

# Estimation of annual bleeding management cost in severe haemophilia A patients, without inhibitors, treated with on-demand therapy with recombinant factor VIII in Spain

Torres C<sup>1</sup>, Oyagüez I<sup>1</sup>, Álvarez MT<sup>2</sup>, Canaro M<sup>3</sup>, Parra R<sup>4</sup>, García JP<sup>5</sup>, Casado MA<sup>1</sup>

<sup>1</sup>Pharmacoeconomics & Outcomes Research Iberia, Madrid, Spain; <sup>2</sup>Hospital Universitario La Paz, Madrid, Spain; <sup>3</sup>Hospital Universitario Son Espases, Palma de Mallorca, Spain; <sup>4</sup>Hospital Universitari Vall d'Hebron, Barcelona, Spain; <sup>5</sup>\*Shire, Madrid, Spain.

## INTRODUCTION

- Haemophilia A (HA) similar to other chronic diseases, is associated with a relevant economic burden<sup>1</sup>.
- The increasing trend in the global prevalence of this disease<sup>2</sup> could have relevant impact on health care systems.
- Additionally, bleeds and muscle and joints complications lead to pain and disability, as well as a substantial impairment in the overall patient quality of life<sup>3</sup>.

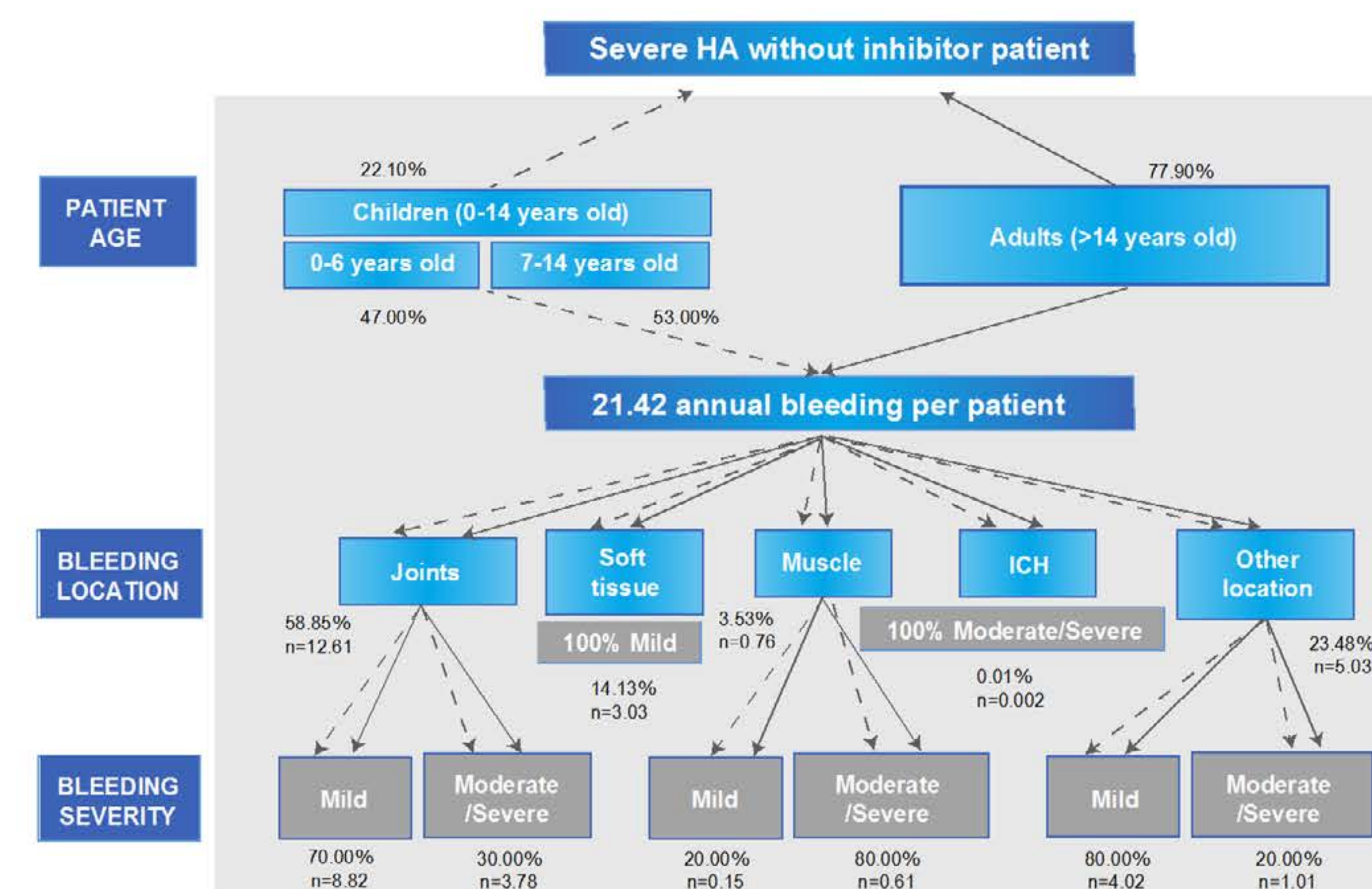
## OBJECTIVE

- To estimate the total annual cost of the management of different haemorrhagic episodes in a severe HA patient treated on-demand with recombinant factor VIII without inhibitors, from the Spanish National Health System perspective.

## MATERIALS AND METHODS

- A decision tree model was designed to estimate an average total annual management cost per severe HA patient without inhibitors.
