**Title**

Does the choice of prior matters in a Bayesian approach to meta-analysis of rare events?

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**Tables**

|  |  |
| --- | --- |
| Table 1. List of prior distributions for | |
| Parameter | **Prior distribution** |
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|  |  |
|  |  |
|  |  |
| 1. \* | where |
|  |  |
|  |  |
| \* hierarchical structure on | |

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| --- | --- | --- |
| **Table 2.** List of prior distributions for | | |
| **Parameter** | **Prior distribution** | **Mean** |
|  |  |  |
|  |  |  |
|  | *half-normal* |  |
|  |  |  |

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| **Table 3**. Parameter values used in the simulation of MA data sets | |
| **FE scenarios** |  |
|  | 0 or 0.69 |
| Number of patients in treatment group | [20, 60] |
| Risk of control group () | [0.001, 0.04] |
| Number of trials in each MA | 10, 20 or 50 |
| **RE scenarios** |  |
| \* |  |
|  | 0 or 0.69 |
| Random effects standard deviation() | 0.2 or 0.5 |
| Number of patients in treatment group | [10, 60] |
| Risk of control group () | [0.001, 0.035] |
| Number of trials in each MA | 20 or 50 |
| **Both** **FE & REs** **scenarios** |  |
| Ratio of group sizes\*\* | 1:1, 1:2 or 1:4 |
| Number of simulated MA data sets | 1000 |
| \* follows a normal distribution with specified characteristics  \*\* We assigned treatment vs. control group for the ratio of group sizes | |

