

Alleviating the Burden of Iron Deficiency in Heart Failure: A Multinational European Study

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INTRODUCTION

- Heart failure (HF) affects 1-2% of adults in developed countries, disproportionately affecting elderly patients with 1 in 10 over 70s diagnosed with the condition¹
- Iron deficiency (ID), a common comorbidity in HF patients², is an independent predictor of recurrent hospitalisations and mortality^{3,4}, and is shown to reduce exercise capacity and worsen quality of life (QoL) in HF patients^{3,5,6}
- Ferric carboxymaltose (FCM), an intravenous (IV) iron therapy, has a robust, established benefit-risk profile based on an extensive clinical trial program
- Data from AFFIRM-AHF demonstrated that FCM treatment reduced risk of HF hospitalisations (HHF) at discharge in patients hospitalised for acute HF (AHF) with left ventricular ejection fraction (LVEF) <50%⁷
- FCM is recommended by the European Society of Cardiology (ESC) for consideration in treatment of ID in HF patients to alleviate symptoms, improve exercise capacity and QoL, and reduce HF rehospitalisations⁴

OBJECTIVES

- This study aims to evaluate the burden of disease in ID patients hospitalised after an episode of AHF with LVEF <50%, and to assess patient and health system outcomes of introducing FCM in five European countries






METHODS

- A targeted literature review was undertaken to estimate the eligible population, as per the inclusion criteria of AFFIRM-AHF⁷ and in alignment with the ESC guidelines⁴
- Quantification of the clinical burden on patients was presented as disability adjusted life years (DALYs), hospitalisation episodes, and hospital bed days
- DALYs were calculated as a composite of years of life lost (YLL) due to premature mortality, and years lived with disability (YLD)
- Monthly mortalities were simulated using data from AFFIRM-AHF, with country-specific life expectancy data used to calculate YLL. The effect of ID treatment in the eligible population was estimated using disability weights for HF, stratified by severity
- Disability weights for patients receiving standard of care (SoC) were estimated as the average of the weights for patients with moderate and severe HF, with the improvement in QoL due to treatment with FCM represented by an average of improvements by one severity class
- Disability weights were applied to the total number of living patients, and the average duration of disability was used to calculate YLD for each study arm
- The effect of FCM treatment versus SoC on hospital capacity was estimated, using AFFIRM-AHF data. Estimations of hospital bed days avoided within each healthcare system were derived from differences in length of stay and total HHF events
- >60% of AFFIRM-AHF trial participants were enrolled from Europe, therefore it was assumed the results were generalisable across all investigated European country settings

RESULTS

- Estimated eligible population was 71,770 in France; 197,919 in Germany; 72,727 in Poland; 44,863 in Spain; and 5,019 in Sweden (**Table 1**)


Table 1: Eligible population calculation for each country

Event	Proportion	 France	 Germany	 Poland	 Spain	 Sweden	TOTAL
Hospitalised for AHF [†]	100%	130,333	359,415	132,071	81,470	9,115	712,404
With LVEF <50% [‡]	73.13%	95,313	262,840	96,583	59,579	6,666	497,438
With ID [§]	75.30%	98,141	270,640	99,449	61,347	6,863	536,440
Eligible population	55.07%	71,770	197,919	72,727	44,863	5,019	392,298

[†] France: Tuppin et al. (2014)⁸; Germany: calculated from reported HHF⁷ with adjustment for rehospitalisation¹⁰; Poland: calculated from reported HHF adjusted for re-hospitalisations (MPZ, 2020)¹¹; Spain: calculated from crude HHF rate⁸ scaled to Spanish domestic population (INE, 2021)¹² and adjusted for rehospitalisations¹⁰; Sweden: calculated from registered HF patients scaled to 1-year incidence¹³ with a ratio applied of hospitalised patients to outpatient CHF patients to calculate the proportion of patients presenting as acute¹⁵.
[‡] Proportion calculated as an average of reported values in the literature¹⁶⁻¹⁸.
[§] Proportion calculated as an average of reported values in the literature¹⁹⁻²².
AHF: acute heart failure; CHF: chronic heart failure; HF: heart failure; HHF: hospitalization for heart failure; ID: iron deficiency; LVEF: left ventricular ejection fraction

