HUMAN RESOURCES INVOLVED IN HOSPITALIZATION IN ROMANIA - COMPARATIVE ANALYSIS BETWEEN THE 8 DEVELOPMENT REGIONS, IN 2014

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BACKGROUND

Over the past 15 years, Romania has registered an increase in the number of physicians per 100000 inhabitants, according to Health for all database [1], from a value of 188.13 doctors/100000 inhabitants in 1999 reaching in 2013 a value of 236.26 doctors/100000 inhabitants. The trend in this period was an upward trend (although in 2013 there was a slight decrease compared to 2012), similar to the one observed in both the European Region and the European Union, although compared to the values recorded in both areas, the figures in Romania were much lower (graphic 1).

Eurostat data [2] over the last 8 years indicates that since 2007, in Romania, the absolute number of specialists has also been slightly increasing, from a figure of 31106 in 2007, reaching 37980 in the year 2014 - graphic 2.

Related to 100,000 inhabitants, the number of specialists in our country showed a predominantly rising trend beginning with 2005, according to Health for All Database [1], reaching in 2013 to slightly exceed the value observed at the level of the European Region but kept at a value slightly lower than the one in the European Union - graphic 3.

Statistical data from the same European database [1] shows that most of the specialist physicians in European countries practice in hospitals. The highest weights are registered at the level of the European Region, but the differences with the European Union countries are minor. The situation is stable from this point of view, fluctuations of these weights being insignificant over the years. Romania is also from this point of view at a lower level, the fluctuations observed over the years being somewhat higher - graphic 4.

In recent years, as new generations of physicians are formed, with the entry of Romania into the European Union, the phenomenon of labor migration appears more and more obvious to us, so worrying statistics warn about the danger that the Romanian health system face a deficiency in the number of physicians, and in particular, specialist doctors. Taking this into account, the National School of Public Health, Management and Development in Health has conducted a 2014 study on various aspects of the provision of health care, obviously including human resources analysis. We will present some of the results of this study, remaining strictly in the area of human resources more precisely we will analyze the human resource represented by specialized doctors working in hospitals.

OBJECTIVES OF THE STUDY

Identify the distribution of human resources in the hospital segment (specialized doctors, except for family doctors and dentists) at national level in each of the 8 development regions and their respective districts, by type of health unit, at the level of 2014.

METHODOLOGY

A transversal, national, descriptive study was conducted in 2014 using secondary data from the databases provided by the National Institute of Statistics, the Ministry of Health, the Public Health Directorates, the Local Public Administration and the Romanian Academy (the database for healthcare staff with higher education in hospitals/districts in 2014 and the database with the number of beds in acute, chronic and anesthesia and intensive care sections) and the National Health Insurance House. Were extracted from these databases the information on the districts of each development region regarding the number of doctors in clinical and preclinical specialties, which provide medical services in different types of sanitary units with beds (acute and out-patient/outpatient units (medical dispensaries, polyclinics, hospital ambulatory, mental health centers, medical laboratories) and in various medical specialties. Regional/districts aggregation has been achieved, and were calculated percentage frequencies, regional and districts averages, indicators of the number of specialists per 10000 inhabitants, number of beds in the care of a doctor, comparing with the value of the
The distribution of specialized doctors according to the region in which they work

By region of development, the values of the number of specialists in 2014 were between 2861 specialists in the South Muntenia region and 7668 specialist doctors in the Bucharest-Ilfov region. The minimum value observed in the South Muntenia region accounted for about 6.8% of the total number of specialists at national level, compared to 18.1% of the national total as specialists were registered in Bucharest Ilfov region. The national average was 5284.25 physicians in 2014, among the least qualified regions, below the country average were five of the eight development regions: South Muntenia with 2861 specialist doctors (6.8% of the total), Southeast with 2989 specialized doctors (representing 7.1% of the national total), the Southwest region with 3554 doctors (8.4% of the national total), the West region with 4542 doctors (10.7% of the total) and the Center region with 5248 specialists, representing 12.4% of the national total, somewhat closer to the national average compared to the other regions mentioned. Except for the Bucharest-Ilfov region, which registered the highest national level, 1.5 times the national average, two other regions were placed above the calculated average the Northeast region with a value of 5541 doctors (13.1% of the total) and the Northwest region with 6041 specialists (14.3% of the total number).

