Indirect treatment comparisons with individual patient data meta-analysis of low back pain
randomized controlled trials

Policy makers and healthcare providers need to decide which among the competing interventions is
the best and consequently recommend it as the first line of treatment. One method is to have a very
large randomized controlled trial (RCT) with all eligible interventions but this is very costly. An
alternative is to perform a systematic review and meta-analysis of completed RCTs. It is quite
common in individual patient data meta-analysis to compare two treatments against each other (direct
comparison). For example, we could compare data from trials comparing treatments A and B, and
data from trials comparing treatments B and C. However, from these pairwise comparisons it is
difficult to infer if A is better or worse than C. This can be achieved by estimating an indirect treatment
comparison for the difference between A and C.

National Institute for Health and Care Excellence (NICE) guidance suggests that all people with
continuing chronic non-specific low back pain should be offered a course of acupuncture needling,
exercise, manual therapy, or cognitive behavioural therapy. The reported effect sizes are of similar
magnitude. This project is concerned with the estimation of indirect treatment comparisons with
individual patient data from RCTs testing therapist-delivered interventions for low back pain.

In this project the student will need to extract data from the low back pain repository (consisting of 19
trials with data from more than 9000 participants). The student is expected to analyse the data using a
Bayesian approach to estimate indirect treatment comparisons which involves the use of WinBUGS
(http://www.mrc-bsu.cam.ac.uk/bugs/winbugs/contents.shtml). The student is also expected to carry
out data preparation and manipulation in the R statistical software package (note WinBUGS can be
called from R) and so knowledge of R is required and familiarity with WinBUGS would be a bonus but
not essential.

The successful completion of this project would provide an excellent basis for a PhD project. Network
meta-analysis, including indirect and mixed treatment comparisons, is an active area of both
methodological and applied medical statistics research.

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