

Differential Target Multiplexed (DTM) SCS: A UK Cost-Effectiveness Model

Ashish Gulve¹, Vivek Mehta², David A. Provenzano³, Simon Eggington⁴, Shanti Scheffler⁴, Nicolas C. Gasquet⁵, Christine N. Ricker⁵

Introduction

Spinal cord stimulation (SCS) therapy is a long-established treatment for chronic low back pain (CLBP), providing significant benefits and treatment satisfaction compared to conventional medical management (CMM). Differential target multiplexed (DTM)-SCS is a recent development to the therapy, using multiplexed electrical pulses to target the modulation of glial cells and neurons.

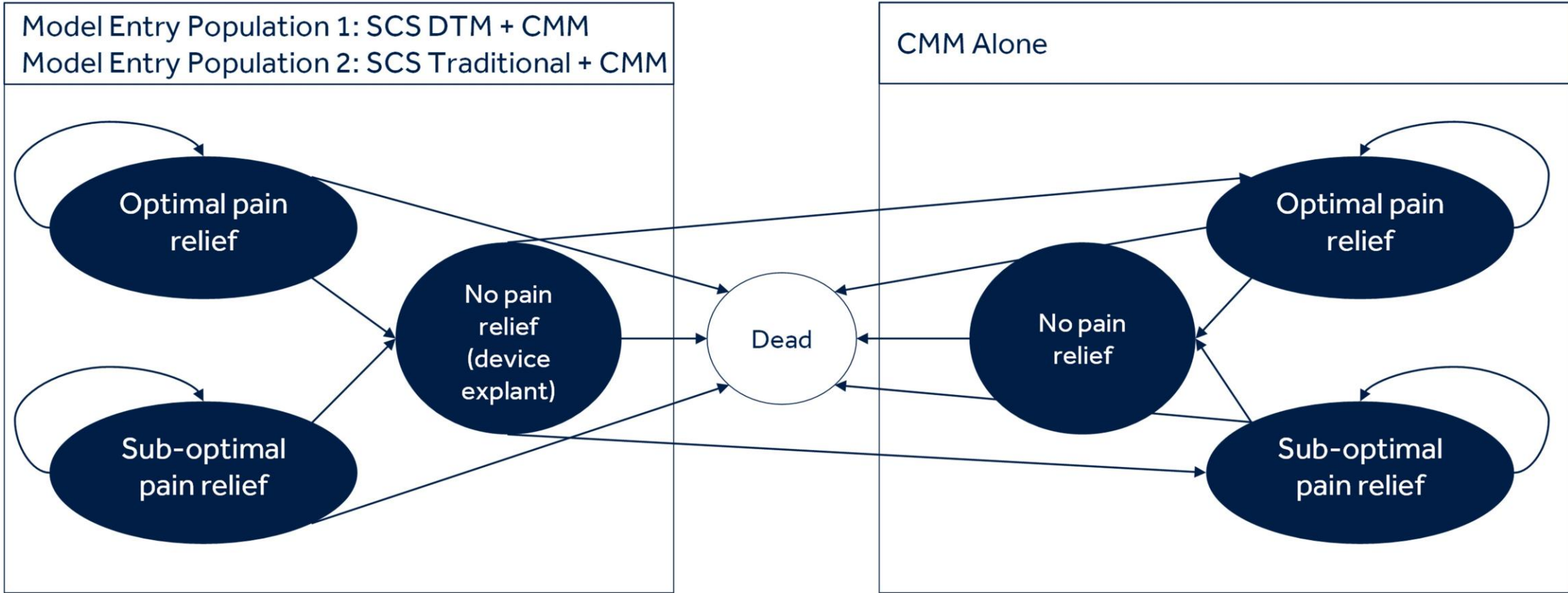
Objective

This study expanded the UK NICE model by assessing the cost-effectiveness of DTM in comparison to CMM and conventional (C)-SCS.

Methods

- The model compared DTM-SCS, C-SCS and CMM.
- Costs were based upon UK NHS data, and model inputs derived from published literature and deidentified sources.
- A single SCS system was modelled for both C-SCS and DTM-SCS cohorts, with SCS groups continuing to receive CMM.
- A 12-month decision tree phase followed by a Markov model to 15-year follow-up was used, with three-month cycles (Figure 1).
- Optimal pain relief was defined as $\geq 50\%$ improvement in VAS back pain.
- Costs and quality-adjusted life-years (QALYs) were calculated over the 15-year period, using deterministic and one-way sensitivity analyses, and probabilistic sensitivity analyses performed to explore the effect of the joint uncertainty in all model inputs.

