

# An overview of methods for network meta-analysis using individual participant data: when do benefits arise?

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on behalf of GetReal Workpackage 4

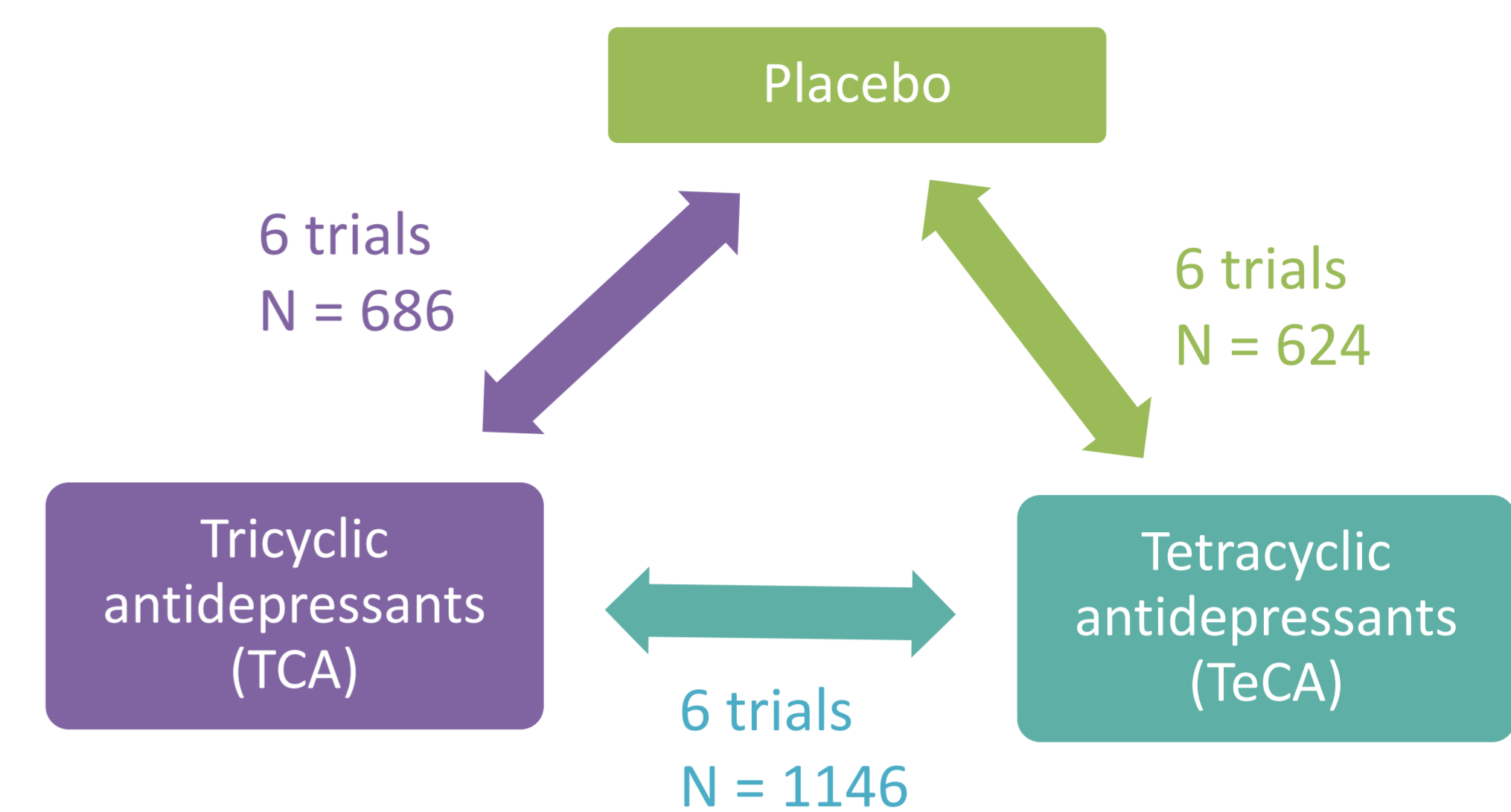
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## Background

- \* Network meta-analysis (NMA) is often based on aggregate data (AD)
- \* About 1/8 of AD-NMA suffer from network inconsistency
- \* In the presence of heterogeneity, the usefulness of NMA may be limited

## Aim

To explore common challenges and potential advantages of NMA that are based in individual participant data (IPD) rather than AD.



