

# The implementation of a purchasing mechanism for hospital resource allocation in Portugal

**Authors:** *Nuno Amaro\**; *Cláudia Medeiros Borges\**; *Fátima Cadoso\**; *Ana Cristina Ferreira\**; *Maria do Céu Valente#*,

\*Administração Central do Sistema de Saúde, IP

# Centro Hospitalar Lisboa Norte, EPE

## 1 Introduction

Until 1997 the Portuguese NHS hospitals' budget had been based on the previous year's funding, updated for inflation.

In 1997 a new activity-based resource allocation model was adopted, case-mix was introduced (inpatient and ambulatory surgery were classified using Diagnosis Related Groups - DRG) and a growing portion of the budget was based on the prevision of the hospitals activity (from 10% in 1997 to 50% in 2002).

In 2003, 40% of the public hospitals received a new statute and were converted into public enterprises, with a change in management rules and financial responsibility. In 2005 more hospitals received this new statute.

With this new legal statute, hospitals are financed according to a contract established between the Ministry of Health, represented by the Central Administration for the Health System (ACSS) and the Regional Health Administrations (ARS), and the units responsible for delivering healthcare - Hospitals. Every year the healthcare services hospitals must deliver and the budget for the following year are negotiated and contracted.

These hospitals have been closely supervised by national and international entities on what contracts' and budget's accomplishment is concerned and several studies have been made, following instructions given by different governments. Studies such as "*Resultados da Avaliação dos Hospitais SA*" done by the Comissão para Avaliação dos Hospitais Sociedade Anónima and the "*Avaliação do Desempenho dos Hospitais SA*" from the Escola Nacional de Saúde Pública, aimed to assess the overall impact of the change in the portuguese hospitals' legal statute.

That is not the purpose of the present paper, carried out according to the payer's perspective, which intention is to analyze the resource allocation model for the Portuguese NHS hospitals, especially in what matters public enterprises hospitals. Some selected indicators for a group of hospitals will be analyzed to see how its evolution reflects the impacts of the changes in the hospital resource allocation model, which was created alongside hospitals' new legal statute.

## 2 Methodology

The resource allocation model introduced in 2003 for public hospitals, when public enterprise hospitals were created as well as the purchasing process, has faced multiple changes in the universe of hospitals with this new statute. More hospitals changed into public enterprises over the last years, joining the first 33 hospitals and hospital centers were created, gathering former public enterprise hospitals with non enterprise hospitals. Furthermore, the financing and purchasing methodology itself has evolved since the whole process started, with new lines of activity being directly financed and contracted. The measurement of such an activity based hospital resource allocation model would definitely be biased unless certain premises were taken into account:

- a) Because from 2003 to the present date the public enterprise hospitals universe has changed, two groups of hospitals were considered: i) 28 Public Administrative Sector Hospitals (SPA Hospitals), corresponding to the 28 units existing in December, 31<sup>st</sup> 2007; ii) 19 Hospitals that were converted into Public Enterprise Hospitals (EPE Hospitals) in 2003, where the new resource

allocation model was introduced, and that are the only ones that have remained unchanged since then (Appendix I).

- b) To compare characteristics of the studied universe before and after the introduction of this new resource allocation model, two periods were considered: 2000-2002, as the pre-introduction of the model period and 2003-2007 as the pos-introduction period.
- c) All the inpatient hospitals activity, from 2000 to 2007 was classified using the All Patient DRG Grouper, version 21, and the current low and maximum trims as well as the relative weights were applied to all the considered episodes. Thus, inpatient production since 2000 was evaluated considering equivalent patients, CMI and LOS resulting from the application of the AP DRG 21 grouper and corresponding trims and relative weights.
- d) The resulting number of equivalent patients and CMI was also used to calculate, in average, the payment by equivalent patient adjusted by case-mix, for each group of hospitals. Meaning, how much was paid for each equivalent patient, considering the total amount received for inpatients by both SPA and EPE hospitals, in a period where no fixed price for inpatient was negotiated (2000 to 2002) and a time when purchasing was implemented (2003 to 2007).
- e) To analyze the financial performance of both groups of hospitals, the difference between effective costs and revenues (operating results) was considered.

