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Precision of the reportable value – statistical optimization of the number of replicates

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Highlights

- Statistical models are presented that allow optimizing efficiently the replication strategy for the number of routine injections, sample preparations, and runs defined for the reportable value with respect to the confidence interval of the precision.
- The level of nesting of the models can be minimized by including only significant variance contributions larger than 20% of the total variation, which will tighten the upper confidence bound of the precision as the level of nesting decreases.
- Four models each have been developed both for a complete intermediate precision study, and using injection precision from an independent source.
- An Excel spreadsheet that performs all the calculations in this paper as well as the appropriate model selection is available from the authors.
- For a statistical evaluation of the precision of the reportable value, the authors recommend a minimum of six runs, two preparations per run, and two injections per preparation, in order to provide sufficient precision of the variance estimates.

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