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| Table 4. 95% coverage and bias for different scenarios of FE MA for log(OR) = 0 and log(OR) = 0.69 | | | | | | | | | | | |
| Prior for | **Ratio a** | **Deletion b** | **Coverage** | **Bias** | **Coverage** | **Bias** | **Coverage** | **Bias** | **Coverage** | **Bias** | **Gel. & Rub. Statistic c** |
|  |  |  | **= 0** | | | | **= 0.69** | | | |  |
| *normal(0, 10)* | | | **≤ 30%** d | | **>30%** | | **≤ 30%** | | **>30%** | |
|  | 1:1 | 0 | 0.941 | -0.033 | 0.945 | -0.071 | 0.952 | 0 | 0.949 | -0.045 | 1.0015 |
|  | 1:2 | 0 | 0.947 | -0.047 | 0.942 | -0.083 | 0.946 | -0.015 | 0.942 | -0.045 | 1.0013 |
|  | 1:4 | 0 | 0.942 | -0.089 | 0.953 | -0.093 | 0.951 | -0.025 | 0.943 | -0.044 | 1.0012 |
|  | 1:1 | 1 | 0.942 | -0.032 | 0.944 | -0.071 | 0.953 | -0.002 | 0.950 | -0.044 | 1.0015 |
|  | 1:2 | 1 | 0.942 | -0.047 | 0.941 | -0.082 | 0.946 | -0.015 | 0.943 | -0.045 | 1.0013 |
|  | 1:4 | 1 | 0.942 | -0.088 | 0.952 | -0.094 | 0.951 | -0.026 | 0.943 | -0.044 | 1.0012 |
| *normal(0, 100)* | | | | | | | | | | | |
|  | 1:1 | 0 | 0.939 | 0.002 | 0.939 | 0 | 0.942 | 0.057 | 0.940 | 0.062 | 1.0017 |
|  | 1:2 | 0 | 0.948 | -0.019 | 0.945 | -0.034 | 0.943 | 0.028 | 0.939 | 0.023 | 1.0013 |
|  | 1:4 | 0 | 0.945 | -0.058 | 0.951 | -0.063 | 0.951 | 0.006 | 0.939 | 0.015 | 1.0012 |
|  | 1:1 | 1 | 0.939 | 0.003 | 0.939 | 0.001 | 0.942 | 0.056 | 0.939 | 0.059 | 1.0017 |
|  | 1:2 | 1 | 0.948 | -0.020 | 0.945 | -0.033 | 0.944 | 0.027 | 0.940 | 0.023 | 1.0013 |
|  | 1:4 | 1 | 0.944 | -0.058 | 0.953 | -0.063 | 0.952 | 0.006 | 0.940 | 0.012 | 1.0012 |
| *unif(-10, 10)* | | | | | | | | | | | |
|  | 1:1 | 0 | 0.940 | 0.001 | 0.940 | -0.004 | 0.945 | 0.056 | 0.942 | 0.051 | 1.0015 |
|  | 1:2 | 0 | 0.946 | -0.020 | 0.946 | -0.036 | 0.944 | 0.027 | 0.940 | 0.019 | 1.0013 |
|  | 1:4 | 0 | 0.945 | -0.059 | 0.953 | -0.064 | 0.952 | 0.006 | 0.940 | 0.010 | 1.0012 |
|  | 1:1 | 1 | 0.939 | 0.002 | 0.940 | -0.004 | 0.944 | 0.054 | 0.944 | 0.053 | 1.0015 |
|  | 1:2 | 1 | 0.948 | -0.020 | 0.946 | -0.036 | 0.944 | 0.026 | 0.940 | 0.019 | 1.0013 |
|  | 1:4 | 1 | 0.944 | -0.057 | 0.951 | -0.064 | 0.952 | 0.004 | 0.939 | 0.009 | 1.0012 |
| *Hierarchical* | | | | | | | | | | | |
|  | 1:1 | 0 | 0.945 | 0.024 | 0.945 | 0.015 | 0.949 | 0.044 | 0.947 | 0.029 | 1.0128 |
|  | 1:2 | 0 | 0.950 | -0.016 | 0.947 | -0.032 | 0.946 | 0.017 | 0.941 | 0.010 | 1.0075 |
|  | 1:4 | 0 | 0.945 | -0.057 | 0.954 | -0.062 | 0.952 | 0.001 | 0.942 | -0.008 | 1.0039 |
|  | 1:1 | 1 | 0.945 | 0.023 | 0.944 | 0.016 | 0.947 | 0.042 | 0.946 | 0.031 | 1.0129 |
|  | 1:2 | 1 | 0.949 | -0.015 | 0.947 | -0.032 | 0.946 | 0.019 | 0.942 | 0.009 | 1.0074 |
|  | 1:4 | 1 | 0.946 | -0.057 | 0.953 | -0.063 | 0.953 | 0.001 | 0.943 | -0.006 | 1.0039 |
| *Mantel-Haenszel* | | | | | | | | | | | |
|  | 1:1 | 0 | 0.957 | 0.008 | 0.974 | 0.005 | 0.962 | 0.034 | 0.963 | 0.028 | NA |
|  | 1:2 | 0 | 0.962 | -0.003 | 0.970 | -0.037 | 0.959 | 0.005 | 0.962 | 0.008 | NA |
|  | 1:4 | 0 | 0.970 | -0.063 | 0.963 | -0.046 | 0.964 | -0.017 | 0.961 | -0.012 | NA |
| a We assigned treatment vs. control group for the ratio of group sizes  b deletion is a logical argument; zero means trials with zero in both arms are excluded from the analyses.  c The Gelman and Rubin diagnostic is used to check the convergence of multiple mcmc chains run in parallel.  d Percentage of trials with no events in both arms. | | | | | | | | | | | |

