

Predicted UK Health Care Associated Cost-savings and Health-Related Quality of Life Benefits of Introducing a Digital Leakage Notification System For People Living with a Stoma

Matthew Cawson, MSc¹; Martin Vestergaard, PhD²; Teresa Adeltoft Ajslev, PhD²; Esben Bo Boisen, MSc²
(1) Coloplast Ltd., Peterborough, United Kingdom; (2) Coloplast A/S, Humlebaek, Denmark

Introduction

For those living with a stoma, experiencing faecal leakage outside the baseplate (LOB), resulting in soiling of clothing and/or bedding, is reported to negatively impact Health-Related Quality of Life (HRQoL) and cause more frequent use of health care resources^{1,2}. Reducing the incidents of LOB, thereby reducing the HRQoL impact and cost of leakage could benefit people living with a stoma and the UK National Health Service (NHS).

Aim

The aim of the analysis was to assess the impact of a Digital Leakage Notification System (DLNS)³ on HRQoL and health care resource utilisation (HCRU) and its related consequences, for people living with an ileostomy and people with a colostomy having liquid or mushy output. This was investigated using a cost-utility model and recent UK study data⁴.

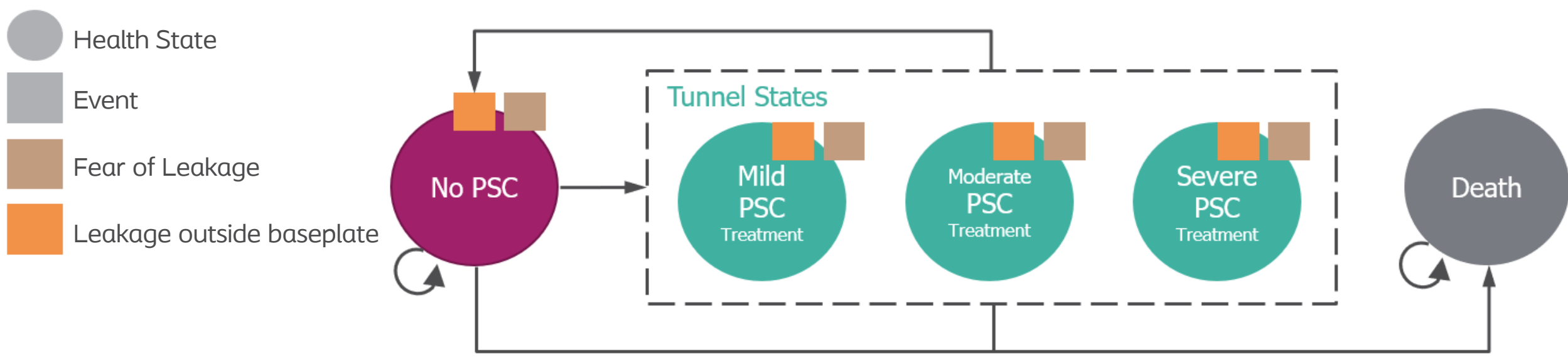


Figure 1 Markov model for ostomy care used in the cost-utility analysis. The model included five health states and two possible events.

