

Differences of Case-mix According to the Type of Hospital: Methodological Aspects and Results

Emmanuelle Constant^a, Hervé Garin^b, Christine Bouchet^a, François Kohler^a.

^aSPIEAO, Faculty of medicine of Nancy, Vandoeuvre-les-Nancy, France

^bGRAIH of Lorraine, Faculty of medicine of Nancy, Vandoeuvre-les-Nancy, France

Abstract

This study has brought to the fore variations of case-mix according to the type of French hospitals taken into consideration. The GHM line-up in the French classification of the hospital stays (French DRG) have also been studied and variations linked to the type of hospitals have been noticed too. This survey has been carried out thanks to the anonymous discharge summary issued by the national and the regional databases.

Keywords

Case-mix; Classification; Types of hospitals; Groupe Homogène de Malades; Diagnosis Related Groups; University Hospitals; Non-University Hospitals; Homogeneity of a Classification.

Introduction

French hospitals financing is now linked not only with the data of the "statistique d'activité des établissements" (SAE: hospital activity statistics: number of stays, number of days...) but with the hospitals' medical activity such as it is described by the PMSI (French program of medicalization of information systems [1,2,4,5,6]). This new way of acting has aroused criticisms concerning the lack of homogeneity of the stays in a same GHM (French adaptation of Diagnosis Related Groups [3]).

In the USA, same criticisms concerning the use of DRG have been expressed [10,11,12] but several changes have contributed to better the homogeneity of this classification, one of them being to reckon with the seriousness of the encountered pathologies [13,14,15]. Therefore, the additional allowances granted to the American university-hospitals have been reduced.

The French hospital system is composed of several types of hospitals with different status: public hospitals (university hospitals -CHU/CHR- or non-university hospital -CH-), private hospitals (submitted to the same financing system as the public ones) called PSPH (Participant au Service Public Hospitalier) or cancer disease specialised hospitals called CLCC (Centres de Lutte Contre le Cancer), and private hospitals with a financing system depending on the consultation fees (profit making hospitals). These hospitals have not been taken into account in this study since they have not been included in the PMSI yet. The

activity of the university hospitals is financed according to a fixed amount of money. The additional expenses deriving from the teaching and research activities have been estimated to represent 13% of the total amount. Up to now, few studies about the differences of case-mix in these different hospitals has been carried out.

The data issued by the French national and regional database of Lorraine have helped us to underscore the main differences and to suggest a way of analysing them. Do the treated pathologies vary according to the type of hospital? In a same GHM do the stays correspond to the same kind of treatment?

This first analysis shows that the treated pathologies are quite different and that the classification is not homogeneous, both these factors being linked to the type of hospital

Material and Methods

Data used

First, they come from the national data base known as "des 151", which has been set up by the Health Ministry using the files of the RSA (anonymous summaries of discharges) from 145 French hospitals during the second term of 1994 (27 CHU-CHR, 77 CH, 20 CLCC, and 21 PSPH). The Paris Hospital Public Association (CHU/CHR in Paris), the CHU in Bordeaux and in Martinique and Guadeloupe have not been included.

Second, the Lorraine data come from the RSA data base of 1995 which has gathered all the data from hospitals providing short stays and belonging to the PMSI system.

For the Lorraine region all the hospitals data have been taken into account whereas for the national data, the stratification of the hospitals has been taken into account in order to obtain a true representativeness of the hospitals belonging to PMSI. A ponderation weight has been calculated for each type of hospital according to the sample fraction.

French hospital stays are classified into homogeneous groups of patients (GHM) which are the equivalents of the US DRG.

Method of analysis

Study of case-mix differences

The GHM distribution has been studied for each category of hospitals. The most frequent and rarest cases encountered in

Table 1 - GHM studied (according the type of hospitals) and rate of variation (CV): national data (regional)

GHM	Name	% in CHU	% in CH	% in PSPH	% in CLCC	CV. 95	CV. 96
4	Spinal procedures for neurological disease	90.1 (91.5)	8.1 (6.8)	1.7 (1.7)	0.1 (0)	76	40.7
13	Spinal disorders and injuries	24.3 (36.5)	73.0 (44.2)	2.5 (17.9)	0.2 (1.3)	408	78.3
119	respiratory infections and inflammations, age>69 years and/or co-morbidity	27.3 (34.5)	61.0 (43.0)	10.8 (21.5)	0.9 (1.1)	450	58.9
186	Cardiac arrest	nc (22.5)	Nc (59.7)	nc (17.1)	nc (0.8)	184	85.2
369	Total mastectomies for malignant breast tumour, age<70 years without comorbidity	nc (11.9)	Nc (13.9)	nc (17.9)	nc (56.2)	38	24
436	Other procedures on the bladder age<70 years without comorbidity	nc (20)	Nc (21.5)	nc (56.9)	nc (1.5)	64	37.5

each category have been selected and identified. Therefore, for each hospital, the preferentially treated pathologies are easily recognisable.

