

DEVELOPMENT OF CONSUMPTION OF MEDICINES IN TWO PEDIATRIC HOSPITALS IN BUCHAREST DURING ECONOMIC AND FINANCIAL RECESSION IN 2009 AND 2010

VALENTINA SOROCEANU ^{1*}, ILEANA POPESCU², ALEXANDRA GEORGESCU ³

¹*Carol Davila University of Medicine and Pharmacy, Faculty of Pharmacy, Str. Traian Vuia 6, sector 2, Bucharest*

²*Gr. Alexandrescu Hospital, Bucharest*

³*Marie Curie Hospital, Bucharest*

*corresponding author: valentina_soroceanu@yahoo.com

Abstract

The study represents an analysis on the use of medicines per patient/hospital bed in two similar institutions – two pediatric hospitals located in Bucharest; the research period was considered from 2009 to 2010.

The method used for the survey is based on the comparative analysis of records regarding medicine output and number of patients treated during that time in the two hospitals. Although the units are comparable in terms of structure of sections and number of treated patients, some differences in quantity and value of drug usage are to be observed. Nevertheless, it has been noted that, from both quantitative and qualitative points of view, the consumption of medicinal products in these units has experienced a decrease in 2010 compared to 2009.

Rezumat

Studiul reprezintă o analiză a consumului de medicamente per pacient/pat în două unități similare – două spitale cu profil pediatric din București, perioada avută în vedere fiind 2009 - 2010.

Metoda folosită se bazează pe analiza comparativă a evidenței înregistrărilor privind ieșirile de medicamente, număr pacienți tratați în perioada respectivă de timp, în cele două unități spitalicești. Deși unitățile sunt comparabile în ceea ce privește structura pe secții și numărul de pacienți tratați, vom observa unele diferențe privind consumul cantitativ și valoric al medicamentelor. Totuși, constatăm că atât cantitativ cât și valoric consumul de produse medicamentoase în ambele unități a cunoscut o scădere în 2010 față de 2009.

Keywords: pediatric drugs, consumption quantity, consumption value

Introduction

Children are a distinct category of patients, hence the medicines for them are specially designed to match their stage of development. A child's body has morphological and physiological particularities which vary with

age and the immaturity of certain systems and organs require a special therapeutic approach.

The administration of pediatric pharmaceuticals calls for both knowledge and correlation of various biological factors that can influence the whole drug circuit in the body [1,3].

A child is by no means a miniature adult, therefore administering drugs destined for mature individuals by fractionating initial doses based on body weight only, without taking into account other aspects which characterize the non-adult body, poses a great risk.

From birth to adulthood, the human body undergoes a series of biological changes, the fastest and most obvious manifesting themselves in the first year of life. In light of these characteristic changes, childhood has been divided into several specific stages, each having its own particularities: newborn, infant, toddler, pre-school child, school child, teenager.

Regardless of the type of health system policy adopted by the government, we must not forget that the most important social category for the future of a healthy nation remains its children. In the context of a poor economic and financial background, a decrease of drug usage has been noticed nationwide in 2009 and 2010. If with the community pharmacies the decrease was of 6.7%, hospitals have registered a drug usage drop-off of 22.0% for January 2010 only, compared to January 2009 [2].

As shown in some studies, in addition to the poor economic situation of the healthcare system, there are other causes which may influence drug consumption in general and pediatric medicine especially.

Recent researches have shown that some children are treated unnecessarily for gastroesophageal reflux disease. These studies have shown that many children who do not require antireflux medications are taking them for regurgitation and vomiting, manifestations often encountered with neonates [6]. Drug therapy in the hospital is inconceivable without the existence of a partnership between physician, pharmacist and nurse. The hospital pharmacist, having the necessary expertise in clinical pharmacy, gets involved in the process of prescription, preparation, issuance, administration and therapeutic follow-up [7,8].

Through the participation of the clinical pharmacist in the development of a therapeutic scheme, costs for both medication and patient can be reduced [8]. Certain things are required in order to change the classic activity of a hospital pharmacist into a modern pharmacy/clinical activity. Among these, training specialists with expertise in the area, creating jobs for the clinical pharmacist in larger hospitals, facilitating their training through various forms of postgraduate education and raising the doctors' awareness

regarding the importance of hospital clinical pharmacists, for acceptance and support.

