حكومة دبي
GOVERNMENT OF DUBAI

مركز الإمارات العالمي للاعتماد
Emirates International Accreditation Centre

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متطلبات اعتماد المختبرات الطبية

Accreditation Requirements for Medical Laboratory Testing

EIAC-RQ-LB-004

Signatories	
Approved:	Head of Laboratories Accreditation Department

Revision history			
Issue no.	**Rev. No.**	**Details**	**Date**
1	0	First Issue for use under EIAC Name	14-07-2019
1	1	Modify the names of International documents used by EIAC (Clause no. 7) and correct the document ID number in the footer	16-04-2020
1	2	Due to the revision of ISO 15189, this requirement has been restructured, revised with updated annexures to meet the ISO 15189:2022 version.	01-04-2024
1	3	Revised due to the incorporation of the new identity of the Dubai Government	23-07-2024

Contents

Foreword

This document describes the requirements for accreditation of Medical Laboratories under the Healthcare Accreditation Program operated by Emirates International Accreditation Centre (EIAC). Accreditation is granted for examination methods that determine quantitative or qualitative values of a measurand, or characteristics of a patient specimen.

The requirements for accreditation of Medical Laboratories are defined in the current version of ISO 15189, relevant EIAC Requirements available at www.eiac.gov.ae and relevant technical standards applicable to the scope of accreditation of the Medical Laboratory or Conformity Assessment Body (CAB). Laboratories are required to comply with all the requirements listed in the international standard ISO 15189 “Medical laboratories - Requirements for quality and competence”. This specific criteria document EIAC-RQ-LB-004 shall be used in conjunction with ISO 15189 along with EIAC documents EIAC-RQ-GNL-001 and EIAC-RQ-GNL-002 accreditation requirements. The specific criteria document EIAC-RQ-LB 005 for POCT/Mobile Laboratories is now included in this document. Further, the laboratory shall follow the national and local laws and regulations as applicable.

While accreditation is a recognition of quality and competence, the laboratory is required to continually improve the effectiveness of the management system and participate in continual improvement activities.

This document is subject to revision periodically when deemed necessary. It is the responsibility of accredited medical laboratories to ensure that the latest version of this document is available for reference and implementation.

1 Scope

The scope of the accreditation is applicable to the following fields of medical laboratory testing services:

1.1 Biochemistry

a) General Biochemistry: automation colorimetric, enzymatic, ISE, immunoassay; Blood gases/co-oximetry/electrolytes/metabolites; therapeutic drug monitoring; HbA1c (HPLC); Osmolality; miscellaneous manual tests.

b) Immunochemistry: turbidimetry (automated); ELISA (automated or manual); protein electrophoresis; immunofixation; radial immunodiffusion.

c) Endocrinology: automation immunoassay; RIA; ELISA; LCMS/MS.

d) Toxicology: automation immunoassay; spectrophotometric; TLC; GC; GCMS; HPLC; LCMS/MS.

e) Trace metals: ICP/MS.

f) Antenatal Testing; Newborn Metabolic Screening; Biochemical Genetics

1.2 Haematology & Immunohaematology

a) General Haematology: full/complete blood count; reticulocyte count; blood film preparation and staining (automated or manual; blood film examination; ESR (manual or automated); infectious mononucleosis screening; malarial or other blood parasites; foetal hemoglobin estimation (Kleihaeur)

b) Haemostasis: coagulation screen (PT, APTT, fibrinogen); factor assays; D-dimer; lupus anticoagulant screen; thrombophilia screen, Von Willebrand screen; platelet function assay; ADAMS-TS-13 screen and assay; platelet aggregation studies; HIT screen; heparin assays; factor inhibitor assays; direct oral anticoagulant assays.

c) Haemolytic anaemia investigations: G6PD; PK; haemosiderin; haemoglobinopathy/thalassemia screen; Heinz body, sickle cell screen.

d) Flow cytometry

e) Immunohaematology: ABO/RH Group (automated or manual); antibody screen (automated or manual); antibody identification; crossmatch (full IAT or abbreviated); direct antiglobulin test (DAT); Apt and Downey test; red cell antigen typing; cold agglutinin investigations.

f) Histocompatibility/immunogenetics: HLA typing, antibody screen, antibody identification; T and B cell crossmatch; HPA genotyping, antibody screen, antibody identification.

1.3 Microbiology

a) Bacteriology: urine dipstick (manual or automated); urine microscopy; microscopy (various techniques); culture various techniques); identification of organisms (conventional manual methods, automated colorimetric, automated mass spectrometry); rapid antigen tests; antibody susceptibility testing (conventional manual methods, automated); MDRO screening/detection; crystal identification; sterility testing; molecular methods.

b) Mycology: microscopy; culture; identification of fungi; identification of actinomycetes and yeast (conventional manual methods and automated mass spectrometry); fungal antigens identification; antifungal susceptibility.

c) Parasitology: microscopy; concentration; molecular methods.

d) Mycobacteriology: microscopy; culture (conventional techniques and MGIT); identification of mycobacteria; antimicrobial susceptibility testing (first line and second line); molecular methods.

