

# STUDY OF THE VARIATIONS IN THE USE OF HOSPITAL SERVICES, BASED ON THE CASE MIX, IN 2008 IN ROMANIA

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*The healthcare system copes with economic challenges worldwide, so the healthcare reform is a topic more important than ever for social policies. What do we get for our money? Is a question that raises more and more. It has been shown that more healthcare services does not necessarily mean a better health. Many countries focus of medical practice variations or health disparities. The collection of case mix data starting with 2003 in Romania made possible several studies concerning practice variations in Romania. The present article shows how these data can be used to provide accurate comparisons in geographic profile concerning the volume of services, territorial disparities and to hypothesize about the possible causes of practice variations.*

**Key words:** Hospitals, medical practice variations, territorial disparities, case mix

## BACKGROUND

Historical, medical practice variations (MPV) are quoted in literature as a common phenomenon, being encountered from the primary medicine level to hospital care [1]. Their existence does not, by itself, make subject to health systems analysts, but their volume does: important practice variations can cause excessive and unnecessary consumption of resources in health care.

As international studies [3,4] have shown, a higher volume of care not necessarily means better health status.

Potential causes of these variations are intrinsic - related to the care provider, or extrinsic - related to the external environment.

Studies concerning the practice variations identify and assess their presence and possible impact on the patients' health, using administrative data, reimbursement claims from the health insurance fund, National registries, medical statistics.

## INTRODUCTION

As definition, the medical practice variations (MPV) are considered essentially to be represented by deviation from a scientific standard. In countries using practice protocols, MPV are measured by the respective protocols deviation.

Besides the actual MPV, literature mentions the so-called *small area variations* (SAV) phenomenon, meaning territorial differences in the rate of utilization of health services. This phenomenon is closely bound with the regional disparities in the health care coverage.

The practice variations phenomenon is evaluated based on activity indicators, most common of which being the number of hospital admissions, the diagnostic procedures rate, the surgical procedures rate.

One can say that the United States, which were published the first studies on this phenomenon more than 30 years ago, have the longest tradition in measuring practice variations.

Twenty years ago, was designed and used to illustrate and evaluate variations in practice The Dartmouth Atlas of Healthcare, a continuously updated tool. It makes comparisons of services and used resources between hospital referral regions, based on well established methodology and standardized indicators, evaluation results being permanently published on the Atlas website. Its usefulness has been proven, including in recent years, by substantiation of measures in the Obama health reform based on the Atlas consumption and resources arguments [4,6].

Not only the United States have shown concern in the field, but also other countries such as Canada, United Kingdom, Japan which made studies on the practice variations.

In Romania, the idea and the opportunity to assess variations occurred with the development of a national database, to implement the system Diagnosis Related Group (DRG) in 2003. The data in this database, known as case mix<sup>1</sup> data, were used, in recent years, in several studies for this field. Here are some of them:

- 2006 - Identifying variations in providing surgical services - C. Palas, S. Mușat, INCDS, București;
- 2007 - Variations in medical practice in hospitals providing medical services in Romania - D. Lăzărescu, Sibiu;
- 2009 - Published studies on regional variation in hip arthroplasty and tonsillectomy in children - N. Chiriac, D. Mincă et al, București.

## AIMS AND OBJECTIVES

Identifying variations in use of hospital services in geographic profile in Romania, in 2008.

## METHODOLOGY

The study presented in the article is a descriptive observational one, conducted for the patients discharged 2008. There were included as subjects all cases discharged from acute hospitals in Romania, regardless of funding type (DRG or nonDRG), considered valid in terms of accuracy of reported data and coding, which were qualified to be reimbursed by National Health Insurances. House Data sources used were: patient level database, managed by National School of Public Health, Management and Professional Development Bucharest, and the statistical demographic data, National Statistical Institute.

The variables studied were the volume of hospital services and the number of days of hospitalization.

For this study we used gross rates of indicators, as the gross rate of hospital discharges, or gross rate of hospital days for comparisons by territories, we used the calculation of standardized rates on one or more criteria and measuring the confidence interval (CI), excess or deficit over the standard, in geographical profile.

Gross rates calculated show volume of services, activity level, but do not allow direct comparisons. To facilitate comparison and measurement of excess or deficiency of services against a particular standard, "the Classics" of MPV measurement (Wennberg, Fischer) used standardization of the rates. Standardization allows fair comparison of structurally (age, gender, area of residence, etc.) different populations.

