

# Optimizing traumatic brain injury care pathways using SNDS: modeling economic impact and socioeconomic determinants of pathways

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## INTRODUCTION

In France, 150,000 people suffer a traumatic brain injury (TBI) each year. Modeling and analyzing the care pathways (CPs) of TBI patients will allow us to identify patients at risk of poor care, with the aim of optimizing care, improving their prognosis, and improving the efficiency of care pathways.

**Objectives :** to identify and describe the CPs of patients with TBI, evaluate the costs of care, and assess the impact of social determinants on CPs and healthcare costs.

## METHOD

### Data Linkage

TBI patients from the University Hospital of Toulouse (from 2014 to 2018) were linked to national health insurance data (SNDS) with access from 2012 to 2020.

### Pathway Modeling

Two years pre- and two years post-TBI CPs were identified using sequential analysis (optimal matching and clustering). Sequences were defined using hospital sectors (public and private).

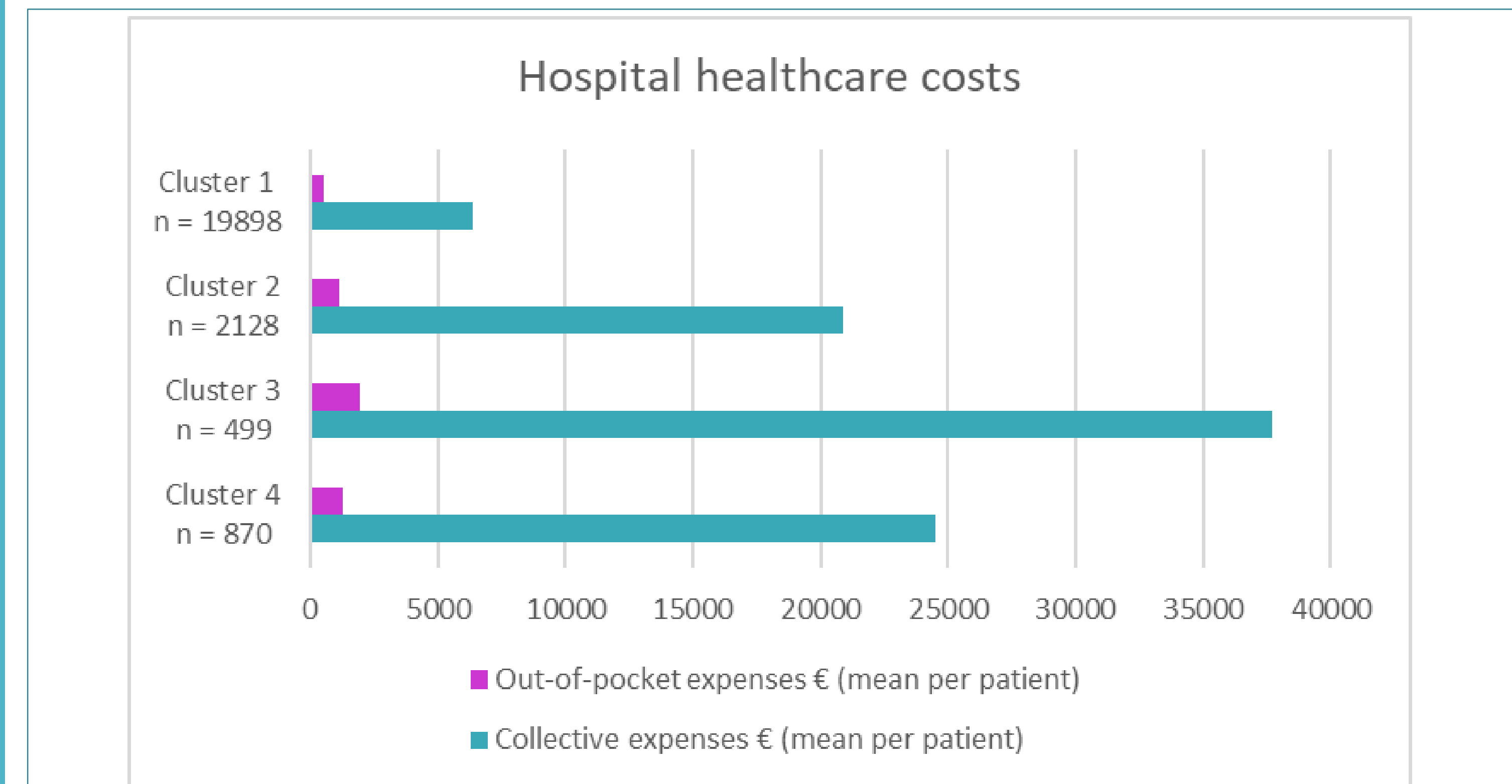
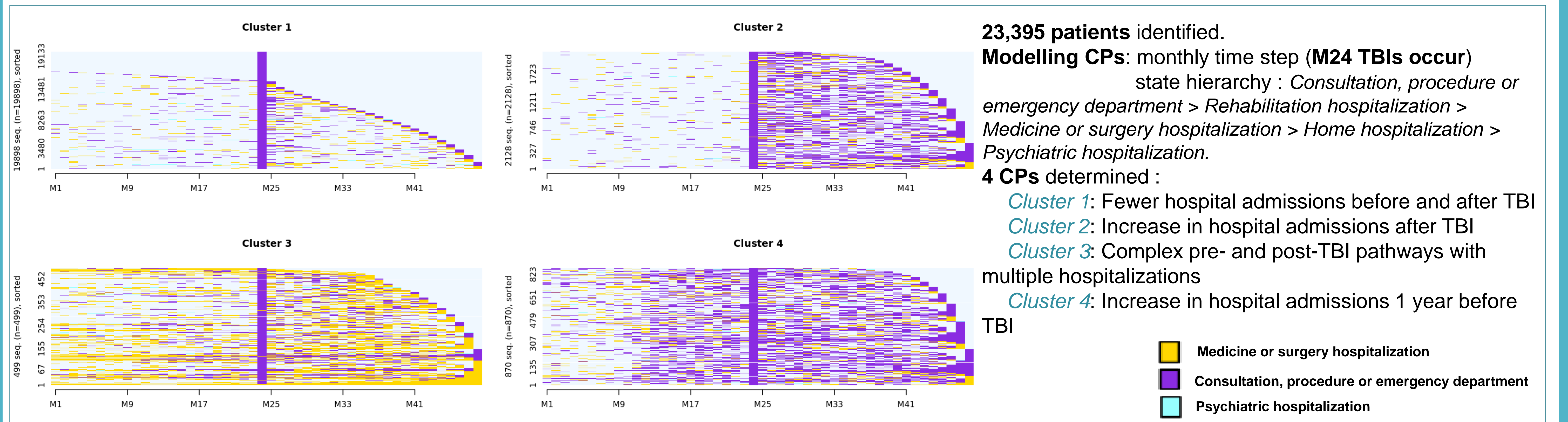
### Cost Assessment