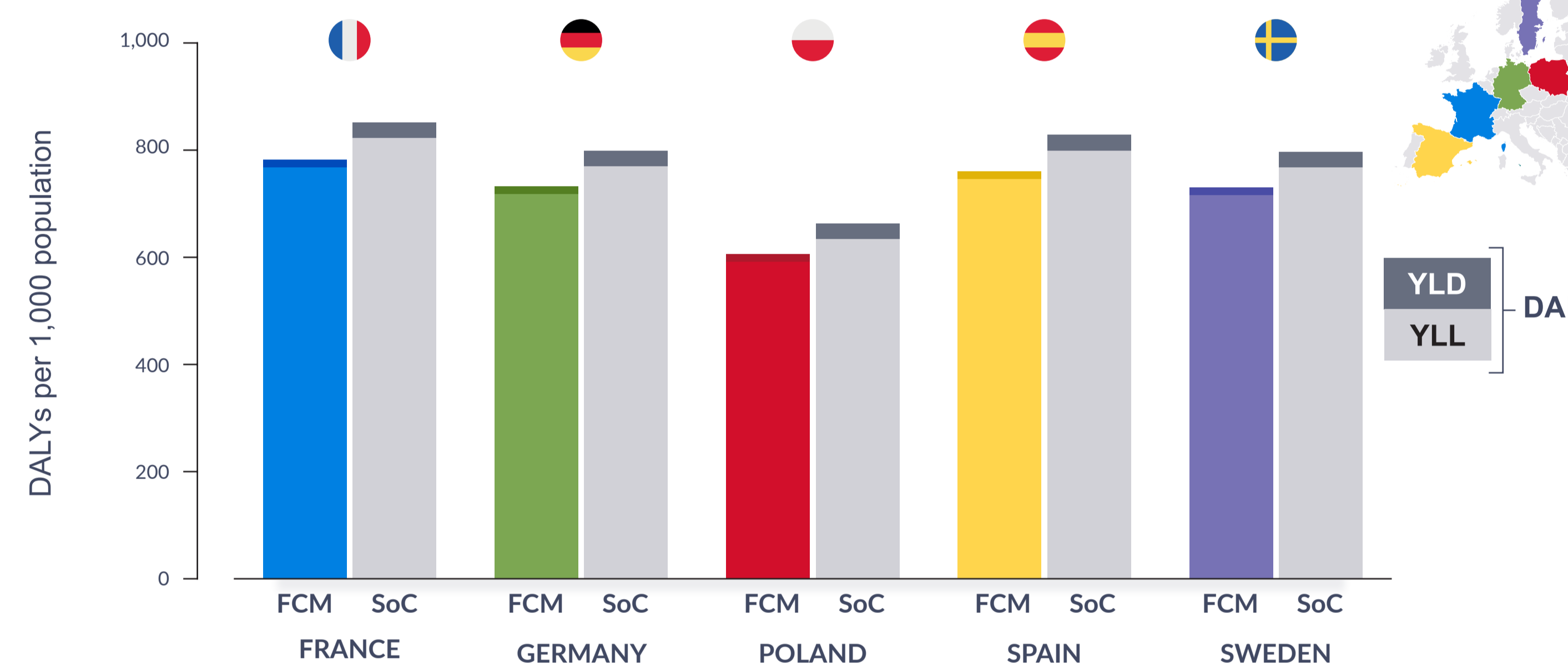
- Extrapolating AFFIRM trial data to estimated eligible populations for FCM treatment was shown to improve DALYs across all five European countries (**Table 2**, **Figure 1A** and **Figure 1B**). The number of DALYs averted were 5,055 in France; 13,238 in Germany; 4,203 in Poland; 3,142 in Spain; and 335 in Sweden
- The avoided hospitalisations and reported shortened length of stay associated with FCM therapy result in an improvement of hospital capacity. In the first year, total bed days averted across all countries were: 74,566 in France; 205,630 in Germany; 75,561 in Poland; 47,398 in Spain; and 5,215 in Sweden
- FCM treatment at discharge was shown to reduce HHF annually: 4,581 in France; 12,633 in Germany; 4,642 in Poland; 2,912 in Spain; and 321 in Sweden

Table 2: Components of disability-adjusted burden of disease outcomes at 1 year across eligible incident population

Component	 France			 Germany			 Poland			 Spain			 Sweden		
	FCM	SoC	Δ	FCM	SoC	Δ	FCM	SoC	Δ	FCM	SoC	Δ	FCM	SoC	Δ
Per 1,000 population															
YLD	15	30	-15	15	30	-15	15	30	-15	15	30	-15	15	30	-15
YLL	767	822	-55	718	769	-52	591	633	-43	745	799	-54	716	767	-51
DALYs	782	852	-70	732	799	-67	606	663	-58	760	829	-69	730	797	-67
Per eligible population															
YLD	1,057	2153	-1,096	2,916	5,938	-3,022	1,071	2,182	-1,111	672	1,369	-697	74	151	-77
YLL	55,046	59,006	-3,959	142,016	152,231	-10,215	42,979	46,071	-3,091	34,002	36,448	-2,446	3,591	3,850	-258
DALYs	56,104	61,159	-5,055	144,931	158,169	-13,238	44,050	48,253	-4,203	34,674	37,816	-3,142	3,665	4,000	-335

