Drug selection in French university hospitals: analysis of formularies for nine competitive pharmacological classes

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WHAT IS ALREADY KNOWN ABOUT THIS SUBJECT

- Variations in hospital drug formularies have been reported in Germany and the Netherlands for competitive classes.
- Since a spill-over effect on the community may be expected, assessment of hospital formularies is needed.
- No study has yet explored French hospitals' drug formularies.

WHAT THIS STUDY ADDS

- Large variations in the number and the nature of selected drugs were found among French university hospitals for competitive classes.
- The wide range in the number of selected drugs suggests an unaccomplished rationalization process by some hospitals.

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AIM

To give a panorama of the selectivity and agreement of French university hospitals' drug formularies (HDF) for nine competitive classes.

METHODS

All university hospitals were asked to send their HDF and selection criteria as of January 2009 for nine competitive pharmacological classes (proton pump inhibitors, serotonin antagonists, low molecular weight heparins, erythropoietins, angiotensin converting enzyme inhibitors, angiotensin II receptor antagonists, statins, α -adrenoreceptor antagonists and selective serotonin re-uptake inhibitors). Selectivity of HDF was estimated by the percentage of drug entities selected by the hospital within the pharmacological class. Agreement between hospitals was assessed with modified kappa coefficients for multi-raters.

RESULTS

Twenty-one out of the 29 hospitals agreed to participate. These hospitals selected between 34% and 63% of the drug entities available for the nine classes, which represented 18 to 35 agents. Regarding the nature of chosen drug entities, the overall level of agreement was 'fair' and varied with pharmacological classes. Selection criteria were sent by only 12 hospitals. The technical component was the most important element in all hospitals. The weight of the economic component varied between 20% and 40% in the tender's grade.

DISCUSSION

Large variations were seen in the number and nature of drugs selected by university hospitals which can be attributable to two successive decision-making processes (evaluation by the Drug and Therapeutics Committee followed by the purchasing process).

Introduction

In 2008, hospital drug expenditure represented 5300 million Euros in France [1]. This figure has dramatically increased in recent years (+128% between 1998 and 2008 and +8% between 2007 and 2008 [1]), while the objective rise of global hospital expenditure ('ONDAM') was fixed to less than 3% each year over the last 10 years. This is of growing concern as resources are becoming scarcer and scarcer in the current context of economic difficulty and an ageing society. Improving the rationalization of drug use and the practice of evidence-based medicine are ways to contribute to limit expenditure [2].

In hospitals, Drug and Therapeutics Committees (DTCs) are the principal promoters of these actions. In France, these committees were legally instituted in 2000, after they had been first mentioned in 1976 by the Department of Health. Since a recent law in July 2009, the existence of DTCs is not compulsory anymore. Nevertheless, their mission is still mentioned in the law, and in practice, DTCs seem to still exist in most hospitals. They are mainly composed of physicians and pharmacists (in some hospitals also of clinical pharmacologists) and their main purpose is to improve rational drug use. In particular, the DTC is responsible for drawing up the hospital drug formulary (HDF), which is the list of medicines recommended in the hospital. The selected drugs should present the best compromise between efficacy, safety and cost. Usually, this list is a selection of one or a few drugs from the pharmacological classes needed in the hospital. The HDF is usually re-assessed every year or every 2 years. Only the drugs listed in the HDF are kept in stock by hospitals. Routinely, physicians must comply with the formulary for inpatients' care (exceptionally, they can justify prescribing another product for one single patient), but are free to prescribe any drug to outpatients. In France, no national formulary or list of therapeutic equivalences is defined. Thus, each DTC leads its own evaluation in order to meet the patients' needs.

After that local evaluation, each hospital pharmacy runs the procurement process yearly or every 2 years, following the rules of the code on public procurement. The code specifies that any time it is applicable, buyers must resort to invitations to tender. When opening bids, the Tender Evaluation Committee (assisted by pharmacists) reviews the tenders and makes a choice between them using pre-established selection criteria. The code on public procurement stipulates that the winning tender should be the one offering the best value for money. This succession of stages of evaluation and procurement makes each hospital's choice of drugs more or less unique.

Authors have suggested that the nature and range of agents on the formulary for specific groups of drugs is a valuable indicator of DTC performance [3, 4]. To our

knowledge, no study has yet been published presenting drug hospital formularies and their variations in France. This article aims to give a panorama of formularies and of purchasing selection criteria of French university hospitals for nine competitive pharmacological classes. Especially, we focused on the HDF selectivity, some of its determinants and the level of agreement between HDFs.

