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Patient migration among the Italian regions in 2003

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Abstract

Background: In the Italian National Health Service hospital planning was influenced by two aspects: the patients' freedom to choose their health care provider and the equal distribution of centers spread throughout Italy. While every Italian Region should be able to meet the health needs of its own inhabitants, consistent migration among regions exists. Retrospective studies of cross boundaries patient flows can be useful for health planning purposes, providing precious information about citizens' preferences, and helping health managers to think about inequality and adjust the offer of care.
The aim of this study is to describe cross boundary flows which occurred across all the Italian Regions in 2003.
Methods: The hospital discharges for 2003 were obtained from the General Directorate for Health Planning of the Italian Ministry of Health. We analyzed regional cross boundary flows using the Gandy Nomogram. This tool, which assesses patient mobility, can be used to describe regions' ability to satisfy their internal health demand and their own capability in attracting foreign patients.
Results: All of the regions, for the most part, were able to satisfy internal health care demands, and are placed in the upper right corner of the Gandy Nomogram.
Umbria, Emilia Romagna, P. A. di Bolzano, Tuscany, Lombardy, Friuli V. Giulia, Lazio, Abruzzo were the regions that appeared to perform best. The Lombardy region attracts the most patients.
Conclusions: This study briefly provides an evaluation of hospital supply of services giving indications about patients' perception of the quality and organization of services.
A deeper analysis of patient migration may be undertaken by looking at specific diseases. This kind of research could be useful for planning and maximising supplies when making decisions about healthcare.

Key words: patients' mobility, perceived quality

Introduction

The law n° 833/1978 [1], cornerstone of the Italian National Health System, states that every citizen must find responses to any health need [2] within his/her own Local Health Unit (LHU) boundary. The LHU, which normally coincides with the local provinces, are the basic health care areas financed by public funds.

At first LHU financing was based on a system of the reimbursement of expenses at the central level according to those of the previous year, a mechanism that was not able to estimate expenses.

In order to correct this problem the Legislative Decrees 502 (1992) [3] and 517 (1993) [4] were issued, confirming the general set up of the 833/1978 Law, but also establishing an organizational model based on Local Health Companies (LHC) thus replacing the previous LHUs. This gave the LHUs, now LHC, not only health care liability, but also a financial responsibility.

At the same time health care competencies switched from the National to the Regional level and the latter became liable for all health needs [5].

This process ended in 2001 with the introduction of a kind of devolution in the health care service that 'de facto' created the Regional Sanitary Subsystems (R.S.S.), which made the LHC financially and managerially dependent on Regions.

The Regions agreed to interpret the directives issued by the national planner, seeking equity and

quality, that are the basis of the same Health Service.

The new system is now characterized by the LHCs which are in competition with each other and with the private sector. Every Region economically sustains all the LHCs within its own boundaries, using the following criteria: number of inhabitants, geographical aspects and demographic distribution. Moreover, the Regions have to pay for citizens who are admitted outside their boundaries and still keep financing their own structures that could be not optimally exploited.

Further payments to the LHCs are given to those that supplied services for out-of-district patients and viceversa payments are withdrawn from the LHCs for health care services supplied to them by others [6]

The previous changes have instituted what is called a 'quasi-market': it is 'market' because it replaces monopolistic state providers with competitive, independent ones. It is 'quasi' because it differs from conventional markets in several ways: non-profit organizations compete for public contracts, consumer purchasing power either centralized in single purchasing agencies is allocated to users in the form of vouchers rather than cash; and in same cases the consumers are represented in the market by agencies instead of operating by themselves [7, 8].

Local Health Companies have to pay attention not only in trying to keep their own users, for which the local health care system has invested money [9], but also in attracting those coming from other LHCs which bring extra funds with them.

Regions as financers and planners of their Regional Health System became an important consideration when studying patient flows among the Regions [10].

Patient boundary flow, in particular those who are admitted to hospitals, is an important tool which reflects: the capacity of a Region to 'answer' health care needs, to evaluate user perception of quality and to identify the lack of services and emerging problems.