## Case study

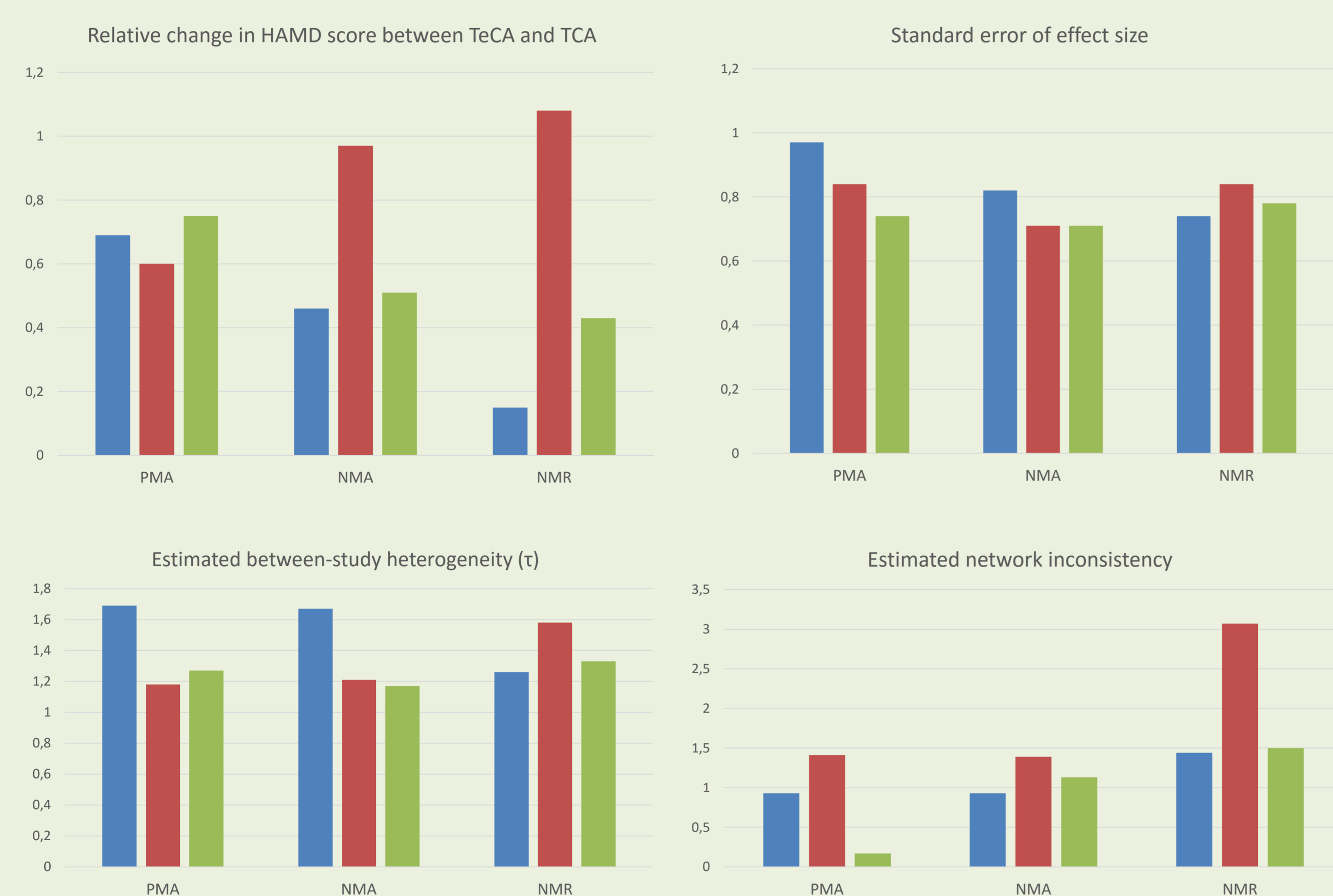
- \* 18 anti-depressant trials
- \* Longitudinal measurements of Hamilton Depression (HAMD) score
- \* Substantial drop-out of participants (up to 36%)
- \* Estimation of relative change in HAMD score after 6 weeks

