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| **Table 3 – Model Parameters** | | | | |
| Author | Treatment Efficacy | Recurrence | QoL | Resource Use |
| **Low back pain decision modelling studies** | | | | |
| Lloyd et al. (2004) [17] | Successful or unsuccessful treatment  **SOURCE:** pivotal trial of heat wrap (n=371) [59] | N/A | Successfully treated patients (meaningful reduction in NRS pain scores and RMDQ)  **SOURCE:** [59] | **SOURCES:** Trial data provide resource use relating to heat wrap, and paracetamol and ibuprofen [59]. Literature used to provide likely number of follow up GP and physio appointments |
| Kim et al. (2010) [14] | Movements between acute, chronic, well and death states. Treatment effect assumed to have same relative risk over time  **SOURCES:** Cohort studies by Grotle et al. [60] (n=123) and Cassidy et al. [61] (n=1100). “Chronic” to “Well” in both treatments from meta-analysis of RCT’s. | “Well” to “Chronic”  **SOURCE:** [61] | **SOURCES: “**Acute LBP” and “Well” from KNHNS [54]  CLBP from pragmatic RCT [62] (n=11630) | **SOURCES:** Resource usage derived from 2 pragmatic trials [62] [63]. Direct non-medical resources taken from KNHNS data [54] |
| Wielage et al. (2013a) [18] | 3-month discontinuation and post-discontinuation rates  **SOURCE:** Meta-analysis of CLBP and OA trials  AEs extrapolated using age-dependent risks derived from literature | N/A | Utilities derived from pain scores, age/sex weighted  **SOURCES:** Pain scores from meta-analysis of CLBP trials. | **SOURCES:** Resource use provided by expert opinion. Costs associated with AE’s from the Agency for Healthcare Research and Quality database and published literature |
| Wielage et al. (2013b) [19] | 3-month discontinuation and post-discontinuation rates  **SOURCE:** Meta-analysis of CLBP and OA trials  AEs extrapolated using age-dependent risks derived from literature | N/A | Utilities derived from pain scores, age/sex weighted  **SOURCES:** Pain scores from meta-analysis of CLBP trials. | **SOURCES**:  Resource use provided by expert opinion. Cost of AE’s from published literature, IMS-Brogan Database [64] and Ontario Costing Analysis Tool [65] |
| Norton et al. (2015) [15] | Initial treatment success, long-term relapse and improvement  **SOURCES:** Back Skills Training Trial [66] (n=701)  Assumed gradual loss of efficacy for CBT by 20% | Recurrence  **SOURCES:** 3 cohort studies  Ten-year recurrence assumed at 0.60 as ‘reflected in literature’ | Utilities derived from EQ-5D scores  **SOURCE:** [66]  Utilities assumed the same in respective states over 10 years as in a 1-year study | **SOURCES:** Resource use during the one-year trial came from the Back Skills Training trial [66], a pragmatic trial.  Not clear how 10-year resource use was estimated. |
| **Sciatica decision modelling studies** | | | | |
| Launois et al. (1994) [16] | Success, Deterioration  **SOURCES**: Literature review of various types of studies  Extrapolation based upon studies in literature review | Recurrences and re-operations  **SOURCES:**  6 studies identified in literature review | Utilities come from conversion of HMQ scores  **SOURCE:** A “survey of 146 patients” who underwent chemonucleolysis and surgery | **SOURCE:** Resource usage obtained from "the survey"  Administrative costs, with laboratory and radiology examinations added, unsourced |
| Lewis et al. (2011) [11] | Success or failure of treatments  **SOURCE:** Systematic review of treatment effectiveness for sciatica treatments. Pair-wise Meta-analysis and mixed-treatment comparison | N/A | Annual utilities derived from 6-12 week EQ-5D scores  **SOURCE:** RCT (n=283) by van den Hout et al. [47] | **SOURCES:** Resource use based upon “clinical opinion from members of the clinical team” |
