Additional file 11 — Final model for assessing heterogeneity of treatment effect

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\begin{aligned}
\text{logit}\left(P\left(Y_{ki} \geq y\right)\right) &= \alpha + \tau_{yk} + \boldsymbol{\beta}\boldsymbol{X}_{ki} + A_{ki}\left(\delta_{k_c} + \gamma_{(ks)_c} d_{kis}\right) \\
\alpha &\sim \text{Normal}\ (\mu = 0, \sigma = 0.1) \\
\tau_{yk} &\sim t_{\text{student}}\ (\text{df} = 3, \mu = 0, \sigma = 8) \\
\boldsymbol{\beta} &\sim \text{Normal}\left(\boldsymbol{\mu} = \mathbf{0}, \Sigma = 2.5^2 I_{p\times p}\right) \\
\delta_{k_c} &\sim \text{Normal}\ (\mu = \delta_c, \sigma = \eta) \\
\eta &\sim t_{\text{student}}\ (\text{df} = 3, \mu = 0, \sigma = 0.25) \\
\delta_c &\sim \text{Normal}\ (\mu = -\Delta, \sigma = 0.1) \\
-\Delta &\sim t_{\text{student}}\ (\text{df} = 3, \mu = 0, \sigma = 2.5) \\
\gamma_{(ks)_c} &\sim \text{Normal}\ (\mu = \gamma_{cs}, \sigma = 1) \\
\gamma_{cs} &\sim \text{Normal}\ (\mu = -\Gamma_s, \sigma = 0.25) \\
-\Gamma_s &\sim t_{\text{student}}\ (\text{df} = 3, \mu = 0, \sigma = 1.5)
\end{aligned}
\tag{A4}
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The pooled effect of CCP (measured by $\log \text{OR}$) across all RCTs for patients with covariate $S = s$ will be $\Delta_s = \Delta + \Gamma_s$.

The prior distribution of Δ_s is less skeptical than Δ_{co} in model (7) because we are interested in estimating the treatment effect in each stratum of S instead of assessing evidence for overall efficacy. A less skeptical prior spreads out the probability mass, and will not shrink the posterior estimate strongly towards zero; this allows the observed data to have greater influence over the posterior distribution.

The introduction of parameters $-\Delta$ and $-\Gamma_s$ required additional prior distribution assumptions. We found that using t_{student} and $Normal$ prior distributions resulted in similar posterior estimations and divergent transitions. The t_{student} distribution, however, achieved slightly better model convergence and is less restrictive. Therefore, we opted for a t_{student} prior distribution for both $-\Delta$ and $-\Gamma_s$.