Moreover studying hospital patient mobility helps in the evaluation of the capacity of hospitals to satisfy health care needs, tests the patient perception of quality and, finally, identifies medical and management areas which need improvement.

Several reasons may determine patient migration: (i) 'physiological mobility' (i.e. movements from zones near the Regional borders and emergencies during occasional stays) not related to improvements of heath care quality; (ii) 'avoidable mobility', i.e. caused by a lack in the local supply or by researching better quality. The latter has to be monitored and analyzed by the health care planner.

Previous studies have found that the main changes in health care services are linked to a change in patient flows: it was apparent that in some Regions the reduction of emigrant neoplastic patients during the 80's was associated with the foundation of new reference hospitals and new postgraduate oncological schools, which were able to satisfy local health care needs [11].

Many migrations are influenced by the reputation of the hospital staff and by the network of relationships between the patient, the doctor working in the hospital and the patient's general practitioner/reference specialist.

Other factors, such as the length of waiting lists and distance, for non-urgent needs, seem to be less important [9-13].

For these reasons, patient flow can be a proxy measure for hospital quality; through the analysis based on the data collected concerning 21 Italian Regions in 2003 we investigated which Regions were able to follow quality and equity goals- the main objectives of the Italian National Health System.

Methods

We used ordinary and day hospital patient discharge data obtained from the Ministry of Health.

The following information was collected for every Italian Region (Table 1):

- admissions of residents in their regional Hospitals (RA),
- admissions to Hospitals of patients 'attracted' from other Regions (A),
- admissions of residents 'escaped' from other Regions (E).

We adopted the Gandy Nomogram [14] to illustrate the situation of the Italian Regions in 2003.

The Gandy Nomogram is a tool that evaluates the use of hospital centres [15] (Figure 1); it is a squared area with the side of 100, placed in a Cartesian plan; in the abscissas there is the percentage of patients admitted to the centre's who were living in the district, while in the ordinate there is the total demand percentage of inhabitants, satisfied in their own district.

The Cartesian plan may be further parted in four squares by two lines, parallel to the axis, which takes the origin at (x=0; y=50) and (x=50; y=0).

The diagonal which originates from the O point

Figure 1. Gandy's Nomogram Italian Regions 2003.

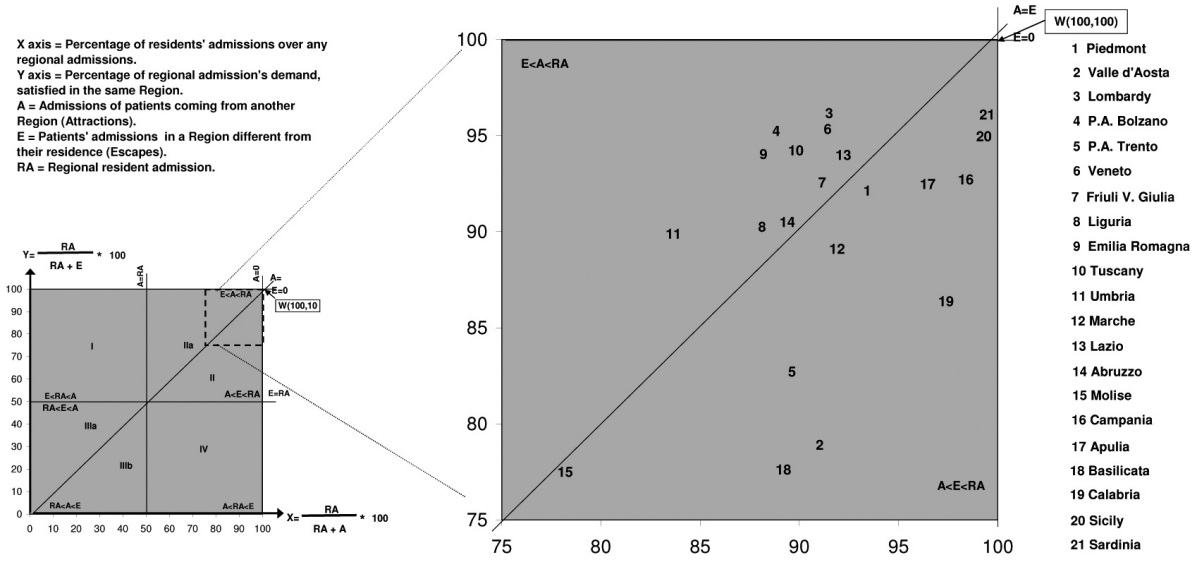

Table 1. Hospital admissions (Ordinary + Day Hospital) in Italian Regions in 2003.

