

Real-World Healthcare Costs of Advanced Metabolic Dysfunction-Associated Steatohepatitis in England: A Cohort Study With Comparison to Modeled Estimates

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INTRODUCTION

- Metabolic dysfunction-associated steatohepatitis (MASH) is a progressive liver disease that can advance to cirrhosis, decompensated cirrhosis (DCC), hepatocellular carcinoma (HCC), and death.¹⁻³
- Economic models commonly assume an incremental healthcare cost increase as patients progress from earlier disease stages to advanced liver disease.^{4,5} However, real-world cost estimates for advanced stages of MASH remain limited.

OBJECTIVE

- To estimate healthcare costs among patients with MASH in England and evaluate how costs change with progression to advanced liver disease.

METHODS

- Retrospective cohort study using Clinical Practice Research Datalink (CPRD) Aurum primary care electronic health records linked to Hospital Episode Statistics (HES) secondary care reimbursement and Office for National Statistics mortality data.
- Adults diagnosed with MASH (as recorded in CPRD or HES) between 2011 and 2020 were included.
- All-cause healthcare costs were calculated as annualized mean and standard deviation (SD) all-cause per-patient-per-year (PPPY) estimates.
- Costs were estimated using contemporaneous National Health Service (NHS) unit costs and inflated to 2023/2024 £ using NHS inflation indices.⁶
- Mean costs were assessed overall and stratified by progression to cirrhosis, including DCC and HCC, among patients with ≥12 months follow-up.

RESULTS

- A total of 2,696 patients with MASH were included, with mean follow-up of 4 years.
- Among patients who progressed to cirrhosis (n=349), mean inpatient costs were substantially higher than among those who did not progress (n=2,347) (£4,145 [SD £7,440] vs. £1,477 [SD £4,505] PPPY) (**Table 1**).
- Costs increased further with progression to advanced liver disease (**Figure 1**). Among patients with DCC (n=163), mean total healthcare costs were £6,859 [SD £9,476] PPPY within the first year of follow-up, £7,763 [SD £11,182] PPPY in the second year, and £10,166 [SD £28,085] by the third year.
- Inpatient care contributed substantially to the DCC cost burden, accounting for more than half (56%; £3,812 [SD £8,043]) of total healthcare costs in the first year of follow-up and an increasing proportion in subsequent years (61%; £4,732 [SD £9,517] in year 2 and 72%; £7,317 [SD 27,105] in year 3).
- Among patients with HCC (n=14), total healthcare costs were £5,003 [SD 4,575] PPPY within the first year of follow-up, £6,267 [SD £6,147] PPPY in the second year, and £6,468 [SD £7,952] by the third year.
- Based on the real-world primary and secondary care data, healthcare costs were lower for HCC than for DCC, differing from published modeling studies^{4,7} that projected a greater cost burden for HCC.

LIMITATIONS

- Advanced liver disease states were identified from routine clinical codes.
- Fibrosis staging data are not directly recorded within the data sources.
- The HCC subgroup was small, with only 14 patients.
- Some oncology-related costs, particularly systemic anticancer therapy, are not fully captured in CPRD-HES data.

CONCLUSION

- The findings support the expectation that healthcare costs increase as MASH progresses to cirrhosis and advanced liver disease. However, the observed pattern for advanced disease states differed from some modeled estimates, with DCC costs exceeding HCC costs in this real-world cohort. This difference is likely due to incomplete capture of oncology-related costs within this study.
- Potential explanations include differences in data source, costing methodologies, follow-up duration, healthcare setting, and incomplete capture of oncology-related costs. The small number of patients with HCC should also be considered when interpreting subgroup estimates.

