FAQ Measurement Uncertainty

What is measurement uncertainty?

Measurement uncertainty is a calculated parameter of quality for any measurement. This is often calculated using quantity values obtained by the measurement of QC materials under intermediate precision conditions that includes as many routine changes as routinely possible.

When samples are examined over and over again, there is often inconsistency in results. Random differences of the measuring conditions will lead to variable results if the measuring system is sensitive enough. That result variability must be quantified so those who produce the examination results and those who receive examination results have an objective estimate of the quality of results produced by the laboratory. Understanding measurement uncertainty allows meaningful comparison with the results of other similar measurements made at different times using the same measuring system and provides a framework estimating the reliability of results produced by a measurement system.

Where is measurement uncertainty mentioned in the DAP standards?

Measurement uncertainty is addressed within EXA3.2 of the 2015 laboratory medicine accreditation standards. The standards require laboratories to:

- determine measurement uncertainty for each quantitative measurement procedure
- define performance requirements for measurement uncertainty for each quantitative measurement procedure
- review estimation of measurement uncertainty at defined intervals
- consider measurement uncertainty when interpreting measured quantitative values
- provide measurement uncertainty to users upon request

What are the responsibilities of a laboratory in estimating and reporting measurement uncertainty?

Laboratories should become familiar with the concept of measurement uncertainty and create a practical approach to developing estimates of measurement uncertainty. There are a number of strategies that can be employed to estimate measurement uncertainty. Laboratories will need to verify the model used to calculate measurement uncertainty and understand when and how to report uncertainty of measurement.
What references are available for estimating and reporting measurement uncertainty?


FAQ Safety Inspections and Audits

What are safety inspections and audits and how do they differ?

A safety inspection is a routine, assessment of the general working conditions. Safety inspections often involve the use of a standardized checklist to assess the physical safety of the laboratory including items such as emergency eyewashes, spill kits, the storage of flammables, etc.

A safety audit is a review covering the basic elements and activities of safety within the facility. An audit often includes interviews, documentation review and first-hand observation. Examples of safety audits include hand hygiene, the use of PPE, environmental decontamination, etc. Safety audits may be comprehensive or may only cover a specific element of safety.

Where safety inspections and safety audits mentioned in the DAP Standards?

**Safety inspections** are mentioned in SAF2.1 of the 2015 laboratory medicine accreditation standards.

**SAF2.1.1** Safety inspections are conducted monthly.

WorkSafeBC states inspections must be carried out regularly, and will not define a required frequency of inspections given the vast range of work environments within the province of BC. However WorkSafeBC states that safety inspections are conducted at an interval that allows for timely reporting to the monthly joint occupational health and safety committee or health and safety representative. Furthermore, WorkSafeBC states they provide minimum guidelines and encourage regulatory bodies to exceed these when appropriate. Finally, WorkSafeBC has identified that plumbed in safety devices such as eyewashes and showers are required by regulation to be inspected and flushed monthly as a minimum, and that if this activity was to be considered by the regulatory body as part of the safety inspection, then inspections must be conducted monthly at a minimum.

**Safety audits** are mentioned in SAF1.1 and SAF2.1 of the 2015 laboratory medicine accreditation standards.

**SAF1.1.17** The safety program includes an audit conducted at least annually

Guidance: The audit should include the following: safety and health policy, written safe work practices, safety education and training, supervision of safety, regular inspections, hazardous materials, health surveillance, first aid services and equipment, accident and illness investigation, health and safety committee review, records and statistics.
The laboratory has defined safety audits of work methods or practices to identify and resolve safety hazards (e.g. hand hygiene, use of PPE, decontamination processes).

What are the responsibilities of a laboratory in conducting safety inspections and audits?

Laboratories should identify what safety elements are to be inspected monthly, and then must conduct a monthly safety inspection. Safety elements subject to less frequent inspection should be identified and inspected at a frequency determined by the laboratory. Records of these safety inspections are to be retained for a time frame defined by the laboratory, facility or health authority.

With regard to safety audits, laboratories must comply with any specific safety audit requests from their facility, health authority, regulatory bodies or government. Records of these safety audits are to be submitted as required and retained for a time frame defined by the laboratory, facility, health authority or requesting body.

As a best practice, laboratories may choose to undergo a comprehensive safety audit on an annual basis.

What references are available for laboratory safety inspections and safety audits?


FAQ Evaluation of Supplies and Suppliers

The quality of the services a laboratory provides is determined by many elements. Supplies, including reagents and consumables should be carefully selected and subsequently monitored.

What are the responsibilities of a laboratory in the evaluation of supplies and suppliers?

Evaluation of suppliers is addressed in QMS3.3 of the 2015 laboratory medicine accreditation standards. The standards require laboratories to:

- have procedures for the selection and purchase of external services, equipment, reagents and consumables that affect the quality of examinations
- select and approve suppliers using established criteria based on the supplier’s ability to provide external services, equipment, reagents and consumables in accordance with the laboratory's requirements
- maintain a list of selected and approved suppliers
- monitor the performance of suppliers to ensure that purchased products and services consistently meet the stated criteria
What are the differences between the 2010 and 2015 standards in regards to the evaluation of supplies and suppliers?
This is a completely new addition to the standards, and it is required by ISO 15189.

What if we have limited choice in the selection of suppliers within our regional system?
Limited input into supplier selection does not remove the laboratory’s responsibility to establish the necessary characteristics for quality and to pass those along to purchasing departments or the requirement to evaluate and monitor supplies provided by vendors.

What references are available for the evaluation of supplies and suppliers?

FAQ Verification of Comparability

What is verification of comparability and why is it important?
Verification of comparability is a process that ensures examination results produced by different measurement systems are equivalent and within acceptable criteria. Patients may present for laboratory examination at multiple locations within the health-care system. Laboratories may have multiple instruments within one location that may provide examination results for an individual patient. Continuity of medical care requires that the comparability of examination results produced by different measurement systems is verified periodically. Maintaining comparability involves standardization and calibration of instruments, forced agreement of results among different measurement systems through mathematical transformation, or adoption of different reference intervals and therapeutic or diagnostic cutoffs that are clearly indicated in the patient report. Regardless of the approach used, periodic verification of examination comparability is necessary to provide optimal patient care.

Where is comparability mentioned in the DAP Standards?
Verification of comparability is addressed within QUA3.1 of the 2015 laboratory medicine accreditation standards. The standards require laboratories to:
- establish comparability of procedures, equipment and methods used, and establishing the comparability of results for patient samples
- apply comparability to the same or different procedures, equipment, different sites or all of these
- encompasses comparability for the entire range of clinically relevant values
- define acceptability criteria for comparability of procedures, equipment and methods.
- document, record and act upon results from comparability
• check instruments and methods against each other at least twice a year for comparability of results

What are the differences between the 2010 and 2015 standards in regards to comparability?

The 2010 standards required comparability to be carried out only within a single facility. The 2015 standards now require that procedures, equipment and methods used are compared to the same or different procedures, equipment, different sites or **all** of these. This effectively means that comparability is required across all of the organizations analytical facilities.

What references are available for verification of comparability?

• CLSI EP31-A Verification of Comparability of Patient Results Within One Health Care System. 2012
• ISO 15189 Medical laboratories – Requirements for quality and competence, Geneva, Switzerland: ISO; 2012

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If you have questions about items in the standards please email them to: laboratorymedicine@cpsbc.ca