STARTING POINT

The Miguel Servet University Hospital

The Miguel Servet University Hospital (HUMS) is a Health Institution belonging to Aragon´s Health Service (SALUD), and linked to the University of Zaragoza. The HUMS provides specialized public assistance to Zaragoza´s II Health Sector while being institution of reference in the region (Aragon) and some neighboring regions in several practices.

It is constituted by 3 Centers: the General Hospital, a Maternal-Infant Hospital and a rehabilitation, trauma and burn care Hospital. At present the Hospital has 1345 beds in place, 28 operating rooms and an extensive Services Portfolio.

The Miguel Servet University Hospital of Zaragoza, was founded more than 60 years ago. It opened its doors in 1955 under the name Jose Antonio´s Residence, having at the time 500 beds of hospitalization. Later, in 1971, it was expanded with the Rehabilitation, Trauma and Burn Care building and the Maternal and Child Center, changing its name to Jose Antonio´s Health City initially and it is now know as Miguel Servet University Hospital.

Zaragoza´s II Health Sector (figure 1) covers the south-eastern zone of Zaragoza´s province and a great part of the Zaragoza city. It serves a population of 386,709 inhabitants (January 2014), mainly urban (95,21 %). Furthermore, the HUMS is an institution of reference in the region (Aragon) and some neighboring regions in the treatment of many pathologies.
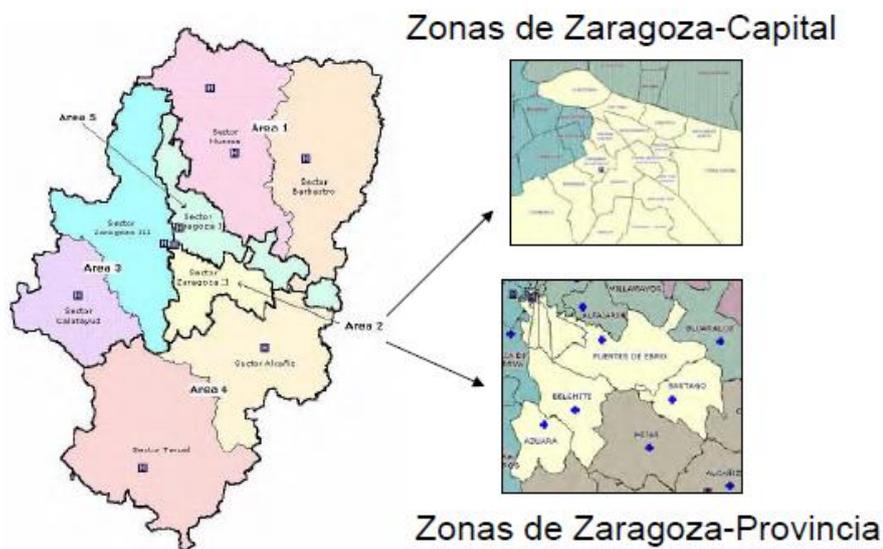

Figure 1. Zaragoza´s II Health Sector. Urban and Rural areas.

Pharmacy Service

The hospital has a Pharmacy Service (PS), whose mission is to add quality to the care process of those patients treated at the Miguel Servet University Hospital (HUMS).

The PS is a central, functional and hierarchically integrated service whose mission is to contribute to improving the health and quality of life of the population through an effective, safe and efficient pharmaceutical prescription, within a framework of comprehensive and continuous care.

Due to the mixed nature of its professional role, as a unit managing purchases and as a care unit, it is closely related to the hospital's clinical services, its Governing Bodies and patients.

Its value chain has two differentiated but coordinated parts: its "technical expertise" assisting on the use of medicines and the logistics, from the drug´s acquisition to its administration/delivery to the patient.

Technical assistance includes:

• Assistance in the evaluation, selection and establishing protocols of the use of medicines and medical devices in the hospital

• Assistance in the prescription of pharmacological treatments to hospital doctors and support to the nursing staff in the preparation and administration of medicines

• Information on medicines and health products to patients

The logistics of the drug include:

• Purchase of medicines as well as raw materials for the preparation of other medicines, with the warehouse and supplier management that this entitles

• Preparation and the conditioning of medicines depending on their typology and prescription´s characteristics

• Dispensation of the medicines to the care units and directly to the outpatients, according to the conditions of the doses established in the prescription and in accordance with the current norm established

The objective of the logistics function is to guarantee the availability of the most appropriate medicines to the patients' needs at the desired moment (opportunity), in the necessary quantity and assuring their quality. These tasks are compliant with technical-pharmaceutical criteria, efficiency and adherence to the fundamental principles of financial management.