Internationally, there are concerns about the initiation and development of regulations addressing the approach of safe, effective and ethical product introduction in pediatric practice since 1997, and, starting with 2006, they have been published in the official journal of the European Union regulations specific to pediatric medication [10, 11, 13].

In accordance with the EU regulations, our country as well has certain policies concerning clinical studies of drugs in pediatric population [9].

Although in 2010, WHO developed and published a classification of drugs for pediatric use, today we do not have a proper classified list of pediatric products consumption [12].

The most encountered problems due to the lack of drugs specially adapted for pediatric population include: inadequate dosing information leading to increased risks of adverse reactions, among which death; ineffective treatment caused by underdosing; the pediatric population's impossibility to access advanced therapeutic progresses, formulations and adequate ways of administrations; pediatric use of magistral and officinal formulas which may be of inferior quality [10]. European Council Regulation no. 1901/2006 aims to facilitate the development and availability of pediatric medicines, to ensure that these drugs become subject to high quality ethical research and are appropriately authorized for pediatric use, as well as to improve the information available on the use of medicines in various pediatric populations [10].

The purpose of this study was to determine the most consumed drugs in two pediatric units in terms of quantity and value, and to establish the most used medications in terms of therapeutic groups.

Materials and Methods

The method used for research is based on the comparative analysis of records keeping regarding consumption/output (quantity and value) of drugs and number of patients treated during that period of time (2009-2010).

In order to undergo an effective comparative analysis on the consumption of drugs, we studied two pediatric units in Bucharest, both having similar structure, functional organization and capacity. The following table presents the type of sections and the corresponding number of beds in each unit.

Table I
Sections and corresponding number of beds in Unit A and Unit B

Unit A			Unit B		
No.	Section	Beds	No.	Section	Beds
1.	Pediatric Surgery 1	72	1.	Pediatric Surgery 1	62
2.	Pediatric Surgery 2	39	2.	Pediatric Surgery 2	50
3.	Plastic and Reconstructive Surgery 1	33	3.	Pediatric Nephrology	28
4.	Pediatric Orthopedics	39	4.	Pediatric Orthopedics	30
5.	Otorhinolaryngology (ORL)	25	5.	Otorhinolaryngology (ORL)	50
6.	Pediatric Hematology-Oncology	10	6.	Pediatric Oncology	28
6.	ATI (anesthesia, intensive therapy)	38	7.	ATI	34
7.	Pediatrics 1	25	8.	Pediatrics 1	55
8.	Pediatrics 2	36	9.	Pediatrics 2	48
9.	Pediatrics 3	50	10.	Pediatrics 3	55
10.	Intensive therapy - Toxicology	25	11.	Hemodialysis Station (4)	4
			12.	Intensive Therapy neonates	15
			13.	Urology	20
TOTAL		392	TOTAL		479

Both hospitals dispose of an emergency room (ER) in their structure.

Unit A also has a total of 24 beds for companions, 10 beds – one day hospitalization and 7 beds – one day hospitalization hemodialysis. Integrated outpatient specialty offices – 12; laboratories – 3; pharmacy – 1.

Unit B also has 73 beds for companions, specialty offices – 15, laboratories – 4, pharmacy – 1.

Results and Discussion

The following tables and graphs present the situation of the most consumed medicinal products in terms of quantity and value for each of the two units under study (A, B):

Table II
Consumption quantity - Unit "A" 2009-2010

DCI	2009	2010
NATRII CHLORIDUM	26,074	30,614
GLUCOSUM 33%	37,168	31,736
METAMIZOLUM NATRICUM	44,729	37,191
ATROPINUM	24,010	12,212
GLUCOSUM 5% X 500ML	33,623	33,713
NATRII CHLORIDUM 0.9% X 500ML	29,514	28,997
CALCII GLUCONAS 10%	31,019	26,835
GENTAMICINUM 40MG/ML X 2ML	27,935	28,580
NEOSTIGMINUM BROMIDUM 0.5MG/ML	19,697	16,290
CEFTRIAxonUM 1G	31,755	40,420
METAMIZOLUM NATRICUM	17,922	16,495

