

Appendix H: Health economic evidence tables

Study	Graves 2016 ²⁴			
Study details	Population & interventions	Costs	Health outcomes	Cost effectiveness
<p>Economic analysis: Cost-utility analysis</p> <p>Study design: Probabilistic decision analytic model</p> <p>Approach to analysis: Individual patient simulation with a Markov model structure to compare competing approaches to managing the risk of SSI. People who get a deep infection will receive either one of the standard treatment options (DAIR, one-stage revision or two-stage revision) or permanent resection for severe cases.</p> <p>Perspective: UK NHS</p> <p>Time horizon: 5 years</p> <p>Discounting: Costs: 3%; Outcomes: 3%</p>	<p>Population: Adults >18 years old who underwent THR</p> <p>Cohort settings: 77,321 patients from the National Joint Registry in 2012.</p> <p>Mean age: NR Female: NR</p> <p>Interventions</p> <p>T1: No systemic antibiotics, plain cement and conventional ventilation</p> <p>T2: Systemic antibiotics, plain cement and conventional ventilation</p> <p>T3: No systemic antibiotics, plain cement and laminar airflow</p> <p>T4: Systemic antibiotics, plain cement and laminar airflow</p> <p>T5: No systemic antibiotics, antibiotic-impregnated cement and conventional ventilation</p> <p>T6: Systemic antibiotics, antibiotic-impregnated cement and conventional ventilation</p> <p>T7: Systemic antibiotics, antibiotic-impregnated cement and laminar airflow</p> <p>T8: Systemic antibiotics, antibiotic-impregnated cement, conventional ventilation and body exhaust suit</p> <p>T9: Systemic antibiotics, antibiotic-impregnated cement, laminar ventilation and body exhaust suit</p>	<p>Total costs (mean £ per patient) vs T1: T2: -93.46, T3: -79.58, T4: -68.17, T5: -59.94, T6: -107.67, T7: -42.31, T8: -51.23, T9: 10.10</p> <p>Currency & cost year: 2012 GBP (£)</p> <p>Cost components incorporated: NHS costs including intervention costs and costs of treating infections including revision surgery and hospital stay.</p>	<p>QALYs (mean per patient) vs T1: T2: 0.0013, T3: 0.0016, T4: 0.0015, T5: 0.0012, T6: 0.0019, T7: 0.0016, T8: 0.0014, T9: 0.0008</p>	<p>T6 dominated all other interventions (p=0.32)</p> <p>Addition of laminar flow by set of co-interventions:</p> <p>T3 vs T1: T3 dominates</p> <p>T4 vs T2: £115,041 per QALY gained</p> <p>T7 vs T6: T6 dominates</p> <p>T9 vs T8: T8 dominates</p> <p>Analysis of uncertainty: Probabilistic sensitivity analysis for the probability that T2-9 are cost saving, increases QALYs and are cost-effective, compared with T1. T2 and T5 had the greatest probability of being cost saving (96%). T6 had the greatest probability of increasing QALYs (70%) and being cost effective (32%).</p>

Data sources

Health outcomes: A network meta-analysis of 12 studies, of which 6 compared a laminar flow strategy with a conventional ventilation strategy; 4 of these are observational studies and 2 are RCTs. **Quality-of-life weights:** 15D HRQoL, AQoL and expert opinion sourced from published literature. **Cost sources:** Antibiotics commonly used in the NHS. Antibiotic impregnated cement and normal cement. Costs of laminar airflow construction and installation were £39,600-£59,400 and made from an estimation based in the USA for 2011-2012. Annual capital costs were made by assuming a 5-year lifetime. A typical caseload of 25 surgeries per week for 50 weeks of the year was assumed to find the laminar airflow cost per case. Costs of body exhaust suits also made from US data, as UK data was unavailable. Costs of treating infection from NHS Reference Costs 2012 to 2013, British National Formulary and published literature.

Comments

Source of funding: The National Institute for Health Research Health Technology Assessment programme and the Queensland Health Quality Improvement and Enhancement Programme. **Limitations:** The baseline risk of deep infection was from a very old study, Lidwell 1982³⁵; the costs for laminar flow units have been converted from US dollars as no UK data was available; 3 out of the 6 studies used to estimate laminar flow effect were not included in this guideline's clinical review because they did not adequately control for confounding and a fourth's population was orthopaedic surgery which is broader than just orthopaedic implants; utility values were not derived from EQ-5D.

Overall applicability:^(a) Partially applicable **Overall quality:**^(b) Potentially serious limitations

Abbreviations: 15D HRQoL; 15 dimension health related quality of life; AQoL: assessment quality of life; DAIR: debridement, antibiotics and implant retention; EQ-5D: Euroqol 5 dimensions (scale: 0.0 [death] to 1.0 [full health], negative values mean worse than death); QALYs: quality-adjusted life years; SSI: surgical site infection; THR; total hip replacement

(a) Directly applicable / Partially applicable / Not applicable

(b) Minor limitations / Potentially serious limitations / Very serious limitations