Discriminatory analysis of some GHM contents

This study has been carried out with GHM, which had been preferentially set up in whatever kind of hospital. These GHM seemed to be either non-homogeneous or to present a high rate of variation (CV: cost variation in 1995 and 1996) [16]. The factors taken into account in this study were: the stay-length, the patients' ages, the death rate, the discharge mode and the main diagnosis.

Results

Study of case-mix according to the type of hospitals

At the national and regional levels the dividing of the stays according to the major diagnosis category (CMD) shows CMD 24 stays are markedly predominant (repeated ambulatory care for treatment and no hospitalisation day) (figure 1). But these stays are proportionally more important in CLCC (82% of the national stays and 53% of the regional stays). Circulatory system diseases (CMD 5) and muscular skeletal and connective tissue system disease (CMD 8) are among the most frequently treated diseases in every kind of hospitals except in CLCC. In these hospitals the CMD 24 and 17 (radiotherapy, chemotherapy, myeloproliferative diseases and non located or general cancer are particularly important. The surgery GHM are much more frequent in PSPH (33 to 38%), whereas medical GHM are predominant in CH (79 to 82%).

The stays are unequally divided between the different GHM. At the national level some GHM include more than 10% of the stays whereas others have only 0.001% of them.

Nine GHM represent more than a third of the hospital stays. Among those GHM, six belong to CMD 24 (repeated ambulatory care for treatment: GHM 680 681 682 684 and day stays for various and ill-defined problems or for tumours: 823 817).

The others GHM concern birth or perinatal (540, 562), com-

mon digestive pathologies (258), and finally non classified stays (miscellaneous 675, or false data 900) (table 2)

19 GHM do not represent 0.005% of the stays: they mainly concern highly specialised cares (surgical thyroglossal, urethral, oral and spleen procedures) or cares requiring very important medical procedures (surgical heart, transplants) or day care with surgical procedures (for infections and parasitic, hepatic and biliary or endocrine diseases)

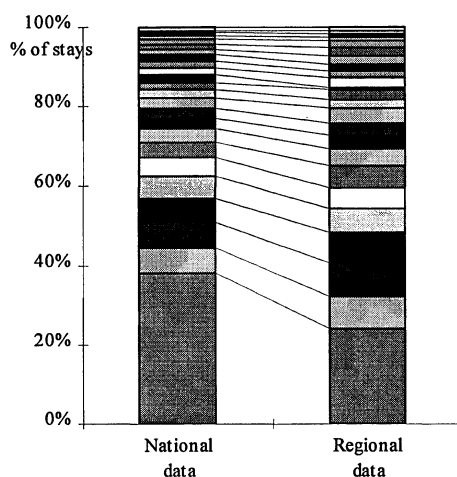


Figure 1 - Dividing of the stays according to the major diagnosis category

Concerning the Lorraine region, the case-mix is more varied. The most frequent GHM represents only 3.8% of the stays and 24 different GHM have to be brought together to amount to the third of the total stays. 21 GHM, however, do not exceed 0.005% of the stays.

The study of case-mix according to the type of hospitals shows specificities related to each of them:

Table 2 - Dividing of the stays in the most frequent GHM

GHM	Nb of stays	% national data	% additional	% regional data
680	537902	10.516	10.516	3.36
682	265256	5.186	15.702	0.38
684	220776	4.316	20.018	0.50
681	189158	3.698	23.716	1.57
540	145649	2.848	26.564	3.05
823	144299	2.821	29.385	3.82
562	106532	2.083	31.468	2.62
675	74501	1.457	32.924	1.75
593	66037	1.291	34.215	1.18
900	59832	1.170	35.385	0.51
817	58112	1.136	36.521	0.84
258	51495	1.007	37.528	1.42

• CHU/CHR :

The case-mix is very diversified. Only 12 GHM amount to 1% of the total stays. Among them, the ambulatory and repeated ambulatory care for treatment, the GHM 258, 540, 562, and 675, the chemotherapy (GHM 593), diabetes (GHM 418), cardiac catheterisation (GHM 182), backbone pathologies with medical treatment (GHM 343), and cerebral vascular infarcts (GHM 18) (table 3). Some pathologies are essentially treated in CHU/CHR: more than 80% of 11 GHM concern CHU/CHR: kidney transplants, craniotomies and some highly specialised surgical procedures such as maxillo, neurological and ophtalmological surgery.

