

# OPTIMIZING HEALTHCARE EXPENDITURE FOR SPINAL CORD STIMULATION IN ITALY: VALUE OF BATTERY LONGEVITY IMPROVEMENT AND A DIRECT-TO-IMPLANT APPROACH

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## Background & Objectives

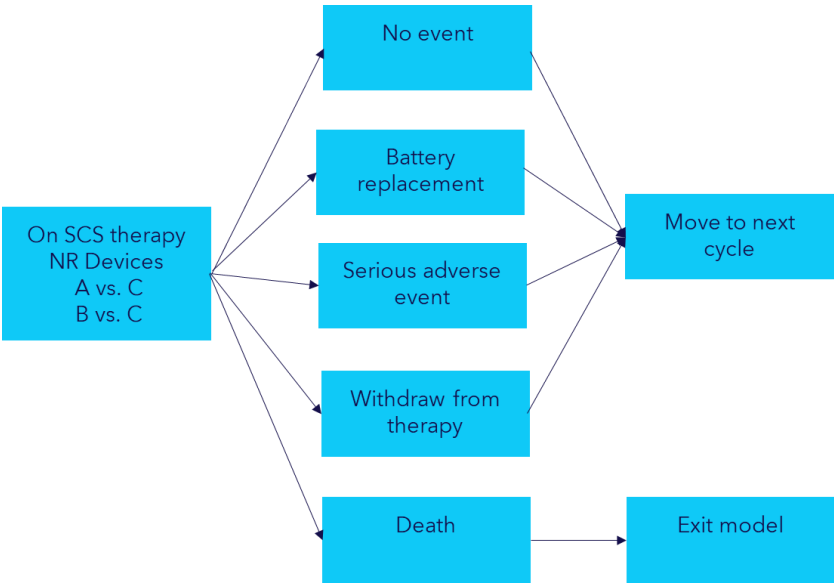
Spinal Cord Stimulation (SCS) is a treatment for chronic intractable pain powered by an implantable pulse generator with a rechargeable or non-rechargeable (NR) battery. SCS is performed in two stages (a trialling phase, followed by permanent device implantation); however, this necessitates two hospitalizations and may increase infection risk.<sup>1</sup> This analysis explores the cost impact of both improvements in battery longevity and the adoption of a 1-step (direct-to-implant) SCS approach within the Italian National Health System (NHS).

## Methods

Since 2019, three leading NR SCS devices have been launched: Device A (2019); Device B (2020); Device C (2021)<sup>2</sup>. Battery longevity of the newest Device C was estimated at comparable stimulation settings for Devices A and B (per product manuals): 4.5 years for Device A (vs. 8.31 for Device C)<sup>3</sup> and 5.1 years for Device B (vs. 9.27 for Device C)<sup>4</sup>.

## Economic Model

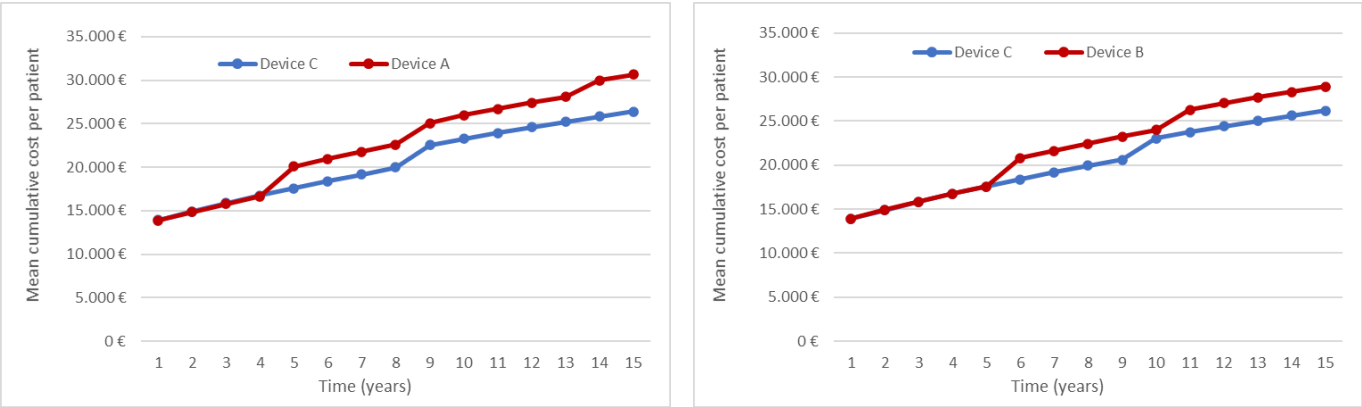
A Markov model (Figure 1) simulated individual patients across two scenarios: Device A vs. Device C and Device B vs. Device C (both with a direct-to-implant approach). Costs considered were the initial device implantation procedure, device replacements and serious adverse event management.<sup>5</sup> Italian DRG tariffs were applied for costs and a 15-year time horizon used.<sup>6</sup>



