Cost-effectiveness of empagliflozin for the treatment of patients with heart failure with above 40% ejection fraction in England

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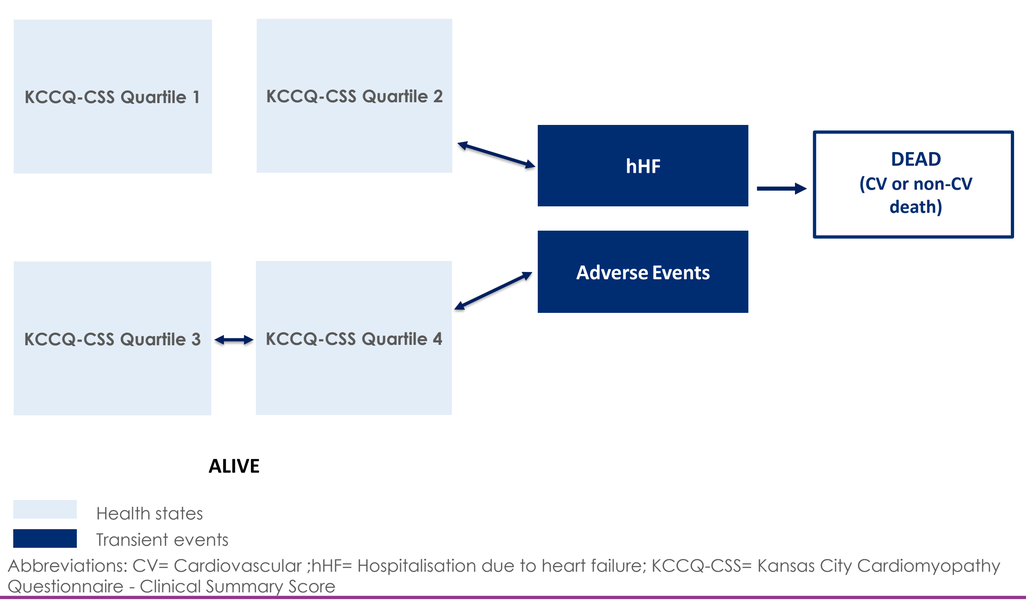
PURPOSE

- Heart failure (HF) is a progressive condition wherein the heart is unable to pump blood sufficiently to meet the body's needs for oxygen.
- Currently, there are no recommended evidence-based targeted treatments for the HF phenotype with ejection fraction >40% (HF>40%EF), and a combination of therapies aiming to relieve patients' symptoms are used.
- The EMPEROR-Preserved trial showed that empagliflozin is clinically effective compared to placebo, both added to Standard of Care (SoC), for HF>40%EF.[1]
- A Markov model was used to examine the cost-effectiveness of empagliflozin for HF>40%EF for the National Health Service England (NHSE).

METHODS

- The modelling approach considered the current treatment landscape, and the EMPEROR-Preserved trial data, including capturing the trial's primary outcomes (hospitalisation due to heart failure [hHF] and cardiovascular death).
- The model's health states were based on Kansas City Cardiomyopathy Questionnaire (KCCQ) quartiles of the EMPEROR-Preserved population.
- Cost categories included drug acquisition and resource use, and disease and adverse events management.[2]
- EQ-5D-3L utility data with UK tariffs were included.
- The model's outcomes included costs, hHF, life-years (LY) and quality-adjusted LY (QALY), which were discounted at a 3.5% annual rate.
- Probabilistic sensitivity analysis was performed to test the uncertainty surrounding the model's estimates
- Subgroups analyses were performed to explore if different patient characteristics influence the results

Figure 1. Model structure



Abbreviations: CV= Cardiovascular ;hHF= Hospitalisation due to heart failure; KCCQ-CSS= Kansas City Cardiomyopathy Questionnaire - Clinical Summary Score

RESULTS

- Over a lifetime horizon, empagliflozin + SoC compared to SoC alone resulted in increased LYs (6.87 vs. 6.79) and QALYs (4.30 vs. 4.20), and higher total lifetime costs (£11,499 vs. £10,092) (Table 1).
- The incremental cost-effectiveness ratio was £19,053/LY and £14,851/QALY, well below the willingness-to-pay threshold of £20,000, which is a commonly accepted threshold by the National Institute for Health and Care Excellence (NICE).
- In addition, empagliflozin + SoC resulted in fewer hHF compared to SoC (7.38 vs 8.37 per 100 patient-years).
- Probabilistic sensitivity analysis showed results similar to base case (Table 3).
- Based on the 1,000 iterations in the probabilistic sensitivity analysis, there was a 56% probability that empagliflozin + SoC would be cost-effective vs SoC (Figure 2).
- ICERs for all subgroup analyses were below £20,000 (Table 4).