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| Table 5. 95% coverage and bias for different scenarios of REs MA log(OR) = 0 for half-normal (mean = 0.5) | | | | | | | | | | | |
| Prior for | **Ratio a** | **Deletion b** | **Coverage** | **Bias** | **Coverage** | **Bias** | **Coverage** | **Bias** | **Coverage** | **Bias** | **Gel. & Rub. Statistic c** |
|  |  |  | **= 0.2** | | | | **= 0.5** | | | |  |
|  |  |  | **≤ 30%** d | | **>30%** | | **≤ 30%** | | **>30%** | |  |
| *normal(0, 10)* | | |  | |  | |  | |  | |
|  | 1:1 | 0 | 0.949 | -0.014 | 0.953 | -0.043 | 0.927 | 0.082 | 0.946 | 0.074 | 1.0065 |
|  | 1:2 | 0 | 0.945 | -0.050 | 0.945 | -0.111 | 0.935 | 0.038 | 0.935 | -0.040 | 1.0074 |
|  | 1:4 | 0 | 0.939 | -0.135 | 0.957 | -0.162 | 0.937 | -0.007 | 0.955 | -0.052 | 1.0095 |
|  | 1:1 | 1 | 0.949 | -0.010 | 0.954 | -0.047 | 0.927 | 0.082 | 0.945 | 0.072 | 1.0066 |
|  | 1:2 | 1 | 0.945 | -0.053 | 0.944 | -0.109 | 0.935 | 0.038 | 0.935 | -0.040 | 1.0070 |
|  | 1:4 | 1 | 0.942 | -0.137 | 0.953 | -0.160 | 0.938 | -0.008 | 0.953 | -0.051 | 1.0093 |
| *normal(0, 100)* | | | | | | | | | | | |
|  | 1:1 | 0 | 0.947 | 0.029 | 0.948 | 0.019 | 0.917 | 0.127 | 0.932 | 0.137 | 1.0067 |
|  | 1:2 | 0 | 0.949 | -0.023 | 0.942 | -0.057 | 0.933 | 0.065 | 0.934 | 0.020 | 1.0075 |
|  | 1:4 | 0 | 0.943 | -0.107 | 0.954 | -0.122 | 0.937 | 0.015 | 0.951 | -0.011 | 1.0092 |
|  | 1:1 | 1 | 0.950 | 0.029 | 0.948 | 0.021 | 0.917 | 0.125 | 0.933 | 0.136 | 1.0066 |
|  | 1:2 | 1 | 0.949 | -0.026 | 0.943 | -0.060 | 0.933 | 0.065 | 0.934 | 0.022 | 1.0074 |
|  | 1:4 | 1 | 0.941 | -0.103 | 0.956 | -0.121 | 0.938 | 0.013 | 0.953 | -0.012 | 1.0093 |
| *Hierarchical* | | | | | | | | | | | |
|  | 1:1 | 0 | 0.943 | -0.023 | 0.950 | -0.032 | 0.928 | 0.067 | 0.938 | 0.073 | 1.0187 |
|  | 1:2 | 0 | 0.942 | -0.055 | 0.945 | -0.093 | 0.932 | 0.025 | 0.936 | -0.019 | 1.0140 |
|  | 1:4 | 0 | 0.941 | -0.127 | 0.953 | -0.152 | 0.939 | -0.016 | 0.953 | -0.048 | 1.0121 |
|  | 1:1 | 1 | 0.943 | -0.021 | 0.948 | -0.031 | 0.930 | 0.071 | 0.939 | 0.072 | 1.0187 |
|  | 1:2 | 1 | 0.941 | -0.053 | 0.941 | -0.095 | 0.932 | 0.021 | 0.936 | -0.019 | 1.0141 |
|  | 1:4 | 1 | 0.940 | -0.128 | 0.955 | -0.147 | 0.941 | -0.017 | 0.957 | -0.046 | 1.0119 |
| *Mantel-Haenszel* | | | | | | | | | | | |
|  | 1:1 | 0 | 0.955 | 0.027 | 0.959 | 0.031 | 0.902 | 0.125 | 0.946 | 0.129 | NA |
|  | 1:2 | 0 | 0.944 | 0.007 | 0.957 | 0 | 0.894 | 0.107 | 0.948 | 0.068 | NA |
|  | 1:4 | 0 | 0.955 | -0.020 | 0.959 | 0.011 | 0.898 | 0.087 | 0.938 | 0.116 | NA |
| a We assigned treatment vs. control group for the ratio of group sizes  b deletion is a logical argument; zero means trials with zero in both arms are excluded from the analyses.  c The Gelman and Rubin diagnostic is used to check the convergence of multiple mcmc chains run in parallel.  d Percentage of trials with no events in both arms. | | | | | | | | | | | |

