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Administração Central  
**ACSS**  
do Sistema de Saúde

FCT Fundação para a Ciência e a Tecnologia  
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

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# The funding system and incentives in Portuguese hospitals

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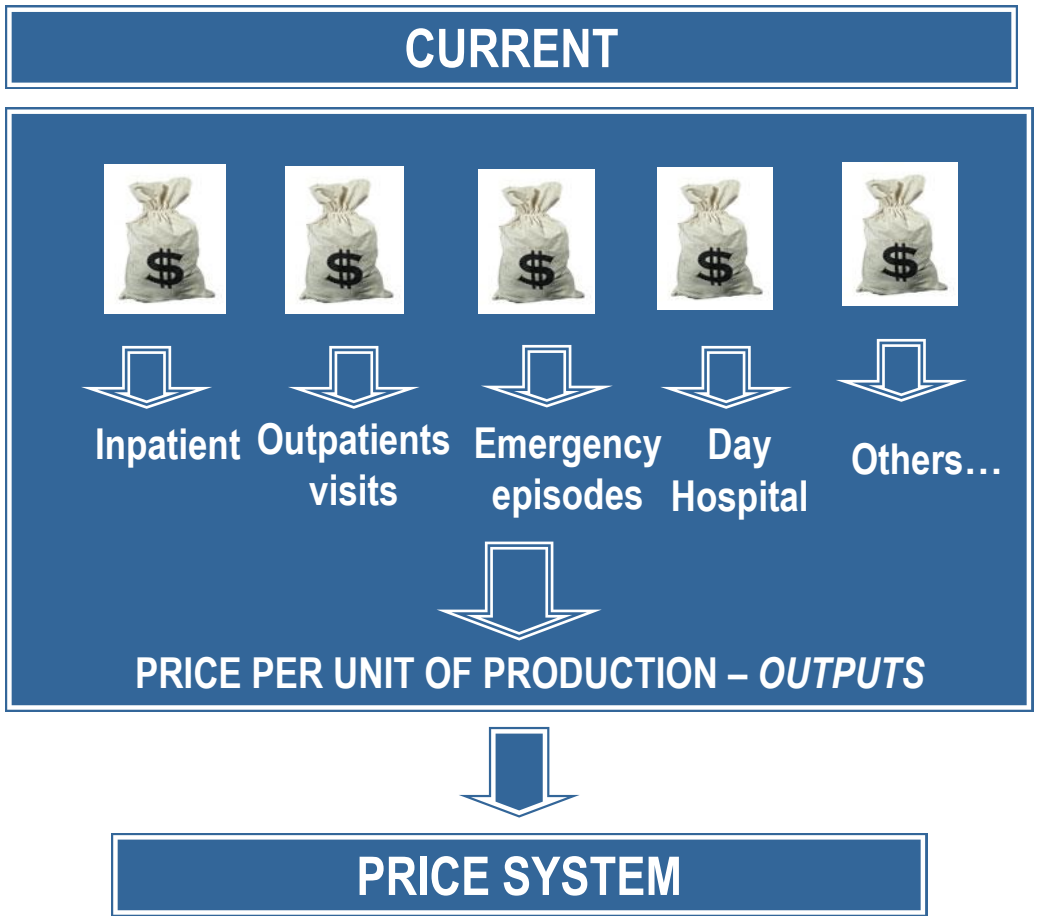
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# Introduction: Changes in Hospital Funding System



# Introduction: Hospital Payment System

Health Care provided by NHS hospitals to  
NHS beneficiaries (84%)



**HOSPITALS GROUP PRICES**

**ADJUSTED by CMI**

Health Care provided by NHS  
hospitals to sub-systems  
health beneficiaries or other  
public or private institutions  
beneficiaries



Portaria n.º110-A/2007, 23th of  
January



**NATIONAL AVERAGE PRICE**

**ADJUSTED by RELATIVE WEIGHT**

# Introduction:

## Production prices adjusted by hospital characteristics

Hospitals are grouped according to technology, age, equipment, specialization, principal diseases.



