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# 36TH PCSI CONFERENCE

**Assessing funding inequalities  
between elective and urgent surgeries  
of the musculoskeletal system in  
French funding mechanisms**

May 2024

ATI H - FRANCE

## INTRODUCTION

1. Scope and aim of the study
2. Major Diagnostic Category (MDC) selection



## What is the scope and aim of the study ?

### A/Scope

We worked with the entire French hospital's activity

The study focus on medical surgical and obstetrics (MSO) activity

### B/ Aim of study

There is a consensus In France that having a large proportion of unplanned activity is a “burden” for hospitals

- An unplanned hospital stay is on average longer and more severe than a planned stay
- The unplanned stays are mostly taken care of in some hospitals
  - These hospitals can't treat as many patients as they could, with similar capacities
- The funding for a hospital stay does not consider whether it is planned or not in the French funding system
- The aim of the study is to find a way to assess the impact of unplanned activity in order to better fund these hospitals in the future



## Major diagnostic category selection

### A/ Homogeneous hospital stay group

We sorted each homogeneous hospital stay group (~DRG) among planned, unplanned and blended

- We mixed a statistical and medical analysis

### B/ Major category diagnostic

Activity categorized by major diagnostic category

- By body part (ex : head, heart and circulatory system, musculoskeletal system...)
- Subcategories => Major procedure (yes or no) (medical, surgery)

### C/ Three MDC categories

Each MDC has been sorted in one of the following categories according to the DRG mix :

- Planned MDC : Majority of planned hospital stays. Every hospital has mostly planned hospital stays (e.g., eye disorder surgery MDC)
- Mixed MDC : Mix of planned and unplanned hospital stays. Each hospital has a different proportion of planned and unplanned activity (e.g., musculoskeletal system disorder MDC)
  - Some hospitals have mostly planned surgery whereas others have mostly unplanned surgery
- Unplanned MDC : Majority of unplanned hospital stay. Every hospital has mostly unplanned hospital stay (e.g., nonsurgical respiratory system pathologies)



## Major diagnostic category selection

### D/ Focus of the study

We focused on mixed MDC because :

- Any hospital that can perform urgent surgeries could also perform elective surgeries with similar material and staff
- The unplanned stays are mostly taken care of in some hospitals when others only do planned stays

**The idea is to assess the unplanned activity impact on the hospitals**

- We assessed the unplanned activity impact at the MDC level
- To do so, we substituted non planned activities by planned activities in the hospital case-mix
  - Every hospitals have, at least some planned activity, in their case-mix
  - Similar capacities (staff and materials) could be used in the same MDC to do urgent and elective surgeries

## ASSESSING FUNDING INEQUALITIES BETWEEN ELECTIVE AND URGENT SURGERIES

1. Observations and description
2. Methodology n°1 « Optimum »
3. Methodology n°2 « bed-blockers »



## Observations

- Unplanned surgery's length of stay (LOS) > Planned surgery's LOS
- Unplanned surgery's daily funding < Planned surgery's daily funding
- Hospitals with mostly urgent surgeries
  - Can't plan urgent surgeries (unpredictability and unknown LOS)
  - Hard to optimize occupancy rate
  - In an activity-based funding system : Loss of funding revenue
- Hospitals with mostly elective surgeries
  - Easier to optimize occupancy rate
  - In an activity-based funding : Optimized funding revenue



## Mixed MDC description

MDC	Number of stays 2022			Average length of stay 2022 (in days)			Average fundind per stay (in €)*		
	Planned	Blended	Unplanned	Planned	Blended	Unplanned	Planned	Blended	Unplanned
Musculoskeletal system surgery	833 853	374 829	315 480	2.80	2.71	6.81	3 573	2 883	5 112
Digestive tract disorders surgery	312 412	112 027	79 503	2.05	11.76	5.17	2 073	9 531	3 910
Hepatobiliary system and pancreas disorders surgery	81 549	22 080	27 123	1.96	11.96	6.14	2 639	11 780	4 594
Heart and circulatory system surgery	70 484	156 680	16 651	1.56	9.35	12.10	1 569	9 901	8 787



## Methodology n°1 « Optimum »

### A/ Methods

Assessing the unplanned surgery impact on a given hospital for a major diagnostic category (e.g. musculoskeletal system surgery)

Calculate the hospital funding as if the entire activity was planned

- We created a standard planned stay for each hospital as a reference\*
- We switched every unplanned and blended hospital stays to the standard planned stay
  - The amount of hospital-bed days remains unchanged

How many more planned hospital stay the hospital could do ?