Methods

Setting and study design

The study was carried out in the 29 French university hospitals (27 in Metropolitan France and two in the Caribbean Sea) in January 2009. It was a cross-sectional survey by questionnaire.

Data collection

Each pharmacist, responsible for drug purchasing in the 29 French university hospitals, was contacted over the phone in March 2009 in order to participate in this research. An E-mail was sent the same day. The pharmacists were asked to send the list of chosen drug products (with brand names) in their hospitals as of January 1 2009 for the nine identified pharmacological classes. They were also asked to send the list of criteria they used to sort tenders. That information could be sent in any form in order to increase the participation rate (i.e. even copies of the printed formulary were accepted). Two reminders were sent by E-mail in April and May 2009.

Nine classes were chosen because of their wide range of competitive drug entities and products. Therapeutic equivalence is usually recognized among these agents (a review for the class of statins is available elsewhere [5]) even if drug licences are not strictly identical for all drugs. These drug groups were concurrent with the ones previously discussed in the literature [4, 6–8]. The classes were identified with their code in the World Health Organization collaborating centre (<http://www.whocc.no>) anatomical, chemical and therapeutical (ATC) classification [9]:

- 1 proton pump inhibitors (PPI) (ATC code: A02BC),
- 2 serotonin (5HT₃) antagonists (setrons) (A04AA),
- 3 low-molecular-weight heparins (LMWH) (B01AB04 to B01AB08 and B01AB10),
- 4 erythropoietins (EPO) (B03XA),
- 5 angiotensin converting enzyme inhibitors (ACEI) (C09AA),
- 6 angiotensin II receptor antagonists (ARA) (CA9CA),
- 7 HMG CoA reductase inhibitors (statins) (C10AA),
- 8 α -adrenoreceptor antagonists (AAA) used in benign prostatic hypertrophy (G04CA),
- 9 selective serotonin re-uptake inhibitors (SSRI) (N06AB).

Data analysis

Selectivity of HDF was estimated by the selection rate, i.e. the percentage of drug entities selected by the hospital within the pharmacological class (the higher the selection rate, the lower the selectivity). Correlation between selectivity and some hospital characteristics was assessed with Spearman rank coefficients. Studied determinants were characteristics of the hospital size (number of hospital sites, number of beds, occupied bed days, number of admissions in 2008), of its level of specialization (number of authorized activities, percentage of the activity dedicated to benign care) and of its patients (mean age of patients, percentage of patients older than 80 years). These determinants were extracted from the annual statistics of hospitals from the French Department of Health [10]. Information was not available for overseas hospitals which were then excluded from the analysis of determinants. Due to the small number of hospitals, we were not able to perform a multivariate analysis. Difference in selectivity according to pharmacological classes was tested by a Kruskal & Wallis *H*-test.

Level of agreement between hospitals on the choice of each drug entity was assessed with modified kappa coefficients for multi-raters [11, 12]. It is to be noted that kappa coefficients may seem paradoxical in the case of a very high prevalence (here a high selection rate) [13]. As a rough guide, magnitude guidelines were used to qualify the degree of agreement [14]. It was said to be slight for $\kappa \leq 0.20$, fair for $0.21 < \kappa \leq 0.40$, moderate for $0.41 < \kappa \leq 0.60$, substantial for $0.60 < \kappa \leq 0.80$ and excellent for $\kappa > 0.80$.

Statistical analysis was performed with SAS® software (version 9.2, SAS institute, Cary, NC, USA).

Results

Twenty-one out of the 29 hospitals sent at least their formulary (72% of hospitals, representing 81% of the beds of university hospitals in France). Twelve of them also sent their selection criteria for purchasing.

Study of HDF variations

Quantitative variations: *selectivity* Table 1 shows a summary of the numbers of drug entities and products chosen by each hospital for each class. Hospitals selected between 34 and 63% of drug entities available for the nine classes (Figure 1), which represented 18 to 35 agents. Larger variations were seen in the selection of drug products which ranged from 38 to 112 across hospitals.

Nine hospitals picked less than 50% of the drug entities available. Among them, three hospitals were particularly restrictive (17, 18, 20, Figure 1). Two of these hospitals were located overseas where difficulty of drug availability may play a part in this selectivity.

No significant relationship was found between selectivity and the hospital level of specialization or the age of patients. Among hospital size characteristics, a non-significant trend towards a positive correlation was observed. The strongest correlation was observed with the number of hospital sites ($r = 0.44$, $P = 0.06$): the more hospital sites, the less selectivity.

