

# Ferric carboxymaltose for the treatment of iron deficiency in patients with acute heart failure with reduced ejection fraction: events avoided and cost savings from the perspective of healthcare payers in the United States

McEwan P<sup>1</sup>, Ponikowski P<sup>2</sup>, Rosano G<sup>3</sup>, Stewart Coats AJ<sup>4</sup>, Dorigotti F<sup>5</sup>, O'Sullivan D<sup>5</sup>, Ramirez de Arellano<sup>5</sup>, Jankowska EA<sup>2</sup>

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<sup>1</sup>Health Economics and Outcomes Research Ltd, Cardiff, UK; <sup>2</sup>Department of Heart Diseases, Wrocław Medical University, Wrocław, Poland; <sup>3</sup>Cardiovascular and Cell Sciences Research Institute, St George's University, London, UK; <sup>4</sup>University of Warwick, Warwick, UK; <sup>5</sup>Vifor Pharma, Glattbrugg, Switzerland

## Introduction

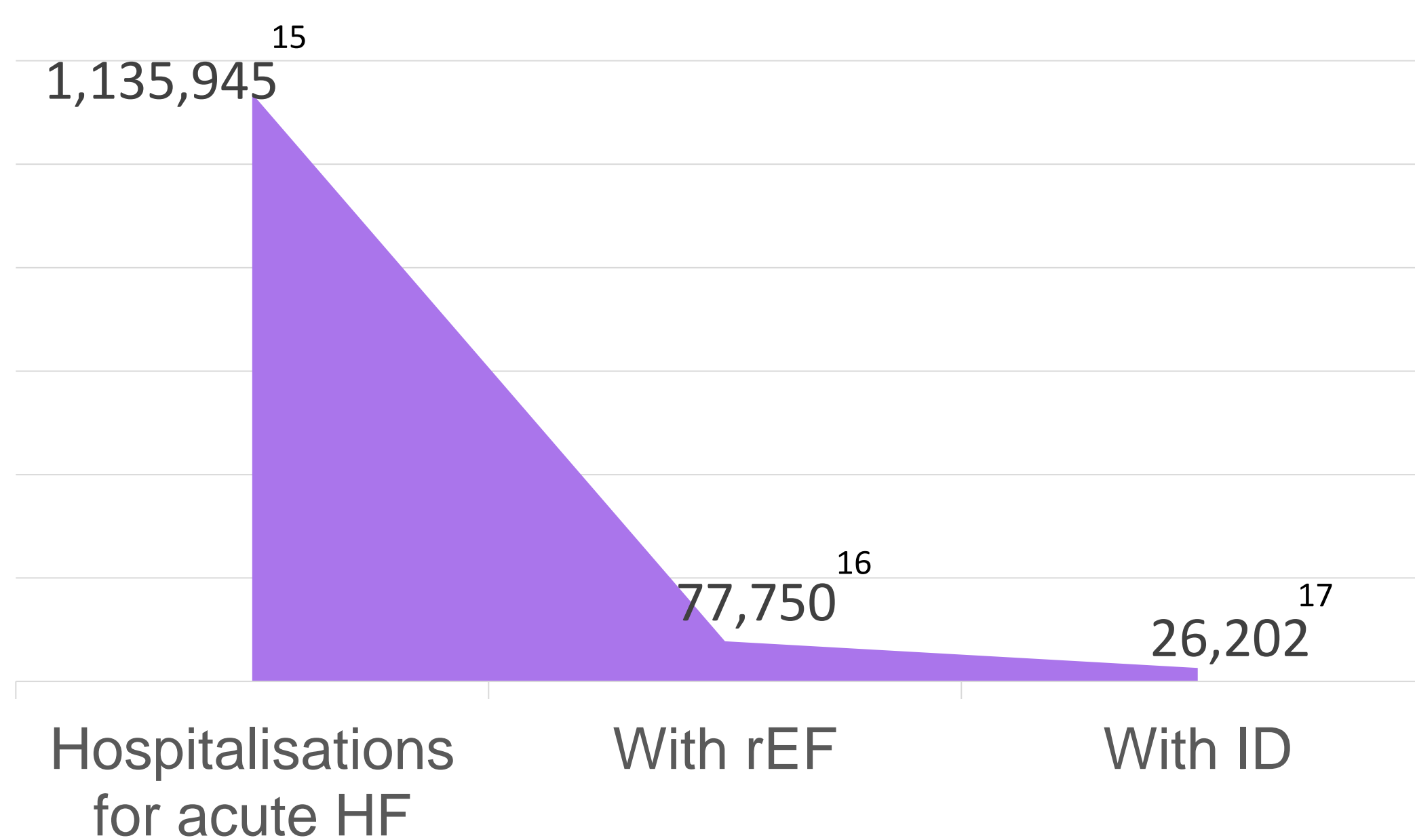
- The global issue of heart failure (HF) is far reaching with an estimated 6.2 million adults ≥ 20 years of age having HF between 2013 and 2016 in the US alone.<sup>1,2</sup>
- In the US and Europe, HF is a leading cause of hospitalisation,<sup>3</sup> with poor quality of life<sup>4</sup>, high mortality rates,<sup>5</sup> and prolonged periods of time hospitalised,<sup>5</sup> increasing financial pressure<sup>1,6,7</sup> and stress on the healthcare system.
- Approximately 50% of individuals with chronic HF<sup>8,9</sup> and up to 80% with acute HF (AHF) are iron deficient.<sup>10,11</sup>
- Iron deficiency (ID) and HF result in outcomes including poor quality of life,<sup>12</sup> hospitalisation, and mortality.<sup>13</sup>
- Therefore, treatment for ID in patients with HF is of high priority.
- Ferric carboxymaltose (FCM) has been proven effective at decreasing hospitalisation risk with heart failure (HHF) in individuals following acute heart failure with reduced ejection fraction (HFrEF) and iron deficiency (ID).<sup>14</sup>