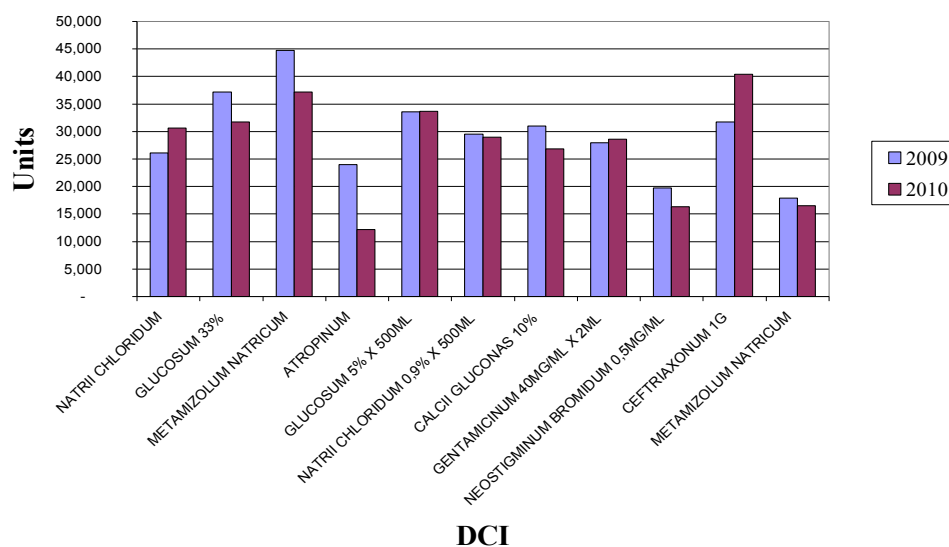


Figure 1

Consumption quantity – Unit "A" (2009-2010)

Table III
Consumption value - Unit "A" 2009-2010

DCI	2009	2010
SEVOFLURANUM	545,022	588,725
IMMUNOGLOBULIN 2.5G	307,047	345,197
MEROPENEMUM 500MG	188,673	283,412
CEFTRIAXONUM 1G	290,498	247,630
CASPOFUNGINUM 50MG	155,021	172,766
VORICONAZOLUM	951,31	160,010
TACHOSIL	126,895	124,427
ERTAPENEMUM 1G	174,584	117,028
TEICOPLANINUM	172,803	108,931
IMIPENEMUM + CISLATATINUM 500MG	119,620	108,053
AMPICILLINUM + SULBACTAMUM INJ.1.5G	119,932	105,045
CEFTRIAXONUM 2G	101,178	104,392

