**Statement from the chairman of the CCQM Key Comparison Reference Value Working Group  
April 2012**

Document CCQM/09‑03 [1] sets out principles for the treatment of key comparison data within CCQM. Document CCQM/10-03 [2] implements these principles by providing a general procedure and a range of estimators for key comparison data. Among these estimators, those referred to in CCQM/10-03 as “excess‑variance” procedures are particularly appropriate for situations where the results accepted as technically valid show greater dispersion than can be accounted for by the reported uncertainties and where this dispersion does not arise from a small number of obviously discrepant observations. These estimators operate by calculating an additional “between-laboratory” variance that augments the provided NMI variances (squared standard uncertainties). This additional variance is chosen such that the resulting data are mutually consistent. Where laboratories agree well, the procedure tends to the simple uncertainty-weighted mean; where the laboratories agree very poorly, the procedure tends to the unweighted mean.

A particularly straightforward excess-variance approach – the DerSimonian-Laird method – was presented at the CCQM plenary meeting in April 2011 in Document CCQM/11-18 [3]. In the presentation (and in CCQM/11-18 [3]) it was pointed out that an undesirable consequence of ensuring data consistency is that the uncertainty components of the calculated degrees of equivalence (DoEs) would often be similar to each other (in cases of extreme inconsistency they would be almost identical). In such situations, the DoEs would not be discriminatory.

In April 2011, therefore, Dr Kaarls invited all WGs to consider the application of CCQM/11-18 [3] and to test it and provide feedback to the KCRV WG. Feedback has since been received from some, but not all, WGs. Comments so far indicate that the particular procedure in CCQM/11-18 [3] is useful in some circumstances, but is unlikely to provide a general solution applicable to all studies within CCQM. One particular problem noted is that as inconsistency increases, DoE uncertainties based on an excess‑variance approach do indeed increase to a point that fails to discriminate between participants. Further, the DoE uncertainties can be very large, which could in turn adversely affect subsequent CMC claims.

In addition, the KCRV WG has considered the advice in CCQM/10‑03 [2] on reviewing reported results and feels that there is benefit in strengthening some of that guidance, in particular in relation to examination of participants’ uncertainty budgets.

KCRV WG additionally notes that in the light of CCQM’s request for rigorous calculation of DoE uncertainties that takes full account of covariances, it remains essential to use available uncertainty information consistently in both the estimation of the KCRV and in the subsequent calculation of the individual DoEs including their uncertainties.

Considering these comments and observations, KCRV WG proposes to move forward by further developing the general guidance document presented as CCQM/10-03 [2] to:

1. Incorporate the DerSimonian-Laird calculation with additional guidance on when such procedures are most appropriate;
2. Include, for completeness, additional guidance on the examination of uncertainty budgets during prior screening of the results.

In relation to the treatment of key comparison data, the working group further proposes to:

* Re-examine the use of the excess‑variance term in calculating DoE uncertainties and to consider whether alternative calculations are appropriate, to assist interpretation or to provide DoE uncertainties;
* Maintain the guidance document issued as CCQM/10-03 over the longer term;
* Return to the question of the use of key comparison data in the evaluation of CMC claims.

Finally, KCRV WG notes that there remain some issues relating to preparation of comparisons on which CCQM lacks published policy, particularly stability checking and homogeneity assurance. KCRV WG suggests that it would additionally be beneficial to develop policy on these issues.

**References**

1. Data evaluation principles for CCQM key comparisons, CCQM document [CCQM/09-03](http://www.bipm.org/cc/CCQM/Restricted/15/CCQM09_03.pdf).
2. Draft CCQM guidance note: Estimation of a consensus KCRV and associated degrees of equivalence (Version 6), CCQM document [CCQM/10-03](http://www.bipm.org/cc/CCQM/Restricted/16/CCQM10_03.pdf) .
3. Use of an ‘excess-variance’ approach for the estimation of a KCRV, associated standard uncertainty and DoEs for CCQM KCs, CCQM document [CCQM/11-18](http://www.bipm.org/cc/CCQM/Restricted/17/CCQM11-18.pdf).

Maurice Cox (chairman, KCRV WG), NPL, and Steve Ellison, LGC Ltd.  
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