The analysis of the absolute number of specialized doctors in terms of number of inhabitants at national level and development regions indicates the following situation. Compared to a national average of 21.46 specialist doctors/100000 inhabitants, the highest registered value is in Bucharest Ilfov region with 33.74 specialists/100000 inhabitants, 1.6 times more than the national average, and the lowest value is recorded by the region of South Muntenia with 9.12 specialists/100000 inhabitants, 2.3 times less than the national average. The Southeast region is located on the same site with 11.7 specialist doctors/100000 inhabitants, while other regions more densely populated such as the Northeastern region have a value of 15.08 specialist doctors/100000 inhabitants, well below the national average and opposite the good situation indicated by the absolute values of the number of doctors by region. A reverse situation is observed in the Southwest region where although the absolute number of physicians is quite low, reporting this value to that of the population in the area results in a shortage of physicians (the area is below the average country value), lower than that appreciated by absolute values. The Center (with 22.2 specialists/100000 inhabitants) will present the distribution of specialized doctors according to the development regions were they practice, the distribution of specialized doctors according to the districts from which they come, but also according to the type of sanitary unit (hospitals, ambulatory care or medical laboratory) and the type of hospital depending on the population served (district, municipal or town hospital).

RESULTS

In 2014, according to official statistics there were 38444 specialized doctors in Romania, except for family doctors and dentists. The section Results of the analysis of the database of healthcare professionals with higher education in hospitals/districts in 2014 (source of data: Ministry of Health network, Public Health Directorates, Local Administration and Romanian Academy) will present the results were presented in graphical and tabular form. The EXCEL software program was used for data processing and analysis.
inhabitants), Northwest (with 23.2 specialist doctors/10000 inhabitants) and the West (with 24.8 specialist doctors/10000 inhabitants) are above the national average, with the exception of the West region, keeping the same classification as the absolute number of physicians/region - graph ic6.

**Graph 4 - Evolution of the percentage of physicians practicing in hospitals in Romania compared to the European Union and the European Region**

**Graph 5 - Number of specialists in Romania, in 2014, by regions**

**Graph 6 - Number of specialist/10000 inhabitants, in 2014, by regions**

From the point of view of the analysis at district level, we can say that the calculated district average indicates a value of 1006.5 doctors/district. Against this level, Bucharest with the 7434 doctors exceeds 7 times the calculated average. With the exception of Bucharest, only 8 districts exceed the calculated average, namely the districts: Constanța (1013 doctors), Brașov (1056 doctors), Bihor (1359 doctors), Dolj (1778 specialists), Mureș (1928 doctors), Iași (2700 doctors) and Cluj (3051 doctors). The lowest national values are recorded in districts in the south of the country (Ialomița with 180 specialists, Giurgiu with 188 doctors and Călărași with 206 doctors), Ilfov district with 234 doctors, Bistrița Năsăud with 250 doctors and 2 districts from the south of the country (Tulcea with 257 physicians and Vrancea with 283 physicians) - graph 7.

Reported to the number of inhabitants of the district, the best represented county is Cluj with 44.1
doctors/10000 inhabitants, followed by Bucharest with 39.5 and Timiș county with 39.4 doctors/10000 inhabitants. The last three counties are located in the South Muntenia region (Ialomița, Giurgiu, Călărași) along with Ilfov County - graphic 8.

The distribution of physicians according to the type of health unit in which they operate is different from one development region to another. Mainly, the largest percentage of specialists is found in hospitals, with more than half of specialists in hospitals (63.6% of all national physicians). In the extra-hospital medical care, fewer specialists are involved, about 30.1% of the national total, and they are active in medical units such as medical dispensaries, ambulatory units such as polyclinics or hospital ambulatories, preventers and TB sanatoriums or mental health centers. The distribution of physicians in such sanitary units is different, between 24 and 40% of all specialists in the region being involved in providing health care outside hospitals. The lowest percentage at national level (24.3%) is registered in the Bucharest Ilfov units, where the hospital sector is the best developed, and the highest percentage in the country is observed in the South Muntenia region (40%).

Laboratory activity is in most of the cases outsourced, a much smaller number, only 6.3% of specialists working in this sector - graphic 9.
Of all development regions, the largest number of specialists is found in Bucharest Ilfov hospitals (71% of the total region), followed by the Northwest region (67%), while the lowest number of doctors in hospitals is observed in the South Muntenia region (52%). Compared to an average of 3057 specialist physicians working in the hospital at national level, the regions that exceed this average are Bucharest-Ifov with 5421 doctors in the region’s hospitals, the Northwest region with 4060 doctors (representing 67.2% of all specialists in region), the Northeast region with 3447 doctors in hospitals (62.2% of the total in the region) and the Center region with 3318 physicians (63.2% of the total in this region). At the opposite side, there are 1739 physicians in South region (58.2% of the total on region), Southwest with 2063 doctors (58% of all region specialists) and West region with 2925 doctors (64% of the total region).