Table I shows the amount of purchases made by the Pharmacy service in medicines (in euros), as well as the consumption by the type of patient in the HUMS in the last 4 years.

Table I. Ammount of purchases and consumption of drugs by type of patients in the period 2012-2015 (data in €)

	2012	2013	2014	2015
Drugs purchases	66.454.350	68.913.658	69.804.531	82.685.756
TOTAL CONSUMPTION	68.619.106	69.658.834	69.847.408	82.064.580
OUTPATIENTS	33.612.024	34.655.723	33.296.304	44.393.916
AMBULATORY PATIENTS	12.756.508	14.143.671	19.289.233	18.082.356
PRIMARY CARE, RESIDENCES	1.941.217	2.156.336	2.253.356	2.301.745
HOSPITALIZED PATIENTS	20.309.357	18.703.104	15.008.515	17.293.806

This table shows the high economic impact of the drugs and the significant increase they have had in the last 4 years, with a 20% increase of total drug consumption and a 32% rise in the economic impact of outpatient´s medicines.

Outpatient Pharmaceutical Care Unit

The Pharmacy Service of HUMS has a Pharmaceutical Care Unit for External Patients (UAF-PEX), responsible for dispensing and monitoring drugs used outside the hospital that require particular monitoring, supervision and control.

The dispensing of outpatient medicines is set out in Royal Legislative Decree 1/2015, of July 24, which approves the consolidated text of the Law on Guarantees and Rational Use of Medicines and Medical Devices in Chapter III, Art 84, which states that the functions of the Hospital Pharmacy Services include: "Guaranteeing and assuming the technical responsibility for the acquisition, quality, correct preservation, coverage of needs, custody, preparation of formulas or official preparations and dispensing of the precise medications for the intra-hospital activities and those for extra-hospital treatments, as established in Article 3.6.

Also Decree 286/2003 of 18 November of the Government of Aragon, which approves the Regulation of Hospital Pharmacy Services and the Deposits of Medicines, provides in its article 5, the dispensation by the Hospital Pharmacy Services Of special medicines for patients not admitted.

The outpatient dispensing is one of the activities that has become more relevant in recent years in the Pharmacy Services. From the UAF-PEX, pharmacy and therapeutic follow-up consultations are carried out, whose objective is to support the patient's care process in the field of external consultations in all matters related to the use of drugs, in order to achieve the best possible health outcomes.

Graphs I, II and III show the outpatient pharmaceutical care unit´s increase in activity at the HUMS in the period 2012-2015.

Gráfico I. number of patients treated in the HUMS´ UAF-PEX in the 2012-2015 period
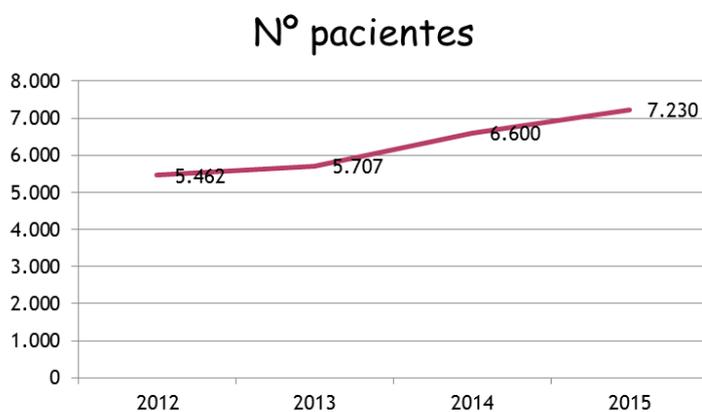
Nº pacientes