The studies of variations in utilization and practice use standardization of gross rates of indicators of hospital activity - in particular by gender, age, race, complexity of cases.

In the international literature, comparisons are made at the level of the service basins of the hospitals. In Romania, "hospital referral regions" are not defined as such, consequently this study used comparisons between counties, taking as reference the patient's home county. We looked for the excess or the deficit of cases or days of hospitalization, comparing to a "standard". The standard was considered the national level of the studied indicator (rate of discharge, number of days of hospitalization, etc.)

In this study we have used the indirect method of standardization (used also in other similar studies in the international literature), knowing the age groups, respectively gender or type of residence, for each county.

As standard it was used the national level of the standardized indicator. Standardized rates were calculated for the studied indicators, and then the standardized ratio of the indicator and its confidence interval CI  $\pm 95\%$ . Surplus or deficit on a county level was estimated by the percentage that exceeded or was below 100%, for the standardized ratio.

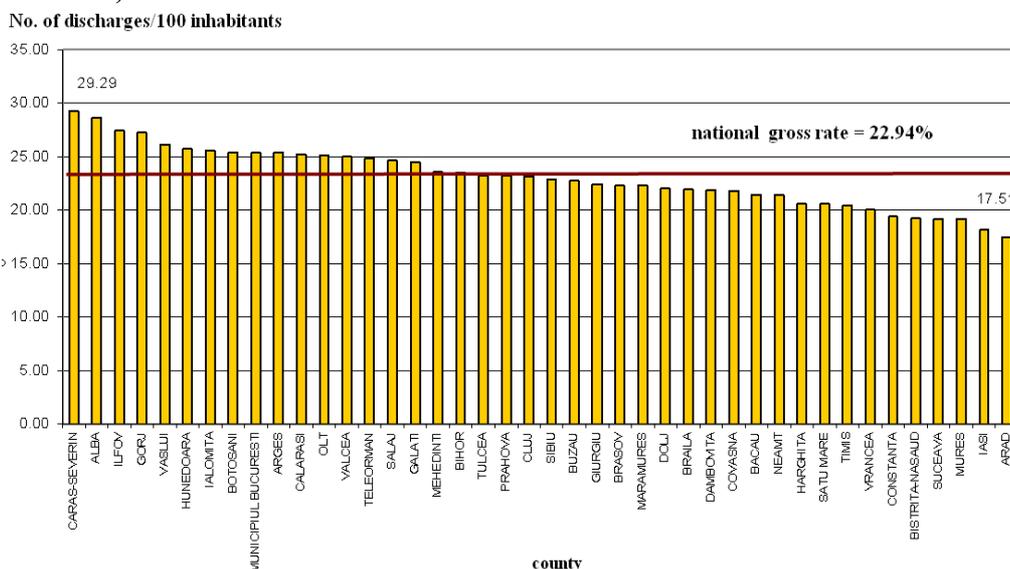
## RESULTS

Gross ratio calculation of hospital discharges in 2008 in Romania shows that, against a national average of 22.94 discharge for hundred residents, there are counties with excess of discharges as Caraş Severin (29.2%, about 30% higher), Alba, Ilfov, Gorj, but also deficient counties - Suceava, Mureş, Iaşi, Arad (17.5%, about 24% less than average) - figure 1.

Are these differences real or they depend on the different structure of populations which patients belong?

In other words, are these differences justified by differences in age, gender or area of residence of patients or are simply an excess of healthcare consumption, rather in relation to the hospitals practice in these areas? To verify these assumptions, standardization of the gross rate of discharge was done initially by sex and area of residence. After applying this method, hierarchy has changed slightly for rates of hospital discharges leading counties, intensely marked in violet on the map chart. For instance, Caraş, Alba, Ilfov, Gorj, Argeş were maintained in the first quartile of the standardized rate of hospital discharges, but Vaslui and Botoşani, among the 10 counties as gross rate of hospital discharges, fell in the second quartile on standardization by sex and area of residence - figure 2. If, however, in counties such as Alba, Hunedoara,

Figure 1. Gross rate of discharges, after the district of residence of the patients, Romania, 2008



