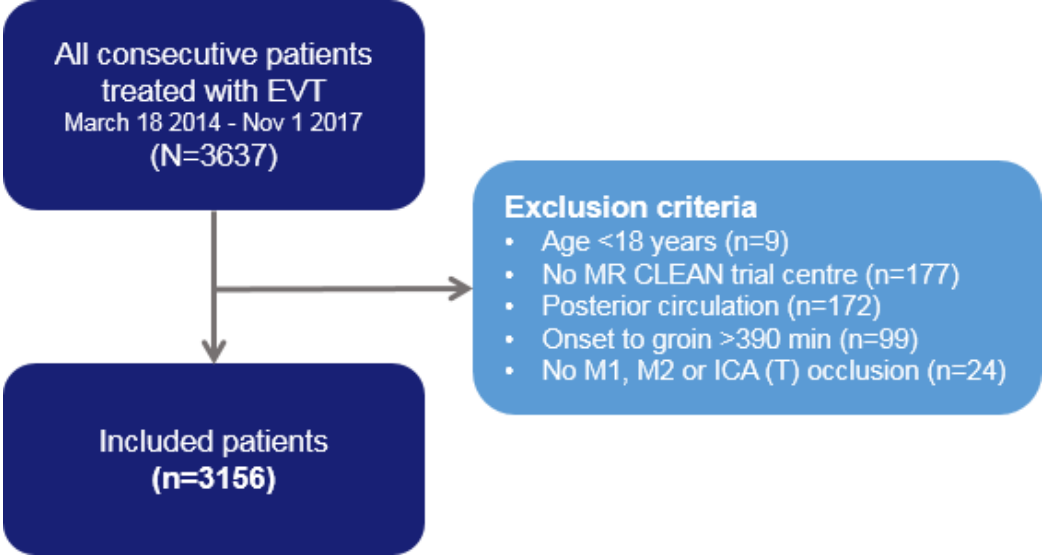


## SUPPLEMENTAL MATERIAL

“Prediction of Outcome and Endovascular Treatment Benefit: Validation and Update of the MR PREDICTS Decision Tool”

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**Supplemental Figure I.** Patient selection in the MR CLEAN Registry validation cohort.



**Supplemental Table I.** Baseline characteristics of the HERMES validation cohort (n=1242) according to quintile of predicted treatment benefit.

	Lowest quintile	Second quintile	Middle quintile	Fourth quintile	Highest quintile	p-value
Age, years	75 (10)	69 (13)	64 (13)	61 (13)	60 (12)	<0.001
Male sex	120 (48%)	128 (52%)	120 (48%)	127 (51%)	135 (54%)	0.60
Baseline NIHSS score	20 (17 to 22)	18 (16 to 21)	17 (13 to 20)	15 (12 to 18)	14 (11 to 17)	<0.001
Baseline systolic blood pressure, mmHg	158 (27)	148 (24)	144 (22)	143 (20)	137 (22)	<0.001
Treatment with IV alteplase	190 (76%)	214 (86%)	232 (93%)	237 (96%)	237 (95%)	<0.001
Previous stroke	43 (18%)	27 (11%)	24 (9.7%)	15 (6.2%)	24 (9.6%)	0.002
Pre-stroke mRS						<0.001
0	113 (70%)	112 (81%)	134 (89%)	134 (88%)	154 (91%)	
1	41 (25%)	26 (19%)	13 (8.7%)	17 (11%)	15 (8.8%)	
≥2	8 (4.9%)	1 (0.7%)	3 (2.0%)	3 (1.3%)	1 (0.6%)	
ASPECTS	8 (6 to 9)	8 (6 to 9)	8 (7 to 9)	8 (7 to 9)	8 (7 to 9)	<0.001
Collateral score						<0.001
0	3 (1.8%)	1 (0.6%)	1 (0.6%)	0 (0%)	0 (0%)	
1	38 (23%)	31 (20%)	18 (11%)	121 (7.5%)	141 (7.8%)	
2	80 (49%)	75 (48%)	60 (36%)	69 (43%)	64 (36%)	
3	42 (26%)	51 (32%)	90 (53%)	79 (49%)	101 (56%)	
Occlusion location						<0.001
ICA	107 (46%)	68 (29%)	48 (21%)	35 (16%)	26 (12%)	
M1	116 (50%)	150 (65%)	167 (71%)	170 (75%)	174 (78%)	
M2	8 (3.5%)	14 (6.0%)	19 (8.1%)	21 (9.3%)	22 (9.9%)	
Onset to groin puncture, minutes	270 (220 to 340)	223 (181 to 285)	235 (182 to 299)	215 (159 to 271)	214 (159 to 264)	<0.001

Data are reported as n (%), mean (SD), or median (IQR).

Abbreviations: ASPECTS = Alberta Stroke Program Early CT Score; ICA(-T) = intracranial carotid artery (terminus); IV = intravenous; M1 = middle cerebral artery segment 1; M2 = middle cerebral artery segment 2; mRS = modified Rankin Scale score; NIHSS = National Institutes of Health Stroke Scale.

**Supplemental Table II.** Odds ratios of the regression coefficients in the original model and the updated model (including interaction effects).

