NOTES ON INTERPRETING DEQAS REPORTS ($1,25(OH)_2D$)

Definitions

Target Value

Currently the Method Mean (see below) against which performance is assessed.

ALTM (All Laboratory Trimmed Mean)
Submitted results are ranked in ascending order and the highest 5% and lowest 5% (10% in total) are removed. The arithmetic mean of the remaining results is the ALTM.

Example: 110 results submitted
10% of 110 = 11
Round to the next even number =12
Remove 6 from the top and 6 from the bottom of the ranked results
Calculate arithmetic mean of remaining 98 results = ALTM

Standard Deviation

A 'robust estimator' of Standard Deviation is calculated after applying weighting factors to the trimmed results (98 in the above example).
A detailed account of this is given in Healey's paper (1).

Method Mean (MM)

The trimming process is also applied to results from individual method groups (those with 10 or more users) to give a Method Mean, SD, and Bias of results from the Method Mean. Bias from the Method Mean is currently used to assess performance.

Occasionally we calculate MM bias (from the ALTM) and calculate the average method bias over a distribution cycle. The estimated bias is necessarily based on a relatively small number of results and takes no account of its variability with concentration

Bias

The difference between the submitted result (R) and the MM (currently the target value), expressed as a percentage of the MM.

Example: MM = 210 pmol/L
R = 190 pmol/L
Bias = [(190 – 210) / 210] x 100 = -9.5%

Outliers

Any of the submitted results (110 in the first example) > 3SD from the ALTM are defined as outliers. These are placed in a separate column at the margins of the frequency distribution histograms (page 1 of the report) and are highlighted (*) in subsequent pages.

Performance Assessment

1. The performance target is the ALTM ± 30%. In individual distributions, failure to meet the performance target in fewer than 4 (80%) of the assessable samples (usually 5) is regarded as unsatisfactory. Failure to submit fewer than 4 results for a distribution is also regarded as unsatisfactory.

2. Participants who achieve acceptable performance in 80% or more of the 'assessable' samples (usually 20) in the distribution cycle are awarded a certificate to this effect. Successful participants will be able to download the certificate over the internet. **Participants must submit results for all four distributions to get a certificate**.

   Should participants be required to produce evidence of their performance before the certificate is available, we recommend they use the Bias Table published with the final report. This displays the bias obtained on each sample for the current and previous 5 distributions.

Report layout

(It would be helpful to have a copy of a report in front of you when reading these notes.

First page. This contains all the information needed to assess your performance.

a. A frequency distribution of all results and the distribution of results submitted by users of your method (green/shaded). The ALTM and SDs are marked at the top of each histogram, and the position of your result indicated by a short line against the relevant column.

b. On the right of page 1 are given details of sample number, the ALTM (current target value), the trimmed mean of results submitted for your method and the bias of your result from the ALTM. Also given is the bias of your result from the Method Mean (MM) although this is not used in performance assessment.

c. Finally, we record the method we believe you are currently using*. If this not correct you should e-mail the Organiser immediately.*

Pages 2-4

These pages list the methods used, the number of results submitted for each, followed by the Method Means, Standard Deviation (SD) and the Coefficient of Variation (CV%) for each sample.
For those participants more familiar with pg/ml (ng/L), values in these units are given in parentheses.

Page 5 Bias Table

This table summarises your data for the samples in the current and previous 5 distributions. The right hand column gives your % Bias from the Target Value (MM). Performance is regarded as unsatisfactory if the Bias is >30.0%.

Subsequent Pages.

These give a complete listing of all results, with the ALTM, SD and CV printed at the bottom of each page. Outliers are marked (*)
NOTE. DEQAS is unusual among proficiency testing schemes in providing this listing and its continued provision is under review. Meanwhile, we suggest that participants do not print these pages, which can be referred to on-line if and when you wish to view them.

Frequently Asked Questions

Q1. **Why does DEQAS use the Method Mean as the target to assess performance.**

A1. Unlike 25-OHD, there is currently no Reference Measurement Procedure for 1,25(OH)2D. Methods for 1,25(OH)2D give disparate results and we are unsure whether the ALTM is a good surrogate for the 'true' value. Accordingly it has been decided that participants' results should be judged against the mean of their method group.

Q2. Do I have to return results for every distribution to achieve acceptable performance?
A2. Yes.
A certificate is not awarded unless results are returned for all 4 distributions during a distribution cycle.

Q3. Does DEQAS ever omit samples when assessing performance?
A3. Yes.
If we deliberately alter the sample matrix (normally unadulterated human serum), results from that sample are likely to be excluded in the performance assessment of individual participants. This is a precaution in case results from one or more methods might be affected by changes in the sample matrix, as has been demonstrated in some 25-OHD methods (2)

Q4. Are vitamin D metabolites stable at ambient temperature?
A4. Yes.
DEQAS and others have demonstrated that vitamin D metabolites in serum are very stable, probably due to their being tightly bound to protein. However, the original DEQAS experiments were done with one particular method and we cannot guarantee that every method is unaffected by the matrix changes (eg. increasing pH) which inevitably occur in samples stored at ambient temperature. To minimize this possibility, we would recommend that participants freeze DEQAS samples at -20 to -40 degrees Celsius immediately on receipt. Samples for the US are shipped overnight to our agent in Atlanta who, on the day of arrival, forwards them by priority mail.

Q5. Can I view DEQAS reports at any time?
A5. Yes, an interim report is available before the results submission deadline but can only be viewed after you have submitted your own results.
Remember that the reliability of the statistics will increase with the number of results submitted. Interim reports based on a small number of results can be very unreliable
Participants are notified by e-mail when the Final Report is available for downloading.

Archived reports can be viewed and printed at any time after logging in and selecting the month and year from the drop-down.

REFERENCES

1. Healey MJR (1979) Clin Chem **25** (5); 675-677 Outliers in Clinical Chemistry Quality- Control Schemes
2. Carter GD, Jones JC and Berry JL (2007) J Steroid Biochem Mol Biol **103;** 480-482 The anomalous behaviour of exogenous 25-hydroxyvitamin D in competitive binding assays.