Quality Assurance (QA) Procedures in WHI Specimen Testing

WHI's main method for monitoring specimen testing quality is to include pairs of sample with each set of specimen vials sent to a lab (called a "Pull"). These samples are given different Vial ID numbers to blind the lab to the fact that they are the same sample. QA pairs are from de-identified non-participant sample.

Two measures of quality are calculated based on the QA sample results: the Coefficient of Variation and the Correlation Coefficient.

Correlation Coefficient (Corr)

The Correlation Coefficient is a measure of the linear association between paired QA samples resulting in a single value calculated for the entire set of QA pairs. A value of 1 is a perfect correlation. We provide the results for the paired QA samples on a scatter chart (see below). Examples: (1) the chart on the left has a correlation of 0.9869; (2) the chart on the right has a correlation of 0.3. NOTE: If the number of duplicate pairs is very small the correlation coefficient may not provide useful information; thus, we do not calculate the correlation coefficient if fewer than three QA pairs were tested.



Coefficient of Variation (CV%)

The Coefficient of Variation (CV%) is calculated for each pair of QA samples and measures the "distance" between the two results received for the pair. CV% is the standard deviation of the two test results / average of those two results. We provide a box and whiskers chart that shows the min, max, median, quartile 1 and quartile 3 CV% values (see below).

Reading the WHI QA measurement charts

We report QA data at three levels of detail, Test, Version, and raw Pull Duplicates. The Test page has a chart showing QA data summarized for each Version of a test. (Note: A Test has a "Version" for each distinct combination of lab, specimen type and testing method, e.g. two labs performing the same test would be considered two versions of that test.) The Version details page shows the QA data summarized for each pull sent to the lab. Finally there a Duplicates page shows the raw data on each member of a QA pair (i.e., Duplicates) with the individual CV% values and a scatterplot of the duplicate pairs.



This example chart shows the QA data for twelve Versions of Insulin. The orange line shows the Correlation Coefficient (corr) for each Version (*plotted as corr*100*). The red line shows the minimum Pull Correlation for that Version. The blue box and whiskers plot shows the distribution of the Coefficient of Variation values. The whiskers show the min and max CV% values and the box displays the range of the middle 50% of the CV% values (quartile 1 - quartile 3). In this example chart, the fourth Version from the left has a pretty good overall correlation, but the red line indicates that at least one Pull for that Version has a troubling correlation value. Clicking into the Version details page will show the QA data for each sample Pull tested with that Version.