Figure 1. Markov model structure



23rd Annual Pain Medicine Meeting

November 21-23, 2024 | #ASRAFALL24

ASRA
PAIN MEDICINE

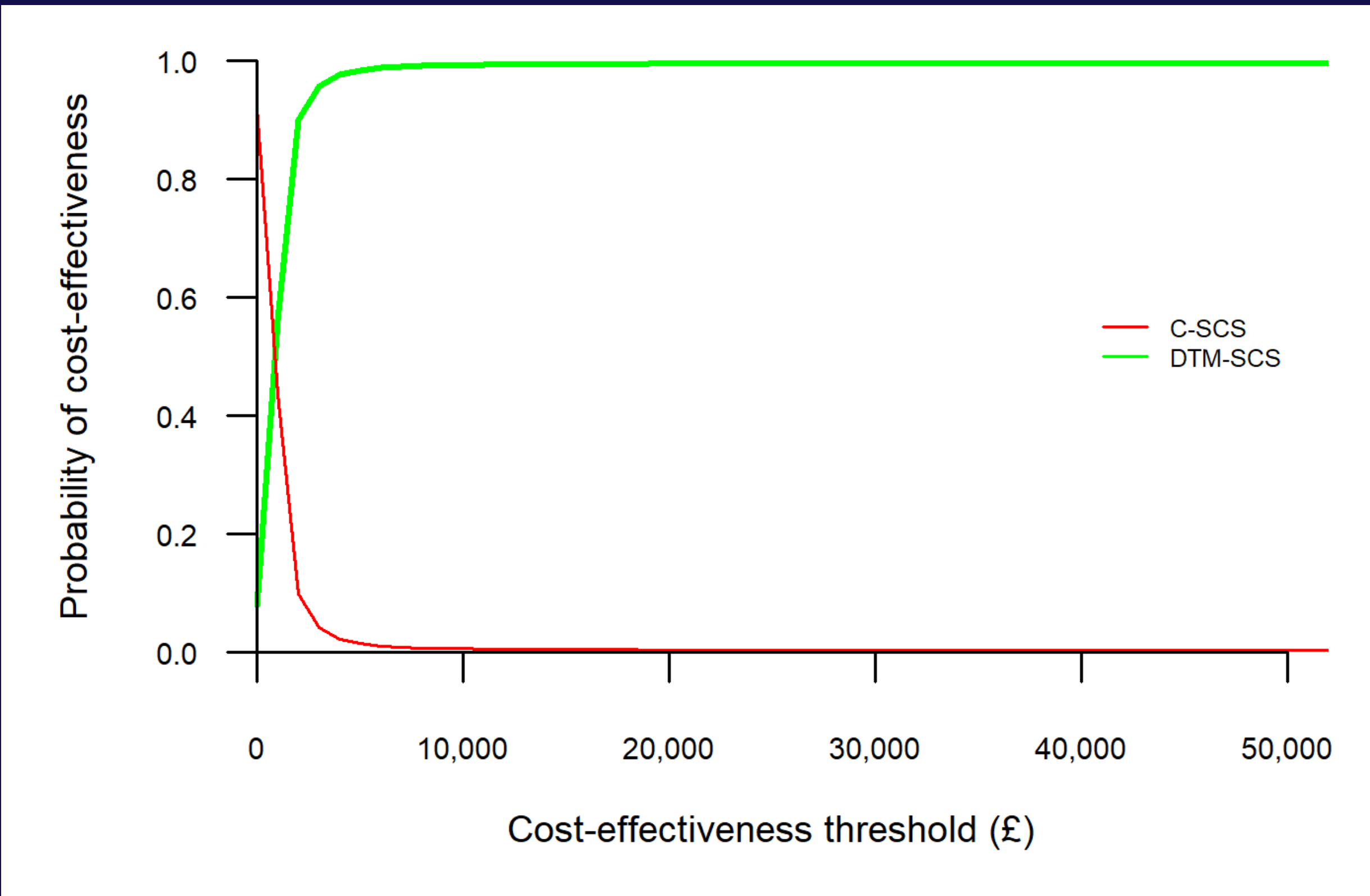
Main Results

Over a 15-year follow-up period, DTM-SCS is cost-effective for treating patients with LBP from both payer and societal perspectives.

While both DTM-SCS and C-SCS are cost-effective compared to CMM in the long term, DTM-SCS achieved a lower ICER than C-SCS.

These findings advocate for the broader adoption of DTM-SCS in the UK healthcare system for managing CLBP.

Figure 2. Cost-effectiveness acceptability for DTM-SCS vs. C-SCS



Full-Manuscript

Gulve, A., Mehta, V., Provenzano, D. A., Eggington, S., Scheffler, S., Gasquet, N. C., & Ricker, C. N. (2024). Differential Target Multiplexed Spinal Cord Stimulation: A UK Cost-Effectiveness Analysis. *Neuromodulation : journal of the International Neuromodulation Society*, 27(5), 908-915. <https://doi.org/10.1016/j.neurom.2024.02.009>

Results (cont.)