	Residents' admissions (RA)	Attracted Admissions (A)	Escaped Patients (E)
Piedmont	671,696	48,504	59,319
Valle d'Aosta	17,579	1,903	4,733
Lombardy	1,743,231	178,910	68,087
P. A. di Bolzano	92,149	12,496	4,502
P. A. di Trento	70,405	8,011	14,880
Veneto	801,863	75,290	38,772
Friuli-Venezia Giulia	183,907	19,522	14,808
Liguria	340,480	45,703	36,549
Emilia-Romagna	718,863	101,941	45,775
Tuscany	591,856	72,343	35,913
Umbria	150,993	30,403	17,097
Marche	247,965	24,358	30,067
Lazio	1,100,925	103,167	68,820
Abruzzo	296,584	38,315	31,170
Molise	56,830	16,160	16,583
Campania	1,130,977	31,716	88,784
Apulia	756,579	35,317	61,201
Basilicata	97,172	12,559	28,011
Calabria	394,956	14,400	62,715
Sicily	1,226,683	20,489	63,406
Sardinia	354,697	6,109	13,906
TOTAL	11,046,390	897,616	897,616

(x=0; y=0) and ends at the W point (x=100; y=100), splits the plan in an upper space where the y value is larger than the x one (there are more incoming patients (A) than escapes (E) and a lower one with an opposite situation. The points on the diagonal have the same value either for the escapes and for the attractions, null in the W point and O point represents the maximum .

The four above-mentioned quadrants show a different balance between escapes and attractions:

- Hospitals placed in the upper left quadrant (I) have a number of residents' admissions higher than escapes and, at the same time, lower than attractions. This condition characterizes hospitals which are 'market oriented' [16] (E<RA<A), thus centres that are able to get more funds because they attract more patients from other areas than patients who are local residents.

The point (x=0, y=100) identifies the paradoxical condition in which all the patients admitted to the hospital are from different areas with respect to estimates, and there are no escapes.

- The upper right quadrant (II) is parted in two areas, a and b. In the first one (IIa) the resident admissions are higher than the incoming patients and the latter, at the same time, are higher than the one of those patients looking for care elsewhere (E<A<RA). In the second area (IIb) resident admissions are higher than escapes, but the latter are higher than the incoming patients (A<E<RA).

In these two areas there are hospitals which satisfy (in a more or less appropriate way depending on their position) the health care needs in their district.

- In the lower left quadrant (III) the diagonal parts two areas IIIa and IIIb. Both of them have a lower number of resident admissions, exceeded by escapes and arrivals: in the IIIa area escapes are lower than arrivals (RA<E<A) and in IIIb we have an opposite situation (RA<A<E).
- Finally, the lower right quadrant (IV) shows hospitals where resident admissions are lower than escapes and higher than arrivals (A<RA<E).

The X value is obtained from the number of admitted residents divided by the admitted residents plus the arrivals:

$$x = \frac{RA}{RA+A} \cdot 100 \qquad (1)$$

The Y value is obtained dividing the admitted residents by the admitted residents plus the escapes:

$$y = \frac{RA}{RA+E} \cdot 100 \qquad (2)$$

In order to provide a better in-depth analysis from the data related to the escapes and attractions, we created a table (Table 2) which summarizes the population, the territorial extension, and the number of hospital beds and hospital rates of the Italian Regions.

The 'escape rates' was obtained drawing the percentage of inhabitants of every Region admitted outside its borders during a specific time.