Table 1

Variations in number of drug entities and drug products in the formularies of the 21 responding hospitals

Pharmacological classes	Available drug entities	Chosen drug entities					Chosen drug products			
		Min	Max	Median	IQ range	Median %*	Min	Max	Median	IQ range
Proton pump inhibitors (PPI)	5	1	4	2	1–2	40.0	2	7	4	3–6
Serotonin (5HT ₃) antagonists (setrons)	3	1	3	1	1–2	33.3	1	10	5	4–6
Low-molecular-weight heparins (LMWH)	4	1	4	2	1–2	50.0	4	18	8	6–9
Erythropoietins (EPO)	5	1	4	3	3–3	60.0	6	33	23	18–28
Angiotensin converting enzyme inhibitors (ACEI)	13	2	10	5	4–6	38.5	6	23	12	9–14
Angiotensin II receptor antagonists (ARA)	7	1	6	4	3–5	57.1	2	16	8	6–11
HMG CoA reductase inhibitors (statins)	5	2	6	3	3–4	60.0	3	15	6	5–7
α -adrenoreceptor antagonists (AAA)	4	1	3	1	1–2	25.0	1	4	2	1–3
Serotonin re-uptake inhibitors (SSRI)	6	3	6	5	5–6	83.3	4	13	9	4–6
All classes	52	18	35	27	24–31	51.9	38	112	75	61–89

*Median percentage of drug entities chosen compared to the number of drug entities available in France. Min, minimal number; Max, maximal number; IQ range, interquartile (percentile 25 – percentile 75) range.

Figure 1

Proportion of drug entities chosen by each hospital for each pharmacological class*. ACEI, angiotensin converting enzyme inhibitors; ARA, angiotensin II receptors antagonists; PPI, proton pump inhibitors; SSRI, selective serotonin re-uptake inhibitors; LMWH, low molecular weight heparins; EPO, erythropoietins. *Percentage of drug entities chosen among drug entities available in France. Statins (◆); ACEI (■); ARA (◆); PPI (●); AAA (×); SSRI (□); LMWH (+); EPO (x); Setrons (○); All classes (◆)

Selectivity also varied according to classes ($P < 10^{-4}$). Selection of AAA and setrons was quite restrictive, while almost all SSRIs were chosen by most hospitals (Figure 1).

Qualitative variations: level of agreement Regarding the nature of drug entities, the overall level of agreement between hospitals was fair ($\kappa = 37\%$) and fluctuated with classes. Agreement was substantial for setrons, moderate for ARA, AAA, ACEI and PPI, and fair for EPO, LMWH and statins (Table 2). The kappa coefficient for SSRIs could not be interpreted due to a very high level of selection in this class. All hospitals selected five agents (ondansetron, perindopril, ramipril, atorvastatin, and paroxetine) and discarded four entities (dolasetron, cilazapril, imidapril and terazosin). For the PPIs, presentation of drugs was particularly important. Drugs with available intravenously were more likely to be selected (Table 2) and lansoprazole was only chosen for its orodispersible formulation (as it can be used by patients with swallowing problems).

Generic drugs were available in six classes (PPI, setrons, ACEI, statins, AAA and SSRI). Depending on hospitals, between 0 and 35% of HDF drugs were generics. This rate also varied within classes (Table 3). None of the hospitals purchased generic drugs for PPI and AAA, while 27% of selected statins in hospitals were generics.

Study of selection criteria

Twelve hospitals sent the criteria used to sort the tenders, but only eleven supplied their weighing system (Table 4).

The main factor was the quality criterion which was divided into technical and clinical components. When details were available, the technical component (i.e. individual packaging, divisibility of drugs, quality of labelling, stability, ease of storage...) had the biggest weight, the clinical component being usually handled upstream by the DTC. The second most important factor was the economic criterion which varied between 20 and 40% in the tender's mark depending on hospitals. This criterion took into account the unit price and the cost of utilization in most hospitals. Last, the majority also assessed the quality of service provided by the supplier (i.e. education and training, delivery time, minimum of orders, exchange of expired medicines, ability to deliver in emergency...).

Discussion

Like previously reported in European settings (1995 in Germany [6] and 1999 in the Netherlands [7]), we found a large variability in hospital choices. For these nine competitive pharmacological classes, we reported a variation from 1 to 2 between the most and least selective hospitals in the number of drug entities and from 1 to 3 in the number of drug products. It is worth noticing that such quantitative variations occurred in rather homogeneous settings as only university hospitals were questioned.

