Online Advanced Methods for Cost-Effectiveness Analysis

Presentation 3: Population decision models: effectiveness evidence
3.7: Network meta-analysis: assumptions

Pedro Saramago, PhD
Research Fellow, CHE

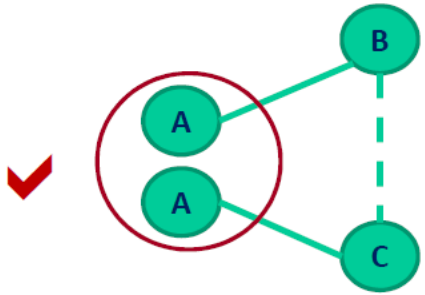
Objectives

- Key assumptions of network meta-analysis:
  - Similarity and homogeneity
  - Exchangeability and transitivity
  - Consistency

The basic assumptions underlying network meta-analysis

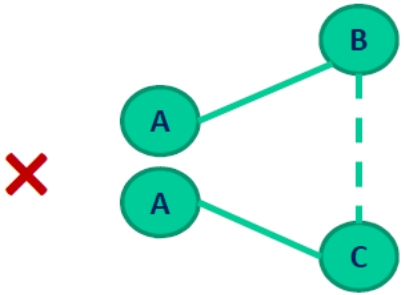
- **Similarity and homogeneity** (= MA)
- **Exchangeability/ Transitivity**
- **Consistency**

Similarity is…



Treatment A is similar when it appears in AB and AC trials

Plausible when A is placebo given in different forms
(e.g. injection versus pill)?



Homogeneity is…

- The effect estimates across trials do not differ beyond what would be expected by chance

Exchangeability is…

- The ‘missing’ arm is missing at random
- A *vs* B do not have a ‘C’ arm and the A *vs* C studies do not have a ‘B’ arm

Transitivity is…

- A valid IC requires that the sets of AC and BC studies are similar in their distributions of effect modifiers – in which case the intervention effects can be assumed as transitive
- can be viewed as the extension of clinical and methodological homogeneity to comparisons across groups of studies that compare treatments.
- Note that similarity within each comparison in the network is not sufficient to justify the transitivity assumption.

Source: Cipriani, *Ann Int Med* 2013

Consistency is…

- ‘Direct’ and ‘indirect’ evidence are assumed to provide estimates of the same parameter (transitivity)
- What does this imply?
- The treatment effect, d_{AB}, estimated by the AB trials, is expected to be similar than the treatment effect estimated by the AC and BC trials if they had included B and A arms, respectively

= direct (AB) and indirect evidence (AC and BC) is not expected to differ beyond what can be explained by heterogeneity

- Consistency can only be tested when a loop in the evidence network exists

Summary points

- The key assumptions of NMAs are: consistency, exchangeability/ homogeneity, similarity and transitivity