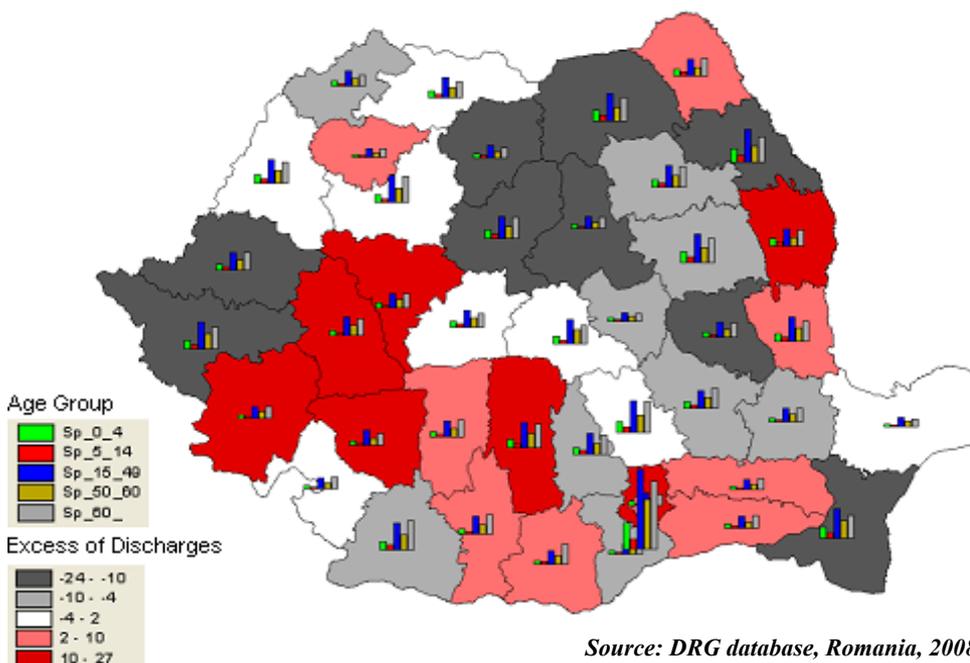
Source: DRG database, Romania, 2008

excess is predominantly due to urban population, in Gorj, for example, excess can be attributed rather to rural patients. The hierarchy of the counties on the last places, as gross rates, does not change after standardization.

In a second phase, gross rates were standardized by age groups of hospital discharged patients. We considered five major age groups, respectively 0-4 year, 5-14 year, 15-49 year, 50-59 year, 60 year and older. Standardization by age groups and represented on the map chart in figure 3 (after division into quartiles), shows even more clearly the excess in the south-west of the country, shaded in violet, and scarcity of cases from the north-northeast of the country (Suceava, Bistrița Năsăud, Mureș, Harghita). Furthermore, Timis county join the last quartile of standardized by age rates, indicating a deficit that does not seemed so important after standardization by sex and type of residence. The deficit is predominantly due to the age groups 15-49 years, but also to 60 years and older.

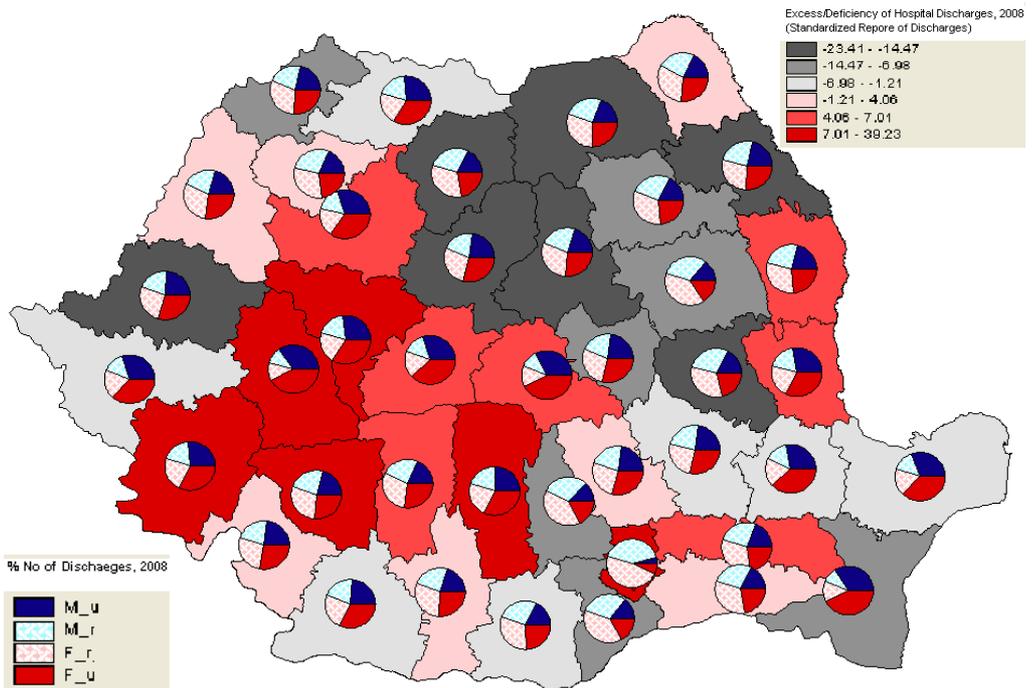
Certainly, only the gross rate of hospital discharges, respectively the number of cases is insufficient to characterize