- Based on published data the model split the population according to (Figure 1):
  - Age interval: children and adults<sup>4</sup>.
  - Bleeding location: joints, soft tissue, muscle, intracranial haemorrhage (ICH) and other locations<sup>5,10</sup>.
  - Bleeding severity: mild and moderate/severe.

Figure 1. Model Design



- The annual total cost included:
  - Pharmaceutical costs:** On-demand factor VIII drug cost was estimated based on official ex-factory price<sup>6</sup> (Advate<sup>®</sup>, Shire) and recommended dosages<sup>7</sup> depending on patient's age and type and severity of bleeding events. (Table 1)
  - Management of bleeding episodes:** A haematologist expert panel provided the health resource consumption required: medical visits (specialist and primary care), hospitalizations, surgeries, diagnostic and monitoring (procedures and laboratory test) and additional medication.
- Unitary cost for health resources (€, 2015) were obtained from national local databases<sup>8</sup>.
- An additional analysis was performed with a social perspective, including the costs associated with absenteeism of adult patients as a result of bleeding events. (Table 2)
  - Spanish average wage (€94.40/day) was considered<sup>9</sup>.

## MATERIALS AND METHODS

Table 1: Factor VIII consumption dosage of each type of bleeding event. Representative dosages of clinical practice validated by external expert panel.

