Introduction to meta-analysis 2: Effect measures for dichotomous outcomes

Practical: Meta-analysis of binary and continuous data using RevMan

Aim: To be able to carry out meta-analysis of binary outcomes using the methods discussed in the lecture and to be able to interpret the results of such meta-analyses using the Cochrane review by Smith CA, Hay PP. Acupuncture for depression. Cochrane Database Syst Rev. 2005

Note
This practical will take you through some of the meta-analytic features of the RevMan software. The software should be installed on your computer; if it is not then a facilitator should have a copy. Ensure the software and data Acupuncture.xls are installed on your computer, and start RevMan.

Getting started
When you start RevMan you will need to specify what you want to do (import review or create a new one etc). For the purpose of this tutorial, select create a new review if it is the first time you open RevMan, or go to file and click new. In the New Review Wizard follow the instructions and select Intervention review. Type the title of the review in the two empty fields “Acupuncture” for “depression” and select it to be a full review, then click finish.

The review title should appear in the main RevMan window. Click on the little circle sign (or double click on the review title) to display a skeletal outline of a Cochrane Review. If you are not familiar with the structure of a Cochrane Review, click on some circle signs (or double click on things) to peruse. Studies are entered under the Studies and References section, and data are entered under the Data and Analyses section. Most of the sections are empty for this tutorial, but you may wish to look later at the complete Cochrane Review to see what each section would contain in practice.
1. To add a new study in the Studies and References section: Highlight the heading that the study belongs under (e.g. Included studies).

2. Either click on the plus sign on the upper left corner or right click and select Add Study to open a study window.


Then we go to enter the data as follows:

4. Highlight the Data and analyses

5. Either click on the plus sign on the upper left corner or right click and Add Comparison to open a comparison window.

6. Type Acupuncture versus medication.

7. Click Finish.
8. Highlight the Acupuncture versus medication comparison and click Add Outcome to get the New outcome Wizard.

9. Select a Dichotomous outcome then click Next.

10. In the window type in
   a. Name: Improvement in depression.
   b. Group label 1: Acupuncture
   c. Group label 2: Control

11. In the statistical methods select Mantel-Haenzel in the effect measure select Risk ratio. Click Finish.

12. On the left panel open the Data and Analyses, Acupuncture for depression Improvement in depression. Highlight the Improvement in depression outcome and with right click select Add Study Data.
13. Select all the studies and press **Finish**. This should display a table with one row for each study.

14. Copy the excel data. Now you can paste them in RevMan table by right click and select Paste.

15. Once the data have been entered into RevMan, producing the desired meta-analysis is straightforward. All the statistical calculations are carried out within RevMan for you.

16. Click on the Forest Plot icon to bring up a **forest plot** of the data.

17. Which effect measure/method of analysis is displayed?

   Above the forest plot are several icons. Click them to see what they produce.

18. Statistical analysis options are controlled from the icon looking like two wheels. Other effect measures and method options are available from the **Analysis Method** menu. Consider a fixed effect meta-analysis on the **risk ratio**, **odds ratio** and **risk difference** scales. You may need to change the range of the display scale to produce clear plots.

19. Can you calculate from the 2x2 table \((a=2, b=8, c=5, d=15)\) to OR, RR, RD? Now enter \(\log OR=-0.28\), \(SE=0.94\), \(CER=0.25\), \(N_{1}=10\), \(N_{2}=20\). What do you observe?

20. How could you evaluate “the other” RR in RevMan. i.e. not cure of depression?