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Interactive demo

ℹ️ For acronym reference, see the introduction page.

In this demo we will compare the expected outcomes for two cases. All of the patients will share a timeline, including factors such as the travel times to the nearest hospitals and the times between arrival at the hospital and receiving the appropriate treatment.

We have invented a scenario where there is a choice of two hospitals for the patients to travel to. One of these can only provide IVT, while the other provides both IVT and MT.

Case 1: all eligible patients receive IVT at the IVT-only centre, and then patients requiring MT are transported to the IVT+MT centre for further treatment.

Case 2: all patients are transported directly to the IVT+MT centre and receive the appropriate treatments there.

Setup

Patient population

⚠️ Currently the ICH option does not impact the change in mRS or utility.

Percentage of patients with each stroke type:

nLVO	LVO	ICH
65 − +	35 − +	0 − +

Submit

Advanced options

Patient pathway

Each step uses times in minutes. To remove a step, set the value to zero.

🚑 Onset to ambulance arrival

60 − +

🚑 Delay for transfer between centres

60 − +

🏥 Travel time from onset location to IVT centre

30 − +

🏥 Travel time from onset location to IVT+MT centre

50 − +

🏥 Travel time between IVT and IVT+MT centres

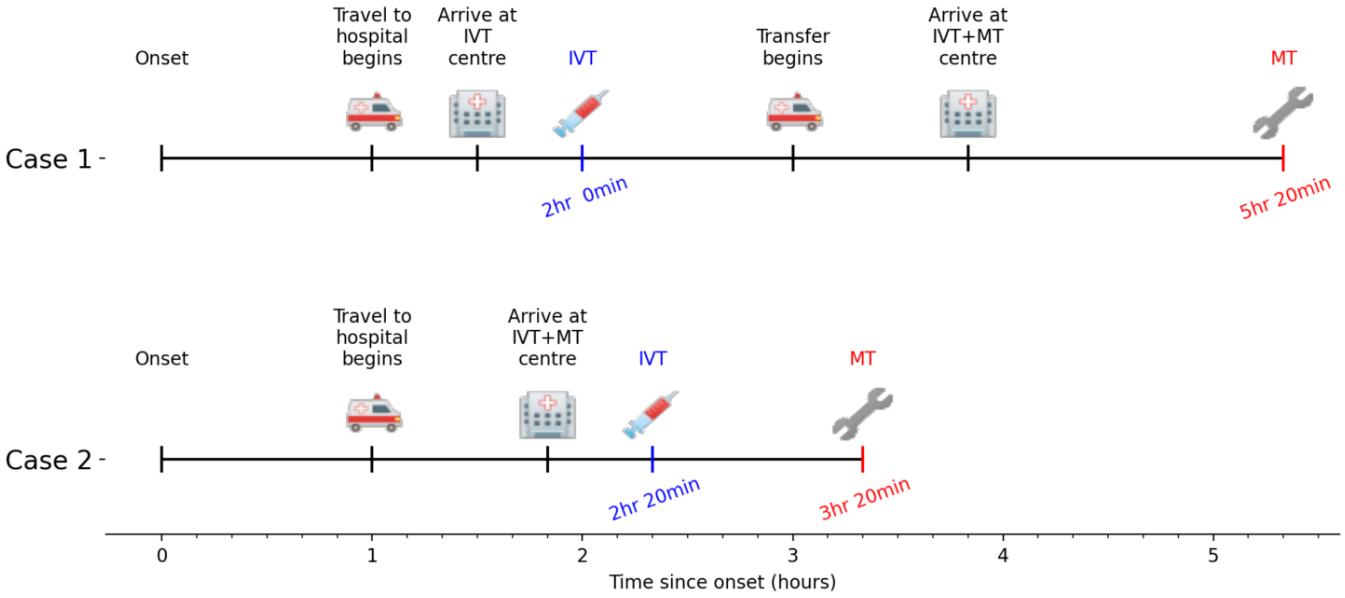
50 − +

💉 Delay between arrival at either centre and IVT treatment

30 − +

🔧 Delay between arrival at IVT+MT centre and MT treatment

90 − +



Results

Case 1

Treatment times

💉 IVT: 2hr 0min

🔧 MT: 5hr 20min

Population mean mRS

2.67

↓ -0.09 from no treatment

Population mean utility

0.524

↑ 0.018 from no treatment

Case 2

Treatment times

IVT: 2hr 20min

MT: 3hr 20min

Population mean mRS

2.63

↓ -0.13 from no treatment

Population mean utility

0.530

↑ 0.024 from no treatment

Details of the calculation

The following bits detail the calculation.

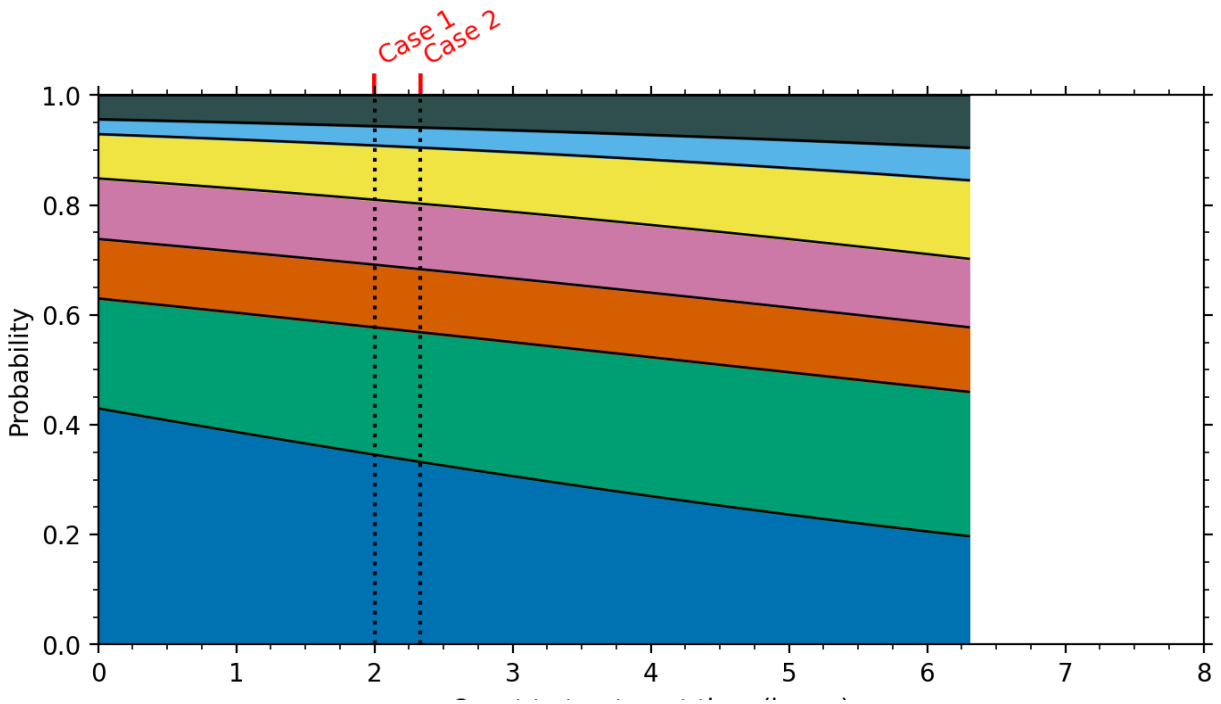
1: mRS distributions at the treatment times

nLVO treated with IVT LVO treated with IVT only LVO treated with MT ICH

Probability variation with time

The mRS probability distributions are a concoction of various sources of data. The full details are given in this document: "mRS distributions..."

The boundaries between the mRS bins follow the shape of a logistic function. For details, see this document: "Mathematics...".