### 3 Hospital Resource Allocation Model

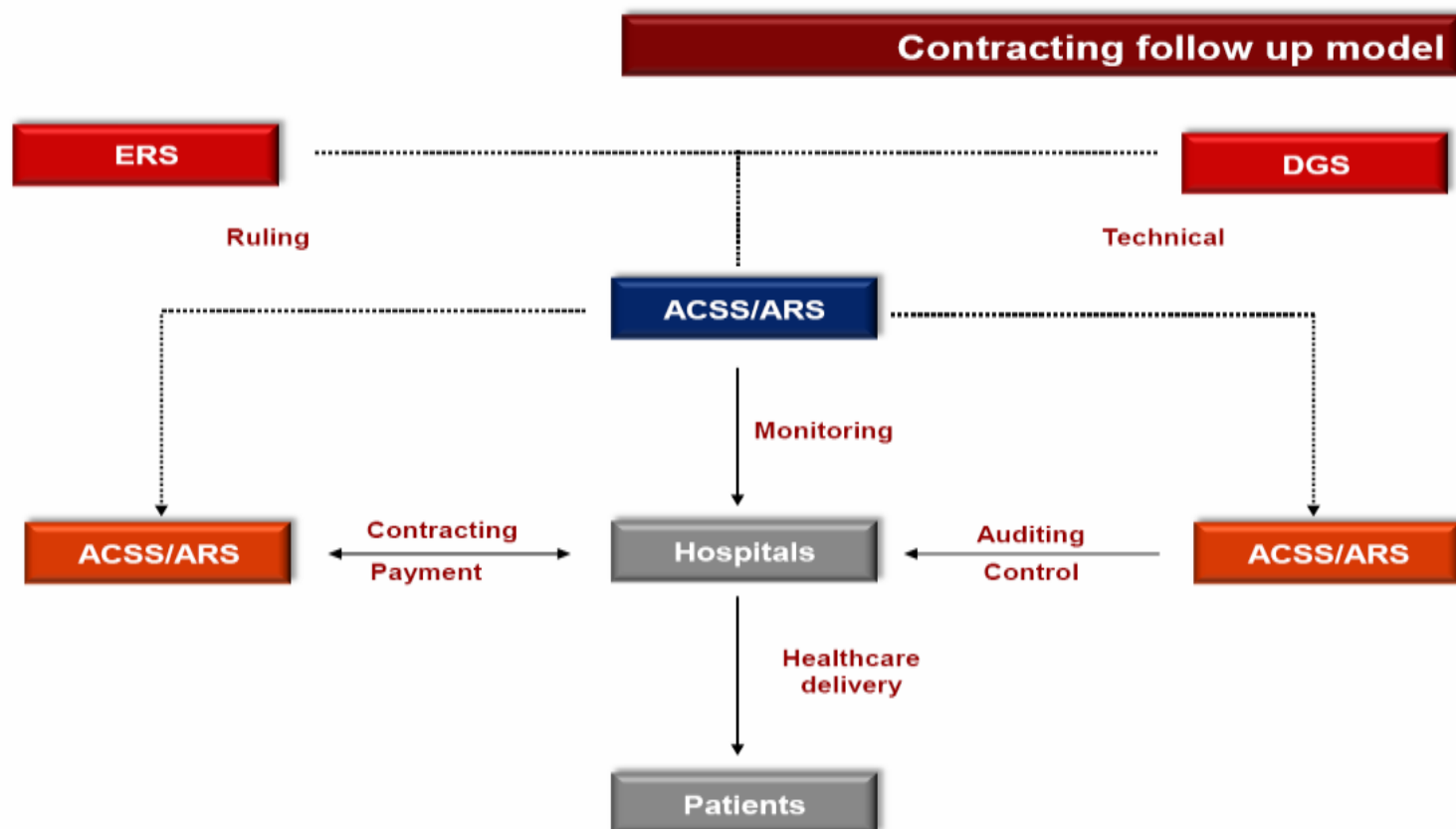
#### 3.1 General description

The resource allocation model, based on the activity provided by hospitals, attempts to separate the healthcare provider from the public payer, represented by the Central Healthcare System Administration (ACSS) and the Regional Health Authorities (ARS). The financing amount that each hospital will get for the healthcare provided depends on the type and amount of delivered services, on the contracted price and on the contracted case-mix index. However, the available budget for the EPE Hospitals is limited by the whole health budget annually proposed by the Portuguese Ministry of Finance and approved in parliament.

The main characteristics of the hospitals resource allocation model, introduced in 2003, are: i) a fixed price for each type of activity, yearly defined according to the available health budget (where the provider's payment depends on the amount of services effectively provided); ii) price structural adjustment according to four hospital groups; iii) price complexity adjustment according to a negotiated case-mix index and iv) establishment of production plafonds, limited by the imposed budget restrictions. With this model, the government aims to introduce an incentive to efficiency and to increase quality in provided healthcare.

EPE Hospitals assure the delivery of healthcare in the contracted amount and quality, managing their own activity into efficiency levels suitable with the contracted prices.

The contract, a key tool in purchasing, establishes the quantity and quality of the production hospitals must provide, as well as its prices, in an active negotiation process, defining the responsibilities for each element in the process (healthcare provider unit and the Portuguese State as the purchaser). Through these contracts, the Ministry of Health, as the purchaser/payer entity, identifies the healthcare needs of the citizens, plans which healthcare must be delivered according to the existing budget restrictions and contracts the needed services so that demand may be satisfied. Hospitals assure that the healthcare is delivered according to the contracted quantity and quality and manage their own activity with an efficiency converging to the contracted prices. A price for each line of activity is established, enabling a payment for the activity effectively done instead of cost reimbursement.



Source: ACSS/Unidade Operacional de Financiamento e Contratualização (UOFC), 2008

## Prices

Since its introduction, the resource allocation model has evolved, with more complex, differentiated and financially significant healthcare services being contracted, with fixed prices, and in accordance to the National Health Plan priorities (such as HIV/AIDS, Renal Chronic Deficiency, etc)

Through the defined prices the State, as the purchaser/payer, persuades EPE Hospital into efficiency in three levels:

(1) global, in consequence of the total available amount to pay the provided activity; (2) inside each structure hospital group, with a fixed price for each hospital group and (3) individual, by negotiating and establishing improvement goals, controlled through a convergence plan.

To each type of production, prices are calculated according to the approved budget, the efficiency aimed for each group of hospitals, and the improvement goals established for each hospital. The hospital's income for the contracted activity, by type of delivered care, is the result of the multiplication of the price of each line of production (which renders the structural adjustment of the hospital group), by the quantity delivered, adjusted by the hospital's production complexity (case-mix index).

Prices were not updated from 2003 to 2005. Only in 2006 and 2007 prices were reviewed and updated (Appendix II).

It was identified that significant efficiency gains were possible for each hospital. Albeit considering hospital's cost accounting, for some hospitals the final contracted prices are significantly lower than the costs.

### **Complexity adjustment**

The volume and type of necessary resources to treat patients in a hospital may depend significantly on the treated patient's complexity (*case-mix*).

Complexity adjustment by the case-mix index (CMI) was not used in the same way since 2003. Previously, inpatient and ambulatory surgery episodes were contracted together and were adjusted by an inpatient normalized case-mix index. In 2004 ambulatory surgery began to be contracted on an autonomous basis with its own case-mix index.

Outpatient activity was also adjusted by a case-mix index, admitting the inpatient casuistic. Because an outpatient case-mix index adjusted by the inpatient production proved itself not to be adequate, in 2005 outpatient production complexity adjustment was dropped.

Also in 2005 a national surgery waiting list program was created, making it necessary to separate surgical from non-surgical activity, each with its own CMI. In 2007, prices were introduced for ambulatory non-surgical DRG, adjusted by the relative weight of each introduced DRG.

Presently, prices for inpatient (surgical and non-surgical), ambulatory surgery and non-surgical ambulatory activity are adjusted by the correspondent CMI, calculated on an annual basis, considering a n-2 period. However, in what the 2008 contract was concerned, and due to the imposed expenditure restrictions, the CMI calculation was based on the 2005 hospital production.

Since 2007, the contracted CMI is no longer nationally normalized. This due to the fact that, being a nationally normalized CMI, hospitals were unable to calculate their own CMI (because they did not have access to national production), and therefore could account for the contracted case-mix.

In the other lines of production (emergency, day-care, homecare, chronic inpatient care, etc), no case-mix adjustment was ever done.

### **Structure Adjustment**

There are factors, such as the existing technology or the technical differentiation of a hospital, that are not taken into account by the case-mix adjustment and that may also explain the differences between the hospitals' unit costs. Therefore, four clusters of the Portuguese NHS hospitals were created, according to 32 variables considering structural factors intrinsic to each hospital. Variables such as the number of beds, equivalent patients, blood tests and analysis, ultrasound scans, emergency visits, differentiated outpatient visits, basic ancillary exams, percentage of special beds (burns, palliative central hospital, % of complex non-surgery DRG, weight of outlier episodes (% of days above the maximum DRG trim), % of complex surgery DRG, ratio between equivalent patients and number of physicians, of physicians in full time and of nurses, number of basic and intermediate outpatient specialty clinics, district level, number of basic and intermediate ancillary exams, number of different DRG treated and classified in basic hospitals and so on were taken into account.

Multifactor analysis was made, considering all the mentioned variables, and the following factors were used to cluster the NHS hospitals: the scale/differentiation of hospitals (dimension and technology differentiation), complexity not adjusted by case-mix (hospitals with more complex patients, have more outliers with long length of stay) and basic/district hospitals. Four groups of hospitals were identified and prices for each of these groups were established making a price adjustment according to the hospitals structure possible, where each group has the same price for each hospital within the group.

