**Supplementary Material**

**Table S1: Sample search strategy: Pubmed.**

|  |  |
| --- | --- |
| #1 | "Markov Chains"[Mesh] OR "Cost-Benefit Analysis"[Mesh]OR  decision model\*[Title/Abstract] OR decision-analytic model\*[Title/Abstract] OR decision analysis\*[Title/Abstract] OR epidemiological model\*[Title/Abstract] OR economic model\*[Title/Abstract] OR  state-transition[Title/Abstract] OR cohort model[Title/Abstract]OR decision tree[Title/Abstract] OR agent-based model\*[Title/Abstract] OR microsimulation[Title/Abstract] OR micro-simulation[Title/Abstract] OR discrete event simulation[Title/Abstract] OR discrete-event simulation[Title/Abstract] OR markov[Title/Abstract]) |
| #2 | Stroke [Title/Abstract] OR cerebrovascular[Title/Abstract] OR poststroke[Title/Abstract] OR cerebral ischaemia [Title/Abstract] OR brain ischaemia[Title/Abstract] OR cerebral ischemia[Title/Abstract] OR brain ischemia [Title/Abstract] OR ischemic attack[Title/Abstract] OR ischemic event[Title/Abstract] OR ischaemic attack[Title/Abstract] OR ischaemic event[Title/Abstract] OR cerebral infarct\*[Title/Abstract] OR brain infarct\*[Title/Abstract] OR cerebral vascular accident[Title/Abstract] |
| #3 | Cerebrovascular Disorders [MeSH Terms] |
| #4 | #2 OR #3 |
| #5 | #1 AND #4 |
| #6 | English[Language] AND "2008/01/01"[Date - Publication] : "3000"[Date - Publication] |
| #7 | #6 AND #7 |

**Table S2: Standard template for data extraction**

|  |  |
| --- | --- |
| Data Item | Description |
| Model purpose | Problem that the model is designed to address, e.g. an empirical exploration of disease progression, or an economic evaluation of alternative treatment or diagnostic strategies |
| Model Type | Individual (e.g. Discrete Event Simulation); Cohort (e.g. Markov or Decision Tree), Hybrid type, Other type [based on ISPOR guidelines) |
| Model structure | Health states, events and other variables included in the model; including relationships between them, and definitions and measures used |
| Model inputs | Sources of data for model parameters such as transition probabilities and baseline distributions |
| Target population | Patient characteristics, geography, disease stage |
| Health outcomes | e.g. life years, quality-adjusted life years (QALYs) or disability-adjusted life years (DALYs) |
| Time horizon and cycle length | The time span that the model covers (e.g. 10 years, lifetime) and the length of a model cycle – i.e., the period of time during which an event or transition can occur (e.g. 3 months, one year). |
| Handling of uncertainty | Sensitivity analyses including one-way, two-way, probabilistic and scenario analyses |
| Validation and transparency | Availability of documentation; process to establish face validity; comparisons with other published models; external validation (e.g. comparisons of results against published observed data). |
| Context | Relevant country or health system context for the model. |

