Reviewer's report

**Title:** Factors explaining heterogeneity of patient decision aid effects on improving knowledge of outcome probabilities: A systematic review sub-analysis

**Version:** 3  **Date:** 2 September 2013

**Reviewer:** Malcolm Price

**Reviewer's report:**

The paper reports a detailed analysis of 17 RCTs estimating the effect of patient decision aids as an intervention to improve the outcome of accuracy of patient knowledge of outcome probabilities. This outcome was previously considered as part of a wider Cochrane review of the efficacy of decision aids of numerous decision related outcomes. The original Cochrane review meta-analysed 14 RCTs that reported this outcome. Whilst the review found very strong evidence of a positive treatment effect the studies where highly heterogeneous. In this paper the authors use sub-group analysis and meta-regression methods to determine how much of this heterogeneity can be explained by three study level covariates: type of control intervention, decision aid quality, and patient's baseline knowledge of probabilities. The covariates are selected as the best representations of characteristics of the controls, active intervention, and population respectively sensibly only exploring only one covariate for each to avoid problems of multiple comparisons.

The methodology employed is sound and the paper is well-written. The authors found no evidence of an effect from type of control intervention; weak evidence that as decision aid quality (as measured by IPDASi probabilities dimension) increased so does the treatment effect; and strong evidence that as baseline (control group) knowledge of outcomes increases treatment efficacy decreases. For this last covariate they fit a model that assumes a linear relationship with the outcome on the log-odds scale and showed that this explains around half of the variability in the effect size between studies (after controlling for the dependence between the effect measure and the baseline proportion – note I haven’t read reference 18 which the authors cite as describing the method they used so I can’t comment on its validity). The authors do a good job of describing the utility of these findings in the discussion by pointing out how estimates of the baseline proportion from pilot studies could be used to inform trial design (and the decision to conduct a trial). They also provide a fairly good description of the modelling assumptions and risk of bias.

**Major Compulsory Revisions**

There is no mention of any investigation of the characteristics of residuals from the two meta-regression models. Please could the authors report some details about whether the assumptions of the linear regression models have been met e.g. Normality, homoscedasticity of residuals etc.
Minor essential revisions

There is no mention of any investigation of the characteristics of residuals from the two meta-regression models. Please could the authors report some details about whether the assumptions of the linear regression models have been met e.g. Normality, homoscedasticity of residuals etc.

Page 10, 2nd paragraph, lines 2-3 and throughout the paper. The authors use the term “control event rate” rather than “baseline risk” to minimise confusion since risk corresponds to a favoured outcome. This is confusing as the term rate makes no sense at all in this context because the outcome is a proportion and so dimensionless. Please change to something like “baseline proportion” or “baseline score.”

Page 10, 2nd paragraph, lines 4-5: “Assuming the type of control intervention does not modify its effects (as confirmed in this analysis)” The analysis does not confirm this. Please rephrase the part in brackets to something like “(and our investigations found no evidence that it does)”.

Page 10, 2nd paragraph, lines 7-13

Page 11, 2nd paragraph, lines 5-6: please change “A chi-squared test is used to detect whether heterogeneity is present” to something like “A chi-squared test is used to examine the strength of the evidence about whether heterogeneity is present”.

Page 16, 2nd paragraph, lines 4-5. Please change “The type of control intervention does not modify” to “There was no evidence that the type of control intervention modifies”

Page 18, 3rd paragraph, lines 7-8: the phrase “they found linear correlations with ln(OR) in only 14% of meta-analysis” is unclear. Please expand on what is meant by found (p-value < 0.05 in 14% of MA’s?)

Discretionary Revisions

Finally, in my view the term statistical significance is not useful and I advise that it be removed from the document.

Typographical errors

Page 12, 1st paragraph, line 12 “a log-transformed values” delete “a”.

Page 16, 3rd paragraph, second to last line: “Thus, additional studies are necessary improve certainty regarding effect modification due by the IPDASi Probabilities dimension score”. Should be “are necessary to improve” and “due to the IPDASi” or similar.

Page 19, 2nd paragraph, line 3: “[2,2]” same reference given twice.

Malcolm Price

**Level of interest:** An article of importance in its field
Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

None