In regions where the number of specialists in hospitals is lower, the proportion of those working in the extra hospital segment increases, for example, compared to Bucharest Ilfov region, where is located the largest number of specialists in hospitals and the outpatient and preclinical segment are less represented (24% of the total of specialists in the region) in the South region (the least represented from the point of view of hospital doctors), the outpatient sector is better represented, the percentage being 40.4% of the total in the region. The national average number of physicians in the outpatient sector was 1447 below the average are Southeast regions with 1007 specialists, South Muntenia with 1156 doctors, Southwest with 1164 specialists and West with 1362 doctors - graphic10.

The database analysis based on the number of beds per physician care, number regulated by the Ministry of Health Order no.1224/2010 [3] on the approval of personnel norms for hospital care indicates that at the regional level the norm of 5-15 beds/doctor is not respected for medical specialties (3.2 beds/doctor), nor for surgical (3.9 beds/doctor), also the anesthesia and intensive care standard of 3-5 beds/doctor is not respected (2.3 beds/doctor). Thus, there are regions such as Bucharest-Ifov, the Center region and the Northwest region, where none of the three types of specializations does not respect the current staff regulations, with staff surpluses at regional level. Another category is the regions where these norms are respected for all three types of specialization, such as the Southwest region, the South region or the West region and the category of regions where the personnel norms are partially respected (the Southeast region where the staff exceeded the norms at the regional level in the case of medical specialties and the anesthesia and intensive care and the Northeast Region where the overall norms are exceeded in the case of surgical specialties and anesthesia and intensive care) – graphic11.

At the district level, the analysis of the data indicates that a large number of the hospitals within each district complies with the existing personnel norms, except those
presented below by type of medical, surgical or anesthesia specialization. Thus, in the case of medical specialization, 14 districts are not respecting the norms in the sense of the existence of a surplus of personnel, those counties are coming from all regions of the country, with a marked surplus registered by the hospitals in Cluj and Timiș county with 1.61 beds/physician, Iași with 1.81 beds/physician, Mureș with 2.3 beds/physician or Bihor and Sibiu with 2.49 respectively 2.5 beds/physician - graphic 8. Generally, this surplus is attributable to the higher number of staff employed in large hospitals, National institutes, in large cities such as Cluj, Timișoara, Iași, Tg Mureș - graphic 12.

In the surgical specialties, the hospitals in 11 counties do not respect the personnel norms, surplus surgeons being more pronounced in the counties with large...
hospitals such as: Timiș (2.46 beds/doctor), Iași (2.52 beds/physician), Cluj 59 beds/doctor) and Mureș (2.9 beds/doctor) – graphic 13.

In the anesthesia and intensive care specialty the hospitals in a larger number of counties (16 counties) recorded surplus of anesthetic physicians, not respecting the staff norm that provides 3-5 beds/doctor. Under 2 beds/doctor are in care of a doctor in the hospitals in Iași (0.94 beds/physician), Timiș (1.06 beds/doctor), Mureș (1.6 beds/physician), Botoșani (1.8 beds/doctor), Cluj and Tulcea (1.9 beds/doctor). Values below 3 beds/physician also register hospitals in other 10 counties - graphic 14. On the other extreme, values over 5 beds/physician, respectively the lack of doctors in this specialization register the hospitals in Argeș county.

The distribution of specialized doctors depending on the type of hospital they are practicing in

From the point of view of the type of hospital, most of the specialists operate in large hospitals, such as district emergency ones. The analysis considered hospitals in all regions, except for those in Bucharest, analyzed separately because their spectrum is wider. In the case of the seven regions were analyzed the data on emergency district, municipal and town hospitals.

It can be seen from graphic 15 that that majority of specialists in these types of hospitals (69%) are located in districts hospitals, hospitals with broader addressability and a vast pathology covering almost all medical or surgical specialties. 23.3% of specialists work in municipal hospitals and 7.6% in town hospitals.

