LabNetAnalysis - An instrument for the analysis of data from laboratory networks based on RExcel

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Abstract. For the definition of reference standards of diagnostic assays, laboratory networks are founded to ensure reliable patient results over space and time. An example of such a network is the IFCC HbA1c standardization network, where 10 - 13 laboratories define the reference values for the HbA1c measurements worldwide. Up to 15 samples are measured within each of these laboratories, the values of each sample are combined to define the reference concentration of this sample.
After the laboratories reported their values to the network coordinator, the following points need to be analyzed:

(i) Analysis of the measurements of an individual laboratory in comparison to the other laboratories.

(ii) Detection of outliers within the data.

(iii) Calculation of the uncertainties of the reference concentrations.

(iv) Comparison of the reference concentrations of one network with other national networks.

To be able to perform all these analysis by the network coordinator in a routine-like fashion, an instrument was needed that enables easy data-handling and storing, user-friendly operation and all statistical power to perform the analysis, which comprises basic statistics, mixed models and MCMC simulations. The interface between R - for the statistical analysis and Excel - for the data handling, storing and user-friendly interaction, provided by RExcel was found to be ideal for these requirements.
The talk will shortly describe the statistical analysis, afterwards the functioning of LabNetAnalysis based on RExcel will be shown, and end with a short story of the development process focusing on highlights and pitfalls during the development.

References

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Keywords

RExel, LABORATORY NETWORKS, UNCERTAINTY CALCULATION