Final prices for each group depend upon the total amount defined for each kind of production.

The contract establishes the number of inpatient and ambulatory episodes (measured using DRG and quantified as equivalent patients), outpatient visits, emergency episodes, day care, chronic inpatient care and home care that the hospital will deliver every year. A price for each line of activity is established, enabling a payment for the activity effectively done. Legal abortion, haemodialysis, pre-natal diagnosis, ambulatory treatments for HIV patients are paid according to a comprehensive price (by patient and including ancillary exams and treatments, outpatient visits and drugs delivered).

For 2008, the contracted production will be paid as follows:

Type of care	Figure	Amount	Case Mix Index	Price	Payment
<b>Inpatient (DRG)</b>	Number of Equivalent Patients a)	$x$	CMI for inpatient care	Group Price	$x * CMI_i * \text{Group Price}$
<b>Medical and Surgical Ambulatory (DRG)</b>	Number of Equivalent Patients a)	$y$	CMI for ambulatory care	Group Price	$y * CMI_a * \text{Group Price}$
<b>Outpatient (first encounter and following)</b>	Number of Consultations	$z$	-	Group Price (First encounters, price 10% above the price for following encounters)	$z * \text{Group price}$
<b>Emergency</b>	Number of emergency episodes	$w$	-	Group Price	$w * \text{Group price}$
<b>Day Care</b>	Number of sessions	$m$	-	Price by type of Day care	$m * \text{Price by type of Day care}$
<b>Chronic Inpatient Care</b>	Per day	$t$	-	Price per day	$t * \text{Price per day}$
<b>Home care</b>	Number of visits	$v$	-	Price per visit	$v * \text{Price per visit}$

a) Total of episodes after conversion of outlier episodes (short and long term stay) and transferred episodes for each DRG into groups of patients equivalent to the medium length of stay for each DRG

Source: ACSS/ UOFC, 2008

### 3.2 Marginal Production

The annually contracted production is an estimation of what hospitals and the State stipulate as the necessary healthcare to be delivered to NHS users.

There is a degree of uncertainty in healthcare demand, not only in what volume is concerned but also in its complexity. On the other hand, the hospital cost structure has a significant fixed component that cannot be adjusted to healthcare demand on a short-term basis.

In a price or production payment system there is a strong incentive for hospitals to maximize their benefit, by producing as much as possible. The budget restrictions impose a previous definition of the volume of healthcare delivery to be purchased and the introduction of payment rules for marginal production.

When this financing model was introduced, the information used to preview what healthcare would be purchased and to establish goals, needed improvement. Therefore, as the contracting production resulted in a unilateral commitment to achieve certain goals, marginal production payment rules were more flexible than those established in the following years.

In 2003, marginal production up to 10% above the contracted goals in outpatient visits and day-care, was paid. And up to 5% for inpatient and emergency episodes. If production was less than contracted, the State guaranteed on this first year the payment of 85% of the fixed costs for all type of healthcare, up to the contracted volume.

Through 5 years since the implementation of this new resource allocation model, the contracted quantities and what is effectively delivered are becoming closer, showing a more precise definition of the healthcare needs for each year and the positive evolution of the negotiation process. Because marginal production is paid with a price inferior than the contracted production, the financing model has pushed hospitals to estimate the annually contracted production on a more accurate way.

In 2008 marginal production payment has a limit of 10% for all contracted activity, except ambulatory and programmed surgical inpatient admissions (as an incentive to transfer inpatient to ambulatory treatments and to reduce the waiting list for surgery).

If production is less than 50% of the contracted amount, there is no payment of any production. Only in emergency, where Hospitals have to guarantee its structure and it is very difficult to control demand, there is a payment of 50% of fixed costs of the contracted units not delivered.

### **3.3 Specific National Health Plans and other activity**

Beyond the purchasing of the activity mentioned above, the State and the Hospitals also contract specific programs, such as Long term care (when Hospitals have convalescence and long term care units); Rehabilitation devices; Cross boarder healthcare; medicines compulsory delivered at Hospitals, etc. These specific programs have an inscribed amount in the NHS budget and in most of them there is not a purchasing by quantities Vs contracted prices.

### **3.4 Prices and convergence value**

The introduction of a price list to pay all the NHS hospitals production is kind of problematic since providers present significant different efficiency levels, with very different production unit costs. In the short term, more inefficient hospitals would not achieve unit costs compatible with the fixed prices.

It was therefore necessary to create a mechanism that would enable a progressive convergence for less efficient hospitals, maintaining a single price list for all hospitals. The present financing model considers a component destined to compensate the inefficiency from certain hospital units and the public service they have to guarantee designated *Convergence Value*. It's a temporary financing for less efficient hospitals, linked to a plan with targets that clearly identifies objectives to eliminate each hospital's inefficiency.

More efficient hospitals see their financing reduced in order to, temporarily, free resources to finance other hospitals' inefficiency.

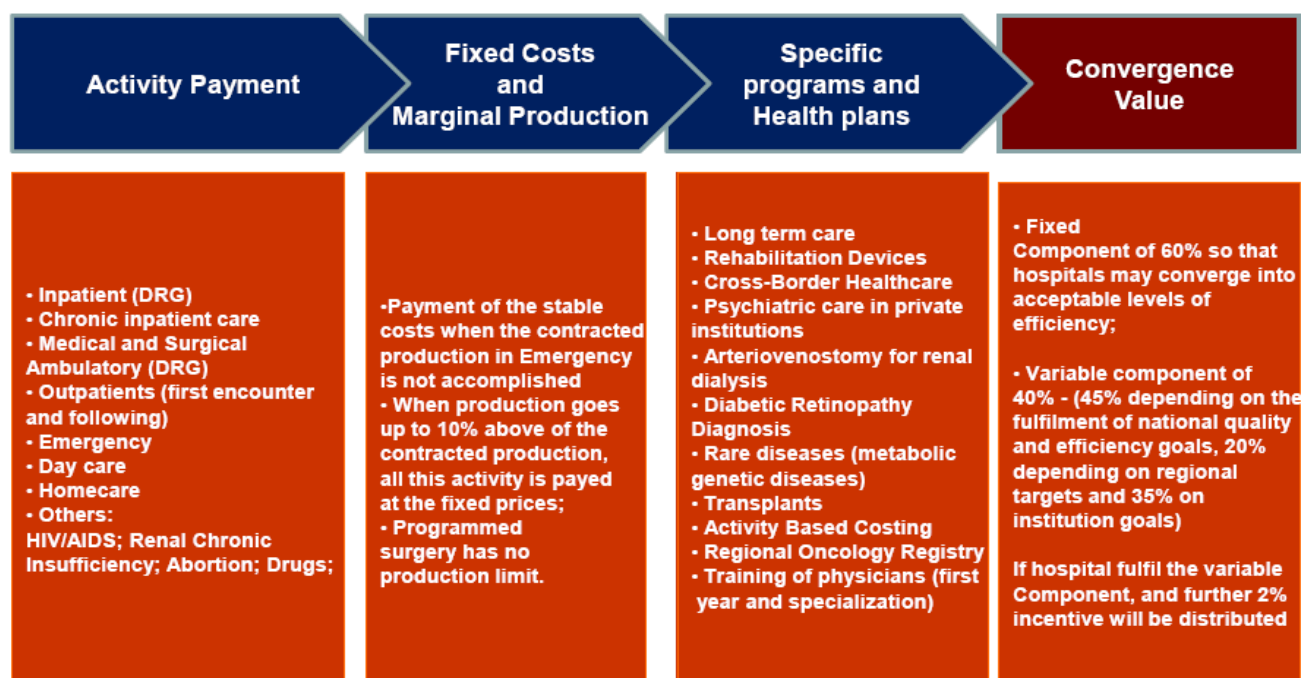
The convergence value covers part of the difference between the total costs and the revenues negotiated, depending on the available resources.