**Figure 3. Geographical distribution of excess, respectively deficiency of hospital discharges, standardized by age, Romania, 2008**



Source: DRG database, Romania, 2008

**Figure 2. Geographical distribution of excess, respectively deficiency of hospital discharges, standardized by sex and area of residence, Romania 2008**



Source: DRG database, Romania, 2008

the use of hospital services. Following, geographical differences were evaluated in terms of hospital days consumed by patients of a county or another.

Standardization of hospital days by age groups showed the same aggregation of areas with excess hospital days in the southwest of the country, as well in Ilfov- figure 4, shaded areas in deep violet. Some counties disappear from the top, like Arges, but other counties enter the top, as Vaslui and

Botoșani, intensive consuming hospitalization days. The deficit of hospital days is important throughout the counties of north-north-east, marked in dark gray on map chart, as well in Constanța, Arad and Timiș.

Analysis of the average length of stay (ALOS), in 2008, showed differences between counties. So, minimum ALOS was 6.08 days and was recorded in Ialomița, and the maximum ALOS, 7.66 days, was recorded in Hunedoara. Territorial differences remain after standardizing by age.

Table 1 synthetic shows the situation of all studied indicators for all the counties, counties with excess for all indicators bearing a “+”, and the ones with deficit for all indicators a “-”.

## CONCLUSIONS

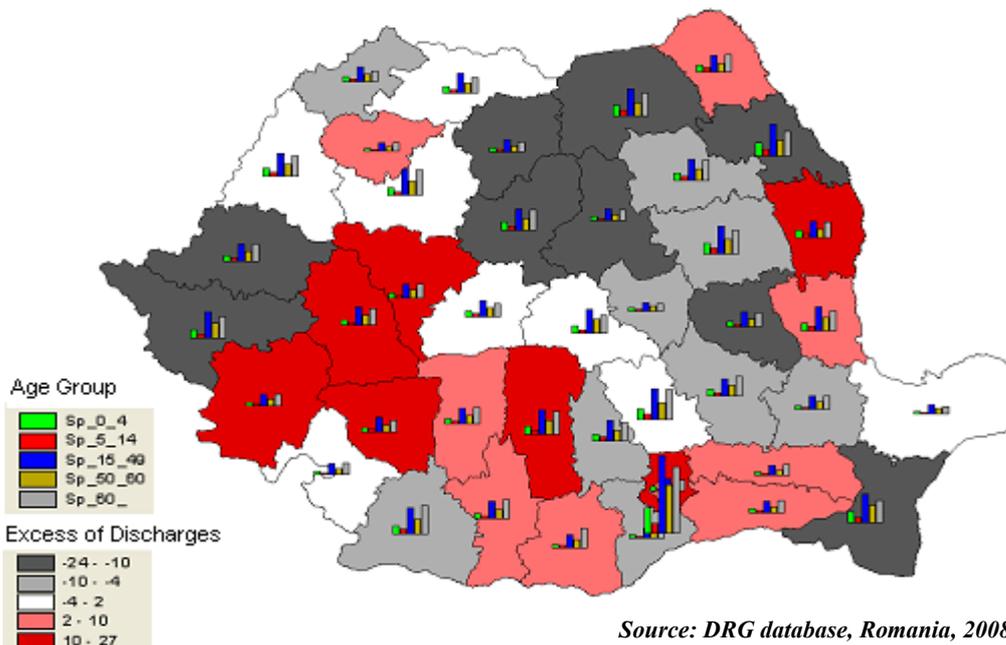
The study demonstrated the existence of real variations →

in the use of hospital services depending on the patient's home county. **Figure 4. Geographical distribution of excess, respectively deficiency hospital days,**