## Objective

- The objective of this study was to estimate the events avoided and cost savings from the introduction of FCM for ID treatment of patients with HFrEF from the perspective of healthcare payers in the United States.

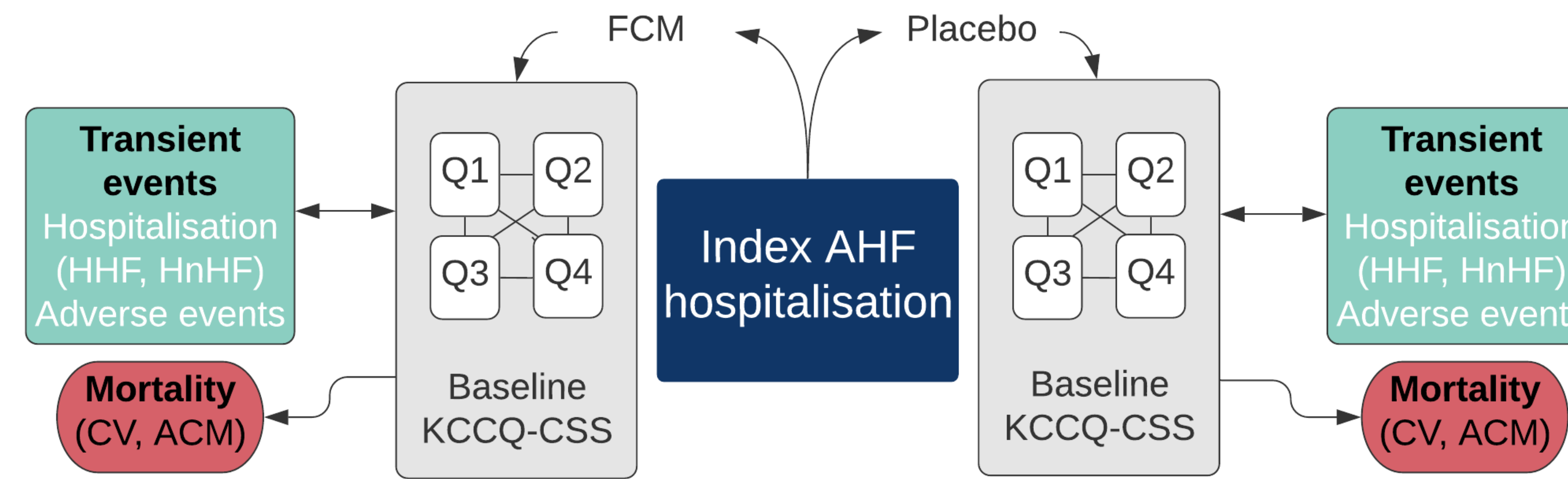
## Methods

- The value of FCM treatment for ID in individuals with HFrEF was deduced using a de novo cost-offset model over a 5 year time period.
- Eligible patient population was estimated from aggregate National Inpatient Sample data in order to identify hospitalised HFrEF population.<sup>15,16</sup> An assumption that 33.7% of these patients had ID was derived from a published report of another setting.<sup>17</sup>
- Derivation of the eligible patient population is outlined below:



- To test the assumption that 33.7% patients hospitalised for AHF have concomitant ID, which was based on a UK-specific retrospective cohort study,<sup>17</sup> scenario analysis was run based on an alternative source – a prospective study in the French setting – where up to 79.4% patients hospitalised for AHF had ID,<sup>6</sup> giving an eligible population of 61,734.
- The AFFIRM-AHF trial<sup>18</sup> was used to capture rates of HHF as seen in **Figure 1**.
- Costings were established from published literature. The mean (SE) cost for hospitalisation for heart failure was \$27,374.07 (2,737.407).<sup>19</sup> Costs of FCM applied over the first two months totalled \$2,118.97.
- The relationship between treatment uptake and events avoided and cost savings was formulated by linear regression.

**Figure 1: Cohort state-transition Markov model used to estimate outcomes for patients with HFrEF and ID following an index hospitalisation for acute HF**