		Children		Adults
		0-6 years	7 - 13 years	≥ 14 years
Joint	Mild	50 IU/Kg - 1 dosage	40 IU/Kg - 1 dosage	30 IU/Kg - 1 dosage
	Moderate/Severe	50 IU/Kg/12 hours (1 <sup>st</sup> day) 50 IU/Kg/24 hours (days 2 - 5)	40 IU/Kg/12 hours (1 <sup>st</sup> day) 40 IU/Kg/24 hours (days 2 - 5)	40 IU/Kg/12 hours (1 <sup>st</sup> day) 30 IU/Kg/24 hours (days 2 - 5)
Soft tissue	Mild	40 IU/Kg - 1 dosage (50% treated)	50 IU/Kg - 1 dosage (50% treated)	30 IU/Kg - 1 dosage (5% treated)
	Moderate/Severe	50 IU/Kg/day (7,5 days)	40 IU/Kg/day (7,5 days)	40 IU/Kg/day (7,5 days)
Muscle	Mild	50 IU/Kg/12 hours (days 1 - 2) 50 IU/Kg/24 hours (days 3 - 14)	50 IU/Kg/12 hours (days 1 - 2) 50 IU/Kg/24 hours (days 3 - 14)	40 IU/Kg/12 hours (days 1 - 2) 30 IU/Kg/24 hours (days 3 - 14)
	Moderate/Severe	50 IU/Kg/8 hours (days 1 - 2)	50 IU/Kg/8 hours (days 1 - 2)	50 IU/Kg/8 hours (days 1 - 2)