Southwest of the country is characterized by excessive consumption of services, and north-northeast by serious deficit. Particularly surprising is the situation in Ilfov, which is a major consumer of hospital services, although it is near Bucharest. Further investigation could possibly reveal hospitals serving these patients - they could be located even in Bucharest, which would generate a supply-induced demand hypothesis.

Possible hypotheses that could explain reported variations in practice could be related to:

- The existence of excess/



Source: DRG database, Romania, 2008

Table 1 Hospital indicators, by counties, Romania 2008

County	gross discharge rate/ 1000 inhabitants	excess/ deficit of discharges	gross hospital days rate/1000 inhabitants	excess/ deficit of hospital days	counties having excess/ deficit for all indicators
ALBA	286.78	24.54	2082.68	38.83	+
ARAD	175.07	-24.17	1286.27	-20.25	-
ARGES	253.82	11.32	1678.27	7.17	+
BACAU	214.59	-5.49	1395.75	-11.93	-
BIHOR	235.08	2.13	1669.29	5.89	+
BISTRITA-NASAUD	192.45	-14.36	1344.43	-12.31	-
BOTOSANI	254.03	9.94	1732.91	6.21	+
BRAILA	219.52	-5.38	1459.13	6.46	
BRASOV	223.33	-1.60	1601.03	-5.61	
BUCURESTI	253.87	10.24	1605.44	2.61	+
BUZAU	227.55	-3.59	1978.70	4.70	
CALARASI	252.15	7.42	1675.86	0.20	+
CARAS-SEVERIN	292.87	26.81	1535.38	31.15	
CLUJ	231.93	0.93	1310.95	4.82	
CONSTANTA	194.18	-14.35	1648.53	-20.88	
COVASNA	218.21	-4.85	1542.01	1.39	
DAMBOVITA	219.13	-3.81	1395.85	-1.02	-
DOLJ	220.46	-5.26	1558.97	-12.11	
GALATI	245.25	8.74	1471.11	1.02	
GIURGIU	224.69	-4.87	1794.64	-6.57	
GORJ	272.58	22.53	1472.72	18.04	
HARGHITA	205.87	-10.43	1973.09	-8.50	
HUNEDOARA	257.59	12.83	1555.39	36.51	
IALOMITA	255.84	9.90	1294.28	-5.28	
IASI	181.56	-19.32	1781.46	-24.98	
ILFOV	274.49	20.93	1626.41	7.83	+
MARAMURES	223.23	-0.76	1664.57	5.48	
MEHEDINTI	235.96	2.09	1411.30	12.13	
MURES	191.84	-17.20	1530.92	-12.85	-
NEAMT	214.47	-6.34	1637.99	-1.91	
OLT	251.67	8.72	1612.80	5.63	+
PRAHOVA	232.49	0.69	1462.73	6.65	
SALAJ	246.43	6.51	1727.11	15.01	+
SATU MARE	205.73	-8.31	1684.39	-4.64	
SIBIU	228.53	0.87	1372.30	8.05	
SUCEAVA	192.14	-15.44	1649.23	-11.85	
TELEORMAN	248.75	2.57	1324.67	9.55	
TIMIS	204.41	-9.76	1539.95	-15.00	-
TULCEA	232.51	2.33	1833.37	0.44	+
VALCEA	250.58	8.13	1289.58	14.93	
VASLUI	261.54	13.62	1736.38	10.78	+
VRANCEA	200.51	-13.15	1570.90	-16.52	
<b>national average</b>	<b>229.40</b>		<b>1558.84</b>		

shortage of hospital beds, doctors in different areas of Romania;

- The existence of different pathologies in the territory;
- The existence of different patterns of care in different geographical areas.

Perhaps the most important conclusion of the study remains the one that the use of statistic demographic data, together with case mix data, can represent a basis for identification and evaluation of practice variations in the geographic profile in Romania, as in other countries.

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