Full Reference List

**Group 1 – Markov Disability and Recurrence (k=29)**

1. Aronsson M, Persson J, Blomstrand C, Wester P, Levin LA. Cost-effectiveness of endovascular thrombectomy in patients with acute ischemic stroke. *Neurology*. 2016;86(11):1053-1059. doi:10.1212/WNL.0000000000002439.
2. Arora N, Makino K, Tilden D, Lobotesis K, Mitchell P, Gillespie J. Cost-effectiveness of mechanical thrombectomy for acute ischemic stroke: an Australian payer perspective. *J Med Econ*. 2018;21(8):799-809. doi:10.1080/13696998.2018.1474746.
3. Baeten S a, van Exel NJ a, Dirks M, Koopmanschap M a, Dippel DW, Niessen LW. Lifetime health effects and medical costs of integrated stroke services - a non-randomized controlled cluster-trial based life table approach. *Cost Eff Resour Alloc*. 2010;8(1):21. doi:10.1186/1478-7547-8-21.
4. Boudreau DM, Guzauskas G, Villa KF, Fagan SC, Veenstra DL. A model of cost-effectiveness of tissue plasminogen activator in patient subgroups 3 to 4.5 hours after onset of acute ischemic stroke. *Ann Emerg Med*. 2013;61(1):46-55. doi:10.1016/j.annemergmed.2012.04.020.
5. Boudreau DM, Guzauskas GF, Chen E, et al. Cost-effectiveness of recombinant tissue-type plasminogen activator within 3 hours of acute ischemic stroke: current evidence. *Stroke*. 2014;45(10):3032-3039. doi:10.1161/STROKEAHA.114.005852.
6. de Andrés-Nogales F, Álvarez M, de Miquel MÁ, et al. Cost-effectiveness of mechanical thrombectomy using stent retriever after intravenous tissue plasminogen activator compared with intravenous tissue plasminogen activator alone in the treatment of acute ischaemic stroke due to large vessel occlusion in Spa. *Eur Stroke J*. 2017;2(3):272-284. doi:10.1177/2396987317721865.
7. Dirks M, Baeten SA, Dippel DWJ, et al. Real-life costs and effects of an implementation program to increase thrombolysis in stroke. *Neurology*. 2012;79(6):508-514. doi:10.1212/WNL.0b013e31826356bf.
8. Ehlers L, Muskens WM, Jensen LG, Kjølby M, Andersen G. National Use of Thrombolysis with Alteplase for Acute Ischaemic Stroke via Telemedicine in Denmark A Model of Budgetary Impact and Cost Effectiveness. *CNS Drugs*. 2008;22(1):73-81.
9. Ganesalingam J, Pizzo E, Morris S, Sunderland T, Ames D, Lobotesis K. Cost-Utility Analysis of Mechanical Thrombectomy Using Stent Retrievers in Acute Ischemic Stroke. *Stroke*. 2015;46(9):2591-2598. doi:10.1161/STROKEAHA.115.009396.
10. Guzauskas GF, Boudreau DM, Villa KF, Levine SR, Veenstra DL. The cost-effectiveness of primary stroke centers for acute stroke care. *Stroke*. 2012;43(6):1617-1623. doi:10.1161/STROKEAHA.111.648238.
11. Jones ML, Holmes M. Alteplase for the treatment of acute ischaemic stroke: a single technology appraisal. *Health Technol Assess*. 2009;13 Suppl 2(February):15-21.
12. Kazley AS, Simpson KN, Simpson A, Jauch E, Adams RJ, Tzeel A. Optimizing the economic impact of rtPA Use in a stroke belt state: The case of South Carolina. *Am Heal Drug Benefits*. 2013;6(3):155-163.
13. Koffijberg H, Buskens E, Rinkel GJE. Aneurysm occlusion in elderly patients with aneurysmal subarachnoid haemorrhage: A cost-utility analysis. *J Neurol Neurosurg Psychiatry*. 2011;82(7):718-727. doi:10.1136/jnnp.2009.185660.
14. Kunz WG, Hunink MG, Dimitriadis K, et al. Cost-effectiveness of Endovascular Therapy for Acute Ischemic Stroke: A Systematic Review of the Impact of Patient Age. *Radiology*. 2018;(19):172886. doi:10.1148/radiol.2018172886.
15. Kunz WG, Hunink MGM, Sommer WH, et al. Cost-effectiveness of endovascular stroke therapy: A patient subgroup analysis from a US healthcare perspective. *Stroke*. 2016;47(11):2797-2804. doi:10.1161/STROKEAHA.116.014147.
16. Leppert MH, Campbell JD, Simpson JR, Burke JF. Cost-Effectiveness of Intra-Arterial Treatment as an Adjunct to Intravenous Tissue-Type Plasminogen Activator for Acute Ischemic Stroke. *Stroke*. 2015;46(7):1870-1876. doi:10.1161/STROKEAHA.115.009779.
17. Lobotesis K, Veltkamp R, Carpenter IH, Claxton LM, Saver JL, Hodgson R. Cost-effectiveness of stent-retriever thrombectomy in combination with IV t-PA compared with IV t-PA alone for acute ischemic stroke in the UK. *J Med Econ*. 2016;19(8):785-794. doi:10.1080/13696998.2016.1174868.
18. Mar J, Sainz-Ezkerra M, Miranda-Serrano E. Calculation of prevalence with Markov models: budget impact analysis of thrombolysis for stroke. *Med Decis Making*. 2008;28(4):481-490. doi:10.1177/0272989X07312720.
19. Pan Y, Cai X, Huo X, et al. Cost-effectiveness of mechanical thrombectomy within 6 hours of acute ischaemic stroke in China. *BMJ Open*. 2018;8(2):e018951. doi:10.1136/bmjopen-2017-018951.
20. Pan Y, Wang A, Liu G, et al. Cost-effectiveness of clopidogrel-aspirin versus aspirin alone for acute transient ischemic attack and minor stroke. *J Am Heart Assoc*. 2014;3(3):1-10. doi:10.1161/JAHA.114.000912.
21. Pandya A, Eggman AA, Kamel H, Gupta A, Schackman BR, Sanelli PC. Modeling the cost effectiveness of neuroimaging-based treatment of acute wake-up stroke. *PLoS One*. 2016;11(2):1-13. doi:10.1371/journal.pone.0148106.
22. Patil CG, Long EF, Lansberg MG. Cost-effectiveness analysis of mechanical thrombectomy in acute ischemic stroke. *J Neurosurg*. 2009;110(3):508-513. doi:10.3171/2008.8.JNS08133.
23. Ruggeri M, Basile M, Zini A, et al. Cost-effectiveness analysis of mechanical thrombectomy with stent retriever in the treatment of acute ischemic stroke in Italy. *J Med Econ*. 2018;21(9):902-911. doi:10.1080/13696998.2018.1484748.
24. Soeteman DI, Menzies NA, Pandya A. Would a Large tPA Trial for Those 4.5 to 6.0 Hours from Stroke Onset Be Good Value for Information? *Value Heal*. 2017;20(7):894-901. doi:10.1016/j.jval.2017.03.004.
25. Steen Carlsson K, Andsberg G, Petersson J, Norrving B. Long-term cost-effectiveness of thrombectomy for acute ischaemic stroke in real life: An analysis based on data from the Swedish Stroke Register (Riksstroke). *Int J Stroke*. 2017;12(8):174749301770115. doi:10.1177/1747493017701154.
26. Svensson J, Ghatnekar O, Lindgren A, et al. Societal value of stem cell therapy in stroke-a modeling study. *Cerebrovasc Dis*. 2012;33(6):532-539. doi:10.1159/000337765.
27. Trippoli S, Caccese E, Marinai C, Messori A. Value-based procurement of medical devices: Application to devices for mechanical thrombectomy in ischemic stroke. *Clin Neurol Neurosurg*. 2018.
28. Tung CE, Win SS, Lansberg MG. Cost-effectiveness of tissue-type plasminogen activator in the 3- to 4.5-hour time window for acute ischemic stroke. *Stroke*. 2011;42(8):2257-2262. doi:10.1161/STROKEAHA.111.615682.
29. Valenzuela Espinoza A, Devos S, van Hooff R-J, et al. Time Gain Needed for In-Ambulance Telemedicine: Cost-Utility Model. *JMIR mHealth uHealth*. 2017;5(11):e175. doi:10.2196/mhealth.8288.