| Skidmore et al. (2011) [23] | Successful treatment  **SOURCES:** CC and X-STOP success from an RCT (n=131) [67]. Success for laminectomy comes from literature | Re-operation rate  **SOURCES**: CC and X-STOP from RCT [67]. Laminectomy from ‘published literature’ | Utility values derived from SF-36  **SOURCES:** Values from an RCT [67], then weighted for adverse events by the “expert panel” | **SOURCES:** Resource use from “expert panel” estimates. |
| Fitzsimmons et al.  (2014) [21] | See Lewis et al. (2011) | | | |
| Koenig et al. (2014) [25] | Satisfaction with treatment  **SOURCES:** Randomised observational study, the SPORT trial (n=743) [57] [68]  Extrapolations all based upon literature and fully sourced | Revision  **SOURCES:**  Three observational studies | **SOURCE:** Utilities come straight from an economic evaluation for treating herniated intervertebral disc [25] originally from the Beaver Dam health outcomes study [26] | **SOURCE:** Surgery frequency estimated from 2009 Medicare claims database [70]  Medical resource taken directly from SPORT trial [69] |
| Udeh et al. (2015) [22] | Relief of symptoms  **SOURCE:** Unclear | Revisions  **SOURCE:** unclear | **SOURCES:** ESI QALY gain from previous economic evaluation [71]. DS QALY gain from an RCT (n=91) [72]and trial (n=601) [73]. Values reduced by 25% as patients in this study had ‘severe’ LSS.  For mild® ODI scores from 4 trials (n=301) converted to utility scores | **SOURCES:** Resource use from previous economic evaluations [22] [75]. It is possible that only costs were abstracted from this literature, as no resource use is mentioned in the paper. |
| Igarishi et al. (2015) [20] | Movements between health states  **SOURCE:** 8-week study by Taguchi et al. [75] (n=331). Surgery risk from Medical Data Vision Co database [unpublished] (n=69,325) | Recurrence of symptoms in months 1-2  **SOURCE:**  [75] | NRS Pain scores from trial converted to utility values.  **SOURCE:** [75]  Extrapolated 8-week pain scores to 52 weeks, citing literature as justification | **SOURCES:** Within study resource use from physician internet-based survey of 205 clinicians |
| Parker et al. (2015) [24] | Success or failed treatment  **SOURCES:** DS estimates from prospective spinal Registry [uncited]. CC estimates from prospective study (n=100) [76] (n=100). Spacer data from Spacer trial [77] (n=129) | N/A | Utility values derived from SF-36.  **SOURCE:** DS estimates from prospective spinal Registry [uncited]. CC estimates [76] (n=100). Spacer estimates from Spacer trial [77] (n=129) | **SOURCES:** Resource use for follow up care for CC and DS patients collected by telephone interviews. Follow-up physical therapy utilization for Spacer patients was from the trial [77] |
| Tapp et al. (2018) [50] | Re-operation or complication  **SOURCES**: Medicare Provider Analysis and Review database for complication and re-operation within 3 years [uncited]. Reoperation 4-10 years, for spacer expert opinion, and for decompression 4 cohort studies | *Re-operation was the major treatment efficacy (see column left)* | Utility values are EQ5D  **SOURCES:** Utilities for CC, decompression, and  fusion taken from pooled SPORT trial [74] & observational study results [78] (n=634). Spacer utility assumed equal to decompression. Disutility associated with complications based upon expert opinion. | Costs stated directly, no resource use as such.  **COST SOURCES:**  CC costs assumed as zero for incremental purposes. Spacer and decompression surgical costs, as well as costs of complications taken directly from Medicare Provider Analysis and Review database [uncited]. |
| **Sciatica decision modelling studies – surgical treatments** | | | | |
| Kuntz et al. (2000) [26] | Clinical improvement and fusion healing rate  **SOURCES:** Mix of 9 prospective and observational studies  Extrapolation used literature and assumptions | Recurrence  **SOURCE:** Assumptions and literature  Extrapolation used literature plus assumptions | Utility scores from time-trade-off technique  **SOURCE:** Beaver Dam Health Outcomes Study [34] | **SOURCE:**  Previous study by Katz et al. [79] who used a hospital cost accounting system, in one Boston hospital provided costs of surgery. Reoperation cost also included. No other costs considered. |
