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Know about the uncertainty game before getting your sample tested

08 July 2019 | Views | By Srinivasa Prasad G B

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Often when we go to purchase fruits and vegetables, the number of items in our bag varies each time. The same weight can have difference in the number of items when taken from two different shops. Similarly, our body weight varies when checked on different machines and so does the temperature during fever when measured using different thermometers, even though marginally.

All of these slight discrepancies are due to the uncertainty measurement. Every measurement is mostly recorded with an error called measurement uncertainty. It is a minor plus/ minus estimate of how far an experimental quantity might be from the "true value".

This measurement uncertainty exists in our lab tests as well. Even the guaranteed error free reports are likely to have this error in their result, which is termed as uncertainty. Globally the best accuracy of quality analysis is considered as 90% not 100%. This is the reason why labs recommend for each report to be interpreted by a qualified medical professional. It is crucial for laboratory professionals and clinicians to ensure that an identified change in any test they conduct is not because of the variation in the lab equipments or system.

The International Standard Organization (ISO) that provides Accreditations to medical lab insists on presenting an accurate result for doctors as well as patients and hence it requires that the uncertainty of measurement be evaluated. Uncertainty of measurement is a variable of measurement result that comprise of dispersing level of measurement results, possible bias, and possible bound

A lot of us get confused on what factors to select a lab for testing our specimen. Well, the confusion is entirely justified and the decision should be very carefully made because many further things of our health are based on these lab tests results.

Uncertainty can be sourced to analytical error. There are three phases during the analytical process where an error is likely to occur. The three phases are:

- Pre-analytical (where the results can be affected before a sample reaches the lab due to issue in sample collection, storage, transportation, as well as the patient’s state.),
- Analytical (the way reagents are stored or prepared, the performance of instruments and operator, and instruments' adjustments affect this error), and
- Post- analytical (this involves the interpretation of the results by the clinician).

Uncertainty is measured by uncertainty estimates extracted from continuous readings and other information including previous history of calibration, bias and so on.

The margin of doubt that is present in the result of any measured value is related to the measurement uncertainty and lab professionals need to examine this margin.

Any lab performing a patient’s sample test should do a performance verification test. The test consists of (but is not limited to) the following:

a. Equipment related tests:

1. Installation qualifications
2. Operations qualifications
3. Performance qualifications

b. Analysing third party known value material on regular basis (regularity should be in reference to international guideline lines), and also they should register for EQAS (External Quality Assurance Programme)

c. Service user should ask labs to provide documents to ensure that they are registered for internationally recognised internal quality programme and EAQS programme because many lab managements do not understand the implication of this minimum requirement and try to cut cost by not following or they don’t register for international programme and try to avail cheaper intra hospital comparisons even though these programmes are available internationally to reduce the cost operations.

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