Since 2006, the convergence value is composed by a fixed component, which hospitals receive independently of their performance, and a variable component that hospitals will receive according to the fulfillment of certain national and regional efficiency and quality targets.

From 2006 onwards, in the analyzed EPE hospitals, the payment for activity increased with the consequent decrease of the convergence value (Appendix III). In 2003 84,3% of what these hospitals received was assigned to production, (60,5% concerned to DRG classified inpatient production) whereas in 2007 it is expected that the activity value for the same hospitals will represent 90,2% of what these hospitals received.

In short, the present resource allocation model, implemented in 2003, with the multiple changes introduced, has presently the following components:





Source: ACSS/ UOFC, 2008

### Strategic purchasing: provider performance analysis

Since the beginning of the purchasing process, quality and financial targets were fundamental. The selected indicators enable hospitals to account for the year contract, understanding how their performance is going. These indicators try to reflect the different type of hospital's performance, enabling the State to give precise orientations on what strategy must be followed.

From 3 indicators established in 2005, concerning mainly production, similar to all hospitals, in 2007 there were more than 10 indicators, on a national and regional basis, allowing an integrated performance accountability (monitoring financial performance, production, quality and service, accessibility, etc).

The established hospital targets contribute to i) a convergence, in the short term, into the values performed by the best hospitals in the NHS; ii) equal effort levels according to each hospital's starting point of so that a bigger effort is imposed on hospitals with a weaker performance and a smaller effort is asked to better hospitals.

In 2008 the contracted targets are associated to a performance system model and to an incentive policy. The fulfillment of production and financial targets is closely monitored.

## 4. Hospitals performance evaluation - 2000 to 2007

### • Financial Performance

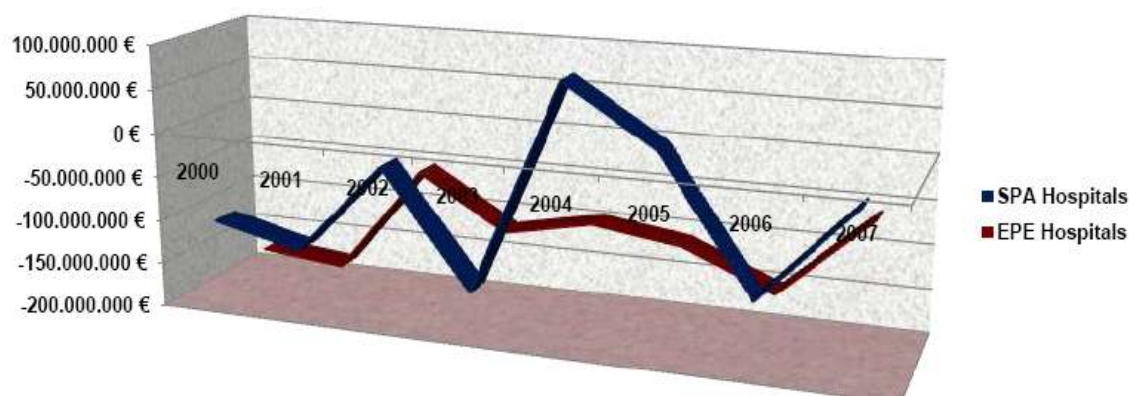
**Table 1: Operating Results (Revenues – Costs)  
SPA and EPE Hospitals – Evolution**

	2000	2001	2002	2003	2004	2005	2006	2007	Δ% 2000 / 2002	Δ% 2003 / 2007	Δ% 2000 / 2007
<b>SPA Hospitals</b>	-103 M€	-127 M€	- 22 M€	-152 M€	86 M€	22 M€	-125 M€	-17 M€	-78,1%	-88,7%	-83,4%
<b>EPE Hospitals</b>	-168 M€	-177 M€	- 54 M€	-115 M€	-95 M€	-109 M€	-151 M€	- 58 M€	-67,5%	-49,1%	-65,1%

Source: ACSS/UOFC/Unidade Operacional de Gestão Financeira (UOGF), 2000-2007

In spite of the fact that the operating results are still negative, in 2007 there was an evident improvement in the 19 studied EPE hospitals, with a changing from 168 million € deficit in 2000 to 58 million € in 2007 (in an overall decrease of 65, 1%). In the studied SPA hospitals, the recovery was even bigger, around 83%. In comparison to 2003, 2007 shows a significant reduction on the EPE hospitals differences between revenues and costs, although not as weighty as in the SPA hospitals.

**Chart 1: Operating Results  
SPA and EPE Hospitals - Evolution**



Source: ACSS/UOFC/UOGF, 2000 - 2007

In addition, the operating results evolution at the EPE hospitals has been more constant in the 2003 to 2007 period when compared to SPA hospitals that show more differences across this period (something that already happened before 2003).

**Table 2: Payment by equivalent patient adjusted by case-mix index  
SPA and EPE Hospitals Evolution**

As formerly noted the present inpatient financing implies the multiplication of a fixed price per equivalent patient per contracted CMI (n-2 period). To acknowledge how much each equivalent patient effectively costs to the payers entities, calculation was made considering the full amount paid per hospital for inpatient care, real equivalent patient and real CMI (n period).

