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## COMPARISON OF TWO APPROACHES FOR META-ANALYSIS OF INDIVIDUAL PATIENT DATA

**1. August 2016 um 11:00 Uhr**

Informatikbibliothek (88.03.806)

Zentrum für Medizinische Statistik, Informatik und Intelligente Systeme (CeMSIIS)

Medizinische Universität Wien, Spitalgasse 23, 1090 Wien

(Plan: <http://www.muw.ac.at/cemsiis/allgemeines/anschrift/>)

### Abstract:

Comparison of two approaches for Meta Analysis of individual patient data

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Our aim is a Meta Analysis based on individual patient data (IPD) for the clinical assessment of coronary computed tomography angiography. The basis for our analysis is the CoMe-CCT data set described in [1].

For IPD the approaches of Reitsma et al [2] or Chu et al [3] to perform a Meta Analysis for a binary outcome do not represent a valid solution, since they need study-specific two by two tables. The article of Riley et al [4] discusses a bivariate random-effects logistic regression Meta Analysis of sensitivity and specificity of a diagnostic test based on IPD, i.e. Bernoulli data as dependent variable. Another idea is to extend the Coughlin approach [5] by adding random-effects to the linear predictor. Debray et al [6] describe and compare several methods for estimating factor-associations from predictor finding studies with binary outcome, including the Riley model and the extended Coughlin approach.

In fact, in this talk we show the existence of a bijection of the Riley model and the extended Coughlin model. We analyze the CoMe-CCT data based on both models and state that the Riley model results in a more specific factor-outcome association of the pretest-probability.

The key question here is: "Do these theoretically equivalent models give also the same content-related interpretation?" Another question of interest is, how valid is the numerical implementation of the bijection?

#### References:

- [1] Individual patient data meta-analysis for the clinical assessment of coronary computed tomography angiography: protocol of the Collaborative Meta-Analysis of Cardiac CT (CoMe-CCT). Schuetz et al, Systematic Reviews. 2013, 2:13
- [2] Meta-analysis of diagnostic studies: a comparison of random intercept, normal-normal, and binomial-normal bivariate summary ROC approaches. Reitsma et al, J Clin Epidemiol. 2005, 58:982-90 Review
- [3] Bivariate meta-analysis of sensitivity and specificity with sparse data: a generalized linear mixed model approach. Chu et al, J Clin Epidemiol. 2006, 59:1331-3
- [4] Meta-analysis of diagnostic test studies using individual patient data and aggregate data. Riley et al, Stat Med. 2008, 27:6111-36
- [5] The logistic modeling of sensitivity, specificity, and predictive value of a diagnostic test. Coughlin et al, J Clin Epidemiol. 1992, 45:1-7
- [6] Individual Participant Data Meta-Analysis for a Binary Outcome: One-Stage or Two-Stage? Debray et al, PLoS ONE 8(4) 2013.

#### Vorstand

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