**Online Supplement**

**Table S1. Selection criteria for mechanical thrombectomy**

Tab

|  |  |
| --- | --- |
| Time from onset of stroke | Typically up to 6 hours. Up to 24 hours in selected cases using advanced imaging |
| Pre stroke functional status | No disability or slight disability (mRS ≤ 2) |
| Stroke severity | Moderate severity or above (NIHSS ≥ 6) |
| Plain CT | Compatible with ischaemic stroke and no contraindications. ASPECTS score >5 (absence of extensive early ischaemic changes) |
| CT angiogram | Confirmed LAO (proximal MCA, ICA terminus, or  basilar); good collaterals |

mRS=modified Rankin Scale ,NIHSS=National Institutes of Health Stroke Scale, CT=computerised tomography, ASPECTS=Alberta Stroke Programme Early CT Score, LAO=large artery occlusion; MCA=middle cerebral artery; ICA=internal carotid artery

**Probability distributions for input parameters in the models**

The probability distributions were derived using the R package “fitdistrplus”. The first step was to obtain histograms of the parameter (e.g. waiting time to see the acute stroke team) derived from Sentinel Stroke National audit Programme (SSNAP) or local audit data. Skewness- kurtosis plots (Cullen and Frey Graphs) were drawn and the most likely candidate distributions were tested using goodness of fit statistics (Anderson Darling and others).

Table S1 shows the probability distributions, parameters in the model and data source. Note that some inputs are based on estimates and bootstrapped resampling because of low numbers in our audits. We are continuing our data collection and hope to refine our models as more patients receive thrombectomy assessments in our region.

**Table S2: Probability distributions of process variations in the simulation models**

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| **Process and model** | **Probability Distribution** | **Time period** | **Distribution parameters** | **Data source** |
| **Stroke onset to arrival time at DSC (all models)** | Gamma | WH (8am to 8pm) | shape-3.612290 rate - 2.013986 | SSNAP |
| **Stroke onset to arrival time at DSC (all models)** | Gamma | OOH (8pm to 8am) | shape - 3.570325  rate - 1.540188 | SSNAP |
| **Patient arrival (all models)** | Exponential | WH and OOH | rate- 0.09357525 | SSNAP |
| **Wait for acute stroke team (all models)** | Exponential | WH | lambda - 6 | Local audit |
| **Wait for doctor (all models)** | Exponential | OOH | Lambda-3 | Local audit |
| **Acute stroke team assessment time (all models)** | Normal | WH | Mean 10 minutes  SD 10 minutes | Local audit |
| **Doctor assessment time (all models)** | Normal | OOH | Mean 20 min  SD 18.5 min | Local audit |
| **CT angio decision (all models)** | Uniform | OOH | 10-20 min | Estimate |
| **CT and CTA time (all models)** | Normal | WH | Mean 21 min, SD 2.5 | Local audit |
| **CT and CTA time (all models)** | Normal | OOH | Mean 24 min, SD 3.5 | Local audit |
| **Radiology reporting time (all models)** | Normal | WH | Mean 5.5 min, SD 0.72 | Local audit |
| **Radiology reporting time (models A )** | Normal | OOH | Mean 15 min, SD 14.5 | Estimate |
| **NSC referral time (model A)** | Uniform | WH | 7-12 minutes | Local audit |
| **NSC referral time (model A)** | Uniform | OOH | 7-12 minutes | Local audit |
| **NSC referral time (models B and C)** | Uniform | WH and OOH | 3-5 min | Estimate |
| **NSC decision time (all models)** | Normal | WH and OOH | Mean 10 min, SD 9 min | Local audit |
| **Call to ambulance arrival (model A and B)** | Normal | WH and OOH | Mean 22 min, SD 4.4 | Local audit |
| **Call to ambulance arrival (model C)** | Normal | WH and OOH | Mean 18 min, SD 2 | Estimate |
| **Remote network consultation time (model A)** | Normal | OOH | Mean 10 min, SD9 | Estimate |
| **Remote network consultation time (model B and C)- includes CTA interpretation** | Normal | OOH | Mean 10 min, SD 2.3 | Estimate |
| **Travel time to NSC (all models)** | Normal | WH and OOH | Mean 51 min, SD 4 | Estimate from Google maps |