Onset to treatment time (hours)

mRS data tables

This table contains the probability distributions at key points from the probability vs. time graph above.

	mRS=0	mRS=1	mRS=2	mRS=3	mRS=4	mRS=5	mRS=6
Pre-stroke	0.5829	0.1625	0.1034	0.1022	0.0420	0.0069	0.0000
Treatment at 0 hours	0.4298	0.2002	0.1082	0.1102	0.0808	0.0271	0.0437
Treatment at 2 hours 0 minutes	0.3456	0.2319	0.1140	0.1182	0.0989	0.0352	0.0563
Treatment at 2 hours 20 minutes	0.3323	0.2362	0.1147	0.1193	0.1021	0.0367	0.0587
Treatment at 6 hours 18 minutes	0.1973	0.2627	0.1176	0.1247	0.1430	0.0592	0.0955
Not treated	0.1971	0.2629	0.1200	0.1277	0.1479	0.0620	0.0823

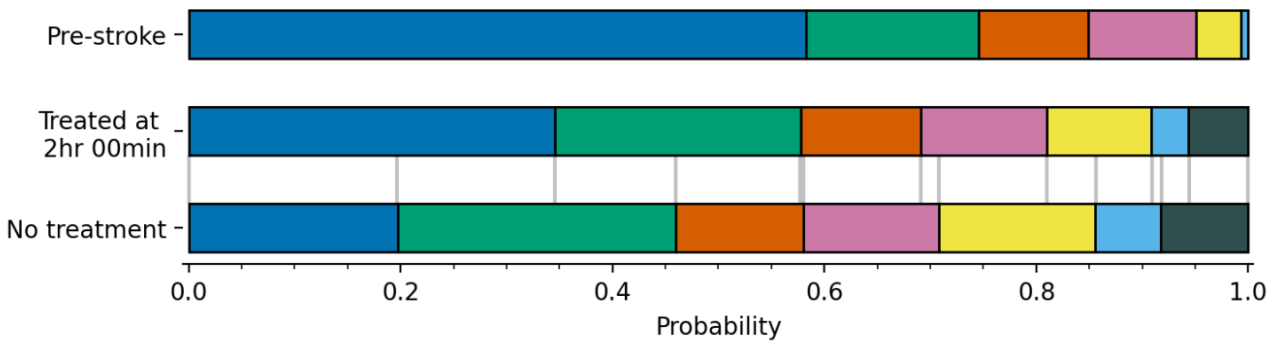
2: Cumulative changes in mRS and utility

nLVO treated with IVT LVO treated with IVT only LVO treated with MT ICH

The effect of treatment on mRS

Case 1

We can draw some of the data from the table in the "mRS distributions at the treatment times" section above to create these bar charts of mRS probability distributions:



The weighted mean utility and mRS is calculated using those regions of the chart where the mRS is

different between the "No treatment" and "Treated at 2hr 0min" bars.

Sums for the cumulative weighted mRS:

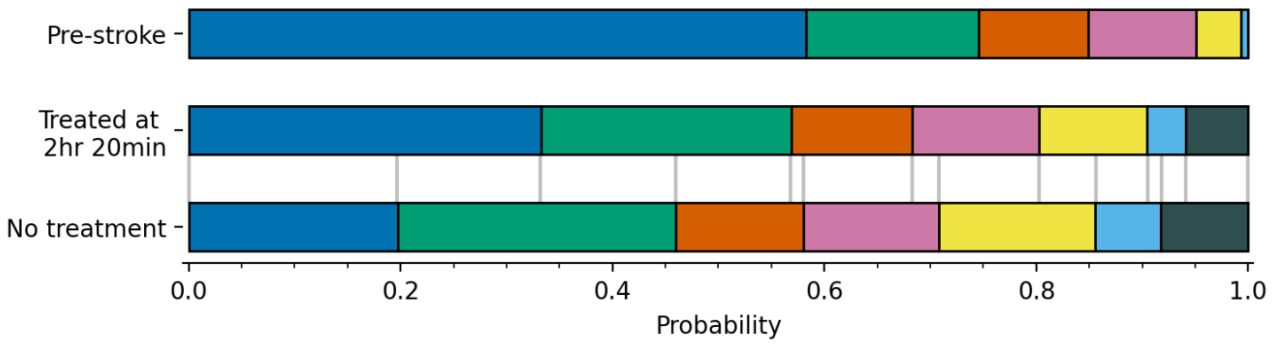
Treated		Not treated	Proportion
(0	−	1)	×0.149 = − 0.15
(1	−	2)	×0.117 = − 0.12
(2	−	3)	×0.111 = − 0.11
(3	−	4)	×0.102 = − 0.10
(4	−	5)	×0.053 = − 0.05
(5	−	6)	×0.026 = − 0.03
			Total : − 0.56

