



A meta-analysis of individual, aggregated and incomplete aggregated data

Reinhard Vonthein^{1,2}, Alexander Jobs³

¹ Institut für Statistik, Ludwig-Maximilians-Universität München

² Institut für Medizinische Biometrie und Statistik, Universität zu Lübeck, Universitätsklinikum Schleswig-Holstein, Campus Lübeck und Zentrum für Klinische Studien Lübeck, Universität zu Lübeck

³ Universitäres Herzzentrum Lübeck, Medizinische Klinik II / Kardiologie, Angiologie, Intensivmedizin, Universität zu Lübeck, Universitätsklinikum Schleswig-Holstein, Campus Lübeck, Lübeck (inzwischen: Herzzentrum Leipzig)

29.07.2020, 16.00 (s.t.)

Online via Zoom

(Meeting-ID: 913-2473-4411; Password: StatsCol20)

Abstract:

Background: Blood pressure reduction within the first hours of ACE inhibitor treatment was reported in numerous small studies. Some reports contain individual patient data at baseline and after treatment, some report arithmetic means and standard deviations of changes, many just give means and standard deviations at both points in time, one article contained medians and interquartile ranges.

Purpose: All of these data should be used in a meta-analysis.

Methods: Medians and interquartile ranges were converted to means and standard deviations by the Cochrane Handbook¹. The correlation of repeated measures was estimated by partial correlations, i.e. individual data were doubly centered within studies. The resulting correlation was used to infer the variance of differences where these were not reported. Finally, meta-regression with random effects was used for data synthesis. Such a two-stage procedure could underestimate variation of the estimator due to the first stage and could introduce bias. This is explored via single stage estimation by MCMC using R².

Results: The medical conclusions were essentially the same. Modeling to explain the considerable heterogeneity between studies posed a formidable challenge.

Discussion: There is a model declaration ready now for further use. Its advantages and drawbacks are better known now.

References:

- 1 Higgins JPT, Green S (Hrsg.) (2011). *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.1.0 [updated March 2011]. The Cochrane Collaboration. <http://handbook-5-1.cochrane.org/> [10.12.2017].
- 2 R Core Team (2017) R: A Language and Environment for Statistical Computing, Version 3.4.2. Wien, <https://www.R-project.org> [28.09.2017]