

Measurement Uncertainty: It's More Than a Number

It encompasses numerical and qualitative uncertainty, including quality routines that give us confidence in our testing.



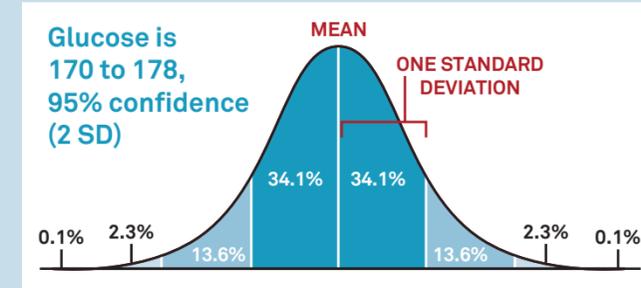
What *creates* uncertainty?

Measurement system factors

- Instrument fluctuations
- Environment factors, such as temperature, humidity, vibration
- Different operators and methods
- Calibration tools

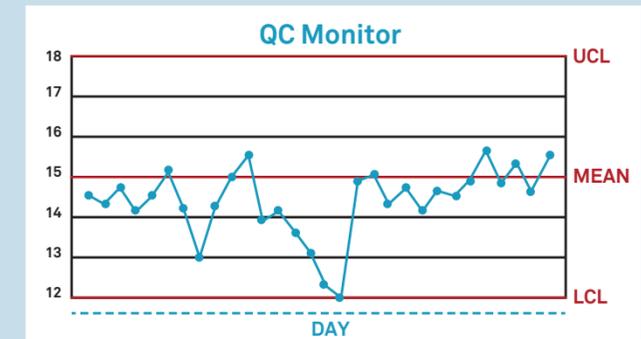
How can we *express* uncertainty?

- Calculable range based on the standard deviation and confidence interval
- Description of all the measures taken to assess, optimize, and manage the test system, plus any results
- Different ways of demonstrating that a test is reliable

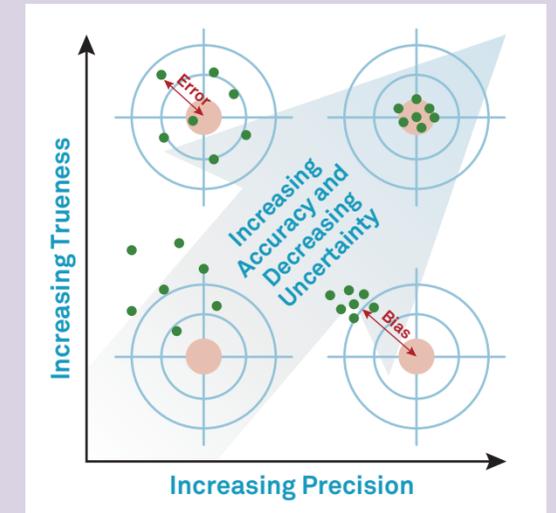


How can we *manage* uncertainty?

- PT, QC
- Instrument comparison
- Method comparison
- Calibration
- Training



Key MU Concepts



Other Influences on Results and Interpretation

Biological variation

- Diet, hydration
- Fasting
- Cycles
- Drug interactions

Estimates of biological variation influencing specific tests

(eg, cyclic daily cortisol variations)

- Patient instructions
- Ongoing patient monitoring



Pre-examination phase factors

- Specimen collection
- Specimen transport
- Specimen receiving

Estimates of effects of procedures

(eg, specimen collection using a tourniquet may result in elevated lactate or ammonia)

- Internal process audits
- Metric monitoring
- Training



Term Definition

Term	Definition
Measurement Uncertainty	The level of uncertainty in the value when an analyte is measured
Accuracy	The closeness of agreement between a measured quantity value and a true quantity
Precision	Variation between individual measurements performed by replicate testing
Trueness	Closeness of the average of replicate measurand values and its true quantity Typically estimated by repeat testing with an established measurand quantity