Table 2. Regional data.

REGION	Population (P)	Territorial extension (km^2)	Number of Hospital Beds (B)	Hospital rate (RA+F)*10000/P	Escape Rate F*100/(RA+ F)	Attraction Rate A*100/(RA+A)	Potential Internal Demand Satisfaction Rate (A-F)/(RA+F)
Piedmont	4,231,334	25,399	16,189	1,587	8.8	6.7	-1.6
Valle d'Aosta	120,909	3,263	485	1,454	26.9	9.8	-16.1
Lombardy	9,108,645	23,861	39,009	1,914	3.9	9.3	6.4
P. A. di Bolzano	467,338	7,413	2,163	1,972	4.9	11.9	8.7
P. A. di Trento	483,157	6,206	2,068	1,457	21.1	10.2	-9.8
Veneto	4,577,408	18,391	19,603	1,752	4.8	8.6	4.6
Friuli-Venezia Giuli	1,191,588	7,855	5,787	1,543	8.1	9.6	2.6
Liguria	1,572,197	5,421	8,135	2,166	10.7	11.8	2.7
Emilia-Romagna	4,030,220	22,124	18,250	1,784	6.4	12.4	7.8
Tuscany	3,516,296	22,997	16,345	1,683	6.1	10.9	6.2
Umbria	834,210	8,456	3,493	1,810	11.3	16.8	8.8
Marche	1,484,601	9,694	6,694	1,670	12.1	8.9	-2.3
Lazio	5,145,805	17,207	24,539	2,139	6.3	8.6	3.1
Abruzzo	1,273,284	10,798	5,769	2,329	10.5	11.4	2.4
Molise	321,047	4,438	1,478	1,770	29.2	22.1	-0.7
Campania	5,725,098	13,595	21,088	1,975	7.9	2.7	-5.0
Apulia	4,023,957	19,362	17,099	1,880	8.1	4.5	-3.4
Basilicata	596,821	9,992	2,566	1,628	28.8	11.4	-15.9
Calabria	2,007,392	15,080	8,536	1,968	15.9	3.5	-12.2
Sicily	4,972,124	25,708	20,570	2,467	5.2	1.6	-3.5
Sardinia	1,637,639	24,090	8,060	2,166	3.9	1.7	-2.2
ITALIA	57,321,070	301,350	247,926	1,927	7.3	7.5	-

$$Attractions = \frac{A}{RA+A} \cdot 100 \quad (3)$$

The 'attraction rate' has been calculated, for every Region, by the percentage of incoming patients over the total of the annual regional admissions.

$$Escape = \frac{E}{RA+E} \cdot 100 \quad (4)$$

We used the above two measures because they are complementary to those used for the values of X and Y in the Gandy Nomogram. Moreover, we adopted the 'potential satisfaction rate of internal demand' (PSRID), which shows if the structures placed in a Region are potentially able to satisfy, as a whole, its own household demand[15] using the following formula:

$$PIDSR = \frac{A - E}{RA+E} \cdot 100 \quad (5)$$

A Region with a negative PSRID supplies every year an unsatisfactory number of admissions (RA+A) to meet, in full, the overall demand of its own inhabitants (RA+E) if this would be expressed within the borders of the Region.

Positive values of PSRID show that the Region is able to meet, completely, the overall demand expressed by its own inhabitants if they were cured within the Region's borders (supplying 'de facto' every year a number of recoveries higher then those necessary for covering all the inhabitants' needs).

The PSRID gives important information related to the 'size' of the health care supply compared with the effective demand expressed by its own population.

The most important limit of boundary flow studies, such this one, is the difficulty in subtracting from all the migrations, those related to aspects that could hardly be modified by the planner.

We should preliminarily subtract from all the migrations the mobility defined as 'physiological' [17], influenced by some factors such as: proximity i.e. reachable hospitals placed in other Regions (this condition is more common in bordering areas), living in a different Region of residence, having their household in a Region different from the one charged with health care or reaching the doctors from the patients' Region [18-20].

