# Additional file 1 - metafor syntax for GLMM in R

In *metafor*, the NCHGN model is specified as

$$rma.glmm(measure = \text{“}OR\text{”}, ai =, bi =, ci =, di =, data =, model = \text{“}CM.EL\text{”}).$$

To use the “dnoncenhypergeom” function for noncentral-hypergeometric distribution or a specific optimizer such as “optim”,“bobyqa”, “newuoa”, or “uobyqa” , the model should be specified as

$$rma.glmm(measure = \text{“}OR\text{”}, ai =, bi =, ci =, di =,$$

$$model = \text{“}CM.EL\text{”}, control = list(dnchgcalc = \text{“}dnoncenhypergeom\text{”}))$$

and

$$rma.glmm(measure = \text{“}OR\text{”}, ai =, bi =, ci =, di =,$$

$$model = \text{“}CM.EL\text{”}, control = list(optimizer = \text{”}optim\text{”}))$$

where $ai$, $bi$ $ci$, $di$ are the binomial data from the table

| | Event | No event | Total |
|---|---|---|---|
| Treatment | $ai$ | $bi$ | $ai + bi$ |
| Control | $ci$ | $di$ | $ci + di$ |
| Total | $ai + ci$ | $bi + di$ | $ai + bi + ci + di$ |

The two methods (“dFNCHypergeo” and “dnoncenhypergeom”) should perform similarly, when fitting the conditional GLMM (exact likelihood). However, convergence problems might occur when trying to fit a saturated model. Switching to an alternative method can help to solve the problem.
With small numbers of events, the binomial-normal approximation may be used. Then the model is a conditional GLMM (approximate likelihood). This model is specified as

$$rma.glmm(measure = \text{“}OR\text{”}, ai =, bi =, ci =, di =, data =, model = \text{“}CM.AL\text{”}).$$