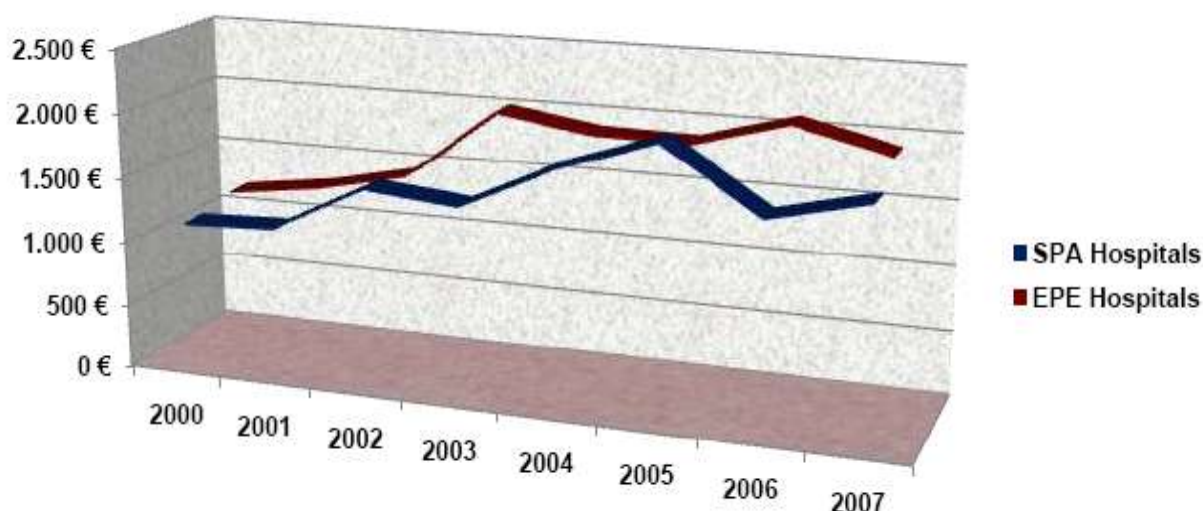
	2000	2001	2002	2003	2004	2005	2006	2007	Δ% 2000 through 2002	Δ% 2003 through 2007	Δ% 2000 through 2007
<b>SPA Hospitals</b>	1.120 €	1.149 €	1.523 €	1.456 €	1.805 €	2.054 €	1.576 €	1.752 €	10,2%	6,4%	8,1%
<b>EPE Hospitals</b>	1.189 €	1.286 €	1.442 €	2.137 €	2.026 €	2.132 €	2.208 €	2.025 €	22,8%	-1,2%	9,1%

Source: ACSS/ UOFC/UOGF, 2000-2007

When one looks at the payment done to each equivalent patient adjusted by the case-mix index (real one and not the contracted one), EPE hospitals have, in average, a higher price. Nevertheless, since 2003 it was possible for these hospitals to reverse this tendency, as the increase of the payment for each equivalent patient has effectively slowed down.



**Chart 2: Payment by equivalent patient adjusted by case-mix index  
SPA and EPE Hospitals Evolution**



Source: ACSS/UOFC/UOGF, 2000-2007

Moreover, in 2007 the average payment for each equivalent patient adjusted by case-mix index on EPE and SPA hospitals, was getting closer. However, this fact may be directly influenced by so many other factors not studied in this paper that it is not licit to take any other conclusions.

- **Hospital activity**

**Table 3: Equivalent patient  
SPA and EPE Hospitals Evolution**

	2000	2001	2002	2003	2004	2005	2006	2007	Δ % 2000/2002	Δ % 2003/2007	Δ % 2000/2007
<b>SPA Hospitals</b>	209.446	207.432	210.528	213.420	210.746	210.064	208.860	207.057	0,5%	-3,0%	-1,1%
<b>EPE Hospitals</b>	279.061	284.681	289.212	303.116	301.262	297.868	295.852	296.019	3,6%	-2,3%	6,1%

Source: ACSS/ UOFC, 2000-2007

EPE hospitals have increased the number of treated equivalent patients between 2000 and 2007, in a significant way. However, since the implementation of the new resource allocation model, there's been a decrease on this type of production on these hospitals, as well as in the SPA hospitals. Such phenomenon is directly linked with the modern medicine technologies advances, that permit a shorter inpatient stay but also with the fact that, as previously noticed, in 2004 there was a strong incentive to develop ambulatory care, with the introduction of a specific and autonomous price for this kind of care.

**Table 4: CASE-MIX INDEX (CMI)  
SPA and EPE Hospitals Evolution**

	2000	2001	2002	2003	2004	2005	2006	2007	Δ % 2000/2002	Δ % 2003/2007	Δ % 2000/2007
<b>SPA Hospitals</b>	0,9363	0,9683	0,9798	0,9900	1,0200	1,0255	1,0564	1,0833	4,6%	9,4%	15,7%
<b>EPE Hospitals</b>	0,9206	0,9443	0,9650	0,9794	1,0119	1,0224	1,0285	1,0600	4,8%	8,2%	15,1%

Source: ACSS/ UOFC, 2000-2007

The CMI in EPE hospitals has increased 15, 1% from 2000 to 2007 (8, 2% in the 2003 to 2007 period). However, the CMI in these hospitals has been lower than the one at SPA hospitals. SPA hospitals have an increase of 15, 7% from 2000 to 2007, and 9,4% between 2003 and 2007. Moreover, the increase in the CMI values has been more significant for both types of institutions in the 2003 to 2007 period, than it was between 2000 and 2002.

**Table 5: Length of stay (LOS) adjusted by CMI  
SPA and EPE Hospitals Evolution**

	2000	2001	2002	2003	2004	2005	2006	2007	Δ % 2000/2002	Δ % 2003/2007	Δ % 2000/2007
<b>SPA Hospitals</b>	8,0427	7,8171	7,6024	7,3909	7,2116	7,2512	7,0168	6,8902	-5,50%	-6,80%	-14,30%
<b>EPE Hospitals</b>	7,7291	7,5551	7,3504	6,8567	6,8068	6,9186	6,8458	6,737	-4,90%	-1,70%	-12,80%

Source: ACSS/ UOFC, 2000-2007

In what LOS adjusted by CMI is concerned, one can admit that EPE hospitals have not reduced their LOS on such a bigger scale as the SPA hospitals. This has to do with the fact that not only the SPA hospitals have higher CMI than the studied EPE hospitals but also because EPE hospitals were already more efficient (and therefore were chosen to have the new public enterprise statute in 2003) and, consequently, there wasn't much to improve in this indicator.

**Table 6: Outpatient visits  
SPA and EPE Hospitals Evolution**

	2000	2001	2002	2003	2004	2005	2006	2007	Δ % 2000/2002	Δ % 2003/2007	Δ % 2000/2007
<b>SPA Hospitals</b>	1.338.768	1.399.842	1.459.931	1.557.898	1.711.971	1.777.432	1.922.097	1.990.341	9,1%	27,8%	48,7%
<b>EPE Hospitals</b>	1.678.630	1.827.955	2.270.745	2.432.487	2.754.686	3.009.180	3.233.076	3.387.497	35,3%	39,3%	101,8%

Source: ACSS/ UOFC, 2000-2007

Outpatient visits was one of the hospitals activities that was included in the annual contract with a negotiated year quantity and a pre-established price for each delivered unit. It was therefore expectable that this kind of healthcare delivery would continue raising significantly from 2003 to 2007 in the EPE hospitals, has it did in the previous years. Simultaneously, in the studied SPA hospitals, the total of outpatient encounters in 2007 was almost less 50% than the total delivered by the 19 EPE hospitals. Nevertheless, in SPA hospitals, the increase of this type of activity between 2003 and 2007 was evident.