Another share of mobility is generated, independently of the patients' will, by pre-established agreements, among the Regions and it involves reference centres for particular diseases.

When considering 'physiological' mobility we have to include acute patients (emergency). These patients have no choice for the place of admission: in fact some hospitals provide primary care for people who did not make sure to be admitted in an hospital. The last condition is more frequent in tourist places [21, 22].

Results

During 2003 in Italy there were 900,000 admissions of 'migrant' patients which amounts to 7.5% of the overall number.

All the Italian Regions generate 'passive' and 'active' patient flows. Those flows are different in terms of quantity and destination.

Lombardy was the region with the highest number of incoming patients; it had 1 out of 5 of all the 'migrant' Italian admissions (178,910); it was followed by Lazio (103,167) and Emilia Romagna (101,941). Val d'Aosta (1,903), Sardinia (6,109) and Provincia Autonoma di Trento (8,011) were the Regions with the lowest attraction power.

Table 2 shows that the Regions with the highest escape rates were Molise, Basilicata and Val d'Aosta while those with the lowest ones were Lombardy, Sardinia and Veneto.

Resident hospital admission rates correlate faintly and inversely to the escape rates (p=-0.449). Hospital rates did not correlate either with attraction rate (p=-0.33) or with PSRID (p=0.26). The number of beds weakly correlate (p=0.4) with PSRID.

The Gandy Nomogram (Figure 1) shows that most of the Italian Regions are placed on the right upper corner, with 'escape' and 'attraction' percentages below 10%.

The Regions with the lowest percentage of escapes, placed in the highest part of the Nomogram are Lombardy and Sardinia, both 3.8%. Sicily, Veneto and Provincia Autonoma di Bolzano have percentage values below 5% .

The lowest attraction percentages were detected in the two insular Regions (1.6%); they are placed at the extreme right side of the Nomogram with Campania (2.7%) and Calabria (3.5%).

The migrant patients phenomenon seems to have an inverse gradient to the distance: patient flows are generally remarkable in the nearby regions and the flows are decreasing as distance increases.

The above condition is not able to fully explain the phenomenon of 'long distance mobility'; this happens in both directions: mainly from the southern Regions to the Northern ones, but also to a lesser degree, in the opposite direction.

In particular we draw attention to the Regions of Molise, Basilicata, Val d'Aosta, Provincia Autonoma di Trento and Calabria; Molise, near the diagonal of the Nomogram, has about an equal percentage of relevant escapes and attractions. This condition is likely to happen in a small Region whose main purpose is not to be self-sufficient but to balance the two flows (PSRID not negative): for example to establish agreements with neighbouring Regions.

Molise has a low population density (72.3 inh./Km2), and borders with wider Regions with higher population densities: Abruzzo (117.9 inh./Km2), Lazio (299.1 inh./Km2), Campania (421.6 inh./Km2) and Apulia (207.8 inh./Km2). The migrations from these four Regions are small in absolute numbers, but they proportionally become relevant when compared with fewer admissions in Molise. This last one overestimates the attraction capacity of this Region.

The Region of Basilicata, similar in size to Molise, has both a lower population density (59.7 inh./Km2), and patients from other Regions, (90% come from three bigger and more populated border Regions: Calabria, Campania and Apulia). For this reason the attraction power of Basilicata appears to be unrealistically greater than the real one.

Similar considerations are also valid for the Provincia Autonoma di Trento and Val d'Aosta which seem to have an average attraction capacity (figure 1). Sicily and Sardinia, have a low escape rate, like Lombardy, Veneto and Provincia Autonoma di Bolzano, probably due to their insular position. Sardinia and Sicily are placed on the right of the diagonal in the Gandy Nomogram, where there are few attractions.

Umbria presents a different picture: using the Gandy Nomogram there is an overestimated attraction capacity because of its smaller size compared to the bordering Regions, but there is also better self-sufficiency for health care needs 'in loco'.

