Risks that can affect the interlaboratory comparison study

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Outlook

☺ Introduction

☺ The Effective Factors on the Risk of ILC

☺ The Impressible Statistical Criteria of ILC

☺ References

Introduction

The validity of laboratory results can be ensured by various methods:

- Repetition of the test
- Controlling the equipments
- Controlling the test procedure by standard material such as

  QCM, RM, CRM, CS
- Proficiency test or laboratory comparison study
- Correlation of results
- and ….

Introduction

☻ Interlaboratory comparison (ILC) is an study that is provided by a laboratory or the validated center.

☺ ILC can help the laboratories for the repeatability and bias which may be present in their results.

Introduction

☺ An ILC usually involves the following steps:

😐 Preparation of the sample

😐 Identification of the participating laboratories

😐 Delivery of the samples to laboratory

😐 Analyses of the samples by the laboratories

😐 Delivery of the results to provider

😐 Analyses of the results

😐 Informing the laboratories about their performance

The sample

- The sample prepared for interlaboratory comparison objective can be
- An standard material

Advantages ☑

Disadvantages ☒

- An internal prepared material

Advantages ☑

Disadvantages ☒

The risks can be resulted from the sample

- Its Inherence
- Its Stability
- Its Homogeneity
- The Value of Analyte

The risks can be resulted from the laboratory

- Its Validity
- The Test Method
- The Reported Value
- The Number of Laboratories

☠ The risks can be resulted from the provider

- Its Validity
- Handling
- Sample Preparation
- Analysis of Data

The risks can be resulted from the data

- Outliers
- Dispersion of the Results
- Estimation of Referenced Value
- The Number of Laboratories
- Statistical Criteria

☹ Some statistical criteria which can be influenced by the risks:

- Average of the results $\overline{\overline{X}} = \sum_{1}^{p} \overline{X} / p$
- Repeatability Standard Deviation $S_r = \sqrt{\frac{\sum_{1}^{P} S^2}{P}}$
- Reproducibility Standard Deviation $S_R = \sqrt{S_L^2 + S_r^2}$

$$S_{\overline{X}} = \sqrt{\frac{\sum_{1}^{P} d^2}{(P-1)}} \qquad S_L = \sqrt{\frac{S_{\overline{X}}^2 - S_r^2}{n}}$$

☹ Some statistical criteria which can be influenced by the risks:

- The Between-Laboratory Consistency Statistic

$$h = \frac{d}{S_{\bar{X}}}$$

- The Within-Laboratory Consistency Statistic

$$k = \frac{S}{S_r}$$

- Z Score

$$Z_i = \frac{\left(X_i - X_{Assigned}\right)}{\sigma_{Assigned}}$$

References:

- ISO Guide 80: Guidance for the in-house preparation of quality control materials (QCMs)
- ISO 13528: Statistical methods for use in proficiency testing by interlaboratory comparisons
- ISO 17043: Conformity assessment — General requirements for proficiency testing
- ISO 17034: General requirements for the competence of reference material producers
- ASTM E691: Standard Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

Thank You for Your Attention