Distribution across different types of hospitals is varied from one region to another. The average number of specialists working in district emergency hospitals in 2014 was 1426.5 doctors, the regions exceeding the average being the Center, West and Northwest, the rest being below the average. In the case of municipal hospitals in the seven regions, the average was about 480.5 doctors under this average were the hospitals in the South, Southeast and Southwest hospitals. For town hospitals, the average of medical doctors was 155.5, lower than the average being hospitals in the Southeast, Northeast, West and Center. From the point of view of the employees' weights in the three types of hospital structures it is found that the highest shares of doctors employed in district emergency hospitals are found in the Southeast regions (83% of all doctors employed in these types of hospitals in the region) and Center (78%), while the lowest share is observed in the West region (59.4%). In municipal hospitals worked between 11.7% (Southeast Region) and 34.6% (West Region) of the total number of doctors employed in these types of hospitals in each region. The town hospitals had employees between 4.8% (Center region) and 15.8% (in the South Muntenia region) of the total number of doctors employed in these types of hospitals in each region - graphic16.

In the case of Bucharest, in general, staff regulations are respected for all three types of medical, surgical and anesthesia and intensive care specialties by smaller hospitals, such as clinical hospitals or specialized care hospitals. For larger hospitals, such as the National Institutes, with wide addressability both locally and nationally, norms are respected for surgical and anesthesia and intensive care specialties, but not for medical specialties where there is surplus of physicians, with 2.96 beds/physician. In the case of emergency clinical hospitals there is a clear surplus of staff, especially for medical specialties (0.4 beds/doctor), but also for surgical specialties (1.53 beds/doctor) or anesthesia and intensive care (1.63 beds/doctor). Emergency university hospitals also register a large surplus of staff in all categories of specialization (anesthesia and intensive care–0.91 beds/physician, medical specialties–1.34 beds/physician and surgical-2 beds/physician) - graphic 17.

Analyzing data on the type of hospital in terms of staff regulations regulated by Order 1224/2010 [3] we find different situations for the three types of hospitals analyzed: emergency district hospital, municipal hospital and town hospital. If in district emergency hospitals there are several cases where there is a surplus of staff for one or more of the analyzed specializations, in the case of municipal hospitals but especially in the case of town ones, there is a shortage of staff in one or more specializations. Almost half of the district emergency hospitals (19 hospitals) in the country recorded in 2014 a surplus of staff in medical specialties. The most representative cases were the district hospitals in Oradea, Craiova, Sibiu, Tg Mureș, Brașov and Iași, which recorded a marked surplus, under 2 beds/physician, while the remaining 13 hospitals registered values between 2.12 and 4.85 beds/physician. The reverse situation in which a staff shortage was observed was recorded in the Deva district hospital, where were 19.7 beds/physician compared with the maximum limit prescribed by the normative 15 beds/doctor - graphic 18.

In surgical specialties at district emergency hospitals, in approximately two thirds of cases, the staff regulations in force are observed. The remaining one third of the county hospitals have the most frequent staff surplus, 11 counties, while two have a shortage of surgeons (Caraș Severin county with 16.8 beds/physician and Hunedoara County with 20.3 beds/doctor). Between the counties with surplus in this field, the most numerous personnel was observed in the counties of Mureș (2.3 beds/doctor), Iași (2.5 beds/physician), Sibiu (2.6 beds/physician), Bihor (2.7 beds/physician) and Dolj (2.9 beds/doctor) - graphic 19.

Regarding the current regulations that provide 3-5 beds/physician in anesthesia and intensive care specialization, more than half of the district hospitals have either surplus (23 hospitals) or staff shortage (2 hospitals). The deficit is an important one in Hunedoara county, being nearly double (9.7 beds/physician) than the maximum admission limit (5 beds/doctor). In Caraș Severin the situation is less serious, the deficit being lower, 7.5 beds/doctor. In
other 23 hospitals there is non-compliance with the existing norms in the opposite direction, the most important surplus being recorded in counties such as Iaşi (0.94 beds/doctor), Mureş (1.3 beds/physician), Timiş (1.4 beds/physician), Bihor (1.47 beds/doctor), Dolj (1.62 beds/doctor), Tulcea (1.78 beds/doctor) and Botoşani (1.82 beds/doctor) - graphic 16. The rest of the counties fall between 2-3 beds/physician.

In municipal hospitals the rule is compliance with human resources norms, exceptions being generally to a surplus of staff. Thus, in the medical specialties in nine counties there is the existence of surplus staff, the most important values being recorded in the counties of Timiş (1.7 beds/doctor), Prahova (2.25 beds/physician), Bihor (3.16 beds/doctor) and Dolj (3.29 beds/doctor). In one county, Dâmboviţa lacked staff in this type of specialization with a value of the indicator of 15.22 beds/physician - graphic 21.