Our study was affected by some inherent limitations. It was able to explore all university HDFs but some

Table 2

Agreement between hospitals on the nature of selected drugs

Class and drug entities	% of hospitals selecting the drug entity	Kappa agreement coefficient between hospitals
Proton pump inhibitors (PPI)		0.40
Omeprazole* oral/i.v. routes	38.1/47.6	
Pantoprazole* oral/i.v. routes	19.0/19.0	
Lansoprazole*	14.3	
Rabeprazole	4.8	
Esomeprazole oral/i.v. routes	90.5/85.7	
Serotonin 5HT3 antagonists (setrons)		0.65
Ondansetron* oral/i.v. routes	100/95.2	
Granisetron* oral/i.v. routes	28.6/28.6	
Tropisetron oral/i.v. routes	4.8/0	
Low-molecular weight heparins (LMWH)		0.35
Dalteparin	9.5	
Enoxaparin	95.2	
Nadroparin	42.9	
Tinzaparin	42.9	
Erythropoietins (EPO)		0.46
Erythropoietin alpha	90.5	
Erythropoietin beta	95.2	
Darbepoetin	85.7	
PEG-epoetin beta	19.0	
Angiotensin converting enzyme inhibitors (ACEI)		0.46
Captopril*	80.9	
Enalapril*	57.1	
Lisinopril*	61.9	
Perindopril*	100	
Ramipril*	100	
Quinapril*	9.5	
Benazepril*	14.3	
Fosinopril*	42.9	
Trandolapril	61.9	
Moexipril	4.8	
Zofenopril	4.8	
Angiotensin II receptors antagonists (ARA)		0.54
Losartan	85.7	
Eprosartan	4.7	
Valsartan	80.9	
Irbesartan	85.7	
Candesartan	95.2	
Telmisartan	23.8	
Olmesartan	9.5	
HMG-CoA reductase inhibitors (statins)		0.39
Simvastatin*	38.1	
Pravastatin*	85.7	
Fluvastatin*	19.0	
Atorvastatin	100	
Rosuvastatin	80.9	
α -adrenoreceptor antagonists (AAA)		0.41
Alfuzosin*	85.7	
Tamsulosin*	23.8	
Doxazosin	4.8	
Serotonin re-uptake inhibitors (SSRI)		0.11†
Fluoxetine*	90.5	
Citalopram* oral/i.v. routes	95.2/33.3	
Paroxetine*	100	
Sertraline*	95.2	
Fluvoxamine*	66.7	
Escitalopram	66.7	

*Drug entities with available generics as of 1 January 2009. †Kappa calculation may not be consistent due to the very high level of selection of drugs for the SSRI class.

Table 3

Selection of generic products according to class in the 21 hospitals

Pharmacological classes	Generics among selected products (%)	Generic penetration rate* (%)
Proton pump inhibitors (PPI)	0	0
Serotonin 5HT3 antagonists (setrons)	18.5	25.3
Angiotensin conversion enzyme inhibitors (ACEI)	20.4	28.9
HMG-CoA reductase inhibitors (statins)	26.6	77.1
α -adrenoreceptor antagonists (AAA)	0	0
Serotonin re-uptake inhibitors (SSRI)	12.5	19.1

*Percentage of cases where hospitals chose generics over brand name drugs when selecting a drug entity with available generics.

pharmacists refused to participate because of a lack of time or interest. However, the participation rate was good (around 70%) and in line with Fjin's study which reported a rate of 80% [7]. We can note that four hospitals were only able to provide printed copies of the HDF suggesting that no computerized information may have been easily available.

Using the range or percentage of selected analogues as a measure of selectivity presents some limitations as one hospital may select a wide range of drugs but mainly use only one. Collecting purchased quantities would have allowed calculating more sophisticated measures of selectivity taking into account quantitative aspects. Such measures had been previously used for studying general practitioners' prescribing behaviour [15]. We chose on purpose to solely ask simply and readily available data in order to facilitate the participation. Thus, in this survey, we gave an overview of the extent of the supply of drugs proposed to the physicians but not of the dispersion of prescribing.