Table 3 - Most frequent GHM in CHU/CHR after suppression of the CMD 24.

GHM	% CHU (nat. data.)	% additional	% all hospitals.	% CHU (reg. data.)
540	1.918	1.918	2.848	2.108
675	1.897	3.814	1.457	2.407
562	1.152	4.966	2.083	1.151
593	1.126	6.092	1.291	0.969
343	1.000	7.092	0.854	1.291
182	0.875	7.967	0.417	1.597
418	0.803	8.770	0.667	1.084
258	0.784	9.553	1.007	1.621
51	0.640	10.194	0.520	0.824
257	0.635	10.828	0.872	0.996
18	0.624	11.452	0.626	0.703

In Lorraine region CHU/CHR are practically the only hospitals which deal with cardiological surgery. But conversely some other GHM are rarely encountered in these hospitals: 17 GHM

represent less than 15% in CHU/CHR whereas they are commonly treated in CH, except for the GHM 592 and 682 (radiotherapy) which are to be found in the CLCC. So, the GHM, which are not frequent in CHU/CHR, are the ones which are treated by local area hospitals

• CH :

As noticed in CHU/CHR, the GHM belonging to the CMD 24 are predominantly present in CH. Then the GHM 540 and 562 are the most frequent preceding the GHM 258, 257, 256 (gastro-enteritis and others digestive disorders), GHM 184 (1.1%) is outstandingly represented, which points to a fairly important cardiological activity in CH (cardiac insufficiencies and circulatory shocks).

Over 70% of more than 30 GHM are treated in CH: the less frequently treated GHM in CHU/CHR are to be found almost in totality among those 30 GHM. They represent the pathologies which do not require a highly specialised level and can be treated in local hospitals: traumatology (12 GHM), common ENT pathologies (GHM 100, 101, 102), gynaecology-obstetrics (GHM 533, 544, 547, 546, 534), and psychiatry.

On other hand, some GHM are hardly ever met in CH. These ones are GHM which require highly specialised care, neurosurgery, heart-surgery and organ-transplant...

• PSPH :

Although these hospitals have very diversified case-mix, only 37 GHM represent more than 50% of the stays and 14 GHM are never present (neurosurgery, kidney transplant, surgical cleft lips and palate repair...). The most common GHM are the dialysis GHM along with the daily hospital stays for digestive track disorders (digestive endoscopy) and the chemotherapy GHM. The GHM 540 and 562 are also fairly common as well as the GHM 295 (hospital stays for hip prosthesis).

In the national data base there is no specific GHM as far as PSPH are concerned, which can be explained by the small percentage of hospital stays in PSPH: only 6.6% of the total hospital-stays in France. 29% of the GHM 156 (surgical cardiac valve procedures with pump and cardiac catheter) is to be found in CHU/CHR and 71% in PSPH.

In the Lorraine region PSPH represent almost one quarter of the total stays (24.6%). Their major kinds of cares are: vascular surgery (non cardiac,) orthopaedic surgery (articular prosthesis and arthroscopies), dialysis and surgery procedures with one-day-stay.

• CLCC :

In the national database, the distribution of the GHM is not very diversified. More than 90% of the stays in CLCC belong to 112 GHM and 58% of the stays belong to 6 GHM (5 for ambulatory cares and 1 for chemotherapy cares with more than one-day-stays).

In Lorraine these same main GHM are in the first position but the diversity is more important. The GHM 823 and 804 (ambulatory cares digestive or respiratory disorders) are also among the most common GHM. In France 118 GHM are not present in the CLCC but in Lorraine this number of GHM amounts to 271. The CLCC are cancer diseases specialised hospitals...

Study of some specific GHM

In each GHM an obvious lack of homogeneity linked to the type of hospital has been noticed. Either the average stay-length is longer in CHU/CHR or the average patient's age is different or the types of dismissal are not the same. Patients discharged from CH, CLCC and PSPH are more likely to be transferred to other hospitals.