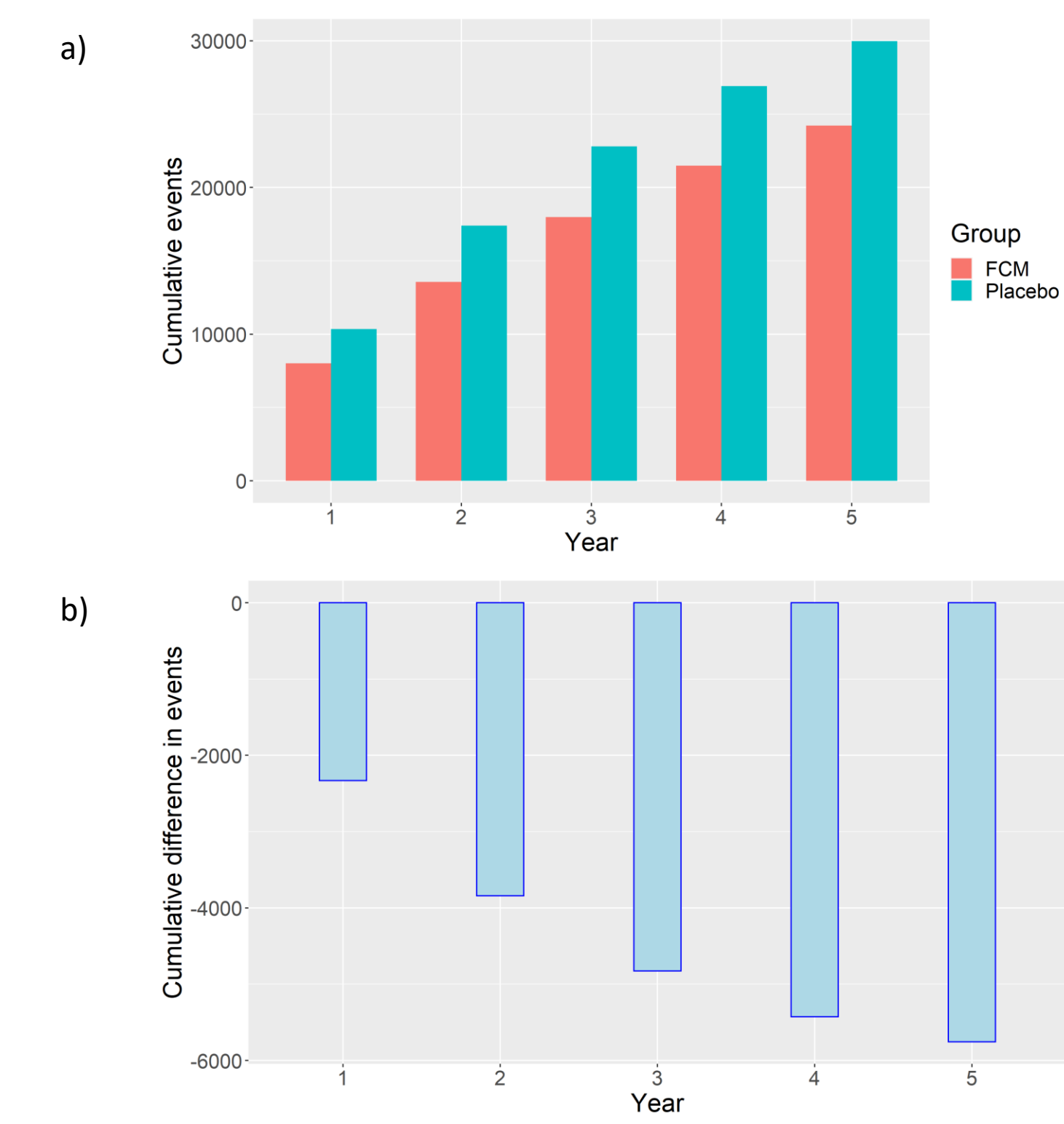


ACM: all-cause mortality; AHF: acute heart failure; CV: cardiovascular; FCM: ferric carboxymaltose; HHF: hospitalisation for heart failure; HnHF: non-heart failure hospitalisation; KCCQ-CSS: Kansas City Cardiomyopathy Questionnaire – Clinical Summary Score; Q1/2/3/4: quartile 1/2/3/4. Figure derived from McEwan et al. 2021<sup>20</sup>