**Group 2 – Markov Disability and Cognition (k=2)**

1. Takao H, Nojo T, Ohtomo K. Cost-effectiveness of Treatment of Unruptured Intracranial Aneurysms in Patients with a History of Subarachnoid Hemorrhage. *Acad Radiol*. 2008;15(9):1126-1132. doi:10.1016/j.acra.2008.02.017.
2. Takao H, Nojo T, Ohtomo K. Screening for Familial Intracranial Aneurysms. Decision and Cost-effectiveness Analysis. *Acad Radiol*. 2008;15(4):462-471. doi:10.1016/j.acra.2007.11.007.

**Group 3: Discrete Event Simulation (DES) (k=4)**

1. Hoffmeister L, Lavados PM, Mar J, Comas M, Arrospide A, Castells X. Minimum intravenous thrombolysis utilization rates in acute ischemic stroke to achieve population effects on disability: A discrete-event simulation model. *J Neurol Sci*. 2016;365:59-64. doi:10.1016/j.jns.2016.04.005.
2. Hunter RM, Fulop NJ, Boaden RJ, et al. The potential role of cost-utility analysis in the decision to implement major system change in acute stroke services in metropolitan areas in England. *Heal Res Policy Syst*. 2018;16(1):1-14. doi:10.1186/s12961-018-0301-5.
3. Kongnakorn T, Ward A, Roberts CS, O’Brien JA, Proskorovsky I, Caro JJ. Economic evaluation of atorvastatin for prevention of recurrent stroke based on the SPARCL trial. *Value Heal*. 2009;12(6):880-887. doi:10.1111/j.1524-4733.2009.00531.x.
4. Mar J, Arrospide A, Comas M. Budget impact analysis of thrombolysis for stroke in Spain: A discrete event simulation model. *Value Heal*. 2010;13(1):69-76. doi:10.1111/j.1524-4733.2009.00655.x.

**Group 4 –** Other (k=5)

1. Aviv RI, Kelly AG, Jahromi BS, Benesch CG, Young KC. The cost-utility of CT angiography and conventional angiography for people presenting with intracerebral hemorrhage. *PLoS One*. 2014;9(5). doi:10.1371/journal.pone.0096496.
2. Demaerschalk BM, Switzer J a, Xie J, Fan L, Villa KF, Wu EQ. Cost utility of hub-and-spoke telestroke networks from societal perspective. *Am J Manag Care*. 2013;19(12):976-985. http://www.ncbi.nlm.nih.gov/pubmed/24512034.
3. Jackson D, Earnshaw SR, Farkouh R, Schwamm L. Cost-effectiveness of CT perfusion for selecting patients for intravenous thrombolysis: A US hospital perspective. *Am J Neuroradiol*. 2010;31(9):1669-1674. doi:10.3174/ajnr.A2138.
4. Leppert MH, Poisson SN, Carroll JD, et al. Cost-Effectiveness of Patent Foramen Ovale Closure Versus Medical Therapy for Secondary Stroke Prevention. *Stroke*. 2018;49(6):1443-1450. doi:10.1161/STROKEAHA.117.020322.
5. Mar J, Sainz-Ezkerra M, Moler-Cuiral JA. Calculation of prevalence estimates through differential equations: Application to stroke-related disability. *Neuroepidemiology*. 2008;31(1):57-66. doi:10.1159/000140096.