Table 4 - Study of GHM 13

	CHU	CH	PSPH	CLCC
Number of cases in the nat. data base	602	1881	62	4
Mean length stay (σ)	9 (12.2)	7.2 (8.8)	6.4 (6.0)	9.5 (nc)
Mean age (σ)	37.7 (23.7)	47.2 (25)	48.2 (22.4)	62.3 (nc)
% of death	3.9%	5.2%	0%	0%
% of transfers	18.2%	18.4%	30.8%	25.0%

Moreover, stays in CH seem to be more diversified than in CHU/CHR and the variability of all the factors is often more important (Table 4).

The main differences are the kind of pathologies treated. For example in the GHM 4, the most frequent pathologies in CH are traumatic lesions (90%) whereas they amount to only 17% in CHU stays (table 5).

Table 5 - dividing of the stays of GHM 4 according to the main pathology

	CHU (%)	CH (%)	PSPH (%)	CLCC (%)
Traumatic injuries	17.5	90.0		
Tumours	15.2			
Myelopathies	17.8	3.3		
Paralytic syndromes	6.3			100.0
Central and peripheral nerve diseases	16.9	3.3	14.3	
Cerebral vascular diseases	0.9	3.3		
congenital disorders	4.6			
Musculo-skeletal diseases	16.3		85.7	
Various	4.4			

Discussion

This study shows the importance of ambulatory activity in the French hospitals and principally in the cancer disease specialised hospitals. The CHU case-mix is hardly more diversified than the other hospitals' case-mix. Highly specialised procedures are grouped in certain kinds of hospitals, which can be explained by the "authorisation system" and the planning of the

"sanitary map". The French care system is based on the care-supply (such as planned by the Health Government Authorities) and not on the care-demand (as in the United States). But in non-restricted sectors (e.g. ophthalmology) specialisation is nevertheless very important and limited to important centres [f g]. The differences between CHU/CHR and CH case-mix concern a few GHM with pathologies requiring cares in local hospitals and highly specialised cares in CHU/CHR. Highly specialised GHM can be represented in some CH or PSPH but they are only a small part of their activities. Care quality and team skills can be called into doubt. The critical mass notion is recent and up to now few scientific data, which could set up standards, have been discovered. But for complex procedures it is obvious that there is a close relation between the number of procedures carried out and the quality of the results [8,9].

The dividing up of the stays shows that some GHM are almost never encountered whatever the kind of hospitals and it is doubtful that they should be of any interest for the classification. Another question concerning the classification can be raised considering the fact that it is composed of more than 500 categories and that it is supposed to be coherent: how is it possible that some categories gather more than 10% of the stays whereas others do not reach 0.001% whatever the type of hospital may be? Are those data an accurate reflection of the dividing up of the hospital activity between the medical and surgical spheres? The study of some specific GHM has shown heterogeneity of those GHM according to the type of hospitals. The GHM classification and the case-mix study have not proved to be the right way of characterising the differences between the types of hospitals. Besides this classification takes into account data about morbidity, about the kind of cares (procedures carried out), about the patients' characteristics (age, sex, social background) and about dependence (for rehabilitation cares). But it cannot evaluate the disability factor (physical or social). This survey also shows that the approach of hospital activities by studying their stays is limited. This approach can be satisfactory in the case of precisely defined cares (e.g. childbirth, acute appendicitis...) when the description of the stays is sufficient to give an accurate account of the disease. But when it comes to more complex and longer treatments for chronic pathologies this approach is no longer acceptable. This system does not allow for keeping track of patients in the care network. Contrary to the American system (HMO) the French care network is not structured and it does not meet quality requirements or local hospital care demands. Neither does it take into account the economic factor. Friendly connections or esteem between practitioners are more often governing the French system.

Finally, the PMSI do not take into account medical innovation. Research and teaching activities are not included in its data and the new techniques, which are tested or used in university hospitals, have been disregarded.

Conclusion

This study has shown the case-mix differences linked to the different kinds of hospitals. It has also underscored that in a same GHM pathologies can vary according to the type of hospitals.

The GHM are not homogeneous and some fields are not taken into consideration such as social field or disability. The GHM French classification and the case-mix study do not give an accurate account of the hospital activity.

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Address for correspondence

SPIEAO
Faculté de Médecine de Nancy
BP 184-54505 Vandoeuvre Cedex
France.