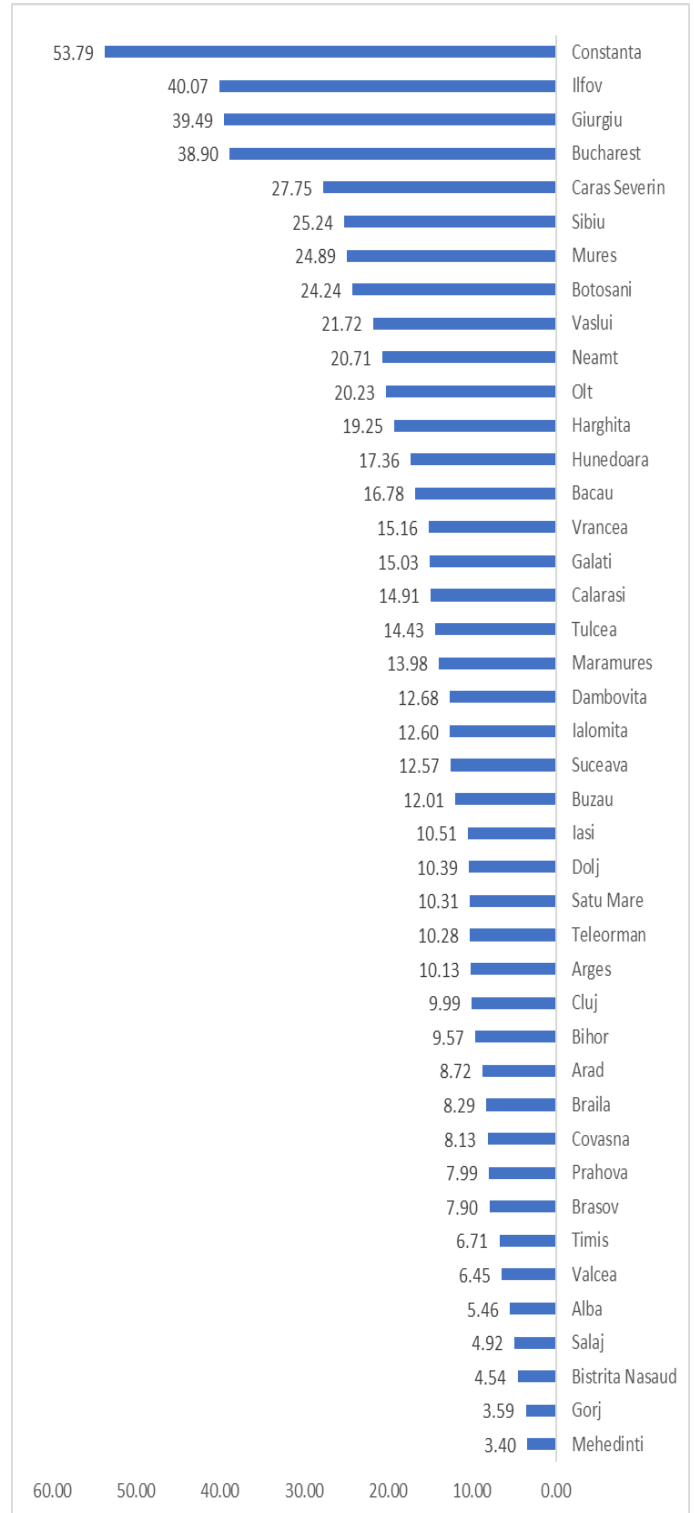


**Chart no.4 Distribution of hospitalization episodes in case of HIV positive patients, at local / county level, in Romania, during 2015-2019**



At the local level, most hospitalization episodes were registered between 2015-2019 in Bucharest, Constanta, Ilfov, Mures, Giurgiu and Sibiu counties, at the opposite pole being Mehedinți and Sălaj counties, with the fewest hospitalization episodes. (chart no.4).

**Chart no.5 Distribution of hospitalization episodes in with HIV positive patients, at local / county level, according to the population of each county, in 2015-2019**



Compared to the population of each county, a change in the ranking can be seen from chart no. 5, with Constanta, Ilfov, Giurgiu counties on the first places, and Gorj and Mehedinți counties on the last ones.



## 5. Distribution of hospitalization episodes in HIV-positive patients by gender

Of the total number of hospitalization episodes of HIV-positive patients nationwide, data analysis indicates that most belonged to males (55.2% of the total) - chart no 6.