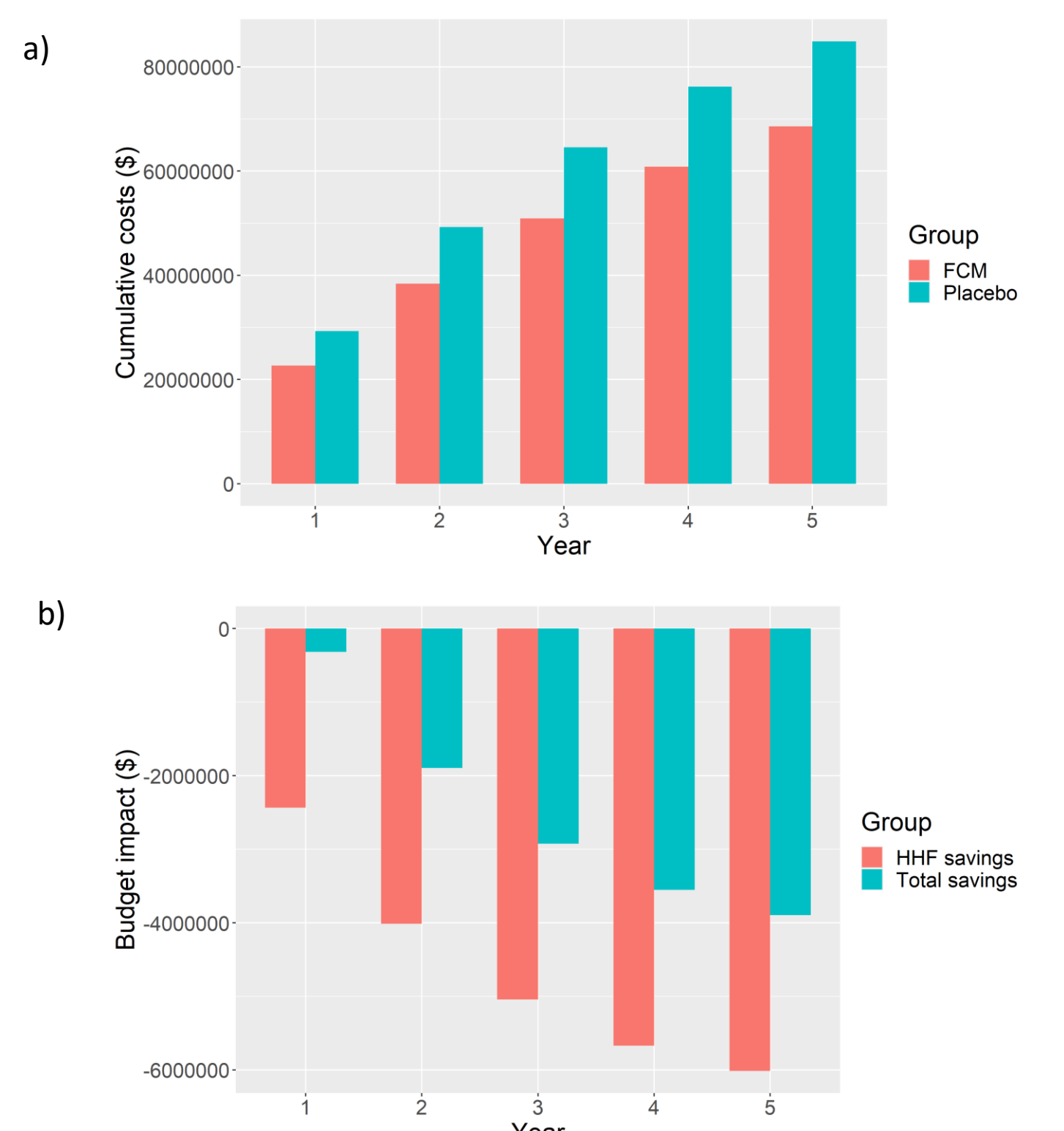
## Results

- Patient hospital admission with HFrEF and ID was estimated to be 26,202.
- Without treatment, patients with HFrEF and ID were associated with 29,973 HHF-related bed days at a cost of \$84.9 million over five years (**Figures 2a and 3a**).
- FCM treatment reduced HF-related days in hospital by 220 days over five years, with a cost saving of \$6.0 million per 1,000 patients. Cost savings decreased to \$3.9 million after accounting for drug acquisition costs (**Table 1, Figure 3b**).
- FCM treatment for all 26,202 patients resulted in reduced HHF-related bed days of 5,755 days and a cost saving of \$102 million when adjusted for FCM acquisition costs (\$158 million without adjustment) over 5 years (**Figure 2b**).
- Comparing retrospective and prospective studies indicates that ID may be underdiagnosed in patients hospitalised for AHF and may affect up to 80% patients.<sup>6</sup> In a scenario where 79.4% patients hospitalised for AHF had ID and were treated with FCM,<sup>6</sup> hospital bed days would be reduced by 13,558 days, with a corresponding cost saving of \$240 million adjusted for FCM treatment costs (\$371 million unadjusted) over 5 years.

**Figure 2: a) HF-related bed days associated with FCM versus placebo b) Difference in cumulative HF-related bed days**



**Figure 3: a) Cost of HF-related bed days associated with FCM versus placebo, b) budget impact associated with FCM versus placebo, per 1,000 patients**



FCM: ferric carboxymaltose; HHF: hospitalisation for heart failure

**Table 1: Model outcomes: HF-related bed days and total cost savings associated with FCM treatment**

Year	Reduction in HF-related bed days/1,000 patients	Hospitalisation cost savings/1,000 patients	Total cost savings/1,000 patients
Year 1	-89	-\$2,432,498	-\$316,528
Year 2	-147	-\$4,014,159	-\$1,895,189
Year 3	-184	-\$5,043,634	-\$2,924,664
Year 4	-207	-\$5,669,085	-\$3,550,115
Year 5	-220	-\$6,012,083	-\$3,893,113

FCM: ferric carboxymaltose; HF: heart failure; HHF: hospitalisation for heart failure

## Conclusion

- Treatment with FCM for ID in HFrEF patients has the potential to reduce HHF burden and provide cost savings to the US healthcare system.
- FCM treatment positively impacted on cost and increased the quality of life for patients living with HF and ID.

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