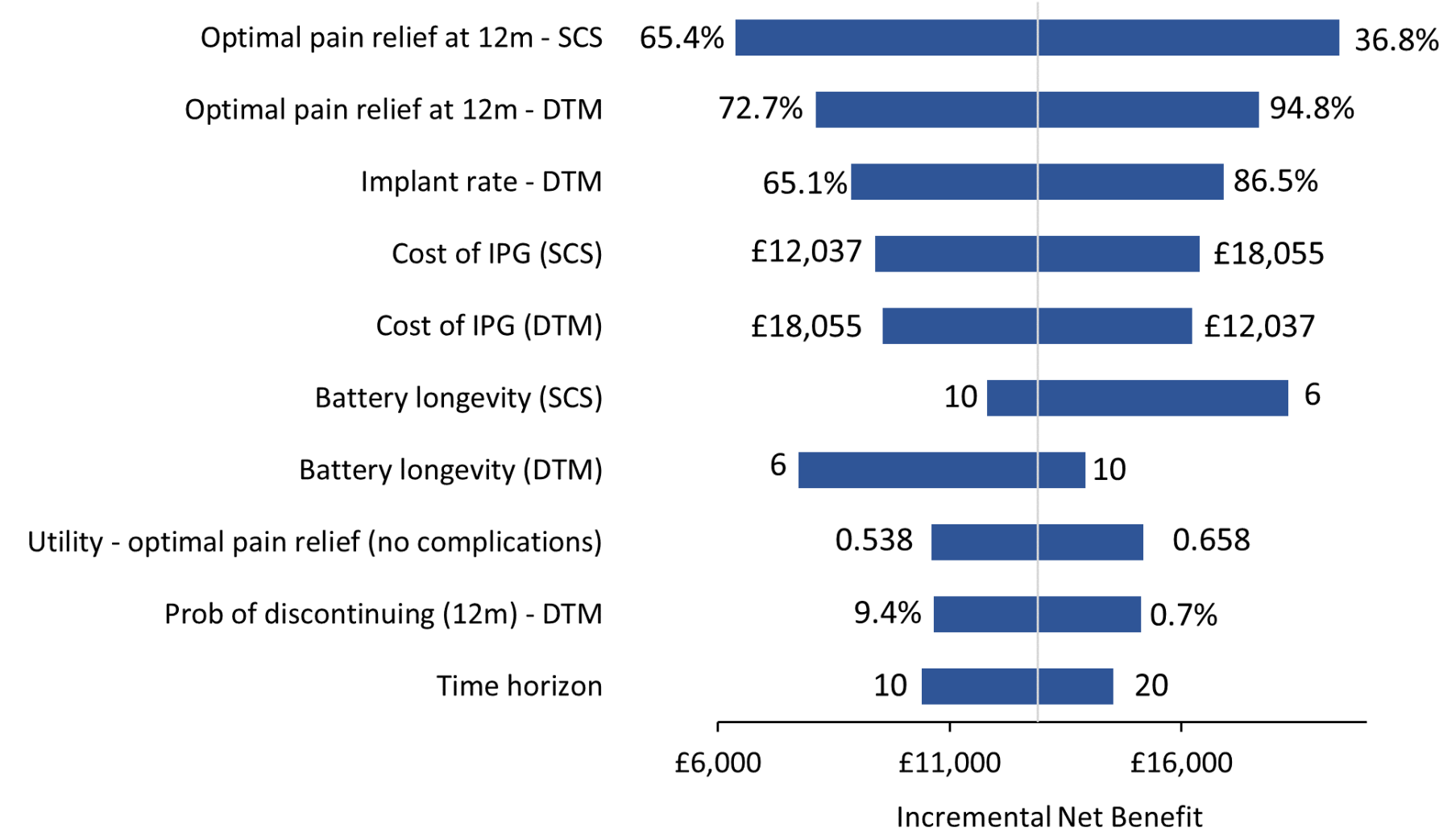
After the discounted mean costs, QALYs, and life-years associated with each treatment group were calculated over a 15-year time horizon, the ICER for each pairwise comparison was:

- £10,111 per QALY gained for C-SCS vs CMM (incremental net benefit [INB] = £8551)
- £6,101 per QALY for DTM-SCS vs CMM (INB = £21,281)
- £897 per QALY for DTM-SCS vs C-SCS (INB = £12,730)