4 GROUPS



# Introduction:

## Price Per Unit Of Production adjusted by complexity

- **Relative Weight**

*“reflects the expected cost of a DRG’s typical patient , compared to the national average, that has a weight coefficient of 1 ”.*

*(based on Portaria 110-A/2007 de 23th of January)*

- **Case Mix Index (CMI)**

*“ Global weight coefficient reflects the position of an hospital compared to others according to their most frequent pathologies, complexity, and consumption of resources.”*

# Objectives:

## Monitoring /Assesement – THE BUDGETARY CONTROL MODEL

ARS/ACSS and Hospitals



Monitoring of activity and financing

### Budgetary Control:

- 1) To identify and qualify the differences between the expected funding obtained:
  - Global
  - Main production lines
- 2) To determine the impact on hospital revenues and potential changes to the composition of production.
- 3) Identify possible patterns of behavior or possible reactions to the hospital funding system implemented.

# Methodology:

Hospital Sample  
(year 2007)



Hospitals that represent about 80% of  
"contracted" euros.

(From the initial sample of 31 hospitals only 26 were assessed since the others 5 didn't have data available)

Production Lines to be  
monitored



Inpatient admissions: DRGs (medical,  
surgical);

DRGs Ambulatory;

Outpatients visits;

Emergency episodes;

# Methodology:

## Potential causes for deviation from initial budget

Quantity Produced	Volume of activity (TV) (results based on NHS weight only)
	MIX between production lines (MPL)
Price	Average Price (AP)
	Case Mix Index (CMI)

$$\text{BUDGET} = \text{Volume} * \text{Production Lines} * \text{Average Price} * \text{CMI}$$





# Results:

## Deviation by Production Lines (Example with Hospital 4)

Deviation Type	Inpatients DRG's			Ambulatory DRG's		Outpatients visits	Emergency Episodes	Total	Weight% Deviation scenario II
	Medical	Surgical Elective	Surgical Emergency	Surgeries	Medical				
TV	1.477.762	1.554.761	635.152	1.395.351	527.304	292.130	237.268	6.119.727	43%
MPL	3.090.701	4.923.983	1.328.405	-625.201	-1.799.557	382.384	20.928	7.321.644	52%
AP	-2.558.339	0	-1.099.592	0	0	-746.649	-301.528	-4.706.107	-33%
Deviation scenario I	2.010.123	6.478.744	863.965	-333.071	-1.562.289	1.031.086	246.704	8.735.263	62%
CMI	3.059.582	1.050.929	1.964.710	184.989	-797.332	0	0	5.462.879	38%
Deviation scenario II	5.069.706	7.529.672	2.828.676	-148.082	-2.359.621	1.031.086	246.704	14.198.142	100%

### Scenario I:

- **MPL e TV** are the main responsible for the positive global deviation. The changing composition of production has allowed financial gains. Increase of inpatient production (DRG Medical and Surgical), in return for a reduction of treatment in outpatient (ambulatory surgeries and medical ambulatory DRG);
- The price penalties (**AP**) from the marginal production were offset by changes in the Mix.

### Scenario II:

- Funding through the CMI would increase the real level of hospital funding around of 5.5 million euros

# Results:

## Summary of all Hospitals

Hospitals	Group	Deviation Scenario I	Deviation Type	Deviation Scenario II	Deviation Type	CMI NHS Deviation	Comparison sceneries
1	II	-6.825.392	-	-764.570	-	6.060.822	Δ +
2	II	7.333.901	+	4.378.670	+	-2.955.231	Δ -
3	II	4.958.993	+	8.553.863	+	3.594.870	Δ +
4	II	8.735.263	+	14.198.142	+	5.462.879	Δ +
5	II	3.088.328	+	5.658.525	+	2.570.197	Δ +
7	II	4.517.566	+	2.714.165	+	-1.803.401	Δ -
8	II	-13.948.940	-	-5.141.722	-	8.807.218	Δ +
9	IV	-2.252.919	-	-1.209.032	-	1.043.887	Δ +
10	II	7.951.840	+	7.020.135	+	-931.705	Δ -
11	I	-26.508.428	-	-27.141.303	-	-632.875	Δ -
12	II	9.348.241	+	4.901.548	+	-4.446.693	Δ -
13	II	-6.081.882	-	-3.236.565	-	2.845.317	Δ +
14	II	-2.668.365	-	587.537	+	3.255.902	Δ ++
17	I	-5.512.751	-	-1.705.149	-	3.807.602	Δ +
18	IV	-1.917.231	-	-511.076	-	1.406.155	Δ +
19	IV	-2.999.651	-	-1.472.882	-	1.526.769	Δ +
20	I	-5.371.259	-	-8.157.369	-	-2.786.109	Δ -
21	IV	-5.565.344	-	-4.686.985	-	878.359	Δ +
23	IV	1.126.682	+	1.079.553	+	-47.129	Δ -
24	IV	-4.175.010	-	-3.239.778	-	935.232	Δ +
25	I	6.289.155	+	1.550.172	+	-4.738.983	Δ -
26	IV	-5.062.755	-	-5.854.189	-	-791.435	Δ -
27	IV	-547.200	-	-665.318	-	-118.118	Δ -
28	IV	-494.126	-	758.390	+	1.252.517	Δ ++
29	IV	2.459.256	+	907.000	+	-1.552.256	Δ -
31	IV	1.162.784	+	1.160.543	+	-2.241	Δ -
<b>Total</b>		<b>-32.959.244</b>	<b>-</b>	<b>-10.317.695</b>	<b>-</b>	<b>22.641.550</b>	<b>Δ +</b>
<b>Mean</b>		<b>-1.267.663</b>	<b>-</b>	<b>-396.834</b>	<b>-</b>	<b>870.829</b>	<b>Δ +</b>