DSC= drip and ship centre, WH= within hours, OOH= out of hours, CTA= CT angiogram, NSC= neuroscience centre

**Figure S1: Arrival times of all strokes and patients suitable for thrombectomy assessment (NIHSS ≥ 6, pre-stroke mRS ≤ 2, within 6 hours of onset) in a 24 hour period**

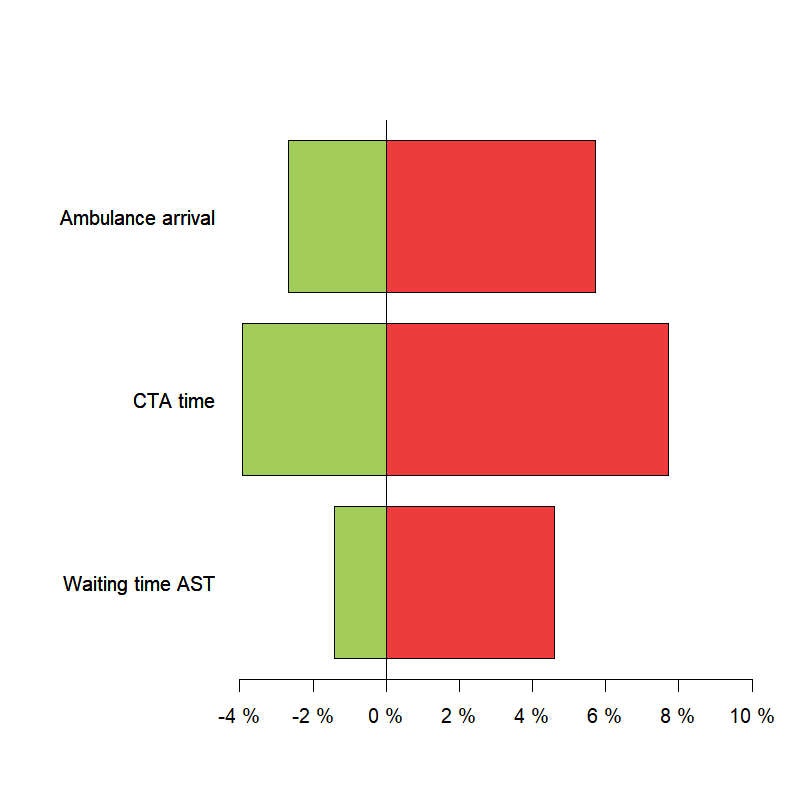
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**Table S3: Estimated annual numbers of MT patients for all hospitals in the AGWS network**

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| **Hospital** | **Total strokes** | **Estimated MT (6 hrs)** | **WH arrivals (8am -5pm** | **OOH arrivals (5pm – 8am)** | **Extended WH arrivals (8am-8pm)** | **OOH arrivals (8pm-8am)** |
| **North Bristol Trust (NSC)** | 683 | 68 | 33 | 35 | 44 | 24 |
| **Bristol Royal Infirmary** | 492 | 49 | 25 | 24 | 32 | 17 |
| **Gloucester** | 823 | 82 | 42 | 40 | 53 | 29 |
| **Swindon** | 472 | 47 | 24 | 23 | 31 | 16 |
| **Bath** | 639 | 64 | 33 | 31 | 42 | 22 |
| **Salisbury** | 383 | 38 | 20 | 18 | 25 | 13 |
| **Taunton** | 625 | 63 | 32 | 31 | 41 | 22 |
| **Weston** | 237 | 24 | 12 | 12 | 16 | 8 |
| **Yeovil** | 390 | 39 | 20 | 19 | 25 | 14 |
| **Total** | **4774** | **474** | **237** | **238** | **309** | **165** |

AGWS= Avon, Gloucestershire, Wiltshire, Somerset, WH = within hours, OOH = out of hours, NSC= neuroscience centre

**Figure S2: Tornado plot showing the influence of a 20% increase or decrease in several factors on door-in-door-out (DIDO) time (shown as a % change on the x axis) within hours.**



**Figure S3: Tornado plot showing the influence of a 20% increase or decrease in several factors on door-in-door-out (DIDO) time (shown as a % change on the x axis) out of hours.**