**Table 7: Emergency episodes  
SPA and EPE Hospitals Evolution**

	2000	2001	2002	2003	2004	2005	2006	2007	Δ % 2000/2002	Δ % 2003/2007	Δ % 2000/2007
<b>SPA Hospitals</b>	1.708.363	1.796.446	1.885.765	1.927.437	1.836.012	1.903.273	1.899.488	1.879.543	10,4%	-2,5%	10,0%
<b>EPE Hospitals</b>	2.004.111	2.068.843	1.998.024	1.804.409	1.987.013	2.078.173	2.127.203	2.139.714	-0,3%	18,6%	6,8%

Source: ACSS/ UOFC, 2000-2007

Emergency episodes were also a line of production with a contracted year quantity and price since 2003. EPE hospitals increased this kind of production in 18, 6% between 2003 and 2007 (the opposite to what was happening before 2003), whereas the SPA hospitals have showed a decrease of 2, 5% for this kind of activity in the same period (in contrast with the 10, 4% increase between 200 and 2002). Moreover, EPE hospitals have, in all the studied years, delivered more emergent care than the SPA hospitals, in spite of the fact that the increase of these episodes in EPE hospitals has been less than the one achieved by the SPA hospitals.

## 5. Conclusions

From the analyzed indicators, one cannot say that there is a whole strong positive impact on the studied EPE hospitals performance with the introduction of the described new resource allocation model. However, the inclusion, in the contract, of emergency episodes and outpatient visits, with a year pre-negotiated quantity and pre-established payment for the activity effectively done instead of cost reimbursement and the great emphasis given to ambulatory care over the last years (with no limit to its marginal production) has led to an increase in this kind of production, pushing inpatient care to a decrease. Nevertheless, further analysis should be made to clarify the additional causes for this increase. Considering the existing constraints, hospitals may still not have a strong capacity to increase their production. Even so, the introduction of a purchasing mechanism along with its improvement over the years has enabled hospitals to analyze and predict their production on a more adequate basis, getting annually contracted and delivered quantities closer.

Simultaneously, the purchasing mechanism created an explicit contracting philosophy between payer and healthcare delivery unit (fixing the quantities to be delivered and the resulting budget, reviewing the former mechanisms to adjust prices). It also made the whole process more transparent, making the allocation of resources clear for each intervening party, with the imposition of management by objectives tools and an obvious distinction between the state as a payer, a deliver and a shareholder.

The definition of prices for equivalent patients in the EPE hospitals made it possible to slow down the amount effectively paid for this type of production, in these hospitals. Along with this slowing down there was an increase of the ambulatory activity and of the treated patients' complexity as well as a decrease on the deficit of the EPE hospitals (getting costs closer to the pre-defined prices, improving their financial situation).

Since 2006, the value EPE hospitals receive for production has increased in the global payment made by the NHS and the convergence value has decreased. Purchasing promoted a better resource allocation among Hospitals and across the different types of delivered healthcare.

If before 2003, hospitals year additional financing was made on a deficit restrain basis, not directly related to the delivered healthcare or to a cost evaluation, presently the convergence value results from a congregate effort and on a commitment between the healthcare delivery unit and the State to prevent this deficit. Despite the decrease on both hospitals groups deficit in 2007 when compared to 2003, the main difference between EPE and SPA hospitals, from the payer's perspective, prevails upon the fact that in EPE there is a pre-negotiated convergence value to face costs, with specific contracted performance

goals, monitored along the year. Until 2005, at the SPA hospitals, the mechanisms of financial reinforcement remained the same as it was before 2003, resulting in less deficit worsening.

However, one cannot expect that hospitals will continue to increase their efficiency on the same basis they have until now. It has been recommended by the Ministry of Finance that the contracted prices converge into the EPE Hospitals accounted costs. Thus, it is urgent to implement a more reliable cost accounting system. On the other hand, there's also the recommendation that, apart from the activity that's being purchased by the State, hospitals should increase the profits related to the care they deliver to other clients (public sub-systems, insurance companies and other private entities). Otherwise deficit may rise and consequently the social capital of the EPE will erode, putting even more pressure into the State's budget and on the public deficit (because more money would have to be canalized to increase the EPE's social capital).

The evaluation of the current resource allocation model introduction impact in a non-stable scenario is not an easy task. It requires the study of other variables, some of them independent from the financing model itself that may have influenced the behavior of the 19 analyzed EPE hospitals. More EPE hospitals were created since 2003 as well as hospital centers and Local Health Units (which comprehend hospitals and primary care units). Furthermore, since 2005 the purchasing mechanism along with the contract has also been applied to the SPA hospitals, in order to improve their performance and prepare them to become public enterprises. This has certainly affected the first EPE hospitals in ways that are not studied and transcribed in the present paper. Moreover, the inducement given to ambulatory care is starting to have its outcomes in the whole of hospital production, effects that were not scrutinized here. With the ongoing resource allocation model and purchasing mechanism, there's a lot of research to be developed to measure their real impact on hospitals' performance.

## Appendix I – SPA and EPE Hospitals

EPE Hospitals
Hospital Pulido Valente, E.P.E.
Instituto Português Oncologia F. Gentil - Centro, E.P.E.
Instituto Português Oncologia F. Gentil - Lisboa, E.P.E.
Instituto Português Oncologia F. Gentil - Porto, E.P.E.
Hospital S. Teotónio, E.P.E. - Viseu
Hospital Garcia da Orta, E.P.E. - Almada
Centro Hospitalar Lisboa Ocidental, E.P.E.
Centro Hospitalar Cova da Beira, E.P.E.
Centro Hospitalar Alto Minho, E.P.E.
Centro Hospitalar do Médio Tejo, E.P.E.
Hospital Nossa Senhora do Rosário, E.P.E. - Barreiro
Hospital Santo André, E.P.E. - Leiria
CH Vale Sousa/Amarante
Hospital S. Sebastião, E.P.E. - Vila da Feira
Hospital Distrital da Figueira da Foz, E.P.E.
Hospital Distrital de Santarém, E.P.E.
Hospital Infante D. Pedro, E.P.E. - Aveiro
Hospital Santa Maria Maior, E.P.E. - Barcelos
Unidade Local de Saúde de Matosinhos, E.P.E.