The evolution of the number of hospitalization episodes during the study period was a decreasing one especially for women, in 2019 the decrease of the number of hospitalizations in continuous hospitalization compared to 2015, being 16%, compared to a very small reduction of only 2% for men. The study of the distribution of the number of hospitalization episodes according to the patient's gender indicates that most hospitalizations occurred in Bucharest, Constanța and Ilfov counties for men and in Bucharest, Constanța and Mureș counties for women. The area with the lowest number of hospitalization episodes was for both sexes Mehedinți County, but for men the number of hospitalizations was almost 3 times higher than for women.

Chart no.6 Number of hospitalization episodes of HIV positive patients, by gender, in Romania, 2015-2019

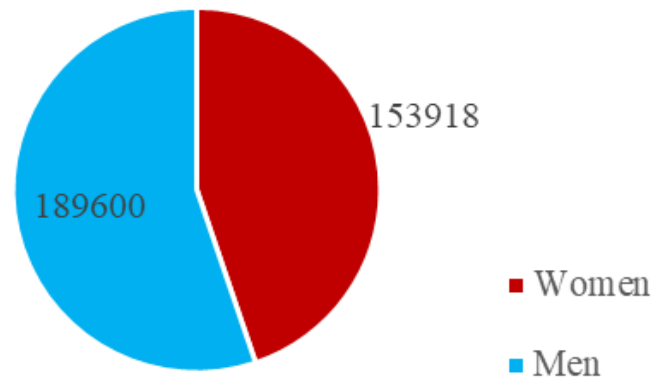
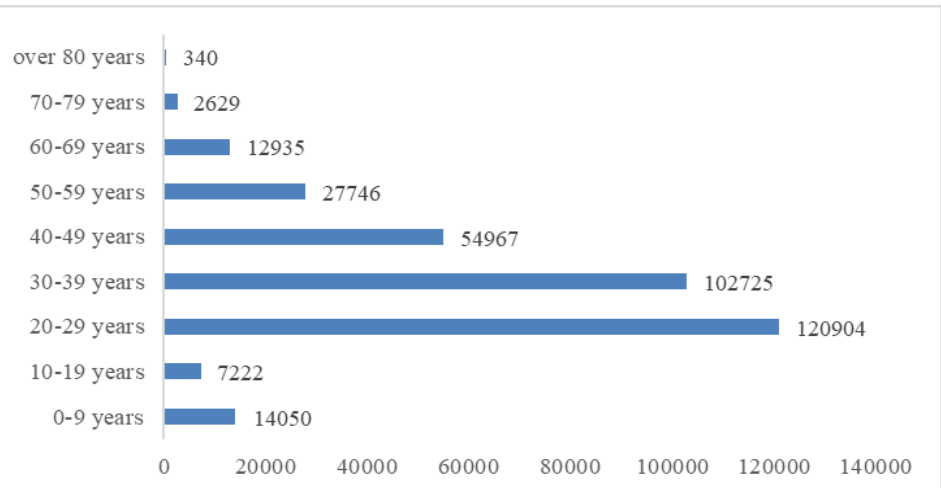


Chart no.7 Distribution of the number of hospitalization episodes of HIV positive patients, according to the age groups of patients, in Romania, 2015-2019