Methods

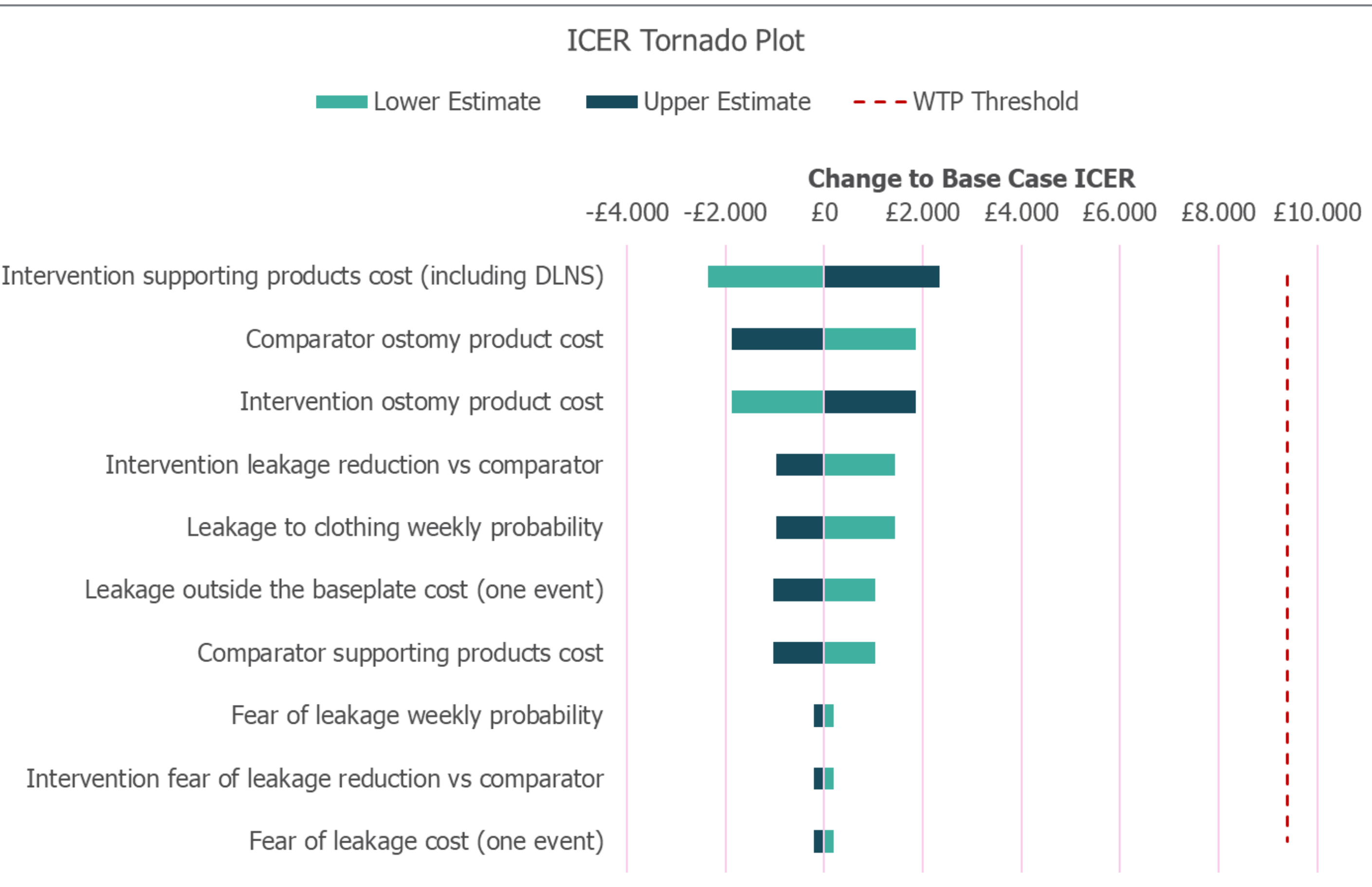
A cost-utility analysis (CUA) was conducted using a Markov model for ostomy care (Figure 1). The model quantified the impact of the DLNS compared to standard of care (SoC) in a UK (NHS) perspective. It utilised a time horizon of 3 years, aligned with the expected lifetime of reusable system components, and a cycle length of 1 week. Key inputs are indicated in Table 1. The DLNS intervention group was assumed to still utilise stoma products and supporting products together with the DLNS.

Health states in the model were based on experiencing Peristomal Skin Complications (PSCs), with LOB and fear of leakage modelled as events. This analysis assumed no difference in the incidence of PSCs between DLNS and SoC.