Regarding selectivity, we tried contrasting our results with reported HDFs [6, 7], bearing in mind the differences in time and location. Only data on ACEI selection were available in the three studies. For this class, French university HDFs were less restrictive than their European counterparts (median number of ACEIs was five in France, three in the Netherlands and two in Germany). This may be particularly driven by the existence of national lists of therapeutic equivalents or national recommendations and the fact that university hospitals tend to select more drugs than other hospital types (all hospitals were included in the two studies mentioned above) [6]. Indeed, university hospitals, because of their size and their representation of all medical specialties, cater for more diverse patients than smaller or more specialized centres. Consequently, the number and variety of medical needs is wider, as well as the number of medical teams involved. Thus, the

Table 4

List of criteria used to sort tenders by the different university hospitals

Selection criteria for purchasing	Responding university hospital (number)										
	2	3	4	5	6	7	8	9	10	11	14
1. Quality	60	75	70	75	70	70	67	80	65	67	80
Clinical and Technical	50	75	70	60	60	70	54	70	65	50	60
Clinical						14	14				
Legal status of drug				x			x				
Approved indications			x	x	x	x		x		x	x
Authorities' recommendations			x		x	x		x		x	
Scientific literature				x						x	
DTC recommendation		x		x		x			x		x
Other		x		x			x			x	x
Technical	50					56	40				
Presentation (individual packs, ready-to-use solutions, etc.)	x	x	x	x	x	x	x	x	x	x	x
Convenience (divisible tablets, soluble in water, feeding tube administration . . .)	x				x	x	x		x		
Quality of labelling			x	x	x	x		x	x		x
Safety of utilization	x						x		x		
Storage conditions			x	x	x	x		x			x
Lag to expiration, stability			x	x			x				x
Other				x	x	x					x
Supplier's service	10	0	0	15	10	0	13	10	0	17	20
Minimum of orders			x		x		x				
Warranted availability at the beginning of the market							x				
Return and exchange of expired medicines					x		x	x			
Return of products				x	x						x
Deliveries (times and charges)	x				x			x		x	x
Emergency deliveries (times and charges)				x			x	x			x
Information/Training	x			x	x			x			x
Logistics (ordering process, times of orders etc.)											x
Ability to meet specific logistical demands				x							x
Technical support				x							x
Discount rate					x					x	
Litigation dissolution	x									x	
2. Price	40	25	30	25	30	30	33	20	35	33	20
Unit price	x	x	x		x	x	x	x	x		x
Cost of daily treatment					x	x		x	x		
Cost of utilization		x	x	x	x	x				x	x

A cross indicates that the responding hospital uses this criterion to sort its tenders. Numbers represent the weight (in %) accorded to the different categories of criteria (when available).

probability of selecting fewer drugs is reduced. This is consistent with our analysis of selectivity determinants where size of hospitals, and especially the number of hospital sites (and in consequence the number of clinical teams), was correlated with lower selectivity, despite its statistical insignificance. This poor significance could be attributable to insufficient statistical power ($n = 19$).

The comparison with the World Health Organization's (WHO) list of essential medicines may be interesting, even if it was built with a very different goal. This list can be seen as the ultimate level of selectivity, which is not necessarily the objective pursued by hospitals in developed countries. The 16th edition of that list (March 2009) does not include any ARA, LWMH, EPO or AAA. For the other five classes, the WHO recognized the equivalence inside the pharmacological classes and therefore recommended the use of one molecule for each class [16].

The wide range in the number of selected drugs suggests an unaccomplished rationalization process by some

DTC in French hospitals for these classes. However, it remains quite unclear whether extreme selectivity is associated with favourable outcomes. In fact, the balance advantages/drawbacks may vary with the different selectivity strategies. For instance, a very stringent selection of drugs in hospital may result in potential savings (i.e. widening the competition between drug manufacturers, decreasing stocking and purchasing costs) and potential improvement in good drug use (i.e. selection of the best evaluated drugs, better information of prescribers, better knowledge of a small number of drugs, etc.). This limited selection also requires increased efforts to inform prescribers, hampers the strict respect of drug approved indications (consequently exposing to medico-legal implications) and is difficult to reconcile with patients' long-term medications.

Concerning agreement between hospitals, the level was fair and fluctuated according to the pharmacological classes. For these nine competitive classes, this

low level was expected because of the large variety of equally effective products available. When Dutch DTC members were asked which drug groups were the most complicated to assess, they had already mentioned several of the nine selected classes (ACEIs, ARAs, hypolipidaemics, antiemetics, antidepressants) [8].

It would have been interesting to study the level of concurrence of HDFs with national recommendations. Despite the documents published by the French Transparency Committee (HAS), there are no national formulary or no national recommendation in France that could readily be used to choose inside a class between the available drugs (with the exception of a document about PPI published afterwards in June 2009 [17]). This lack of official recommendations has notably been deplored by some in France in the context of improving rational drug purchasing by hospitals [18].