## Three types of AD

- \* Scenario 1: Complete case analysis ■
- \* Scenario 2: Last observation carried forward ■
- \* Scenario 3: Multivariate regression ■

Trial <i>i</i>	Comparison <i>t<sub>i</sub> : b<sub>i</sub></i>	Scenario 1		Scenario 2		Scenario 3	
		<i>H<sub>0</sub></i>	<i>d<sub>t<sub>i</sub>b<sub>i</sub></sub></i>	<i>H<sub>0</sub></i>	<i>d<sub>t<sub>i</sub>b<sub>i</sub></sub></i>	<i>H<sub>0</sub></i>	<i>d<sub>t<sub>i</sub>b<sub>i</sub></sub></i>
1	TeCA:Plac	22.2	-3.54 (2.63)	22.1	-6.72 (1.80)	22.1	-6.07 (2.35)
2	TeCA:Plac	23.7	-1.94 (2.16)	23.6	-1.46 (1.78)	23.6	-2.22 (2.10)
3	TeCA:Plac	22.9	-0.77 (1.81)	23.1	1.59 (1.40)	23.1	1.11 (1.71)
4	TCA:Plac	24.7	-6.92 (2.11)	24.8	-5.36 (1.77)	24.8	-7.00 (2.15)
5	TCA:Plac	21.5	1.80 (1.06)	21.6	-3.00 (1.40)	21.6	-0.23 (1.25)
6	TCA:Plac	27.6	-4.67 (1.60)	27.2	-3.77 (1.57)	27.2	-4.49 (1.72)
7	TCA:Plac	23.3	-3.33 (1.79)	23.4	-5.34 (1.49)	23.4	-5.56 (1.90)
8	TeCA:Plac	21.9	-3.03 (1.06)	22.2	-2.22 (1.00)	22.2	-2.78 (1.09)
9	TeCA:TCA	25.8	0.13 (1.11)	25.9	0.02 (1.23)	25.9	0.21 (1.24)
10	TeCA:Plac	24.0	-3.46 (2.02)	24.0	-1.83 (1.73)	24.0	-3.46 (2.09)
12	TCA:Plac	29.1	-0.95 (2.44)	30.2	2.89 (4.08)	30.2	-0.50 (3.37)
13	TeCA:TCA	26.0	2.00 (1.17)	25.7	0.99 (1.34)	25.7	1.81 (1.21)
14	TeCA:TCA	22.4	0.14 (1.19)	22.3	-0.50 (1.24)	22.3	0.42 (1.16)
17	TeCA:TCA	27.2	0.82 (1.23)	26.8	1.96 (1.36)	26.8	0.82 (1.24)
18	TeCA:TCA	24.7	0.42 (0.91)	24.6	0.68 (0.96)	24.6	0.57 (0.90)

## Meta-analysis using (published) AD



PMA = pairwise meta-analysis (using common heterogeneity term), NMA = network meta-analysis, NMR = network meta-regression, NMA-PF = network meta-analysis adjusting for prognostic factors, NMA-TX = network meta-analysis adjusting for treatment-covariate interaction, MNMA = multivariate network meta-analysis

## Meta-analysis using IPD



## Conclusions

- \* IPD-NMA models achieved improved consistency and less heterogeneity by (1) modelling longitudinal outcomes with informative drop-out and (2) allowing for participant-level treatment-covariate interaction
- \* Obtaining IPD could be prioritized for those trials in an AD-NMA that compare the treatments of primary interest (1) and for which direct and indirect evidence are in disagreement or (2) when the NMA suffers from heterogeneity

## More information

Please do not hesitate to get in touch!! ([T.Debray@umcutrecht.nl](mailto:T.Debray@umcutrecht.nl))

Our work has recently been published in Statistical Methods in Medical Research

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The article can directly be accessed by scanning the QR code.