Table 1 Key input variables used for the cost-utility model

Model input	
LOB event, cost ²	£33.14
LOB event, weekly risk ⁴	78.57%
Fear of Leakage, cost	£8.27
Fear of Leakage, weekly risk ⁴	49.8%
Utility Decrement	
HRQoL decrement per LOB event ¹	0.0064
Base case values	
Time perspective	3 years
Discount rate (costs and utilities)	3.5%
Cycle length	1 week

Figure 2 Tornado diagram of one-way deterministic sensitivity analysis assessing impact ICER. The WTP threshold of £10,000 is illustrated as a dotted line.



References

1. Rolls et al, (2022). Utilities associated with stoma-related complications; PSC Peristomal skin complications and Leakages. Journal of Medical Economics, 2022 Jan-Dec;25(1):1005-1014.
2. Jensen et al, (2023). Leakage of stomal effluent outside the baseplate leads to rise in product usage and health professional interactions. Br J Nurs. 2023 Jan 12;32(1):8-19.
3. Brady et al, (2023). A pilot study of a digital ostomy leakage notification system: impact on worry and quality of life. Br J Nurs. 2023 Mar 23;32(6):S4-S12.
4. Coloplast A/S, (2022). Investigation of Patient Benefits With a New Supporting Ostomy Product and Support Service in Patients With a Newly Stoma Formation, (NCT05135754). Data-on-file (VV-0553033).
5. NHS prescription cost Analysis – England (2018), Volume 2018, 2019
6. Drug Tariff Part IXc – England (June 2023), 2023
7. PSSRU Unit Cost of Health and Social Care (2018), 2019
8. NHS Reference Costs (2018/2019), 2019

The key data incorporated in the model included:

- (i) Efficacy data from a UK trial, showing a reduction in leakages outside the baseplate of 41% every 2 weeks (1.57 vs. 0.93; p=0.046) when using the DLNS⁴.
- (ii) UK-based Time Trade-off study¹
- (iii) HCRU impacts from a market research surveys²
- (iv) Stoma appliance unit costs from Drug Tariff with costs weighted through market share data^{5,6}
- (v) Unit costs for health care services determined by UK primary and secondary sector^{7,8}
- (vi) The DLNS was assigned a preliminary cost, as the product is yet to be listed for reimbursement in the UK.

The model outputs included costs, Quality Adjusted Life Years (QALYs) and incremental cost-effectiveness ratio (ICER). Deterministic and probabilistic sensitivity analyses were conducted to investigate the robustness of the results. The model did not include societal impacts.

Results

Estimated costs directly associated with LOB indicated an average cost to the health care system of £33.14 per event², while HRQoL impacts were 0.006 QALYs per LOB event¹. When results were extrapolated over 3 years, assuming no change in leakage risk, the DLNS reduced the number of LOB events by 49 per patient, leading to a potential LOB related saving of £1,577 and a gain of 0.306 QALY. Overall results were an incremental cost of £186 with an ICER of £608/QALY (Table 2). Variables having the biggest impacts were cost of the DLNS, the weekly cost of ostomy appliances and the associated reduction in LOB events (Figure 2). The probabilistic analysis showed 94% of the simulations were cost-effective at the £10,000/QALY willingness to pay (WTP) threshold (Figure 3).

Conclusion

The introduction of a DLNS could enable people living with a stoma to avoid LOB and improve their HRQoL at a minimal incremental cost to the NHS.

Table 2 Outcomes of the cost-utility model, 3-year perspective

Group	Total Cost	Total QALY
DLNS	£19,470	1.796
Standard of Care	£19,283	1.491
Incremental	£186	0.306
ICER		£/QALY
DLNS vs. Standard of Care		£608
LOB Events	Events per patient	Cost
DLNS	71.4	£2,289
Standard of Care	120.6	£3,866
Incremental	-49.2	£-1,577

Figure 3 Scatter plot of the probabilistic sensitivity analysis with 2000 simulations. 94% of simulations were below the WTP threshold of £10,000/QALY.

