

## README Document for SAS Macro BPNMA

The SAS macro BPNMAmacro.sas and BPNMAtest.sas need to be placed in the same folder as the user's choice. BPNMAtest.sas needs to be opened in SAS window.

```
%BPNMA(bpdata=, r12=, r13=, r23=, phi1=, phi2=, phi3=);
```

### Input for BPNMA

bpdata: Data set that is constructed with eight columns, ID( sequential trial id from 1 to N, N is the total number of trials), n(sample size), trt1(estimate for treatment #1), trt1sd(standard deviation of the estimate for treatment #1), trt2(estimate for treatment #2), trt2sd(standard deviation of the estimate for treatment #2), trt3(estimate for treatment #3), trt3sd(standard deviation of the estimate for treatment #3). Currently, this SAS macro can only take care of three treatments with the same sample size.

r12: Assumed fixed correlation between treatment #1 and treatment #2.

r13: Assumed fixed correlation between treatment #1 and treatment #3.

r23: Assumed fixed correlation between treatment #2 and treatment #3.

phi1: Initial value for parameter phi1.

phi2: Initial value for parameter phi2.

Phi3: Initial value for parameter phi3.

Note: the options for PROC NLMIXED can be modified inside the SAS macro.

### Output for BPNMA

Automatically generated output from PROC NLMIXED. BPdata.rtf will be generated and saved to the same folder as BPNMAtest.sas.

The output file produces

1. the maximum likelihood estimates of  $\mu_1$ ,  $\mu_2$ , and  $\mu_3$  corresponding to EXalone, MEDSalone, and EX+MEDScombined, respectively;

2. the maximum likelihood estimates of EXalone+MEDSalone, EXalone vs EX+MEDScombined, MEDSalone vs EX+MEDScombined, EXalone+MEDSalone vs EX+MEDScombined, and EXalone vs MEDSalone;
3. the maximum likelihood estimates of the standard deviations of the error terms, for example, sig22, sig42, sig51, sig53, sig61, sig62, and sig63; and
4. the maximum likelihood estimates of the standard deviations of the random effects, namely,  $\tau_1 = \exp(\phi_1)$ ,  $\tau_2 = \exp(\phi_2)$ , and  $\tau_3 = \exp(\phi_3)$ .

Note that the detailed development of BPNMA is given in

Linda S. Pescatello, Yin Wu, Simiao Gao, Jill Livingston, Bonny Bloodgood Sheppard, and Ming-Hui Chen (2021).

Do the Combined Blood Pressure Effects of Exercise and Antihypertensive Medications Add Up to the Sum of their Parts? A Systematic Network Meta-Analysis and Meta-Review. *BMJ Open Sport & Exercise Medicine*, 7:e000895. doi:10.1136/bmjsem-2020-000895.