SPA Hospitals
Hospital Joaquim Urbano
Hospital Curry Cabral
Maternidade Dr. Alfredo da Costa
Hospitais Universidade de Coimbra
Hospital Distrital de Faro
Hospital S. Marcos - Braga
Centro Hospitalar Póvoa do Varzim/Vila do Conde
Hospital Bernardino Lopes de Oliveira - Alcobaca
Hospital Cândido de Figueiredo - Tondela
Hospital Distrital de Pombal
Hospital do Montijo
Hospital Dr. Francisco Zagalo - Ovar
Hospital José Luciano de Castro - Anadia
Hospital Nossa Senhora da Assunção - Seia
Hospital Nossa Senhora da Conceição - Valongo
Hospital S. Pedro Gonçalves Telmo - Peniche
Hospital Visconde de Salreu - Estarreja
Centro Hospitalar de Cascais
Centro Hospitalar de Torres Vedras
Hospital Amato Lusitano - Castelo Branco
Hospital Distrital de Águeda
Hospital Distrital de S. João da Madeira
Hospital do Litoral Alentejano
Hospital Reynaldo dos Santos - Vila Franca de Xira
Hospital S. Miguel - Oliveira de Azeméis
Hospital Sousa Martins - Guarda
Centro Hospitalar das Caldas da Rainha

Source: ACSS/ UOFC, 2007



## Appendix II - Purchasing prices 2003/2007

### Hospital Purchasing contracts – 2003 to 2007

Inpatient	Group	Price euros					Notes
		2003	2004	2005	2006	2007	
Non-surgical DRG Surgical DRG	1	2.129,44	2.129,44	2.129,44	2.342,38	2.396,25	<ul style="list-style-type: none"> <li>• Price by discharge (equivalent patient)</li> <li>• 2003 - DRG Inpatient and ambulatory care were Contracted as one line of production</li> <li>• 2003/2006 - Normalized CMI</li> <li>- HCFA - DRG version 16.0</li> <li>• 2005/2007 - Split between surgical and non surgical inpatients</li> <li>2007 - Non normalized CMI</li> <li>- All Patient DRG Version 21</li> </ul>
	2	2.129,44	2.129,44	2.129,44	2.342,38	2.396,25	
	3	1.719,19	1.719,19	1.719,19	1.800,16	1.841,56	
	4	1.849,10	1.849,10	1.849,10	1.893,36	1.936,91	
Chronic Inpatients: Psychiatric Mechanically ventilated patient Rehabilitation	-	75,70	75,70	75,70	83,30	85,22	<ul style="list-style-type: none"> <li>• Per diem price</li> </ul>
	-	261,20	261,20	261,20	287,30	293,91	
	-	219,50	219,50	219,50	241,50	247,05	
Ambulatory							
Non-surgical DRG Surgical DRG	1		2.129,44	2.129,44	2.342,38	2.396,25	<ul style="list-style-type: none"> <li>• Price by discharge (equivalent patient)</li> <li>• 2003/ 2004/ 2005/ 2006 - Price for Ambulatory Surgical DRG represents respectively 51%, 71%, 80%, 80% e 73% Of the inpatient price</li> <li>- Normalized CMI</li> <li>- HCFA - DRG version 16.0</li> <li>• 2007 - Ambulatory Surgical and non-surgical DRG (such as chemotherapy and radiotherapy)</li> <li>- Non normalized CMI</li> <li>- All Patient DRG Version 21</li> </ul>
	2		2.129,44	2.129,44	2.342,38	2.396,25	
	3		1.719,19	1.719,19	1.800,16	1.841,56	
	4		1.849,10	1.849,10	1.893,36	1.936,91	
Outpatient							
First encounter Following encounters	1	61,46	61,46	61,46	70,68	134,27	<ul style="list-style-type: none"> <li>• Price by medical outpatient encounter</li> <li>• 2003/2006 - Normalized CMI</li> <li>• 2005 - No CMI adjustment</li> <li>- Price for first encounters is 10% more than price for following encounters</li> </ul>
	2	77,24	77,24	77,24	88,83	119,05	
	3	50,48	50,48	50,48	58,05	49,85	
	4	74,06	74,06	74,06	85,17	75,42	
Emergency							
Episodes	1	90,66	90,66	90,66	92,93	95,07	<ul style="list-style-type: none"> <li>• Price by episode</li> <li>• Fifth price for hospitals in group IV*, with general emergency</li> <li>• 2007 - When an emergency episode results in an inpatient Episode, there's no payment for the inpatient episode</li> </ul>
	2	131,53	131,53	131,53	134,82	137,92	
	3	37,53	37,53	37,53	38,47	39,35	
	4	65,91	65,91	65,91	67,56	69,11	
	5*	101,94	101,94	101,94	104,49	106,89	
Day care							
Quimiotherapy Hematology Infectiology Imuno-Hemotherapy Psiquiatria Others	-	300,00	300,00	300,00	360,00	-1)	<ul style="list-style-type: none"> <li>• Price per session</li> <li>1) Production classified in Non surgical ambulatory DRG</li> </ul>
	-	300,00	300,00	300,00	360,00	368,28	
	-	460,00	460,00	460,00	506,00	517,64	
	-	300,00	300,00	300,00	360,00	368,28	
	-	34,00	34,00	34,00	37,40	38,26	
	-	24,70	24,70	24,70	24,70	25,27	
Radiotherapy							
Radioterapia	-	-	-	-	256,49	-2)	<ul style="list-style-type: none"> <li>• Price per session</li> <li>2) Production classified in Non surgical ambulatory DRG</li> </ul>
Home care							
Home care	-	25,80	25,80	25,80	40,60	41,53	<ul style="list-style-type: none"> <li>• Price per visit</li> <li>• 2003/2005 - Payment only for medical visits</li> <li>• 2006/2007 - Payment for visits of every professional</li> </ul>
Home							
Home	-	70,20	70,20	70,20	77,20	78,98	<ul style="list-style-type: none"> <li>• Per diem price</li> <li>• Only for Oncology institutes</li> </ul>
Additional surgical production							
Inpatient Ambulatory	-	-	-	-	-	-	<ul style="list-style-type: none"> <li>• Despacho (normative) nº 24 036/2004</li> <li>• 2005 - Additional production is only paid after Contracted production is accomplished</li> <li>• 2006/2007 - No limit for surgical additional production</li> </ul>

## Marginal Production

	Types of production	Year					Year					Year				
		03*	04	05	06	07	03	04	05	06	07	03	04	05	06	07
		Fix costs (between 50% and 100%)					Marginal production (between 100 and 110%)					Marginal Production (above 110%)				
<b>Marginal production</b>	Programmed inpatient admission (Non-surgical DRG)	59%	48%	28%			30%	44%	44%	44%	44%					
	Programmed inpatient admission (Surgical DRG)	59%	48%	28%			30%	44%	44%	Pr.S	Pr.S				Pr.S	Pr.S
	Emergent inpatient admission (Surgical DRG)	59%	48%	28%			30%	44%	44%	Pr.S	Pr.S					Pr.C
	Non surgical ambulatory DRG	59%	48%	28%			30%	44%	44%	Pr.S	Pr.S				Pr.S	Pr.S
	Surgical ambulatory DRG	59%	36%	21%			31%	58%	58%	58%	58%					
	Outpatient	54%	47%	27,5%	27,5%	27,5%	Pr.C	Pr.C	Pr.C	45%	45%	Pr.C	Pr.C	Pr.C		
	Emergency	38%	21%	12,5%			55%	75%	75%	75%	75%					
	Day care						Pr.C	Pr.C	Pr.C	Pr.C	Pr.C			Pr.C	Pr.C	Pr.C
	Chronic inpatient						Pr.C	Pr.C	Pr.C	Pr.C	Pr.C			Pr.C	Pr.C	Pr.C
	Homecare															