Sums for the cumulative weighted utility:

Treated		Not treated	Proportion	
(0.97	−	0.88)	×0.149 =	0.013
(0.88	−	0.74)	×0.117 =	0.016
(0.74	−	0.55)	×0.111 =	0.021
(0.55	−	0.20)	×0.102 =	0.036
(0.20	−	− 0.19)	×0.053 =	0.021
(− 0.19	−	0.00)	×0.026 =	− 0.005
			Total :	0.102

Case 2

We can draw some of the data from the table in the "mRS distributions at the treatment times" section above to create these bar charts of mRS probability distributions:



The weighted mean utility and mRS is calculated using those regions of the chart where the mRS is different between the "No treatment" and "Treated at 2hr 20min" bars.

Sums for the cumulative weighted mRS:

Sums for the cumulative weighted mRS:

Treated		Not treated	Proportion
(0	−	1)	×0.135 = −0.14
(1	−	2)	×0.108 = −0.11
(2	−	3)	×0.103 = −0.10
(3	−	4)	×0.095 = −0.10
(4	−	5)	×0.049 = −0.05
(5	−	6)	×0.023 = −0.02
			Total : −0.52

Sums for the cumulative weighted utility:

Treated		Not treated	Proportion
(0.97	−	0.88)	×0.135 = 0.012
(0.88	−	0.74)	×0.108 = 0.015
(0.74	−	0.55)	×0.103 = 0.020
(0.55	−	0.20)	×0.095 = 0.033
(0.20	−	−0.19)	×0.049 = 0.019
(−0.19	−	0.00)	×0.023 = −0.004
			Total : 0.095

3: Calculations for overall changes in utility and mRS

For each group, the weighted change is equal to the product of the following:

- proportion with this stroke type (%)
- proportion receiving this treatment (%)
- total change across this population

The final change given in the Results section above is the sum of the weighted changes.

Case 1

Change in mRS:

	Proportion with type	Proportion treated	Weighted change	
nLVO with IVT :	65% ×	15.5% ×	−0.56 =	− 0.06
LVO with IVT :	35% ×	0.0% ×	−0.15 =	0.00
LVO with MT :	35% ×	28.6% ×	−0.36 =	− 0.04
			Total :	− 0.10

Change in utility:

	Proportion with type	Proportion treated	Weighted change	
nLVO with IVT :	65% ×	15.5% ×	0.102 =	0.010
LVO with IVT :	35% ×	0.0% ×	0.032 =	0.000
LVO with MT :	35% ×	28.6% ×	0.075 =	0.007
			Total :	0.017

Case 2

Change in mRS:

	Proportion with type	Proportion treated	Weighted change	
nLVO with IVT :	65% ×	15.5% ×	−0.51 =	− 0.05
LVO with IVT :	35% ×	0.0% ×	−0.13 =	0.00
LVO with MT :	35% ×	28.6% ×	−0.74 =	− 0.07
			Total :	− 0.12

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› Change in utility:

	Proportion with type	Proportion treated	Weighted change	
nLVO with IVT :	65%×	15.5%×	0.095 =	0.010
LVO with IVT :	35%×	0.0%×	0.029 =	0.000
LVO with MT :	35%×	28.6%×	0.147 =	0.015
			Total :	0.025