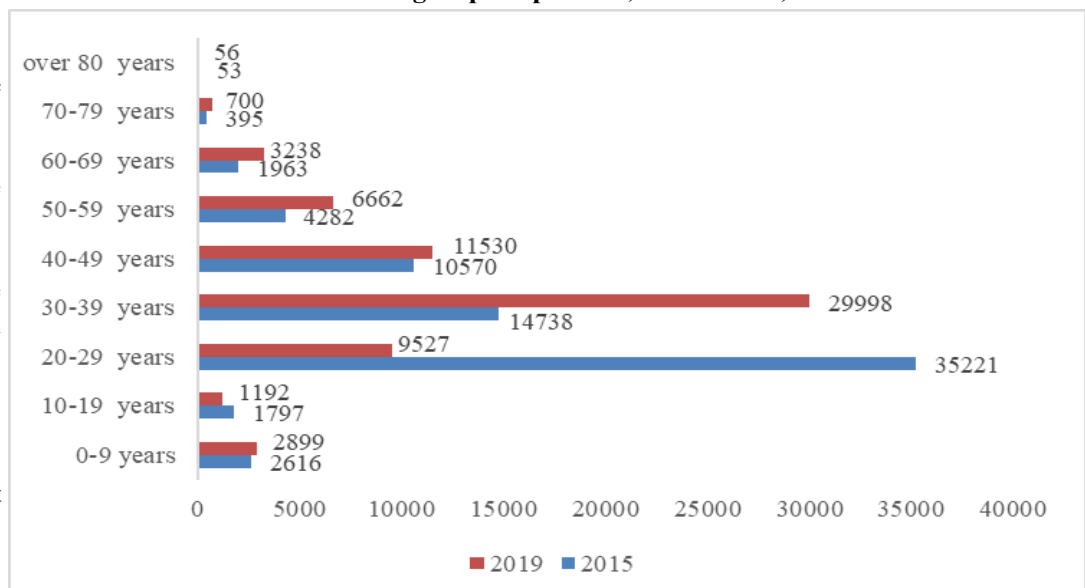
## 6. Distribution of hospitalization episodes of HIV-positive patients, according to patient's age

The analysis of data by age groups indicates that at national level, for the entire study period, most episodes of hospitalization were recorded in the young age groups, respectively 20-29 years (35% of the national total) and 30-39 years (30%). An important percentage is registered in the group of 40-49 years (16%), and in children the highest percentage is in the category 0-9 years (4% of the total), among them children under the age of one year have the highest share- chart no.7.



From the point of view of the evolution of the number of hospitalization episodes, it is difficult to draw clear conclusions, because, in the 5-year period analyzed, patients passed from one age group to another. Thus, for example, if at the level of 2015 the largest share was patients belonging to the age group 20-29 years (survivors of the "Romanian cohort"), in 2019 most patients were in the age group 30-39 years (probably the same survivors, who have reached other ages)- chart no.8.

Chart no.8 Evolution of the number of hospitalization episodes of HIV positive patients, depending on the age groups of patients, in Romania, 2019 versus 2015



In the age group 0-9 years, the most hospitalized cases were registered in Bucharest and the counties of Ilfov, Cluj, Dâmbovița, and the fewest in the counties of Botoșani, Bacău and Hunedoara (less than 30 episodes). Over 60 years, the patients were hospitalized with this diagnosis, especially in Bucharest, Cluj and Dâmbovița counties, the fewest hospitalizations occurring in Covasna, Harghita, Gorj and Arad counties, under 100 episodes of hospitalization throughout the period.

### 7. Distribution of hospitalization episodes for HIV-positive patients, based on average length of hospital stay.

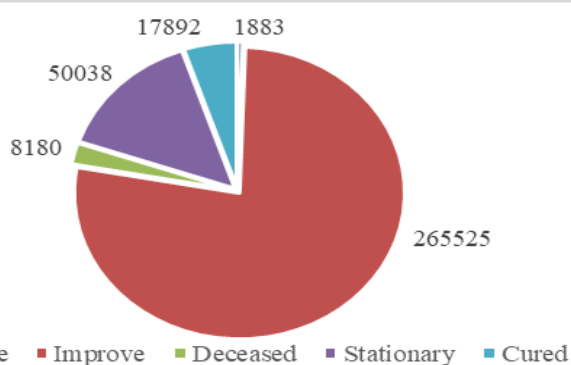
The average duration of hospitalization for HIV-positive patients in continuous hospitalization was in the period 2015-2019 of 8.28 days, varying throughout the study period, the maximum value was recorded in 2015 (8,9 days) and 2016 (8.86 days) decreasing in 2019 to 7.8 days, the trend being slow and continuously decreasing. The highest average value of hospitalization was registered in the case of HIV-positive patients hospitalized in chronic psychiatric wards (long-term)-151 days, also with a decreasing trend compared to the initial year, the pneumophysiology wards adults and children registering values over one month. (45.5 and 37.6 days, respectively). The highest average hospital stays were recorded in the acute hospitals in the counties of Prahova (16.5 days), Botosani (13.3 days), Ilfov (12.8 days) and Constanta (10.2 days), and the smallest in Iași (3.8 days), Galați (4.3), Cluj (4.7 days) and Alba (4.8 days).

