

Patient Blood Management with intravenous iron is economically advantageous compared to usual care in German hospitals

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BACKGROUND

Intravenous iron (IVI) is a cornerstone of Patient Blood Management (PBM) in elective surgery, reducing the need for red blood cell transfusion. Two high-dose IVI formulations are commonly used in Germany: ferric derisomaltose (FDI) and ferric carboxymaltose (FCM) with differences in administration and outcome:

- ▶ **Treatment logistics:** Different dosing regimens may influence pre-surgical hospital visits.
- ▶ **Safety:** Comparable rates of mild infusion reactions for FDI and FCM [4]. Randomized trials consistently demonstrate a higher incidence of hypophosphatemia with FCM than with FDI [4,7,8].
- ▶ **Clinical outcomes:** Emerging data link FCM to increased risk of osteomalacia and fractures, while FDI shows no excess fracture risk [9].

OBJECTIVE

This study evaluates the costs and clinical consequences of different IVI formulations and blood transfusion in German patients with pre-operative iron deficiency anemia.

MATERIALS & METHODS

An Excel-based budget impact model [6] was adapted to the German hospital setting, using both published evidence and clinic-specific inputs. Analyses were conducted from the perspective of a German university hospital.

Treatment arms

- ▶ **Usual care:** Red blood cell transfusion, oral iron [3]
- ▶ **IVI treatment:** FDI or FCM

Patient population

- ▶ Mean Hb: 10.7 g/dL (SD 1.3) [3]
- ▶ Mean body weight: 87.0 kg (SD 24.0) [3]

PBM assumptions

- ▶ Red blood cell transfusion rate reduced by 50% vs. usual care [3]
- ▶ Transfused units reduced by 75% (32 → 8 units) [3]

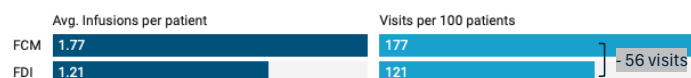
Table 1: Costing approach

Component	Costs [Source]
Blood transfusion	€90.50 per unit + €67.33 per event [5] Up to 16 transfusions per adult patient already covered under DRG lump sum
IVI drug costs (per gram)	FDI €351.17; FCM €379.04 [Lauer Taxe]
Personnel	Nurse €53.90/h; Consultant €70.50/h [5, University Hospital Heidelberg data]
Time per IVI infusion	15 min nurse + 17 min consultant [5]
Overhead per transfusion	€26 [1]
Ward stay	€445 per day (Non-ICU)

Ressource utilization

Mean iron deficiency was 1,448 mg, requiring 1.21 FDI vs. 1.77 FCM infusions. This would result in 56 visits saved per 100 patients treated.

Figure 1: Comparison of IVI treatment with FCM and FDI



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Sources: [1] Boese et al. 2020, DOI: 10.1007/s00132-020-03889-6; [2] Dettle et al. 2025, DOI: 10.1080/13696998.2024.2444833; [3] Froessler et al. 2016, DOI: 10.1097/SLA.0000000000001646; [4] Kennedy et al. 2023, DOI: 10.1007/s11096-023-01548-2; [5] Kleinerüschkamp et al. 2019, DOI: 10.2450/2018.0213-17; [6] Loughane et al. 2020, DOI: 10.1007/s12325-020-01241-0; [7] Wolf et al. 2020, DOI: 10.1001/jama.2019.22450; [8] Zoller et al. 2023a, DOI: 10.1136/gutjnl-2022-327897; [9] Zoller et al. 2023b, DOI: 10.1182/blood-2023-174508.

RESULTS

Table 2: Base case costs of IVI treatment with FCM and FDI compared to usual care [EUR]

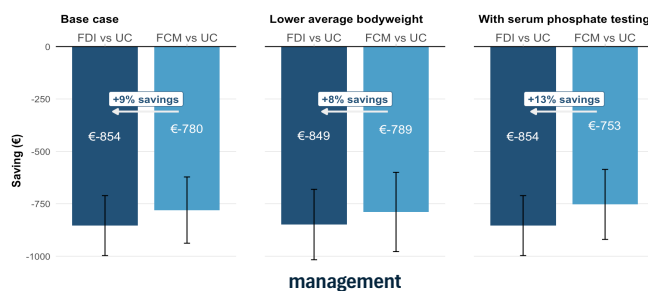
Category	FDI	FCM	Usual Care
Iron cost	508	549	0
Iron infusion cost	72	105	0
Serum phosphate test (not yet common in Germany)	0	0	0
Pre-operative blood	0	0	24
Intra-operative blood	0	0	30
Post-operative blood	27	27	72
Total costs excluding cost offsets (i.e. iron and blood)	607	681	126
Ward stay (6 days versus 9 days)	2,670	2,670	4,005
Total costs	3,277	3,351	4,131

- ▶ From a hospital perspective, mean treatment costs were €607 (FDI) vs. €681 (FCM). Accounting for reduced length of stay (6 vs. 9 days with usual care [3]), average total costs per patient were: FDI €3,277; FCM €3,351; usual care €4,131.
- ▶ IVI substitution as part of a structured PBM might result in direct costs savings and resource/capacity savings for hospitals. Comparing usual care and FCM, savings may add up to EUR 780 per patient. Given the cost of treatment differences with FDI and FCM, PBM with FDI may gain additional savings compared to FCM of EUR 74 per patient (+9%).

Sensitivity analyses

- ▶ Addition of one **serum phosphate test** per FCM infusion: The need for phosphate testing in patients treated with FCM as per SmPC compared to no testing with FDI, this showed a cost saving of EUR 101 (+13%) with FDI compared to FCM.
- ▶ Lower mean **body weight** (77.7 kg, SD 24.0): With a lower average body weight, mean iron deficiency was calculated as 1.364mg, requiring 1.29 FDI vs. 1.63 FCM infusions. This would result in 34 visits saved per 100 patients treated. PBM with FDI may gain additional savings compared to FCM of €60 (+8%) per patient.

Figure 2: PBM savings using FDI or FCM compared to usual care (UC)



- ▶ High-dose IVI formulations such as FDI enable full iron repletion in a single visit for most patients (21% vs. 77% with FCM), reducing pre-admission visits by up to 33%. Fewer visits lower clinical workload, administrative burden, and indirect patient costs (travel, time off work).
- ▶ Avoiding red blood cell transfusions is directly relevant in the German DRG system, as hospitals are only reimbursed for ≥17 units. In a Heidelberg cohort (n = 576, elective surgery, no PBM), 88% received < 16 units (mean 3.7), highlighting savings potential.
- ▶ Furthermore, optimized IVI choice may reduce complications such as hypophosphatemia and osteomalacia, improving patient safety and minimizing downstream treatment costs.

Optimizing IV Iron Therapy in Patient Blood Management in Germany: Cost Savings and Reduced Hospital Visits with Ferric Derisomaltose (FDI)

- ▶ PBM with IVI is economically advantageous compared to usual care, driven by direct cost savings due to less red blood cell transfusion and reduced ward stay length. Additionally, red cell transfusion avoidance is expected to reduce complications
- ▶ A key difference between FCM and FDI is the maximum iron dose that can be administered per infusion, saving 34 to 56 visits per 100 patients with FDI versus FCM.