$$\bullet \text{ Nbr planned stay added} = \frac{\text{Nbr unplanned stay} * \text{LOS unplanned}}{\text{LOS standard planned}} + \frac{\text{Nbr blended stay} * \text{LOS blended}}{\text{LOS standard planned}}$$

- We added more planned stay than there was unplanned stay because  $\text{LOS unplanned} > \text{LOS standard planned}$

- We calculated the hospital funding with this new stay's distribution
- We calculated an unplanned impact ratio by dividing the "new calculated" funding by the real hospital funding for the same activity

\*See appendix for standard hospital stay's definition



## Methodology n°1 « Optimum »

### B/ Simplified example

An hospital has 9 stays in the musculoskeletal system surgery divided between two diagnosis groups

- Stays A : 3 unplanned stays in the first diagnosis group (average LOS = 7 days, average funding =5,000€)
- Stays B : 6 planned stays in the second diagnosis group (average LOS = 3,5 days, average funding =3,500€)
- Standard planned stays for the hospital
  - A stay of the second diagnosis group with the national LOS and average funding (LOS = 3 days, average funding =3500€)
- Hospital funding = Stays A funding + Stays B funding =  $(3*5,000) + (7*3,500) = 36,000 \text{ €}$

#### Method applied

- Stays A => turn into standard planned stays (LOS =3 days, funding per stay =3500€)

$$\text{Nbr planned stay added} = \frac{\text{Nbr stay A} * \text{average LOS A}}{\text{LOS standard planned}} = \frac{3 * 7}{3} = 7 \text{ stays}$$

- Stays B => remains unchanged (funding =21 000€)
- New funding is :

$$\text{New funding} = \text{Stays B funding} + \text{Nbr planned stay added} * \text{standard planned funding} = 21\ 000 + 7 * 3\ 500 = 45\ 500\text{€}$$

- Unplanned impact ratio =  $45\ 500 / 36\ 000 = 1,26$



## Methodology n°2 « Bed-blockers »

### A/ Methods

Calculate the hospital funding as if urgent surgery's stays had the same length of stay as elective ones

- How many more planned stays could a hospital do if urgent surgery's stays had the same length of stay as elective ones
  - As if the hospital did not suffer from different length of stay between planned and unplanned or blended stays
  - The amount of hospital-bed days remains unchanged

How many more planned hospital stay the hospital could do ? And how many unplanned hospital stays are left ?

$$\bullet \text{ Nbr planned stay added} = \frac{\text{Nbr unplanned stay} * (\text{LOS unplanned} - \text{LOS standard planned})}{\text{LOS standard planned}} + \frac{\text{Nbr blended stay} * (\text{LOS blended} - \text{LOS standard planned})}{\text{LOS standard planned}}$$

$$\bullet \text{ New nbr unplanned stays} = \frac{\text{Nbr unplanned stay} * \text{LOS standard planned}}{\text{LOS unplanned}}$$

- Same methods as the methodology n°1 for the rest of the methodology

## RESULTS AND USE

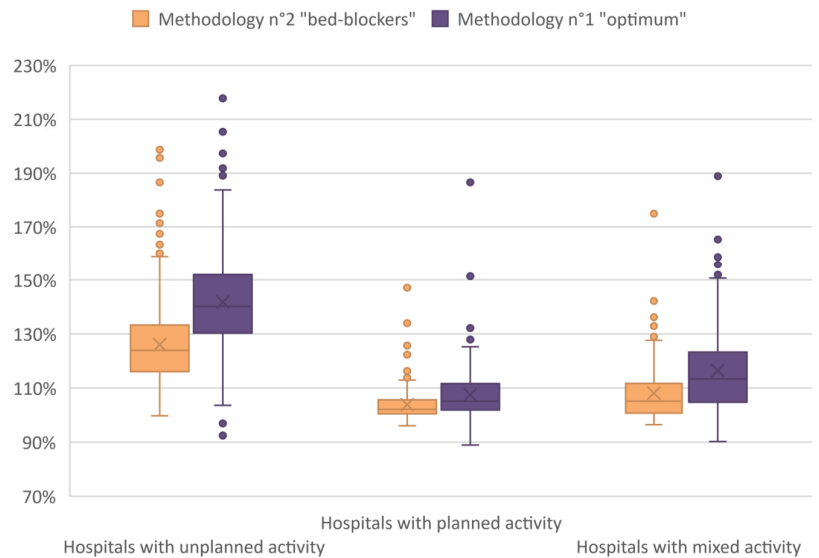


## Results

### Three hospitals categories

- Three hospitals categories are created according to the proportion of unplanned, planned and blended activities\*
- The hospitals with many unplanned activities have bigger impact ratio
- The methodology "optimum" gives on average bigger impact ratio than the methodology "bed-blockers"
- The impact ratios are highly correlated between the two methodologies