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

Depending on the patient's discharge status, the data analysis indicates that of the total number of episodes reported in continuous hospitalization for HIV-positive patients, most patients were discharged in an improved condition (77% of the total). 15% of patients were discharged as stationary, and small percentages, below 2.4% died or were registered as aggravated (0.5%) - chart no. 9.

The calculated in-hospital mortality rate was for the entire study period of 2.4%, with a slow decreasing trend since 2015, from a value of 2.54% to a value of 2.05% in 2019,

**Chart no.9 Number of hospitalization episodes in case of HIV positive patients, depending on the state of discharge of patients, in Romania, during 2015-2019**



the highest value registering in 2016 - 2.77%, and the lowest in 2019, with a quarter lower than the highest value observed. Most deaths occurred in men, 2.4 times more than in women, in people aged 30-39 (33% of total deaths), 20-29 years (29%) and 40-49 years (22%).

### 9. The most frequent 20 pathologies associated with HIV / AIDS infection at the group level and for the entire studied range.

The first 20 most frequent secondary diagnoses recorded in HIV-positive patients were selected for the entire analyzed interval and are presented in chart no.10. For the patients in the studied group, pathologies such as viral hepatitis, urinary tract or respiratory tract infections, as well as eating disorders were reported more frequently. Although tuberculosis does not appear in this top, it should be mentioned that in the studied group the pathology of this type represents approx. 1.2% of all secondary diagnoses (forms of pulmonary, miliary, nervous system, lymph node, etc. tuberculosis).

### CONCLUSIONS

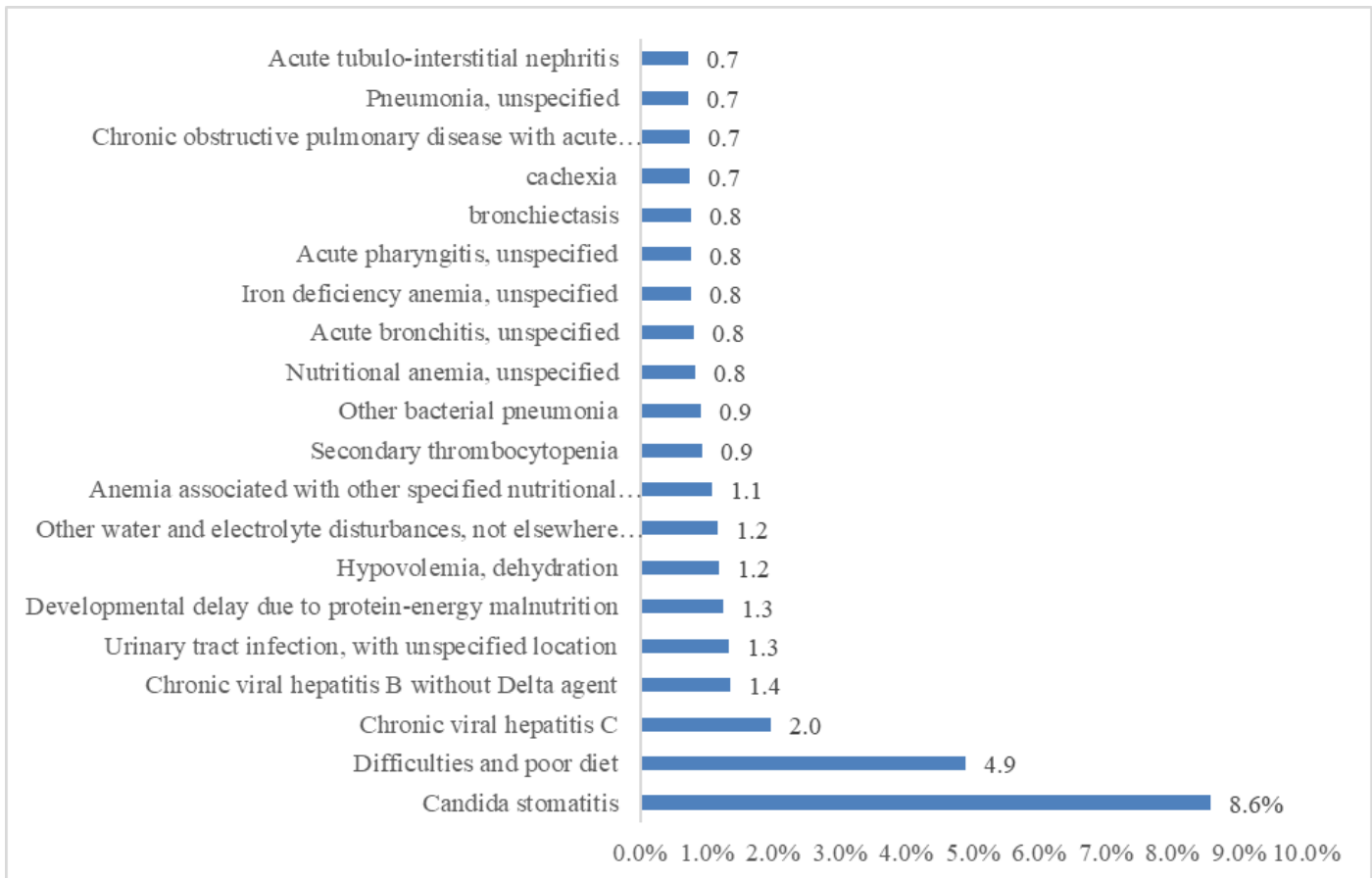
Between 2015 and 2019, in Romanian hospitals a percentage of 1.7% of the total episodes of hospitalization in continuous hospitalization was registered by HIV-positive patients.