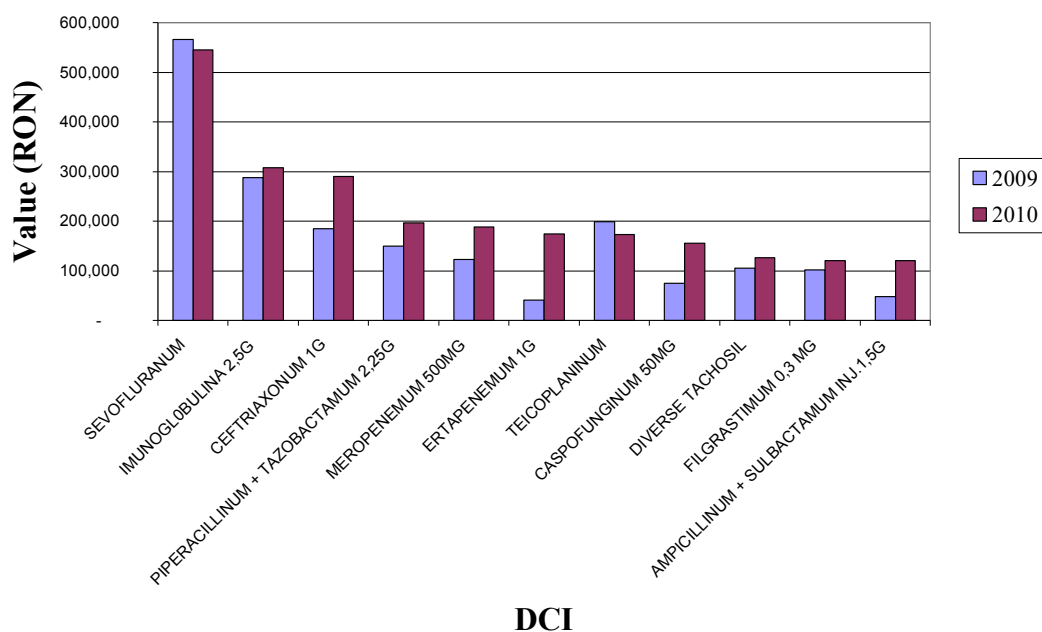


Figure 2
Consumption value – Unit "A" (2009-2010)

According to data analyzed in tables II and III and figures 1 and 2, we find that 6 out of 11 medicines have underwent reduced quantitative consumption in 2010 compared with 2009, while from a qualitative point of view, also 6 out of 11 drugs recorded less usage in 2010 compared to 2009.

Table IV
Consumption quantity - Unit "B" 2009/2010

DCI	2009	2010
PERHYDROL	48,230	63,290
LACTIC CALCIUM 500MG	43,500	39,537
CEFORT 1GR	30,166	40,564
HYDROCORTISONE HEMISUCCINAT 25MG	29,175	30,395
AMPICILLIN 500MG INJ.	26,476	23,293
METAMIZOLE AMPOULE	25,635	28,467
SODIUM HYDROGEN CARBONATE	20,861	13,108
SODIUM CLORHIDE SOL.-0.9%-500ML	19,920	19,210
KREON 25.000UI	19,320	15,080
CALCIUM GLUCONATE SOL.10%-10ML	16,896	18,996
GLYCEROL	14,949	5,459
ADRENALINE 0.1%	13,616	19,324

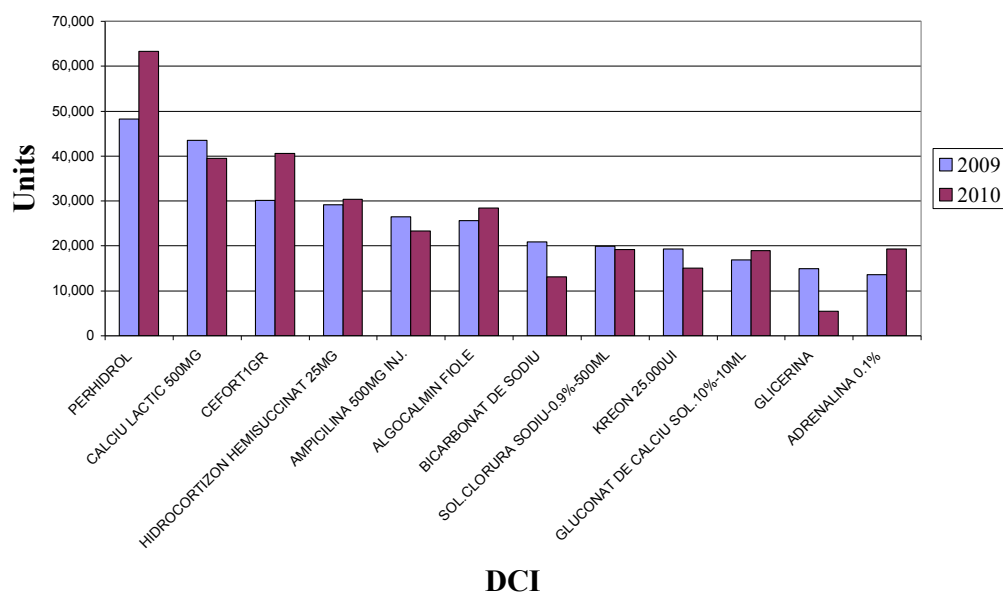


Figure 3
Consumption quantity – Unit "B" (2009-2010)