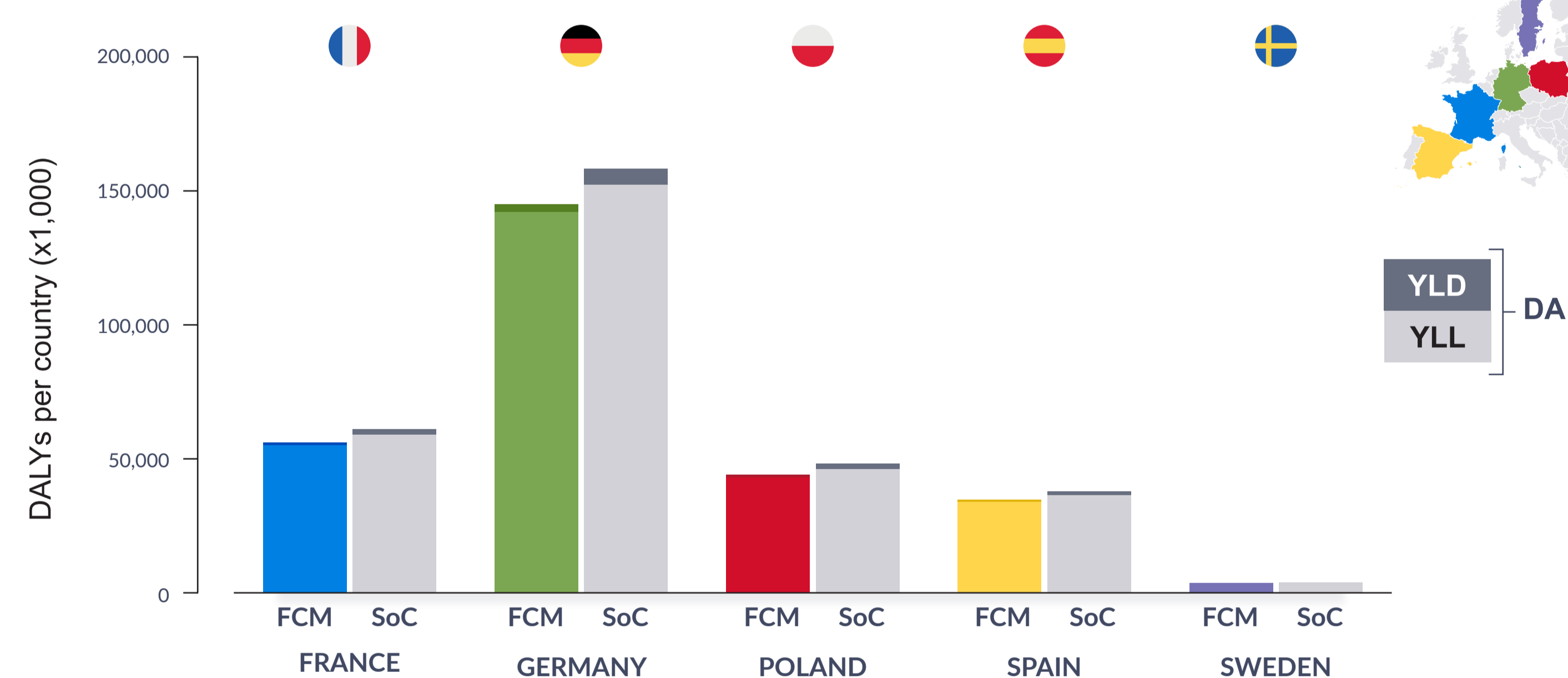
YLD: Years lived with disability; YLL: years of life lost; DALY: disability-adjusted life year; FCM: ferric carboxymaltose; SoC: standard of care. Incremental represents the possible averted outcomes by use of FCM.

Figure 1A: DALY breakdown associated with FCM treatment versus SoC per 1,000 population



FCM: ferric carboxymaltose; SoC: standard of care; YLL: Years lost of life; YLD: years lost due to disability.

Figure 1B: DALY breakdown associated with FCM treatment versus SoC per per country population



FCM: ferric carboxymaltose; SoC: standard of care; YLL: Years lost of life; YLD: years lost due to disability.

CONCLUSION

- FFCM for the treatment of ID has been shown to be effective in reducing the burden of HF in this patient population, compared to SoC
- Across all five European countries, FCM treatment resulted in avoidance of DALYs and an improved hospital capacity
- Results highlight potential benefits of implementing FCM treatment at discharge in patients hospitalised after an episode of AHF with LVEF <50%, as a treatment strategy to significantly improve quality of life and healthcare capacity

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Disclosures

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