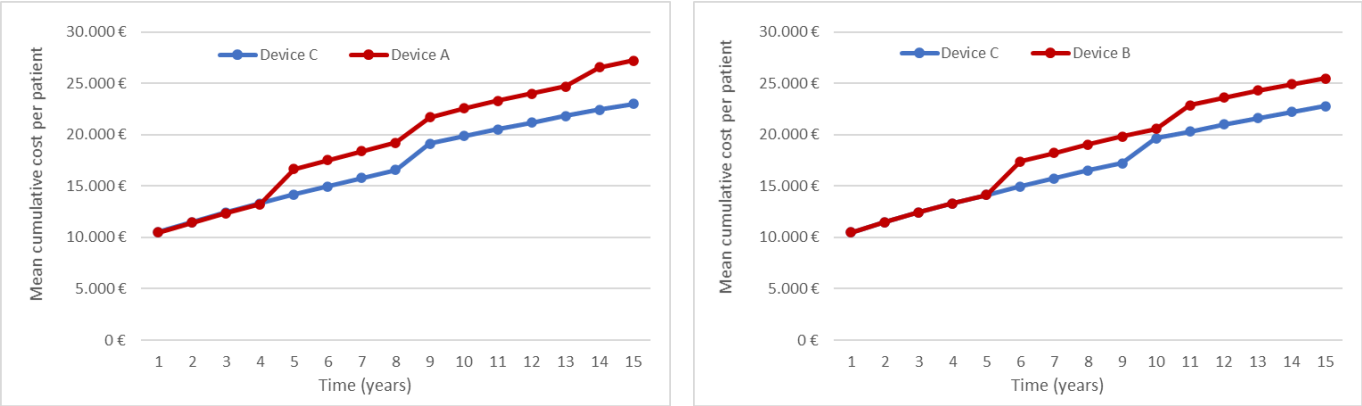
**FIGURE 1:** Markov Model. Events possible in each monthly cycle

## Results

Over 15 years, using a direct-to-implant approach, undiscounted total costs for Device A vs. Device C were €29,666 and €25,380, respectively; and for Device B vs. Device C were €27,895 and €25,141, respectively. Compared to Devices A and B, Device C offered savings of €4,286 and €2,754, respectively, with the savings due to fewer expected device replacements afforded by increased battery longevity.



**FIGURE 2:** Cost modeling using 2-stage SCS approach. Left: Devices C vs A; Right: : Devices C vs B. Costs reported in 2021 Italy (€)



**FIGURE 3:** Cost modeling using 1-stage SCS approach. Left: Devices C vs. A. Right: Devices C vs. B. Costs reported in 2021 Italy (€)

## Conclusions

Extended SCS battery longevity can translate into tangible cost savings for payers. Furthermore, a direct-to-implant approach for SCS supports NHS cost efficiencies and can offer the additional benefits of optimizing OR time and having only one recovery period for the patient.

## References

1. Eldabe et al (2020) *Pain* 161(12):2820-2829. 2. Based on dates of FDA approval 3. Settings for Device C (Medtronic Vanta™) used from Device A (Abbott Proclaim™) clinician manual. Nominal settings 12 hours per day: 50-Hz frequency, 225-μs pulse width, and 5-mA amplitude at 500-ohms impedance. Compared to flagship model 3660. 4. Settings for Device C (Medtronic Vanta™) from Device B (Boston Scientific's Alpha™) IFU. Programmed at 4.1 mA, 280us, 40 Hz, 1 area, 730 Ohms, 2 contacts. 5. Brinzeu A et al (2019) *Eur. J. Pain* 23,103-44. 6. DRG Manual ICD9-CM-2007 Version 24.0. National DRG Tariffs DM 2009.