Unplanned impact ratio distribution according to the hospital category



\*See appendix 1 for more details about these groups



## How these results could be used in the funding ?

- An endowment could be created to better fund hospitals with a large proportion of unplanned activity
- This new endowment could be distributed among hospitals with the results of the study
  - The larger the impact ratio the largest the hospital endowment would be
  - Giving bigger fundings to the hospitals with a greater impact from urgent surgeries

# APPENDIXES

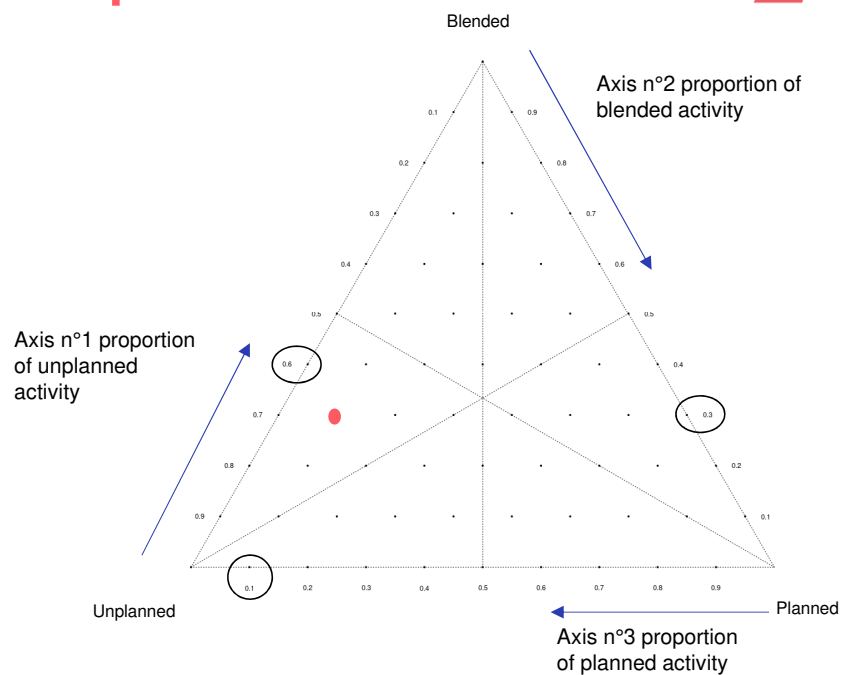
## Appendix 1 (1/3)

# Graphic representation of hospitals in each MDC



## A/How to read triangles graphics

- Each hospital, with activity within the given MDC, is represented by a colored dot in the triangle
- The hospital position depends on the repartition of the activity among the diagnosis group's categories
- Example for one hospital represented by the red dot
  - 60% of unplanned activity
  - 10% of planned activity
  - 30% of blended activity



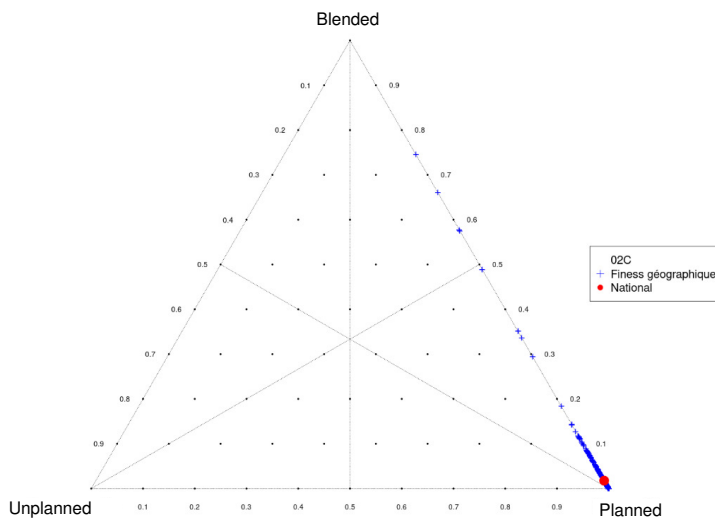




# Focus planned MDC

## A/Characteristics

- All hospitals have mostly planned activities in the MDC
- **Ex : Eye disorder surgery**
  - No urgent DRG in this MDC
  - All the hospitals do a majority of elective surgery in this MDC