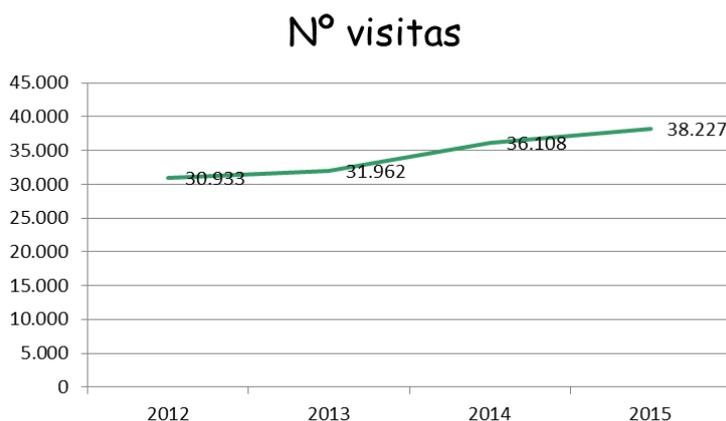Gráfico II. Number of consultations given at the HUMS´ UAF-PEX in the 2012-2015 period

Nº visitas

Gráfico III. Number of dispensations given out by the HUMS´ UAF-PEX in the 2012-2015 period
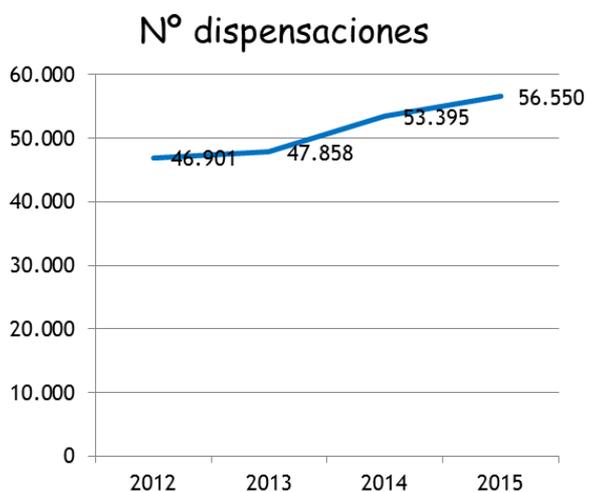
Nº dispensaciones

Table II shows the number of external patients seen in the UAF-PEX in diseases with a higher average age. The total number of dispensations made to these patients in 2015 was 12,962.

Table II. Main pathologies treated in the UAF-PEX. Nº of patients and their age

	# patients	Avg. age	>60 Y.O. (#)	>60 Y.O. (%)
HEMATOLOGICAL PATIENT	438	68,8	334	76,3
CRONIC RENAL INSUFFICIENCY	771	69,8	585	75,9
PULMONARY HYPERTENSION	161	62,1	110	68,3
ONCOLOGY PATIENT	758	62,2	490	64,6

The significant increase in activity shown in Figures I, II and III is associated with a significant increase in the amount of medicines dispensed there. Outpatient dispensing drugs reached 54% of total expenditure in 2015 as seen in Table I.

Table III shows the average annual amount of drug expenditure in the pathologies mentioned above in the years 2014 and 2015 and its increase in both average expenditure per patient and total expenditure.

Table III. Number of patients treated, total expenditure and average cost per patient by pathology in 2014 and 2015

	20 14			2015			CHANGE 2015/2014		
	PTE	CONSUMPTION €	CONS/PTE €	PTE	CONSUMPTION €	CONS/PTE €	PTE	CONSUMPTION €	CONS/PTE €
ONCOLOGY PATIENT	705	2.863.074	4.061	772	3.262.316	4.226	9,50%	13,94%	4,06%
HEMATOLOGICAL PATIENT	532	4.275.478	8.037	495	4.144.670	8.373	-6,95%	-3,06%	4,19%
CRONIC RENAL INSUFFICIENCY	667	447.417	671	725	473.599	653	8,70%	5,85%	-2,62%
PULMONARY HYPERTENSION	95	1.226.891	12.915	139	1.418.888	10.208	46,32%	15,65%	-20,96%

From the UAF-PEX work is done to improve the efficiency and safety in the use of medicines. One of the main therapeutic resources that we use to confront the lack of health are medicines; However, its benefits can be altered by errors of prescription, dispensing and administration, being in the latter case the lack of adherence and its consequences the most common problem. Specifically, the concept of therapeutic adherence refers to the behaviors that lead to compliance with the treatment according to the prescribed dosage and duration.

The World Health Organization (WHO) defines therapeutic adherence as the degree to which a person's behavior corresponds to the recommendations made by his or her doctor.