Table 1. Cost-effectiveness results

Outcome	Empagliflozin + SoC	SoC	Incremental	ICER
Total Cost	£11,499	£10,092	£1,407	£14,851
Total QALYs	4.30	4.20	0.095	
Total LYs	6.87	6.79	0.07	£19,053

Table 2. Breakdown of outcomes per patient

Cost outcomes per patient	Empagliflozin + SoC	SoC	Incremental
Drug Acquisition Cost	£3,315	£1,634	£1,681
Clinical Event Management Cost	£3,081	£3,366	-£285
Adverse events Management Cost	£1,837	£1,862	-£25
Disease Management Cost	£3,265	£3,230	£35
Total Cost	£11,499	£10,092	£1,407

Figure 2. Probabilistic sensitivity analysis results: cost-effectiveness plane

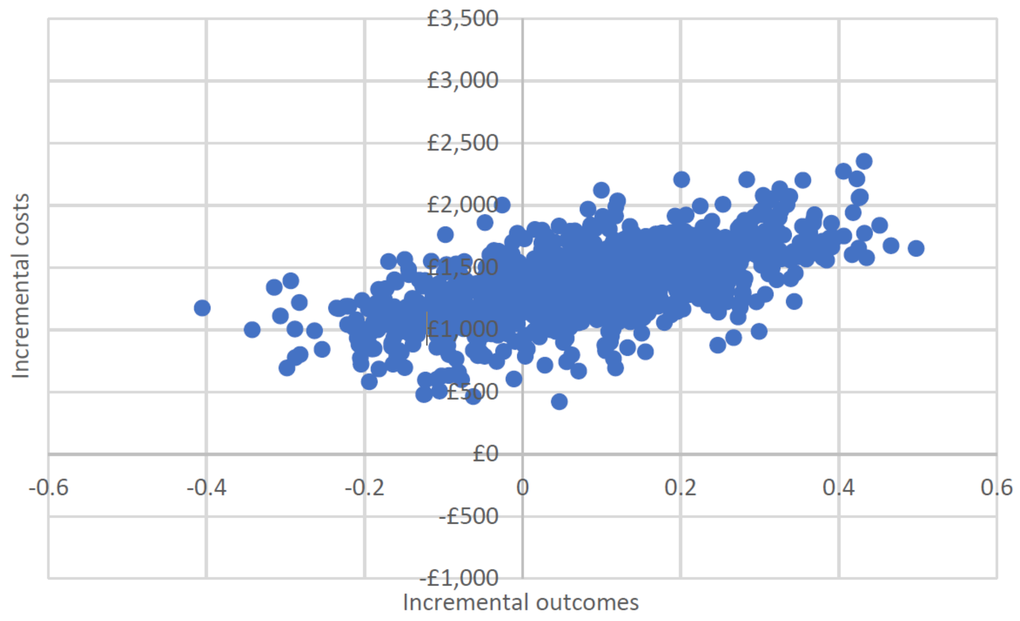


Table 3. Probabilistic sensitivity analysis cost-effectiveness results

Outcomes	Mean difference	Lower 95% CI	Upper 95% CI	ICER
Costs	£1,400	£808	£1,958	-
QALY	0.09	-0.19	0.37	£15,359
LYs	0.07	-0.25	0.40	£20,216

Table 4. Cost-effectiveness results by subgroups

Subgroup	ICER (cost/ QALY gained)	% change from base-case
T2DM at baseline	£15,254	2.7
No T2DM at baseline	£14,360	-3.3
Baseline age < 65 years	£17,866	20.3
Baseline age ≥ 65 years	£13,822	-6.9
Baseline eGFR < 60 mL/min/1.73m^2	£13,967	-6.0
Baseline eGFR ≥ 60 mL/min/1.73m^2	£17,182	15.7

CONCLUSION

- Empagliflozin has demonstrated to be the first efficient and cost-effective treatment option for HF>40%EF patients treated in the NHSE setting, which is largely due to its impact on reducing hHF and cardiovascular deaths.

References

1. Anker SD, et al. N Engl J Med. 2021;385(16):1451-1461
2. National Health Service England. National Cost Collection 2020/21. https://www.england.nhs.uk/costing-in-the-nhs/national-cost-collection/

Declaration of interest
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