Pr.C - Contracted price according to hospital group  
Pr.S - Price for additional production  
2003 - Payment of 50% of the fixed costs of the not produced contracted units in all lines of production  
In Chronic patients, Homecare and Home, in all years, effective production is paid at contracted prices, independently of the units produced

## Convergence value

	National targets					
		2003	2004	2005	2006	2007
<b>Fix Component Variable Component National Regional</b>	. Inpatient readmission on the first 5 days	x	x	x	x	x
	. First outpatient encounters in total of medical outpatient encounters	-	-	-	-	x
	. Ambulatory surgery in total programmed surgery	-	-	-	x	x
	. LOS	x	x	x	x	x
	. Net results	-	-	-	x	x
	. Operational results	-	-	-	-	x
	. Unit cost by padronized treated patient	-	-	-	-	-
	. caesarean sections in total births	x	x	x	-	-
	. Extraordinary salaries in total costs for personnel	-	-	-	x	-

2003/2007 - Targets for improvement in unit costs - For the convergence value calculation limits are imposed to certain kind of expenditure (medicines, personnel, etc)  
2003/2005 - National targets - The convergence value to be distributed is not dependent on the contracted amounts  
2006 - 30% of the convergence value depends on the fulfillment of contracted national (20%) and regional (10%) targets  
2007 - 40% of the convergence value depends on the fulfillment of contracted national (20%) and regional (20%) targets  
Regional targets - Defined by each Regional Health Administration

Source: ACSS/ UOFC, 2000-2007

## Specific programs

Rehabilitation devices  
Cross-Border Healthcare  
Psychiatric care in private institutions  
International protocols  
Diabetic Retinopathy  
Diagnosis  
Training of physicians (first year and specialization)  
Rare diseases  
Transplants  
Arteriovenostomy for renal dialysis  
AIDS\*  
Waiting list program\*

**2004**

- Psychiatric care in private institutions as a specific program. In 2003 this type of production was contracted as chronic psychiatry

**2005**

- A new waiting list program was implemented - SIGIC

**2006**

- Since HIV patients were included in health plans, AIDS treatment was no longer contracted as a specific program

**2007**

- Rare diseases (metabolic genetic diseases) contracted as a line of production
- Training of physicians (first year and specialization) - Specific amount given as an allowance, representing up to 1% of the expenditure with personnel

## Health plans

**HIV/ AIDS**

**2007**

- Hospitals treating more than 400 patients in an ambulatory therapeutic basis and developing strategies for patients to follow this therapy
- Epidemiology vigilance and clinical criteria
- 920 Euros/ patient/ month

**Pre - Natal Diagnosis**

- Quality control in ultrasound scans in pregnant women in Primary Care
- Protocol 1 - 1st trimester ultrasound scan together with biochemical analysis 1st Trimester (11-14 weeks) - 41,80 Euros/pregnant woman
- Protocol 2 - 2nd trimester ultrasound scan along with an outpatient visit for obstetric risk evaluation - 71,60 Euros/pregnant woman
- Protocol 3 - protocol 1 + protocol 2 - 113,40 Euros/pregnant woman

**Oncology**

- Hospital activity evaluation with the purpose of monitoring the use of certain medicines, according to therapeutic protocols

**Long term care**

- Recovery (480 beds) and palliative care (85 beds)
- 83,30 Euros/day

Source: ACSS/ UOFC, 2000-2007

## ABC - Activity Based Costing

---

2007

ABC

- Implementation in a group of five hospitals of an Activity Based Costing program to account costs in a more accurate and precise way
- Hospital Geral de Stº António; Hospital D. Pedro - Aveiro, Hospital Sta Marta, CH Baixo Alentejo, CH Barlavento Algarvio

---

Source: ACSS/ UOFC, 2000-2007

### Appendix III – Contract values: Production VS Marginal Production VS Convergence value

2003			2004			2005			2006			2007		
Production	Marginal Production	Convergence value	Production	Marginal Production	Convergence value	Production	Marginal Production	Convergence value	Production	Marginal Production	Convergence value	Production	Marginal Production	Convergence value
84,3%	3,0%	12,6%	82,1%	3,6%	14,4%	79,0%	2,5%	18,5%	87,9%	1,5%	10,5%	90,2%	1,1%	8,8%

Source: ACSS/ UOFC, 2000-2007



## References

- **Portugal – Health System Review**, Pedro Pita Barros, Jorge de Almeida Simões, Health Systems in Transition, vol.9, nº 5, 2007, European Observatory on Health Systems and Policies
- **Purchasing to improve health systems performance**, Josep Figueras, Ray Robinson, Elke Jakubowski, European Observatory on Health Systems and Policies
- **Hospitais SNS - Contrato-Programa 2008 – Metodologia para definição de preços e fixação de objectivos**, ACSS, Unidade Operacional de Financiamento e Contratualização, October 31<sup>st</sup>, 2007
- **Resultados da avaliação dos hospitais SA – Síntese de resultados**, Comissão para a avaliação dos hospitais Sociedade Anónima, January 16<sup>th</sup>, 2006
- **Avaliação do desempenho dos hospitais SA – Memorando – Resultados provisórios**, Carlos Costa, Sílvia Lopes, ENSP, November 14<sup>th</sup>, 2005
- **EPE na área da saúde – Auditoria à contratualização das EPE na área da saúde**, Projecto de relatório, Inspeção Geral das Finanças, July 2008
- **Apoiar o ministério da saúde na definição de um modelo de tabela de preços para o Sistema Nacional de Saúde – Documentos finais do projecto**, McKinsey, Lisbon, December 23rd, 2002

## Contacts

**Administração Central do Sistema de Saúde, IP**  
Unidade Operacional de Financiamento e Contratualização  
<http://www.acss.min-saude.pt/>

Telephone: 00 351 217925522

[acferreira@acss.min-saude.pt](mailto:acferreira@acss.min-saude.pt)  
[cborges@acss.min-saude.pt](mailto:cborges@acss.min-saude.pt)  
[mcandoso@acss.min-saude.pt](mailto:mcandoso@acss.min-saude.pt)  
[namaro@acss.min-saude.pt](mailto:namaro@acss.min-saude.pt)

**Centro Hospitalar de Lisboa Norte, EPE**  
<http://www.chln.min-saude.pt/>

Telephone: 00 351 217548239  
[Maria.Valente@hvp.min-saude.pt](mailto:Maria.Valente@hvp.min-saude.pt)