Table 1. Cost-Effectiveness Ratios

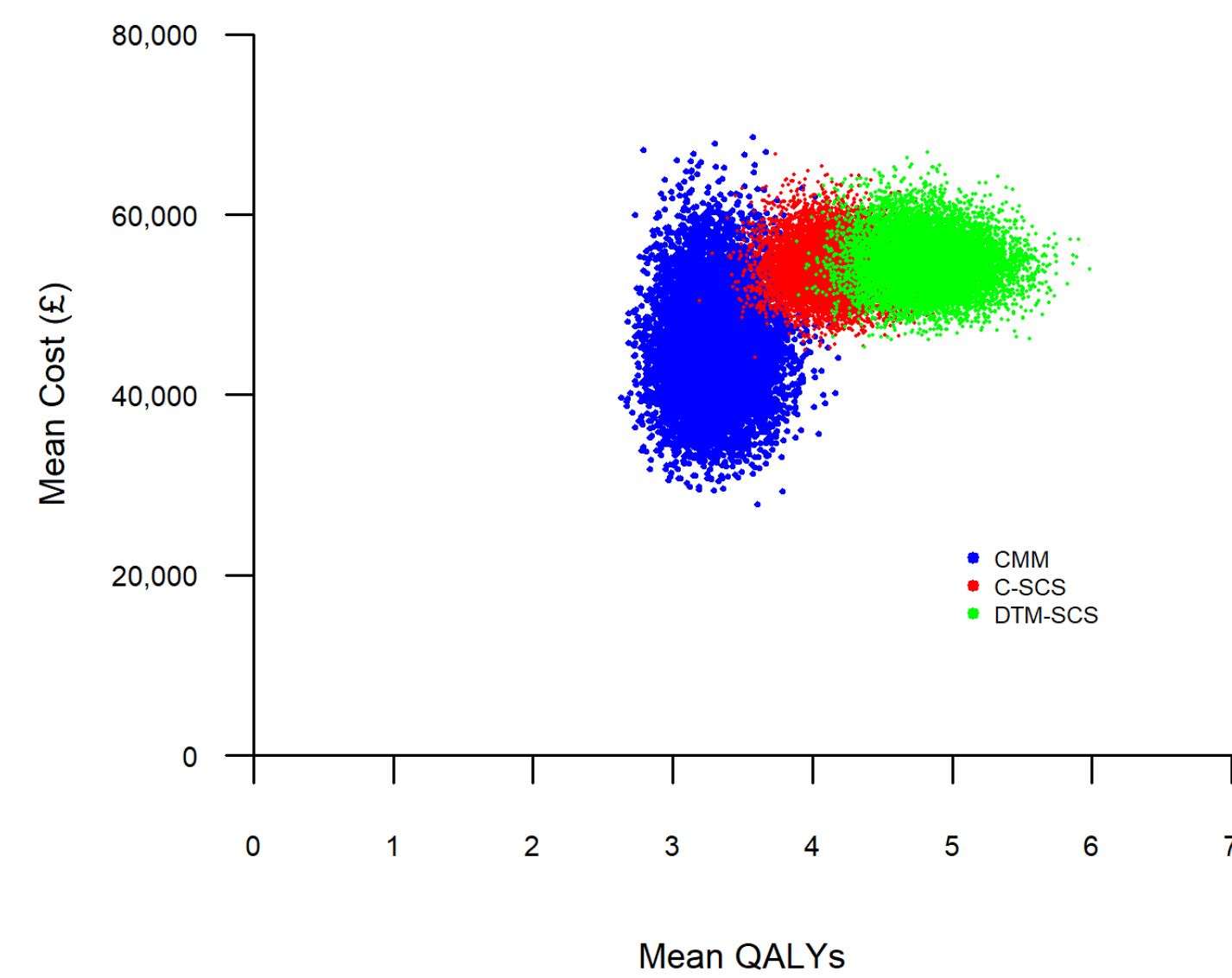
Treatment group	Costs	QALYs	ICER (vs CMM)	ICER (vs C-SCS)
CMM	£45,426	3.29		
C-SCS	£54,169	4.16	£10,111	
DTM-SCS	£54,767	4.82	£6,101	£897

Figure 3. Sensitivity Analysis of DTM-SCS vs. C-SCS



Key drivers of uncertainty in the comparison of C-SCS and DTM-SCS were the optimal pain relief rates, the full-implant rate of patients in the DTM-SCS group, and the cost and longevity of each device. In all scenarios, DTM-SCS was predicted to be cost-effective vs C-SCS at a threshold of £20,000 per QALY gained.

Figure 4. Cost-Effectiveness Costs and QALYs



The point clouds show that costs and QALYs are higher for C-SCS and DTM-SCS than for CMM, with QALY gains for both SCS modalities vs CMM. Costs were similar in the two SCS groups, with greater QALYs predicted for DTM-SCS.

Affiliations:

- James Cook University Hospital, Middlesbrough, UK
- St. Bartholomew's Hospital, London, UK
- Pain Diagnostics and Interventional Care, Edgeworth Medical Commons, Sewickley, PA, USA
- Medtronic International Trading Sarl, Tolochenaz, Switzerland
- Medtronic, Plc, Minneapolis, MN, USA