The number of patients hospitalized during this period was 25,609, the average number of hospitalization episodes/patient being 13.4 episodes.

Over 90% of the hospitalization episodes belonged to the HIV/AIDS or infectious wards, the rest of the patients being transferred from other types of wards (especially pneumophthisiology and Psychiatry, and as the main diagnosis at discharge, the most frequently observed were HIV disease associated with other specified conditions, human immunodeficiency virus [HIV] associated with other infectious and parasitic diseases, human immunodeficiency virus [HIV] associated with other specified diseases or diseases by human immunodeficiency virus [HIV] unspecified. The evolutionary trend of hospitalizations during the study period was slightly downward, the number of hospitalizations decreasing by about 8% in 2019 compared to 2015.

As a spatial distribution, most of the hospitalized patients came from the regions of Bucharest-Ilfov, South-East and North-East, the counties best represented from this point of view being near Bucharest, Constanța, Ilfov, Mureș, Giurgiu and Sibiu, and according to the number of inhabitants, the order was: Constanța, Ilfov, Giurgiu. The most frequently affected were men, and as an evolution of the number of hospitalization episodes during the study period, the trend was a decreasing one, more accentuated 8 times in the case of women compared to men. Regarding the areas of origin of the patients, most hospitalizations occurred in Bucharest, Constanța and Ilfov counties for men and in Bucharest, Constanța and Mureș counties for women.

**Chart no. 10** The share of the first 20 secondary diagnoses in frequency, identified in patients with HIV / AIDS infection, in Romania, in the period 2015-2019



From the point of view of patients' age, most episodes of hospitalization were registered in the young age categories, people between 20-49 years representing over 80% of the number of hospitalizations, and in children the highest percentage is category 0- 9 years old, among them children under the age of one having the highest share. In the last year compared to the initial year, the frequency of hospitalizations in the 20-29 age group, the most affected age group, decreased almost 4 times.

The average duration of hospitalization at national level for the entire study period was 8.28 days and recorded a reduction in value over time, by more than one tenth compared to the highest value observed in 2015. Higher values were recorded in the case of adult and child psychiatry and pneumophthisiology departments. The longest average hospital stays were registered in the acute hospitals in Prahova, Botoșani, Ilfov and Constanța counties, and among the main diagnoses at discharge that registered prolonged

hospitalization we can mention: Other forms of airway tuberculosis without confirmation bacteriological or histological, Other miliary tuberculosis, Acute bronchitis due to streptococci, Pulmonary tuberculosis, confirmed only by cultures, Tuberculosis of the nervous system, unspecified. Most patients were discharged in an improved condition, and small percentages, below 2.4%, died or were registered as aggravated. The calculated in-hospital mortality rate registered a decreasing trend since 2015, in 2019 there was a reduction by a quarter compared to the highest value observed in 2016. Most deaths occurred in men, 2.4 times more than in women, in people between 20 and 49 years.

The most common associated pathologies of patients in the study group were viral hepatitis, urinary tract or respiratory tract infections, as well as eating disorders, and all forms of tuberculosis combined total approx. 1.2% of their secondary diagnoses.

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