# Cost-Effectiveness of Intravenous Iron Formulations in Patients with Iron Deficiency Anaemia and Inflammatory Bowel Disease in Sweden

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#### **BACKGROUND**

- · A widespread complication of inflammatory bowel disease (IBD) is iron deficiency anemia (IDA), which affects quality of life and is associated with more frequent hospitalizations.
- The intravenous iron formulations, ferric carboxymaltose (FCM), ferric derisomaltose (FD) and iron sucrose (IS) have previously been shown to replenish hemoglobin (Hb)-levels more effectively than oral iron. These IV iron formulations differ in both costs and efficacy (i.e., response to treatment), leading to differences in acquisition by healthcare payers.
- Decentralized procurement systems, like the Swedish system, and variation between regions results in disparities in tender prices and the quantities procured. Therefore, making a state-wide assessment of cost-effectiveness between products would be less impactful for regional decision making in decentralized systems.

### OBJECTIVES

This study aimed to highlight the potential differences in treatment benefit for IBD-IDA patients in different Swedish regions and to provide the regional stakeholders with additional evidence to make informed decisions. This was done by investigating the cost-effectiveness of FCM versus FD and IS, in terms of additional cost per additional responder, using regional tender prices.

# **METHODS**

- A microsimulation model estimated the additional cost per additional responder, based on hemoglobin (Hb) normalization (≥2g per dL in Hb-levels). Efficacy estimates were taken from a previously published network meta-analysis by Aksan
- Treatment costs (2021 SEK) included tender prices for Swedish healthcare regions, which were available for the following four regional clusters: Stockholm (incl. Gotland), JÖK (Jönköping, Östergötland and Kalmar county), 3-Klöver (Örebro, Sörmland and Värmland) and 4-Klövern (Uppsala, Västmanland, Dalarna and Gävleborg). Figure 1 provides comparable price examples for each IV formulation
- Based on dosing recommendations from the respective SmPCs [2-3] , two separate methods were used to calculate supplemental iron dosing for the three treatment arms. For FCM and FD, a simplified dosing table based on the ECCO anaemia guidelines used body weights and Hb levels to determine the appropriate dosing (see Table 1). For IS, the Ganzoni formula was implemented:

Iron deficit (mg) = body weight \* (target Hb - Hb) \* 2.4 + iron stores

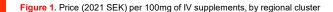
- Both methods were explored for all treatments in the scenario analyses. For each simulated patient, body weight (mean: 66.6 kg, SE: 0.7 kg) and Hb levels (mean: 9.6 g/dL, SE: 0.1 g/dL) were sampled based on the distributions of patient characteristics from two well-known RCTs of FCM [4-5].
- To quantify health care resource use from a hospital perspective, a micro-costing approach was used in the base case for each region. This included summing the costs of administration (e.g., infusion time at the clinic, supervision time) and consumable resources (e.g., dressings, giving sets) used for a given patient (see Table 2). It was assumed that health care professionals would try to minimize wastage of treatment vials.

## **RESULTS**

- For all included regions, the analysis estimated that FCM was the most effective IV iron formulation, increasing the number of responders compared to FD and IS by 7% and 6%, respectively. Moreover, the results show that FCM was less costly compared to both FD and IS (see Table 3).
- Scenario and deterministic sensitivity analyses yielded similarly positive results for FCM, though there were certain exceptions; the treatment costs per patient were close for FCM and FD, making the ICER results more dependent on the prices in each region. This meant that small changes in the price or costs impacted the relative cost-effectiveness.
- Using an alternative method for quantifying resource use meant that FCM was still more effective but exhibited a small cost per responder when compared to FD. Applying a specific dosing method (Ganzoni formula) for all three IV formulations increased the treatment costs of FCM, thus making it slightly more costly per additional responder than FD.

#### CONCLUSIONS

The analysis suggests that regional budget holders like the regional clusters in Sweden should consider more than drug prices when choosing which IV formulations to procure. This analysis included public tender prices and treatment efficacy, encouraging regional decision makers with additional tools to use all available information when tailoring resource allocation to fit the needs of their patients



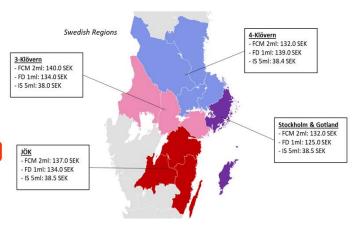


Table 1. Simplified dosing table: estimation of iron requirements

Haemoglobin (g/dL)	Body weight (kg)		
	<35	35-70	≥70
<10	500	1,500	2,000
10-14	500	1,000	1,500
≥14	500	500	500

Table 2. Estimates of time required for treatment, based upon SmPC

	FCM	FD	IS
<500 mg	6 min		-
500-1000 mg	15 min	-	-
< 1000 mg	-	15 min	-
> 1000 mg	-	30 min	-
< 50 mg	-	-	8 min
50-100 mg	-	-	15 min
100-200 mg	-	-	30 min
Preparation time (min)	15 min	15 min	15 min
Observation time (min)	30 min	30 min	30 min
Giving sets required	1	1	1
Cannula required	1	1	1
Dressings required	1	1	1

Table 3. Cost-effectiveness results for FCM vs FD or IS

	FCM	FD	IS		
Responder rate					
(Same for all regions)	81%	74%	75%		
Iron dose					
Stockholm	1,443	1,356	1,365		
3-Klöver	1,446	1,358	1,368		
4-Klövern	1,443	1,357	1,365		
JÖK	1,441	1,351	1,360		
Average of regions	1,438	1,348	1,358		
	Number of infusions				
(Same for all regions)	1.7	1.5	7.3		
Cost of treatment per patient (SEK)					
Stockholm	SEK 25,335	SEK 25,618	SEK 129,942		
3-Klöver	SEK 25,461	SEK 25,701	SEK 130,204		
4-Klövern	SEK 25,317	SEK 25,645	SEK 129,935		
JÖK	SEK 25,365	SEK 25,478	SEK 129,543		
Average of regions	SEK 25,274	SEK 25,436	SEK 129,285		
ICER		(FCM vs. FD)	(FCM vs. IS)		
Stockholm		FCM more effective	FCM more effective		
3-Klöver		and less costly per	and less costly per		
4-Klövern	(Dominant)	responder than both	responder than both		
JÖK		FD and IS, for all	FD and IS, for all		
Average of regions		regions	regions		