SA63

Communicating Complex Methodology Via Infographics: An MAIC Case Study

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I need to compare outcomes from my Trial A to those of published Trial B but the populations differ in clinically meaningful ways.

Step 1
Is the difference between populations large enough to matter?

Step 2
Estimate weights for each patient (pt) in Trial A.

Step 3
Calculate reweighted outcomes for Trial A, representing what would have been observed if its population was more like that of Trial B.

Step 4
Estimate comparative effectiveness with methods such as a T-test (for single-arm comparison) or the Bucher method (for anchored comparisons).

How are these weights calculated? For most, it's a black box. We open the box in the graphic below:

Reminder:
The weights are an odds > Odds are a representation of probability > Can estimate the probability that each Trial A patient is in Trial B by logistic regression.

Standard logistic regression

My characteristics

$$logit(Prob\ of\ being\ in\ Trial\ B_i) = \alpha + pt_i \times \beta$$

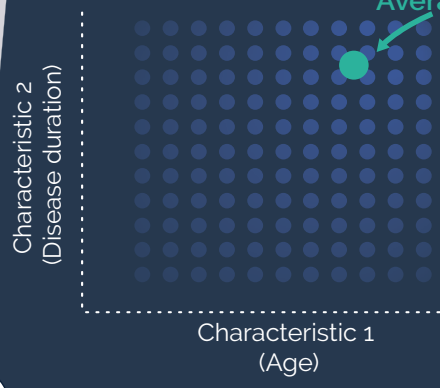
Algebraic rearrangements

$$ln(Odds\ of\ being\ in\ Trial\ B_i) = ln(Weight_i) =$$

My characteristics

$$w_i = exp(\alpha + pt_i \times \beta)$$

The weight for each person in Trial A is the odds of being in Trial B



Patients whose characteristics are more likely to be in Trial B have a larger weight than those with less likely characteristics

But how are weights estimated for all people and all characteristics at the same time?

Find the collection of weights so that the weighted average of the characteristics in Trial A equals the average of Trial B

$$\frac{\sum pt_i \, w_i}{\sum w_i} = \text{Avg of Trial B} = \frac{\sum pt_i \, exp(\alpha + pt_i \times \beta)}{\sum exp(\alpha + pt_i \times \beta)}$$

Algebraic rearrangements

$$\sum exp(pt_i \times \beta) \times (pt_i - \text{Avg of Trial B}) = 0$$

Let's assume for simplicity that

$$\text{Avg of Trial B} = 0$$

(we could easily transform all values to center around 0)

Now we have:

$$\sum exp(pt_i \times \beta) \times pt_i = 0$$

Solving for β in this equation is the same as minimizing

$$\sum exp(pt_i \times \beta)$$

Estimate β that satisfies this equation

REFERENCES
Signorovitch et al. Comparative effectiveness without head-to-head trials: a method for matching-adjusted indirect comparisons applied to psoriasis treatment with adalimumab or etanercept. Pharmacoeconomics. 2010
NICE DSU technical support document 18: methods for population-adjusted indirect comparisons in submissions to NICE. http://nicedsu.org.uk/wp-content/uploads/2017/05/Population-adjustment-TSD-FINAL.pdf
Bucher et al. The results of direct and indirect treatment comparisons in meta-analysis of randomized controlled trials. J Clin Epidemiol. 1997

ABBREVIATIONS
MAIC, matching-adjusted inidirect comparison; NICE, National Institute for Health and Care Excellence; RCT, randomized controlled trial; TSD, Technical Support Document

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