Intracranial haemorrhage	Mild	50 IU/Kg/12 hours (days 3 - 7) 50 IU/Kg/24 hours (days 8 - 30)	50 IU/Kg/12 hours (days 3 - 7) 50 IU/Kg/24 hours (days 8 - 30)	50 IU/Kg/12 hours (days 3 - 7) 50 IU/Kg/24 hours (days 8 - 30)
	Moderate/Severe**	30 IU/Kg - 1 dosage	30 IU/Kg - 1 dosage	20 IU/Kg - 1 dosage
Other	Mild*	50 IU/Kg/12 hours (1 <sup>st</sup> day)	50 IU/Kg/12 hours (1 <sup>st</sup> day)	50 IU/Kg/12 hours (days 1 - 3)
	Moderate/Severe**	50 IU/Kg/24 hours (days 2 - 10)	50 IU/Kg/24 hours (days 2 - 10)	50 IU/Kg/24 hours (days 4 - 9)

IU: International Units; Other mild bleeds\*: gingival bleeding, epistaxis, or haematuria; Other moderate/severe bleeds\*\*: gastrointestinal bleeding.

Table 2: Loss of Productivity

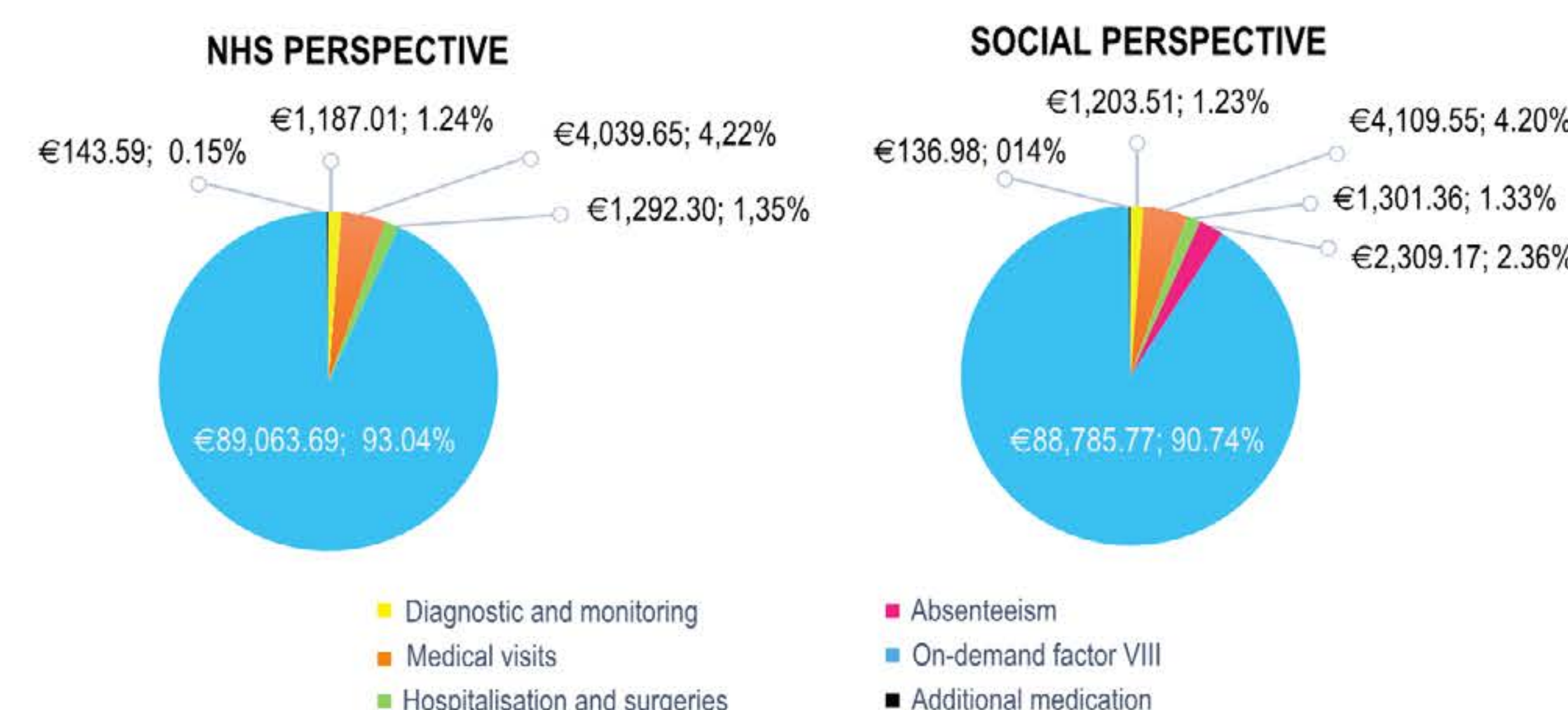
	Mild		Moderate/Severe	
	% patients	Duration (days)	% patients	Duration (days)
Joint	80%	2.00	100%	3.00
Soft tissue	0%	—	—	—
Muscle	80%	2.00	100%	14.00
ICH	—	—	100%	90.00
Other locations	0%	—	100%	14.00

