

716 Additional file 2 — Extended model for multi-site RCTs

717 We assume that there are again  $K$  RCTs but  $M$  total sites, where  $M > K$ . The outcome for the  $i^{th}$  patient from

718 the  $k^{th}$  RCT and the  $m^{th}$  site is denoted by  $Y_{kmi} = y$ ,  $y = 0, \dots, 10$ .

$$\begin{aligned}
 \text{logit}(P(Y_{kmi} \geq y)) &= \tau_{ykm} + \beta \mathbf{X}_{kmi} + \delta_{m_k} A_{kmi} \\
 \tau_{ykm} &\sim \text{Normal}(\mu = 0, \sigma = \sigma_\tau) \\
 \beta &\sim \text{Normal}(\boldsymbol{\mu} = \mathbf{0}, \Sigma = \sigma_\beta^2 I_{p \times p}) \\
 \delta_{m_k} &\sim \text{Normal}(\mu = \delta_{kc}, \sigma = \eta_1), \quad k \in (1, \dots, K) \\
 \eta_1 &\sim \text{Cauchy}(\mu = 0, \sigma = \sigma_{\eta_1}) \\
 \delta_{kc} &\sim \text{Normal}(\mu = \delta_c, \sigma = \eta), \quad c \in (1, \dots, C) \\
 \eta &\sim \text{Cauchy}(\mu = 0, \sigma = \sigma_\eta) \\
 \delta_c &\sim \text{Normal}(\mu = -\Delta_{co}, \sigma = \eta_0) \\
 \eta_0 &\sim \text{Cauchy}(\mu = 0, \sigma = \sigma_{\eta_0}) \\
 -\Delta_{co} &\sim \text{Normal}(\mu = 0, \sigma = \sigma_{\Delta_{co}}).
 \end{aligned} \tag{A1}$$

719 The notation largely follows model (3). The extended model (A1) incorporates new parameters:  $\tau_{ykm}$ , and  $\delta_{m_k}$ .

720 The  $\tau_{ykm}$  indicates the site-specific intercept and  $\delta_{m_k}$  is the  $m^{th}$  site-specific “control effect”. Each  $\delta_{m_k}$  is

721 normally distributed around a RCT-specific “control effect”  $\delta_{kc}$ , with a standard deviation  $\eta_1$ .