Table V
Consumption value - Unit "B" 2009/2010

DCI	2009	2010
SEVORANE	476,513	288,767
MERONEM 1G	286,462	172,204
CEFORT 1GR	272,388	254,815
TAZOCIN 2.25G	184,749	148,871
TARGOCID 400 MG	145,240	103,278
CANCIDAS 50 MG	118,922	14,381
TIENAM 500 MG	103,275	87,501
NETROMYCINE 50MG 2ML	83,309	13,590
PERFALGAN 10 MG/ML	82,993	101,419
VANCOMICYN 500 MG	73,014	67,739
AXETINE 1.5 MG FL -CEFUROXIM 1.5-MAXIL	64,722	71,724
AXETINE 750 MG FL - CEFUROXIME-MAXIL	62,804	37,136

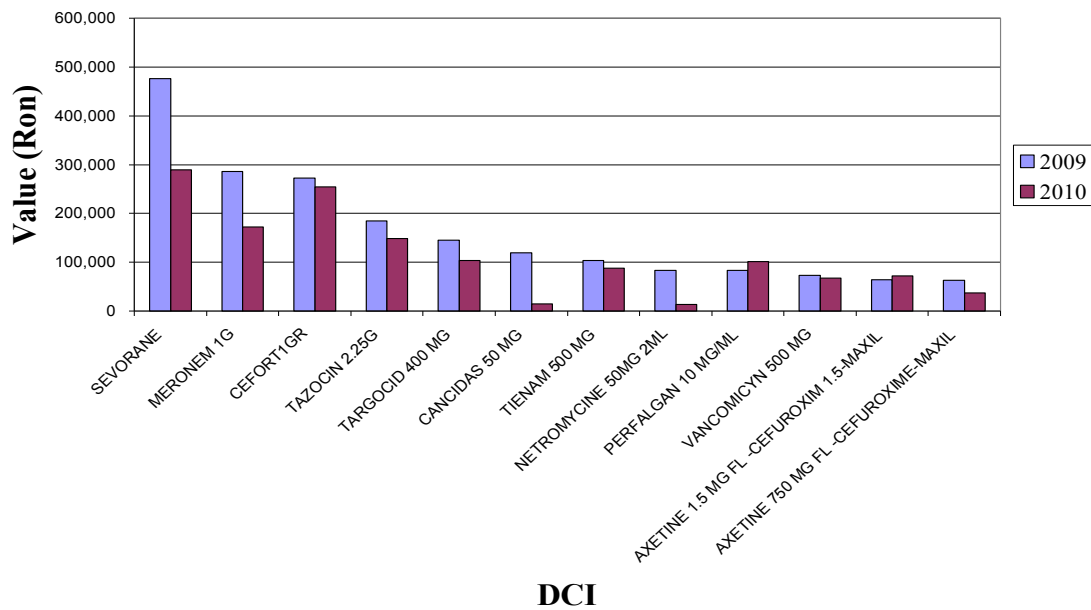


Figure 4
Consumption value – Unit "B" (2009-2010)

The situation found in unit A is repeating itself in unit B, hence, compared to 2009, in 2010 we registered a decreased drug consumption in 6 out of the 12 most used medicines from a quantitative point of view, while in terms of value and the most expensive products used in unit B, 10 out of 12 products were less used.

Table VI
Centralized summary Units A/B in the year 2009/2010

	Unit A		Unit B	
	2009	2010	2009	2010
Number of sections	9	10	11	13
Number of beds	392	392	460	479
Number of patients	27785	32321	26684	26708
Total costs on drugs (RON)	5108860	4475853	3875453	3351531
Costs/bed (RON)	13032	11417	8424	6996
Costs/patient (RON)	183.87	138.48	145.23	125.48

The data presented in table VI shows a decrease in costs per bed, as well as in costs per patients in both hospital units under study. Although the number of patients was higher in 2010 compared to 2009, both units have registered a lower level of total drug costs in 2010.