Hospitals distribution according to their activity distribution among planned, unplanned and blended activity for the eye disorder surgery (02C)



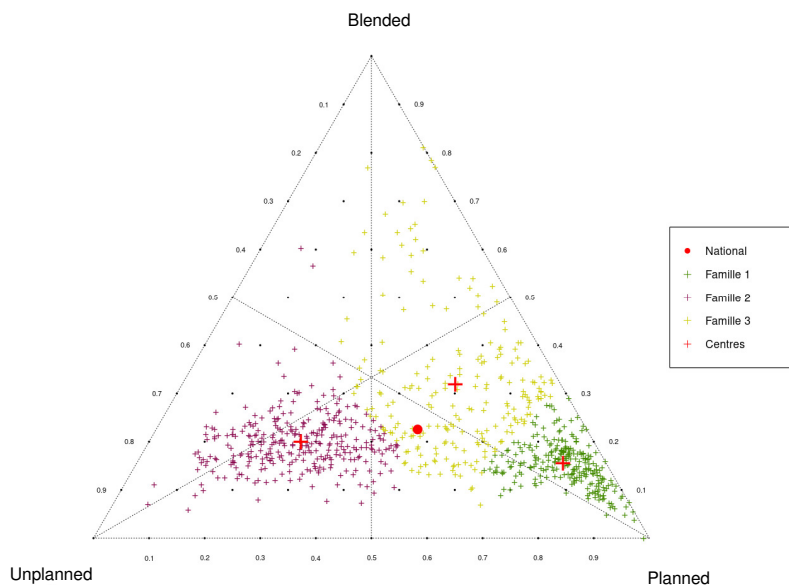
# Mixed MDC

## A/Characteristics

- Hospitals have various profiles in the MDC
  - Some have mostly unplanned activities
  - Other have mostly planned activities

### Ex : Musculoskeletal system surgery (08C). Three types of hospitals profile

- N°1 (green dots on the graph) : 33% of hospitals with mostly planned activities
- N°2 (purple dots on the graph) : 40% of hospitals with mostly unplanned activities
- N°3 (yellow dots on the graph) : 28% of hospitals with a mix of planned, unplanned and blended activities



Hospitals distribution according to their activity distribution among planned, unplanned and blended activity for the musculoskeletal system disorder surgery



## Appendix 2 (1/2) : Methodology n°2 « Bed-blockers »

### A/ Simplified example

An hospital has 10 stay in the musculoskeletal system surgery divided between two diagnosis groups

- Stays A : 3 unplanned stays in the first diagnosis group (average LOS = 7 days, average funding =5000€)
- Stays B : 7 planned stays in the second diagnosis group (average LOS = 3,5 days, average funding =3500€)
- Standard planned stays for the hospital
  - A stay of the second diagnosis group with the national LOS and average funding (LOS = 3 days, average funding =3500€)
- Hospital funding = Stays A funding + Stays B funding = (3\*5000) + (7\*3500) = 39 500 €



## Appendix 2 (2/2) : Methodology n°2 « Bed-blockers »

### Method applied

- Stays A :  

$$\text{Nbr planned stay added} = \frac{\text{Nbr unplanned stay} * (\text{LOS unplanned} - \text{LOS standard planned})}{\text{LOS standard planned}} = \frac{3 * (7 - 3)}{3} = 4 \text{ séjours}$$

New number of unplanned stays

$$\text{New nbr stays A} = \frac{\text{Nbr stay A} * \text{LOS standard planned}}{\text{LOS stays A}} = \frac{3 * 3}{7} = 1,29 \text{ séjours}$$

- Stays B => remains unchanged (funding =24 500€)
- New funding is :

$$\begin{aligned} \text{New funding} &= \text{Stays B funding} + \text{Nbr planned stay added} * \frac{\text{standard planned funding} +}{\text{New nbr stays A} * \text{stays A funding}} \\ &= 24 500 + 4 * 3 500 + 1,29 * 5 000 = 42 388,89€ \end{aligned}$$

**Unplanned impact ratio = 42 388,89/39 500 = 1,07**



## Standard planned

### We calculated one standard planned activity for each hospital

We used this activity in both methodologies

#### What is the standard planned activity for a given hospital

- Step 1 : We considered the planned case-mix of the hospital (In a given MDC)
  - This activity can be done in this hospital
  - A hospital can not do all unplanned activity possible

#### LOS et average national funding

- Step 2 : Given the case-mix from step 1 we considered the LOS and national average funding of each homogeneous hospital stay
  - The aim is to not encourage longer stays in the hospital

**THANK YOU!**