Legend	
+	Positive Deviation
-	Negative Deviation
Δ ++	Impact CMI allowed to become positive deviation
Δ +	Positive CMI Impact
Δ -	Negative CMI Impact

# Results:

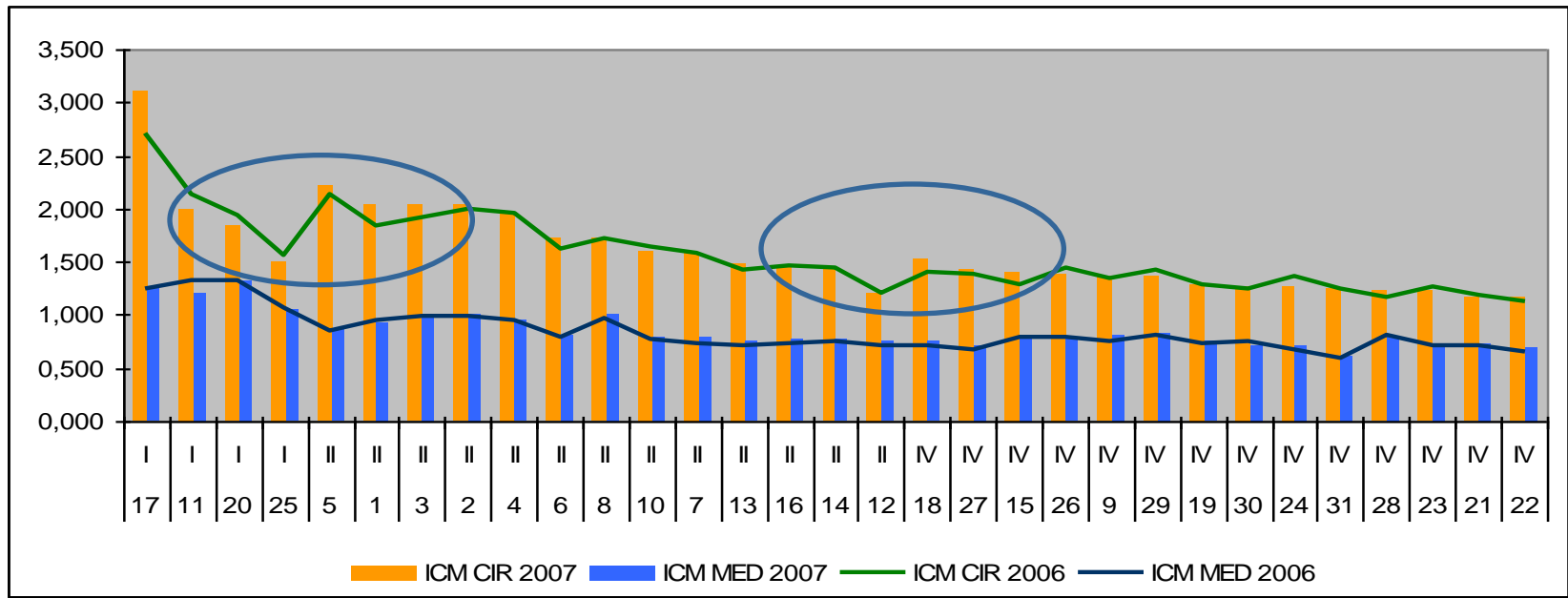
- Overall, the 26 hospitals had a negative result, i.e. the payment of final production was inferior to the initial budget, in both scenarios;
- **Scenario I – previous year's CMI:**
  - 42% of hospitals showed positive deviations (11/26) i.e. they received more than initially budgeted. Causes vary by hospital: some did more, some changed their mix of activities towards more expensive ones;
  - The causes of differences by production line is also variable between hospitals;
- **Scenario II – Real CMI:**
  - 50% of hospitals showed positive deviations (13/26) i.e. they received more than initially budgeted. Causes vary by hospital: some did more complex procedures;
- **CMI variation between previous and current year:** Positive in 54% of the hospitals (14/26), meaning that they would benefit from funding based on current CMI.

