Some considerations for an interlab study...

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October 24, 2013
Harmonization

Poor harmonization

MEP-21: Trace elements, PCBs and PAHs in Sewage Sludge
Certified value for Hg: 9.03 ± 0.36 mg·kg⁻¹ [U=k·u_c (k=2)]

1 value above 50%

11 values below -50%

Results for Hg from all participants

Good harmonization

CCQM-K43: Se in salmon
KCRV_Mixture Model-median: 7.32 ± 0.28 · 10⁻⁵ mol·Kg⁻¹; [μ ± 0.9t/√n]
Validation to Support Confident Decisions

Fig. 4 IMEP-14 results for lead compared to the results for lead from the NMIs that participated in CCQM-P15, measured in the same sample material as in IMEP-14
“Space” of Lab Comparisons

- **Case A**
  - mutually consistent results, harmonious
    - results in the same population; error-bars touch

- **Case B**
  - over-dispersion
    - poor overlap of error-bars
    - *evidence of under-estimation of measurement uncertainty*
      - may arise from experiment design that doesn’t include important factors
        » e.g. “Day” effects

- **Case C**
  - consistency and harmony, with outliers
    - evidence that most labs in control
    - evidence that assay probably valid
    - possible blunders in outlier labs

- **Case D**
  - over-dispersion with outlying values
    - mix of Case B and C
Design for Comparison Data

• Required:
  – quantitative numeric measurand
    • “Y-axis” values
  – quantitative measurement uncertainty estimates
    • error bars

• Useful:
  – estimate of correct value...
    • either
      – “reference” value or range
      – Orthogonal measurement
    • or
      – estimate of reference from the population of data

“CCQM Guidance Note: Estimation of a consensus KCRV and associated Degrees of Equivalence”
Draft 2010-03-01, Stephen LR Ellison, LGC and Maurice Cox, NPL
“Target” Plots

• Another way of examining concordance amongst a population of labs
  – perhaps suitable for sorting performance into tranches