\*Expert panel estimation.

## RESULTS

- Based on the published evidence of 21.42 haemorrhagic events per patient per year<sup>10</sup>, the estimated total annual cost for a severe HA patient, treated on-demand, was €95,726.24 (average cost of €4,469.01 per haemorrhagic event). (Figure 3).
- Factor VIII drug cost was responsible of 93.04% of the total cost (Figure 2).
- Bleeding costs according to location, severity and patient's age are detailed in Table 3.
- The estimated cost per event resulted in €2,767.94 per child population and €4,951.60 for the only adult population. The average costs per each type of bleeding for children and adults are shown in Table 3.
- For the social perspective, the total annual cost increased up to €97,846.34 per average HA patient (average cost of €4,567.99 per haemorrhagic event). (Figure 3).

Figure 2. Distribution of average annual cost per patient



## RESULTS

Figure 3. Total annual bleeding costs per patient (€)

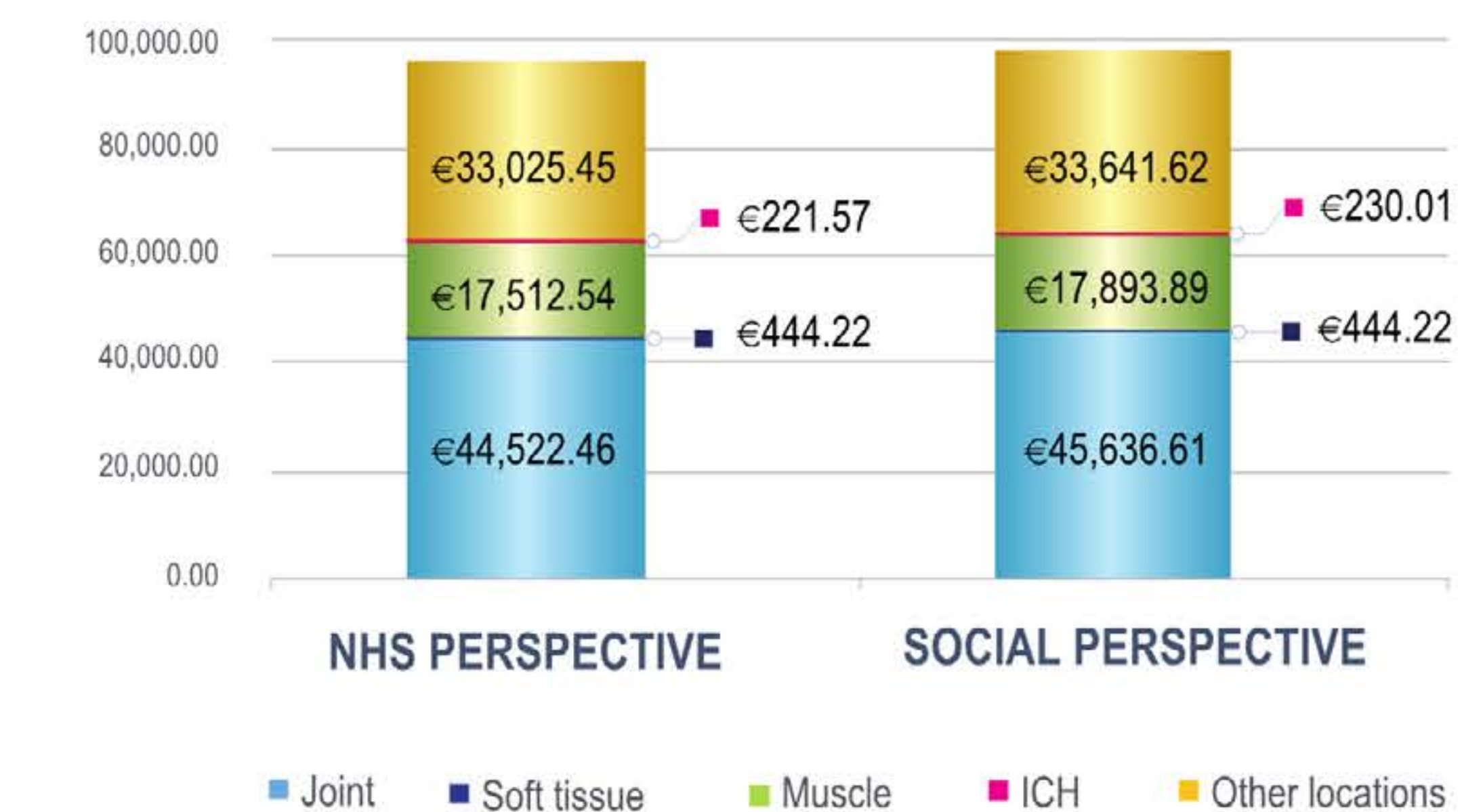


Table 3. Bleeding costs (NHS PERSPECTIVE)

Severity	Duration (days)	Mild		Moderate/Severe		
		Children	Adult	Children	Adult	
Location						
Joint	1.5	€1,017.30	€1,364.23	5	€5,401.19	€9,724.21
Soft tissue	1	€409.69	€72.21	—	—	—
Muscle	7.5	€5,889.10	€13,610.14	14	€17,311.83	€28,411.86
ICH	—	—	—	30	€61,826.78	€115,248.18
Other locations	1	€545.93	€913.51	10	€14,861.72	€33,656.95
Mean cost		€1,965.51	€3,990.02	Mean cost	€24,850.38	€46,760.30

## CONCLUSIONS

- The management of bleeding episodes in HA patients is associated with relevant annual costs for the National Health System.
- Any strategy able to reduce the number of annual bleeds could contribute to improve the management of patients with HA and might alleviate the public budget.

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## DISCLOSURES

\* Author formerly an employee of Baxalta (Baxalta, Madrid, Spain), now part of Shire.



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