RESULTS

FIGURE 1. Annual Mean Healthcare Costs Following Progression to DCC and HCC

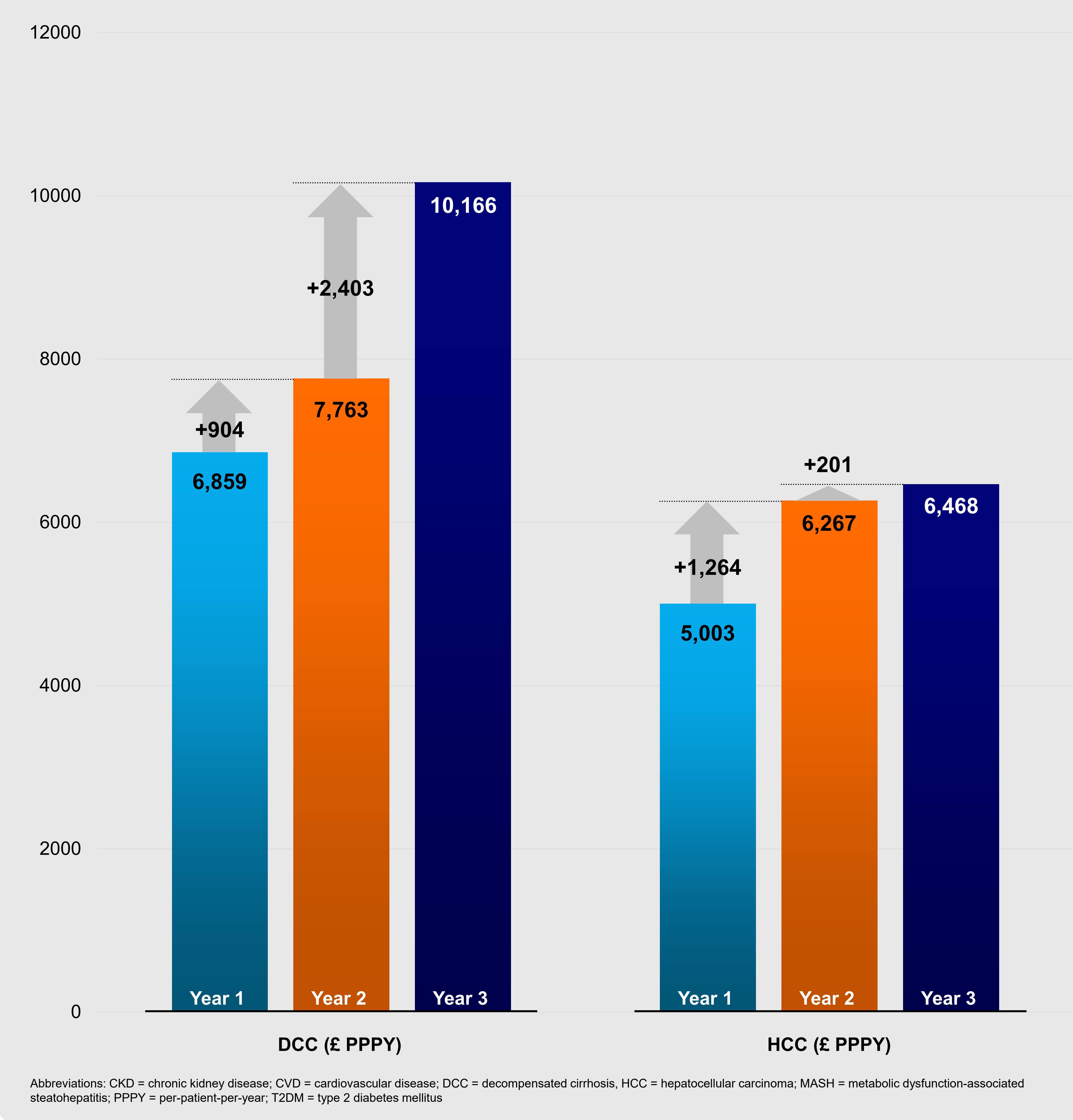


TABLE 1. Mean Healthcare Costs Associated With Progression to Advanced Liver Disease (inflated to 2023/2024 £)

Progression Status	N	Mean Cost Estimate
No progression to cirrhosis	2,347	£1,477 PPPY inpatient costs
Progression to cirrhosis	349	£4,145 PPPY inpatient costs
DCC		
Year 1	163	£6,859 PPPY healthcare costs
Year 2	163	£7,763 PPPY healthcare costs
Year 3	145	£10,166 PPPY healthcare costs
HCC		
Year 1	14	£5,003 PPPY healthcare costs
Year 2	14	£6,267 PPPY healthcare costs
Year 3	13	£6,468 PPPY healthcare costs

Abbreviations: DCC = decompensated cirrhosis, HCC = hepatocellular carcinoma, PPPY = per-patient per-year

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