The status of drug use according to the National Centre of Health Statistics is as follows [14]:

Table VII
The evolution of pediatric medicines expenditure in Romania between 2005 and 2010

Year	2005	2006	2007	2008	2009	2010
Total costs/bed (average/country)	2406	2379	2672	3393	3894	4268
Total costs/bed (Bucharest)	6676	6152	6002	7008	6837	7420
Total costs/patient (average/country)	47	45	48	58	66	84
Total costs/patient (Bucharest)	125	112	101	113	118	130
Total costs/hospitalization day (average/country)	8	9	10	12	14	16
Total costs/hospitalization day (Bucharest)	20	19	18	19	20	23

**costs are expressed in RON*

Conclusions

Although no national statistics show a decrease in pediatric drug use in 2010 compared to 2009, the actual situation of the two units under study shows a decrease of both total drugs expenditure and costs per patients and beds, as presented in table VI.

Analyzing the entire range of products used in the two hospitals, we found that unit A used around 370 products, while unit B around 530 products. It must be noted that the total range of drugs includes medicines obtained by the industry, medicinal substances and milk powder formulas used for feeding infants and those undergoing special therapies. The range of medicines consists of drugs belonging to all therapeutic groups, but the most used products in terms of quantity and value are the ones in the following pharmacotherapeutic groups: A - Digestive system and metabolism; B - Blood; C - Cardiovascular system; H - Hormonal preparation; J - Antiinfectious AB; M - Musculoskeletal system; N - Central Nervous System; R - Respiratory system; S - Sensory Organs; V -Varia.

Out of 15 therapeutic classes, among the most sought for medicines for pediatric use are 10 groups, the first place being occupied by drugs in group **J** – antiinfectious (antibiotics), which, in terms of value, represent over 50% of the total usage in unit A and over 55% in unit B. This is understandable if we consider that both units under study are emergency clinics with access to the most difficult and complicated cases across the country. Thus, the statistics show that health expenses in Bucharest are twice and even three times higher than the average per country [14].

In descending order of consumption, products can be listed in groups, as follows: B – products related to blood and hematopoetic organs; A – digestive system; N – products destined for the treatment of the central nervous system; C – cardiovascular system; R – respiratory system; H - hormonal preparation, S – sensory organs and V – varia.

References

1. Craiu D., Măgureanu S, *Hyperactive children need attention* – 5th Conference on Child and Adolescent Mental Health, Bucharest, Nov 8th 2008
2. Crăciun P., Accesibilitatea la tratamente medicamentoase în scădere în 2010, Săptămâna medicală 23 martie 2010.
3. Georgescu A., Pascal Ciofu E., Ghiduri și protocoale în pediatrie *Pediatric guidelines and protocols – Editura Medicală Amaltea, 2008*
4. Hurgoiu Voichița - Etica cercetării științifice în pediatrie, Revista Română de pediatrie – vol. LVI, nr. 3, an 2007
5. Leucuța Adrian - *Clinical and pharmacokinetic study of drugs used in reflux esophagitis in children – the summary of doctoral thesis (2009)*

6. Lupu V.V, Dr. Smaranda Diaconescu, Dr. M. Burlea Tratamentul bolii de reflux gastroesofagian la copil - *Revista română de pediatrie*, 2010, LIX, 4
7. Nanulescu M., Rolul farmacistului de spital din perspectiva medicului clinician, *Pharma Business* 3/2008.
8. Ștefan M.- *Remitting medication from a pediatric perspective, First National Conference of Pediatric Rheumatology in Romania, juvenile idiopathic arthritis: realities and prospects - Bucharest, May 2011*
9. *** ORDER nr. 409 / 19 April 2005 aproving Guidance on clinical investigation of drugs in the pediatric population.
10. *** Regulation (CE) nr. 1901/2006 of the European Parliament and the Council of medicinal products for pediatric use
11. *** Regulation (CE) nr. 1394/2007 of the European Parliament and the Council of medicinal products for advanced therapy
12. *** WHO model formulary for children 2010.ISBN 978 92 4 159932 0 (NLM classification: QV 55)
13. *** www.emea.europa.eu/pds/human/ich
14. *** *Health Statistics Yearbook 2010 – CNSIP-INSP*

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