Healthcare costs were assessed from the perspective of collectivity and the patient. Direct hospital costs were included.

### Deprivation Effect

Bivariate analysis was performed on the association between deprivation and CPs and healthcare costs.

## RESULTS



*Cluster 1:* Collective expenditure mean €6,332 per patient (median €15,327)  
*Cluster 2:* Collective expenditure mean €20,879 per patient (median €44,261)  
*Cluster 3:* Collective expenditure mean €37,702 per patient (median €52,374)  
*Cluster 4:* Collective expenditure mean €24,502 per patient (median €35,041)

	Cluster 1 n = 19898	Cluster 2 n = 2128	Cluster 3 n = 499	Cluster 4 n = 870	p-value
<b>Sex</b>					0.023
women	8583 (43%)	855 (40%)	232 (46%)	374 (43%)	
men	11315 (57%)	1273 (60%)	267 (54%)	496 (57%)	
<b>Age</b>					<0.001
[10-31]	7164 (36%)	606 (28%)	35 (7%)	142 (16%)	
[32-73]	6102 (31%)	925 (43%)	195 (39%)	465 (53%)	
[74-107]	6632 (33%)	597 (28%)	269 (54%)	263 (30%)	
<b>CCI</b>					<0.001
0	18790 (94%)	1997 (94%)	376 (75%)	730 (84%)	
1	1020 (5%)	109 (5%)	98 (20%)	110 (13%)	
2	58 (<1%)	13 (1%)	13 (3%)	15 (2%)	
3	30 (<1%)	9 (<1%)	12 (2%)	15 (2%)	
<b>CMU</b>					<0.001
2098 (11%)		282 (13%)	37 (7%)	120 (14%)	
<b>Fdep (n=22826)</b>					<0.001
1	4885 (25%)	503 (24%)	146 (30%)	182 (21%)	
2	9600 (50%)	924 (44%)	233 (48%)	420 (49%)	
3	2393 (12%)	310 (15%)	58 (12%)	108 (13%)	
4	1672 (9%)	221 (11%)	38 (8%)	89 (10%)	
5	850 (4%)	125 (6%)	14 (3%)	55 (6%)	
<b>Collective expenses per patient mean (med)</b>	6332 (15327)	20879 (44261)	37702 (52374)	24502 (35041)	<0.001
n (%)					
CCI = Charlson comorbidity index, CMU = Solidarity Health Supplement, Fdep = French deprivation index					

*Cluster 1:* Youngest population, least co-morbid, least expensive CPs  
*Cluster 2:* More men, more disadvantaged (CMU and Fdep)  
*Cluster 3:* Most elderly, most comorbid, most urban (Fdep), most expensive CPs  
*Cluster 4:* Middle-aged and deprived population (CMU and Fdep)

## CONCLUSION

Initial results show that deprivation is associated with higher CPs costs and determines their typology. The optimization of CPs must consider socioeconomic characteristics. The goal is then to design more appropriate, effective, and equitable care programs.

### Further Research

Continue investigating the long-term impacts of TBI on patient outcomes and costs with mixed models.

### Optimize Care

Design more appropriate and effective care programs for TBI patients.

### Enhance Equity

Develop strategies to address socioeconomic disparities in TBI care.

## REFERENCES and CONTACT \*



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