# Results:

## Real medical e surgical CMI Evolution

### Inpatient

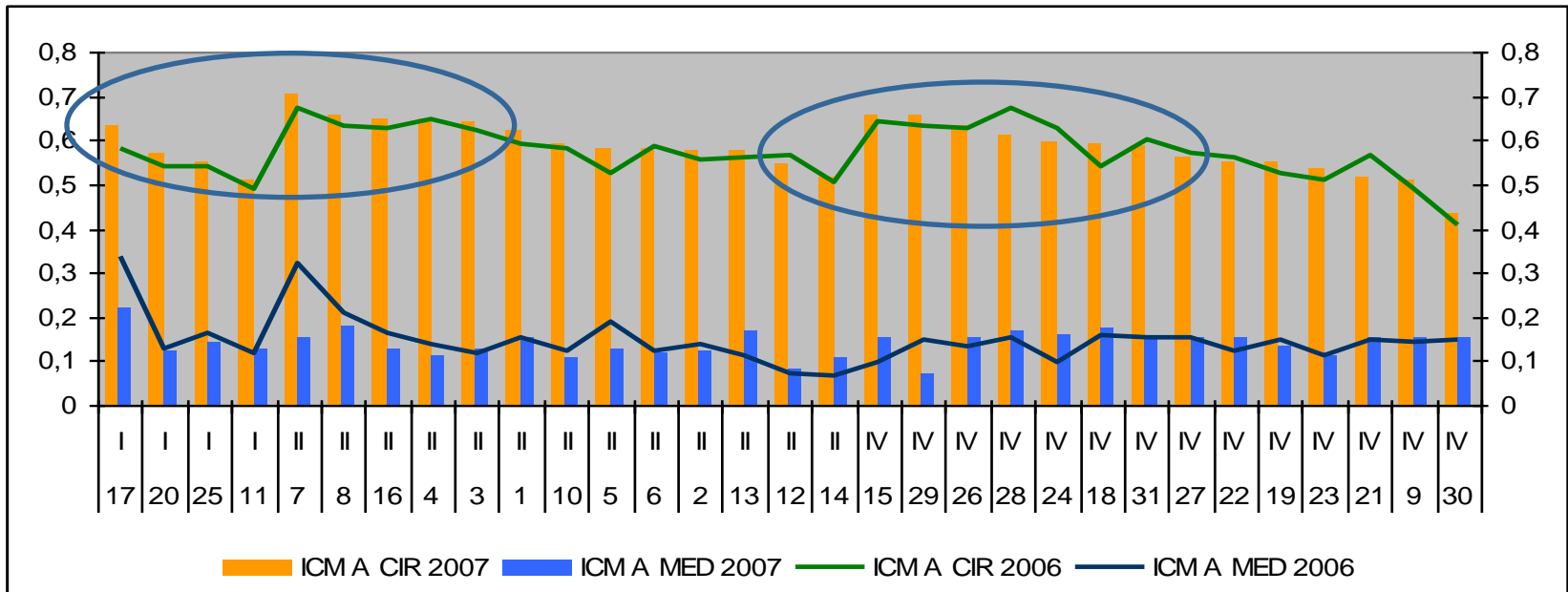
- Unexpected finding:** some hospitals theoretically less specialized had higher levels of complexity than those of groups I and II (suggested, not tested).



# Results:

## Real medical e surgical CMI Evolution

### Ambulatory



# Conclusions:

## Budgetary Control Model Utility

- The model developed can be interesting for both providers and funders, since it allows, among other things :
  - Hospitals
    - To quantify and analyze the types of deviations and overall production lines and causes;
    - To perform simulations that allow identification of the scenario that maximizes level of funding given production and the patient needs;
    - To make managers more accountable;
  - Funders
    - To identify and analyze patterns of hospital behavior, arising from possible reactions to the funding system;
    - To perform simulations that allow the identification of scenarios that optimize the contracted process with the hospital. Contracting taking into account the actual needs of population health rather than hospital's revenue maximization.

Thank you.

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