A WHO study published in 2003[1] points out that in developed countries adherence to treatment by patients with chronic diseases is only 50 per cent, even lower in developing countries.

Also, other studies indicate that about half of patients in the United States do not adhere to the recommendations of their physicians for the prevention or treatment of chronic or acute diseases[2] and that adherence rates to therapies with medications for pathologies Chronic diseases, such as oral chemotherapy, do not exceed 50% [3].

DESCRIPTION OF THE CURRENT MODEL OF PHARMACEUTICAL CARE FOR EXTERNAL PATIENTS

Until very recently PS has been oriented towards process management where the hospital pharmacist has a fragmented view of the patient and has often focused his efforts on the hospitalized acute patient. But in the coming years, the PSs must adopt a model of pharmaceutical care more oriented towards the chronic/external patient, a change that is motivated mainly by 3 reasons: (i) the continuous increase of chronic patients who demand specialized and continuous care (ii) the need to improve safety in the use of medicines, also at an outpatient level, and (iii) the need to increase the efficiency of the pharmaceutical delivery received by these patients.

Increased life expectancy, improvements in public health and health care, as well as the adoption of certain lifestyles have conditioned that, at present, the dominant epidemiological pattern is represented by chronic diseases[4] in an elderly patient. As a consequence of these demographic and epidemiological changes and therapeutic advances, PSs have to respond to a growing demand for services and to increasingly diversified needs, with the consequent increase in activity and the use of resources.

Specifically, since its inception in the early 1990s, the outpatient dispensing of medicines in hospitals has continued to increase over time. The traditional predominance of patients with viral pathologies (HIV and HCV) is compounded by other chronic diseases requiring specialized pharmaceutical care, renal failure, multiple sclerosis, or cancer.

Although for some time the Pharmacy Services in general, and the HUMS in particular, have been incorporating devices and strategies that have allowed the automation of the circuits that involve the processes of dispensing and controlling drug stocks in different areas and units, these have not included the outpatient unit in our case.

Among the developed technologies the following stand out: vertical kardex in the area of preparation of unitary doses stands out, pyxis dispensing cabinets in hospitalization plants, programs for the prescription and elaboration of cytostatics and the electronic prescription assisted in the hospitalized patient. However, in spite of the volume of patients being treated, the complexity of their care and the economic impact of the medications used there, the outpatient area hasn´t been equipped with any automation process and so it continues to function in a traditional way.

In recent years, community pharmacies have also incorporated automatic dispensing robots (RADs) with the aim, in the first instance, of making drug dispensing more efficient and optimizing stock management and logistics.

In the UAF-PEX, a ´Farmatools´ software is available for the stock management and the dispensations made to each patient. However, tasks such as: requests to suppliers, reception of medicines or dispensation must be manually inputted into the system. As a consequence, the process is subject to potential human errors causing difficulties in the traceability and registration of batches dispensed to patients.

Numerous publications have highlighted the advantages of automated dispensing robots (RADs) in the outpatient area. Take Garcia-Candado et al[5] work which illustrates that, among the advantages of robot implantation there are: the reduction of the immobilized stock, the reduction of the difference between real and virtual stocks, the increase in the rotation index and the decrease in the number of weekly orders. In short, the implementation of RAD managed to increase the efficiency in the management of these drugs in the field of external consultations and patient satisfaction by reducing the perception of waiting time.

In relation to the drug dispensing circuit, once the patient is evaluated by a hospital doctor and receives a prescription of a dispensing drug in the UAF-PEX area, the patient must go to collect the medication monthly to the Pharmacy Service with the difficulties that this entails for some patients due to the need for continuous trips to the hospital whose working hours are in the morning of working days. This can be particularly problematic for elderly and/or displaced patients.

Part of the dispensation is a face-to-face pharmaceutical consultation which is focused on patient information and training in order to promote adherence to treatment, minimize the appearance of problems related to medication and ultimately improve health outcomes in the patient.

But there is no doubt that a change in our organization must take place. The way in which people and organizations relate to us is undergoing a process of transformation. Part of it is explained by the rise of a set of new technological tools that allow us to communicate and interact as we have never done before. We have more and more alternatives to distribute information, find contacts or encourage social participation and interaction. More importantly, in this process of change, citizenship is switching from being the consumer or recipient of information to content creation[6].

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