These large variations in the number and nature of HDF drugs occur despite the use of rather similar criteria in the different hospitals. The selection by DTCs is based on the resort to universal criteria such as efficacy, safety and cost [8, 19, 20]. Regarding the drug purchasing process, more than 40 different criteria were cited by hospitals. The reported quality/price weighing varied between 60/40 and 80/20 in our survey. The importance of the consequences regarding such differences has already been reported [21]. Without information regarding the marking method it is difficult to assess the real impact of such variations [21]. Overall, it seems that drug presentation (individual package, availability of different administration routes) and price account for the most important criteria.

This similarity in criteria and the fact that selectivity usually varied among the classes for the same hospital suggest that important factors, internal or external to DTCs and purchasers, play a great part in hospital drug selection. These are the social relationships and the strategies of pharmaceutical companies. First, relationships between the pharmaceutical industry and physicians have been reported to be associated with requests to add drugs to HDFs or with prescribing (in the outpatients' department if the drug is not listed in the HDF) and are acknowledged by DTC members in qualitative studies [8, 19, 22–24]. Along these lines, the rate of DTCs asking for a declaration of financial relationship or potential conflicts of interest from its members and experts was quite low in the literature: from 0% in the French survey [19] (but we know that some hospitals have implemented this system) to 37% in the Dutch survey [8] and 51% in a US study [3]. This rate is expected to increase, as a compulsory transparency statement is now part of the guidelines of the American Society of health-system pharmacists [25]. These guidelines also require a declaration of conflicts of interest from every physician requesting the addition of a drug to the HDF. Moreover, Brennan *et al.* in 2006 recommended excluding from DTCs any health care profession-

als 'with financial relationships with drug manufacturers, including those who receive any gift, inducement, grant or contract' [26].

Then, local opinion leaders (i.e. eminent faculty) have a special influence on the number and the nature of selected drugs. It has been reported that the eldest and the most experienced in the committee usually imposed their views [19]. Furthermore, selection of drugs hinges to the behaviour of pharmaceutical companies. Parameters that may affect the selection of drugs are the fact that applicant suppliers respond or not to the invitation to tender (generic manufacturers tend to answer less frequently than brand name suppliers partly explaining the low rate of generic drugs in hospitals), the moment of establishing contracts (a hospital may take advantage of a company's previous failure if they establish a contract afterwards) and the choice of the procurement procedure (i.e. invitation to tender or negotiated contract) [18]. In case of call for tenders, the construction of lots is also of great importance as it determines the level of competition between manufacturers. These last two factors (moment and type of procedure) affect the price of drugs proposed by the company and thus the probability that the drug will be selected by the hospital.

This survey has given an overview of the pharmaceutical market in university hospitals for nine classes in January 2009. No transposition regarding the nature of chosen drug entities in space or time could be expected as the pharmaceutical market is in constant evolution (i.e. arrival of new drugs, arrival of generics, modification of drug authorizations, implementation of new policies, price fluctuations, etc.). However, reported variations could give an idea of the level of selectivity and agreement for competitive drug groups in hospitals. The extent of our conclusions only applies to these pharmacological classes. Nonetheless, numerous competitive drug groups may be concerned by similar findings (i.e. β -adrenoceptor blockers, diuretics, non steroidal anti-inflammatory drugs, calcium channel blockers, etc.).

To conclude, we have to mention an important transformation in the hospital drug purchasing process in our country. Strong incentives are currently given to hospitals so that they combine in order to make common purchasing. In 2005, the national group for purchasing of university hospitals was instituted. At the time of our survey, out of the nine classes, only the setrons and PPIs were influenced by national purchasing. The national group chose to retain only one setron (ondansetron) and one PPI (esomeprazole). However, not all hospitals agreed to enter these national markets, and among the participants, some chose to complement this unique choice with another drug entity (i.e. omeprazole 10 mg which is licensed to be used in paediatrics). Thus, this gathering is in favour of a decrease in variability of HDFs. If the national decision-making process is better conducted than in each hospital, then improved pharmacotherapy

and savings should be expected, but some drawbacks may also arise in case of misguided choice or product shortage.

In conclusion, this study outlined the quantitative and qualitative variations in the choice of drugs by French hospitals for nine competitive pharmacological classes. As a spill-over effect of hospital selection on prescribing patterns in the community is hypothesized, it is of interest to analyse those variations and their determinants which may affect the ambulatory care setting. This possibility needs to be further addressed.

Competing Interests

There are no competing interests to declare.

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