In the surgical specialties, only two counties had surplus of specialists Timiş (2.6 beds/physician) and Braşov (4.3 beds/physician), and two other counties had a shortage of specialists in the field, Ialomîta (15.71 beds/physician) and Bihor where the value of the indicator indicates almost double (28.22 beds/physician) of the maximum admitted value (15 beds/physician) - graphic 22.
In the anesthesia and intensive care specialization the deficit of specialists is predominant, of the 15 counties that do not meet the staff norms, ten lacked specialists. The most important deficits are observed in counties like Ialomiţa (13 beds/physician), Vâlcea (12 beds/doctor) and Satu Mare (10 beds/doctor) where the value of the indicator exceeds twice the maximum in the specialty. The other 7 counties with staff shortages fall within the range of 5.2-7.5 beds/physician.

Five of the counties registered a surplus of surgical specialists in the town hospitals during 2014, the most important being Tulcea county (2.3 beds/doctor). In the rest of the counties, the surplus of staff was not significant with values of the indicator ranging from 4.3 to 4.6 beds/physician - graphic 25.

The anesthesia and intensive care specialization in the case of town hospitals was also deficient as a number of specialists in a significant share of the counties, with almost one third in such a situation. The most important deficits were observed in counties like Călăraşi and Buzău (10 beds/doctor), Hunedoara, Cluj and Bistriţa-Năsăud (8 beds/doctor). The rest of the counties had a deficit that ranged between 5.5 and 7.5 beds/physician. In seven counties the situation was reversed, with the surplus of the specialized personnel, the most important being in Ialomiţa counties (1 bed/doctor), Olt (1.17 beds/doctor) and Arad (1.7 beds/doctor) - graph 26.

**Graph 24** - The counties where the normative of 5-15 beds/doctor (according to Order no.1224/2010) in town hospitals is not respected, in the medical specialization, in 2014

**Graph 25** - The counties where the normative of 5-15 beds/doctor (according to Order no.1224/2010) in town hospitals is not respected in surgery, in 2014

**Graph 26** - The counties where the norms of 3-5 beds/doctor (according to Order no.1224/2010) in town hospitals are not respected, in the anesthesia and intensive care

**CONCLUSIONS**

As the official statistics indicate, there has been a steady increase in the number of doctors in the last 15 years in Romania, including specialized doctors,
although with the accession to the European Union our country has increasingly intensified the phenomenon of the migration of force work in the health sector. Compared to both the European Region and the European Union countries, Romania is far behind as a number of doctors in terms of population, situation in different development regions showing significant differences between one area or another. There is a stronger concentration of the medical workforce in the regions with more intense economic development (Bucharest-Ilfov, Northwest, Center or West), while the poorer and heavily populated areas show a decrease in the distribution of the personnel, with regions such as South Muntenia, the Southeast or Northeast region, where in some specialties, especially intensive care and surgery, there is a shortage of physicians. In a county plan, the counties with a more developed economy benefit from surplus of personnel in hospital care, while the poorly developed counties (Ialomița, Giurgiu, Călărași) face the same lack of specialized personnel, often in surgical specialties and anesthesia-intensive care.

Depending on the type of health care unit, more than half of the doctors were operating in hospitals in 2014, compared to one third working in ambulatory units and only 6% in laboratories. Referring to the weight of specialists in European Union or European Region hospitals, Romania has recorded lower rates over the years, with the 2014 level being somewhat closer to previous ones. Of the specialists registered in our hospitals, most of them were active in large hospitals such as emergency district hospitals (69%), while specialists from small hospitals (municipal or town) were much fewer. And in this case there are variations of one area to another. If at the level of Bucharest, the smaller hospitals such as clinical or specialized care were in compliance with the norms in force in the respective year regarding the superior health personnel for all three categories of medical, surgical and anesthesia and intensive care specialties, in the larger hospitals like clinical hospitals or university emergency hospitals staff norms were not respected, with staff surplus for all categories of specializations. Also at the local level, district hospitals often registered staff surpluses in at least one of the three types of specialization, while in the case of small, municipal or town hospitals there was rather a staff shortage in one or more specializations. Most frequently, staff surpluses in district emergency hospitals targeted medical or anesthesia and intensive care specialties (more than half of cases) and less surgical specializations. The smaller hospital categories have reported rarely staff surplus, especially in medical specialties, while the shortage of staff is more frequent in these cases, especially in the anesthesia and intensive care specialization.

In view of this, the health authorities should not only achieve the correct planning of the needs of graduates of the faculties of medicine and of the national residency program, but also apply effective strategies for attracting young specialists to areas with lower coverage, according to the local needs of the population and to the number permanently updated by the local authorities of the specialists in each area.

References

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