

Practical aspects of method comparison studies

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The comparison of two methods of measurement using the so-called “Bland-Altman” procedure of plotting the difference against the mean for each pair of observations has become the *de facto* standard for analysis of method comparison studies without replicates [1]. In a more recent publication Bland and Altman [2] recommended the use of replicate measurements and provided theory and examples for specific scenarios such as linked exchangeable replicates, and one where the magnitude of the bias depended on the level of measurement.

Carstensen [3] outlined a general model for comparing two or more methods of measurement with arbitrary replication structure, linking methods by linear functions. All the procedures proposed by Bland and Altman are special cases of this. The algorithm suggested for fitting these models is absurdly complicated, so we recast it in a graphical models framework using the BUGS machinery. The BUGS routines allows the user to fit variance component models, generate translation formulae between methods with proper prediction limits accounting for all sources of variation, and is not restricted to comparing only two methods.

We provide illustrative examples and demonstrate the **R**-package “MethComp” that incorporates the models and BUGS routines, and provides a friendly yet flexible interface to a set of models for method comparison studies which encompass all previous ones as a proper subset.

References

- 1: Bland, J.M. and Altman, D.G (1986) Statistical methods for assessing agreement between two methods of clinical measurement. *Lancet*, **i**, 307–310.
- 2: Bland, J.M. and Altman, D.G (1999) Measuring agreement in method comparison studies. *Statistical Methods in Medical Research*, **8**, 136–160.
- 3: Carstensen, B. (2004) Comparing and predicting between several methods of measurement. *Biostatistics*, **5**(3), 399–413.