| Kim et al. (2012) [27] | Clinical improvement or worsening, death, relapse  **SOURCE:** Peri-operative death rates from Deyo et al. [80]. Clinical improvement from SPORT-DLS trial [81]. | Reoperation  **SOURCE:** Re-operation based the Kuntz et a. [26] study above. | Combined utility values from their surgical cohort study with other literature  **SOURCES:** Their observational study, reported in the paper, alongside “best available literature”.  Referenced a source [43] suggesting outcomes achieved at 1-year are maintained for 4-years, authors then assume utility is further constant over 10 years | **SOURCE:**  Costs derived from the authors hospital financial department, in text reference (http://intranet.uhn.ca/departments/finance/) |
| Parkinson et al. (2012) [31] | Success or failure of surgery  **SOURCE:** Systematic review and meta-analysis of RCT’s | Revision, Re-operation, other surgical outcomes  **SOURCES**:  Systematic review and meta-analysis of RCT’s | Utilities derived from EQ5D  **SOURCE:**  A single RCT [82] (n=150) | **SOURCES:** Resource use for surgery based upon Medicare Benefits Schedule claims database [83]. Assumptions also used for pre and post-surgery resource use. SR used to identify hospital resources. |
| Schmier et al. (2014) [28] | Clinical success  **SOURCES:** Initial rates come from an RCT comparing Coflex to instrumented fusion [84] (n=150)  These are extrapolated using published sources, Medicare data, and expert opinion.  24 month treatment effect assumed the same continuously through five years | Revisions and complications  **SOURCES:** Published sources, Medicare data, and expert opinion.  Extrapolated using published sources | Utility scores converted from ODI scores  **SOURCES:** RCT [84] extrapolated using expert opinion.  24 month utilities assumed the same continuously through five years | **SOURCES:**  Expected treatment patterns derived from published sources, analysis of the Medicare Limited Data, and expert opinion |
| Bydon et al. (2015) [30] | Resolution of symptoms  **SOURCE:** Retrospective data on 137 patients from a single institutional series, detailed within their study | Re-operation rates  **SOURCE:** The 137 patient institutional series | Utility values taken directly from Kuntz et al. [26]  **SOURCE:** Previous economic evaluation by Kuntz et al. [26], originally from Beaver Dam Health Outcomes study [34] | **SOURCE:**  Surgery and impatient resource use from their 137 patient institutional series. Longer-term costs derived from Kuntz et al. [26] |
| Vertuani et al. (2015) [32] | No treatment effects as such. Their model appears more of an amalgamation of costs and QALY’s | N/A | EQ5D  **SOURCE:** Swedish National Registry for Lumbar Spine Surgery Report 2008 [85] (n=2437) | **SOURCE:**  Resource use based upon systematic literature review and meta-analysis |
| Yaghoubi et al. (2016) [29] | Success or failure of surgery  **SOURCE:**  Meta-analysis and SR | N/A | Reported as VAS scores  **SOURCE:**  Meta-analysis and SR | **SOURCE:**  Costs are derived directly from literature, “the bill of 30 patients in Tehran” and manufacturer costs |
| Abbreviations: AE (Adverse events); CBT (Cognitive behavioural therapy); CC (Conservative care); CLBP (Chronic low back pain); DS (Decompression surgery); EQ5D (EuroQoL-5D); ESI (Epidural steroid injections); FDA (The Food and Drug Administration) (GP (General Practitioner); KNHNS (Korean National Health and Nutrition Surveys); LBP (Low back pain); HMQ (Health Measurement Questionnaire); mild® (Minimally invasive lumbar decompression); NRS (Numerical rating scale); OA (Osteoarthritis); QALY (Quality-adjusted life year); ODI (Oswestry Disability Index); RCT (Randomised controlled trial); RMDQ (Roland Morris Disability Questionnaire); SF-36 (Short Form (36) Health Survey); SPORT (Spine Patient Outcomes Research Trial); SR (Systematic review); VAS (Visual Analogue Scales) | | | | |