Discussion

The results of this study confirm how it is possible to induce patient flow among health care agencies with different organizations and services. Once again, as has been ascertained through other studies [9, 23-31], we can find several causes for this phenomenon, If one excludes the aforementioned 'physiological mobility' phenomenon, it can be said that the majority of observed flows can be explained by different patient quality perceptions for the health services provided by the Regions. In particular those placed in north-central Italy which seem to be preferred by the patients.

Patients in the Southern Regions are more likely to forego the benefits of a nearby hospital for a hospital with a better reputation. Moreover, a paradoxical "reputation effect"! has been highlighted in patients that do not trust a nearby hospital and prefer centres placed far away and which are even less known [9, 32, 33]. Furthermore, it should be remembered that there is a central regional coordinating authority in Italy for heath care services and patients are free to move and acquire services where they wish and it could even be said that patients' migration, from a Region to another, can be a positive aspect in a country, where interregional reference centres exist and the law assures the patient's right to choose the hospital [34].

Our results show that patient flows are different when comparing Mid-Northern and Southern Regions: in the former most of the migrations occur in a short range mainly involving bordering areas, while in the case of the latter centres there is a prevalence of long range migrations.

The difference in attitude to move could be explained the case of the Northern Regions by the 'physiological mobility' phenomenon; while patients who choose to travel great distances, which characterize the Southern Regions, could be attributable to the 'avoidable mobility' phenomenon. The former is also known as 'hope migration' due the fact that these patients travel great distances hoping to find better cures in Northern hospitals [35].

Moreover, it is possible that a relation exists between distance covered and the perceived quality of the destination hospital [36], and to the fact that patients are more likely to move if they don't trust the nearby hospital. Patients living in the Northern-Central Italy mainly move when they need a second medical opinion, even if they have already been diagnosed; on the contrary, people living in the Southern Regions seek a 'first diagnosis'. The mentioned differences were highlighted by both the interregional and international mobility rates [28, 376-39].

From the Southern Regions patients move for any sort of disease, while in the Northern-Central Regions movements are mainly related to severe diseases [40].

Some flows from the Northern to the Southern Regions could be explained as some patients were born in the South and, then moved to the North, preferring to receive treatment in their native region, whilst the fact of being close to

their relatives and friends became in itself part of the cure.

All of the regions were mostly able to satisfy their internal health care demand, and are placed in the upper right corner of the Gandy Nomogram.

It is likely that those Regions which have a higher attraction capacity and are self-sufficient, have a well-equipped and valuable health care system.

Umbria, Emilia Romagna, P. A. di Bolzano, Tuscany, Lombardy, Friuli V. Giulia, Lazio, Abruzzo seem to be the best performing Regions.

Lombardy is the leader in terms of attraction rates. In fact, in Italy, 1 out of 4 of foreigner admissions (20,000 in 2003) occurred in Lombardy.

We have observed a 'congestion effect' in centres in smaller Regions [32]: centres with small catchment areas have low receptive capabilities; moreover the inhabitants of the smaller Regions seek out-of- boundary services for special treatments which would be not be economical to receive locally.

Eventually, we have to bear in mind that our study describes interregional mobility while patients looking for care (and quality of care) could even choose to find those services abroad.

In Europe, within the Schengen area, obtaining health care has become simpler from a foreign Country [41-44], and the 'market' is moving in that way.

The European Court of Justice [45-6, 46-7] established the free flow of goods and services within the European Union, which has been extended to health care services as well. Any EU citizen has the right to freely seek out treatment within the Territory of the member States and one can obtain a reimbursement of these services from his residence State [48].

This new course of health care in Europe is an important challenge for the National Health Systems of the EU member States [47, 49].

In order to face this challenge properly, it is of fundamental importance to get to the root of the strong and weak points of the National Health Systems.

This study briefly provides an evaluation of hospital services and care, giving indications about patient perception of quality and organization.

A deeper analysis of patient migration may be undertaken by studying specific diseases. Results concerning this research could be useful for taking action in planning and optimizing supply. We suggest using the Gandy Nomogram not only to describe the 'macro' hospital supply, as the current experience did, but also to adopt this tool for a 'micro' environment related to each single department as well as the auditing of the hospital.

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