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| Table 6. 95% coverage and bias for different scenarios of REs MA log(OR) = 0.69 for *half-normal (mean = 0.5)* | | | | | | | | | | | |
| Prior for | **Ratio a** | **Deletion b** | **Coverage** | **Bias** | **Coverage** | **Bias** | **Coverage** | **Bias** | **Coverage** | **Bias** | **Gel. & Rub. Statistic c** |
|  |  |  | **= 0.2** | | | | **= 0.5** | | | |  |
|  |  |  | **≤ 30%** d | | **>30%** | | **≤ 30%** | | **>30%** | |  |
| *normal(0, 10)* | | |  | |  | |  | |  | |
|  | 1:1 | 0 | 0.956 | 0.023 | 0.960 | 0.020 | 0.918 | 0.128 | 0.951 | 0.098 | 1.0084 |
|  | 1:2 | 0 | 0.947 | 0.002 | 0.948 | -0.036 | 0.928 | 0.090 | 0.939 | 0.073 | 1.0071 |
|  | 1:4 | 0 | 0.946 | -0.037 | 0.944 | -0.085 | 0.933 | 0.042 | 0.934 | 0.027 | 1.0071 |
|  | 1:1 | 1 | 0.957 | 0.024 | 0.961 | 0.017 | 0.920 | 0.127 | 0.949 | 0.100 | 1.0087 |
|  | 1:2 | 1 | 0.948 | 0.003 | 0.947 | -0.036 | 0.929 | 0.091 | 0.937 | 0.072 | 1.0070 |
|  | 1:4 | 1 | 0.944 | -0.037 | 0.943 | -0.085 | 0.933 | 0.043 | 0.939 | 0.028 | 1.0069 |
| *normal(0, 100)* | | | | | | | | | | | |
|  | 1:1 | 0 | 0.940 | 0.083 | 0.946 | 0.128 | 0.895 | 0.189 | 0.912 | 0.209 | 1.0087 |
|  | 1:2 | 0 | 0.943 | 0.038 | 0.944 | 0.039 | 0.912 | 0.132 | 0.920 | 0.150 | 1.0069 |
|  | 1:4 | 0 | 0.945 | -0.006 | 0.945 | -0.036 | 0.983 | 0.074 | 0.927 | 0.081 | 1.0073 |
|  | 1:1 | 1 | 0.940 | 0.086 | 0.941 | 0.130 | 0.896 | 0.192 | 0.914 | 0.216 | 1.0089 |
|  | 1:2 | 1 | 0.944 | 0.039 | 0.941 | 0.041 | 0.914 | 0.132 | 0.920 | 0.148 | 1.0067 |
|  | 1:4 | 1 | 0.944 | -0.010 | 0.947 | -0.034 | 0.928 | 0.073 | 0.925 | 0.080 | 1.0074 |
| *Hierarchical* | | | | | | | | | | | |
|  | 1:1 | 0 | 0.945 | 0.005 | 0.949 | 0.027 | 0.923 | 0.083 | 0.934 | 0.111 | 1.0390 |
|  | 1:2 | 0 | 0.939 | -0.018 | 0.941 | -0.025 | 0.929 | 0.059 | 0.930 | 0.079 | 1.0198 |
|  | 1:4 | 0 | 0.939 | -0.056 | 0.942 | -0.087 | 0.932 | 0.018 | 0.936 | 0.026 | 1.0120 |
|  | 1:1 | 1 | 0.948 | 0.004 | 0.949 | 0.026 | 0.922 | 0.087 | 0.933 | 0.111 | 1.0380 |
|  | 1:2 | 1 | 0.943 | -0.017 | 0.942 | -0.026 | 0.927 | 0.057 | 0.931 | 0.074 | 1.0195 |
|  | 1:4 | 1 | 0.939 | -0.056 | 0.940 | -0.086 | 0.933 | 0.019 | 0.935 | 0.020 | 1.0121 |
| *Mantel-Haenszel* | | | | | | | | | | | |
|  | 1:1 | 0 | 0.951 | 0.037 | 0.966 | 0.060 | 0.909 | 0.136 | 0.954 | 0.153 | NA |
|  | 1:2 | 0 | 0.934 | 0.024 | 0.959 | 0.027 | 0.895 | 0.121 | 0.937 | 0.131 | NA |
|  | 1:4 | 0 | 0.944 | 0.008 | 0.963 | 0.007 | 0.895 | 0.104 | 0.934 | 0.106 | NA |
| a We assigned treatment vs. control group for the ratio of group sizes  b deletion is a logical argument; zero means trials with zero in both arms are excluded from the analyses.  c The Gelman and Rubin diagnostic is used to check the convergence of multiple mcmc chains run in parallel.  d Percentage of trials with no events in both arms. | | | | | | | | | | | |