	Original model	Updated model
Endovascular treatment*	2.35	1.49
Age†		
Each year under 65 years	1.00	0.99
Each year from 65 years and above	0.97	0.95
Baseline NIHSS (per point)	0.93	0.93
Baseline systolic blood pressure†		
Each 10 mmHg under 130 mmHg	0.99	1.22
Each 10 mmHg from 130 mmHg and above	0.89	0.89
Baseline glucose level†		
Each 10 mg/dL under 120 mg/dL	NA	0.97
Each 10 mg/dL from 120 mg/dL and above	NA	0.98
Treatment with IV alteplase	1.70	1.10
Previous stroke		
Main effect	0.90	NA
Interaction with treatment	0.55	NA
Diabetes mellitus	0.61	0.63
Pre-stroke mRS	0.69	0.65
ASPECTS (per point)	1.12	1.13
Level of occlusion on non-invasive imaging		
ICA(-T)	0 (ref)	0 (ref)
M1	1.67	1.65
M2	2.28	2.42
Collateral score		
Main effect	1.48	1.29
Interaction with treatment	1.13	1.26
Time from onset stroke to groin puncture (per 30 minutes)		
Main effect	0.92	0.94
Interaction with treatment	0.95	0.97

Presented common odds ratios with 95% confidence intervals reflect the effect on the reversed modified Rankin Scale (odds ratio >1 corresponds with better functional outcome).

\*The effect of endovascular treatment is partly incorporated in the interaction effects of previous stroke, collateral score and time to groin puncture with treatment.

†Modelled using a restricted cubic spline function.

Abbreviations: ASPECTS = Alberta Stroke Program Early CT Score, EVT = endovascular treatment; ICA(-T) = intracranial carotid artery (terminus), IV = intravenous, M1 = middle cerebral artery segment 1, M2 = middle cerebral artery segment 2, mRS = modified Rankin Scale, NA = not applicable, NIHSS = National Institutes of Health Stroke Scale.

**Supplemental Table III.** Baseline characteristics of MR CLEAN Registry validation cohort (n=3156) according to category of predicted treatment benefit: low (<1%), moderate (1-10%), or high (>10%).

<b>Characteristic</b>	<b>Low benefit (n=135)</b>	<b>Moderate benefit (n=1390)</b>	<b>High benefit (n=1631)</b>	<b>p-value</b>
Age, years	80 (12)	72 (14)	67 (14)	<0.001
Male sex	57 (42%)	709 (51%)	874 (54%)	0.03
Baseline NIHSS score	20 (18 to 24)	17 (13 to 21)	14 (10 to 18)	<0.001
Baseline systolic blood pressure, mmHg	168 (27)	151 (25)	147 (23)	<0.001
Treatment with IV alteplase	81 (60%)	1030 (74%)	1299 (80%)	<0.001
Previous stroke	29 (22%)	282 (20%)	216 (13%)	<0.001
Pre-stroke mRS				<0.001
0	39 (31%)	816 (60%)	1238 (77%)	
1	18 (14%)	172 (13%)	218 (14%)	
≥2	69 (55%)	368 (27%)	148 (9%)	
ASPECTS	8 (6 to 9)	9 (7 to 10)	9 (8 to 10)	<0.001
Collateral score				<0.001
0	68 (54%)	118 (9.1%)	0 (0%)	
1	50 (40%)	797 (62%)	222 (14%)	
2	8 (6.3%)	313 (24%)	831 (54%)	
3	0 (0%)	75 (5.8%)	482 (31%)	
Occlusion location				<0.001
ICA	66 (52%)	405 (31%)	324 (21%)	
M1	58 (45%)	724 (55%)	982 (63%)	
M2	4 (3.1%)	187 (14%)	250 (16%)	
Onset to groin puncture, minutes	271 (219 to 323)	212 (169 to 270)	170 (135 to 220)	<0.001

Data are reported as n (%), mean (SD), or median (IQR).

Abbreviations: ASPECTS = Alberta Stroke Program Early CT Score; ICA(-T) = intracranial carotid artery (terminus); IV = intravenous; M1 = middle cerebral artery segment 1; M2 = middle cerebral artery segment 2; mRS = modified Rankin Scale score; NIHSS = National Institutes of Health Stroke Scale.

## MR PREDICTS regression equation

### Variable definitions

- EVT 0=no, 1=yes
- age numeric, in years
- NIHSS numeric, range 0-42
- premrs numeric, range 0-5
- diabetes 0=no, 1=yes
- BP numeric, in mmHg
- IVT 0=no, 1=yes
- glucose numeric, in mg/dL
- ASPECTS numeric, range 0-10
- location categorical: "ICA-(T)", "M1", "M2"
- collaterals numeric, range 0-3
- onsetgroin numeric, in minutes

### Intercept

	First validation cohort (HERMES)	Second validation cohort (Registry)
mRS 0	-1.35209	-1.95789
mRS 0-1	-0.0966187	-0.423007
mRS 0-2	0.854397	0.704584
mRS 0-3	1.68040	1.47090
mRS 0-4	2.86330	2.16359
mRS 0-5	3.52439	2.52240

### Predicted probability (R code)

```
plogis(0.401368*EVT - 0.0118443*age - 1.92454e-05*pmax(age-46,0)^3 + 4.98209e-05*pmax(age-67.5,0)^3 - 3.05755e-05*pmax(age-81,0)^3 - 0.0737296*NIHSS - 0.427549*premrs - 0.458441*diabetes + 0.00124704*BP - 3.38789e-06*pmax(BP-115,0)^3 + 6.45817e-06*pmax(BP-144,0)^3 - 3.07028e-06*pmax(BP-176,0)^3 + 0.0947369*IVT - 0.00469116*glucose + 4.51697e-07*pmax(glucose-94.5,0)^3 - 7.22715e-07*pmax(glucose-121.8,0)^3 + 2.71018e-07*pmax(glucose-167.3,0)^3 + 0.122167*ASPECTS + 0.501521*(location=="M1") + 0.883908*(location=="M2") + 0.258226*collaterals + (0.230021*EVT*collaterals) - 0.00213380*onsetgroin - (0.00116301*EVT*onsetgroin) + intercept)
```

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