1.4 Virology

a) General virology: microscopy; immunofluorescence; immunoblot.

b) Molecular virology

1.5 Serology

a) Viral serology

b) Bacterial/parasitic serology

1.6 Immunology

a) Autoimmune serology: ELISA (manual or automated); IFA (manual or automated); RIA; line immunoassay; multiplex assays.

b) Immunochemistry: turbidimetry (automated); ELISA (automated or manual); electrophoresis; immunofixation; radial immunodiffusion; ouchterlony double diffusion.

c) Flow cytometry.

d) Allergen testing

e) Molecular immunology

1.7 Andrology

Semen analysis (fertility and post vasectomy)

1.8 Histopathology (Histology)

a) Routine H&E stains

b) Special stains

c) Frozen sections

d) Immunohistochemistry

e) Immunofluorescence

f) In situ hybridization

g) Enzyme histochemistry

h) Electron Microscopy

1.9 Cytopathology (Cytology)

a) Liquid base cytology

b) Conventional methods

c) FNA cytology

1.10 Genetics

a) Cytogenetics

b) Molecular Genetics

c) Molecular Oncology

d) Molecular Haematology

1.11 Nuclear Medicine (IVD Only)

1.12 POCT /Mobile Laboratories

a) Biochemistry

b) Haematology

c) Microbiology

The scope may be extended for other parameters as if required. EIAC accreditation to ISO 15189 is test/method based.

The laboratory has the option to not include some of its testing in their scope of accreditation, however local and legal regulations apply. If the regulatory/user requirements mandate accreditation, it is the responsibility of the laboratory to include all the tests in its scope of accreditation.

The accreditation shall be considered only for those tests for which the laboratory has applied for. The laboratory shall be enrolled in an external quality assurance/proficiency programme for each test parameter in the scope application and shall be able to demonstrate competency to perform these tests and compliance to the relevant standards.

The facility for primary sample collection at sites other than its main laboratory shall also comply with the relevant requirements of ISO 15189 (refer to the checklist available on EIAC website www.eiac.gov.ae. These facilities shall be assessed by EIAC for their compliance with the requirements.

2 Normative references

This document is inclusive of some requirements of following documents. Those documents are subjected to revision periodically and when deemed necessary. It is the responsibility of accredited medical laboratories to ensure that the latest version of those documents is available for reference and implementation.

EIAC-RQ-GEN-001 *General Accreditation Requirements.*

EIAC-RQ-GEN-002 *The Conditions for the Use of EIAC Accreditation Symbol and ILAC MRA/ IAF MLA Mark.*

EIAC-RQ-LB-012 *EIAC Requirements on Metrological Traceability of Measurement Results.*

3 Definitions

The terms and definitions in ISO 15189 are all relevant to these requirements.

In this document, the following verbal forms were used:

- 'shall' indicates a requirement.
- 'required to' refers to the expected requirement from the standard.
- 'should' indicates a recommendation; however, the laboratory has to provide a justifiable reason in case it is not implemented.
- 'may' indicates a permission.
- 'can' indicates a possibility or capability.
- 'NOTE' provides explanatory information to the related clauses and can be a requirement.

The following information is referenced to the specific clauses on ISO 15189: 2022. Where there is no additional information, it is considered that the wording in the standard is sufficiently clear not to warrant explanation.

4 General requirements

4.1 Impartiality

I. All potential risks to conducting laboratory activities impartially shall be identified, monitored and any threats mitigated. Threats that can compromise impartiality include commercial relationships, financial arrangements, governance structures, personnel and promoting of laboratory services.

II. All personnel involved in the activities of the laboratory shall declare any conflicts of interest and these need to be managed appropriately.

III. Management commitment to impartiality shall be demonstrated.

4.2 Confidentiality

4.2.1 Management of information

I. All patient information obtained or created during the performance of laboratory activities shall be managed with privacy and confidentiality. There needs to be robust systems in place to ensure that breaches to confidentiality are not able to occur.

II. Laboratories are required to inform users of their services if they intend to make information publicly available.

4.2.2 Release of information

No additional explanatory commentary.

4.2.3 Personnel responsibility

I. All laboratory personnel should sign a confidentiality agreement as part of their induction which clearly defines the information that is required to be kept confidential.

II. Contractors and other external visitors to the laboratory shall be made aware of the confidentiality requirements.

4.3 Requirements regarding patients

I. The well-being, safety and rights of patients shall be the laboratory's primary consideration.

II. The laboratory is required to provide patients and requesting clinicians' opportunities to make enquiries or suggestions regarding available tests and the interpretation of test results.

III. Information regarding the range of tests available, associated costs and how long the test results will take, needs to be readily and publicly available.

IV. The laboratory is required to ensure that the minimum number of specimen tubes are collected for the tests requested.

5 Structural and governance requirements

5.1 Legal entity

Any changes in the license of the laboratory shall be notified to EIAC.

5.2 Laboratory director

5.2.1 Laboratory director competence

I. The laboratory is required to be directed by a person or persons who has the specified qualifications, competencies, and resources with the authority to ensure the requirements of this standard are fulfilled.

NOTE There is now no specific requirement for this role to be named as Laboratory Director and can be however named as the laboratory defines.

5.2.2 Laboratory director responsibilities

I. The responsibilities of the laboratory director role shall be clearly documented.

NOTE The prescriptive list of responsibilities of a laboratory director has been removed from the standard, however the role of laboratory director maintains ultimate responsibility for overall operation of the laboratory including risk management application.

5.2.3 Delegation of duties

The role of a deputy laboratory director, as for a laboratory director, can be covered by more than one person. The QMS documentation shall specify who covers the various responsibilities of a laboratory director in their absence and if required the clinical/advisory responsibilities can be covered by a pathologist from another laboratory through a service level agreement.

NOTE Regulatory body requirement shall be followed.

5.3 Laboratory activities

5.3.1 Scope of laboratory activities

I. The laboratory is required to detail all activities for which conformity with this standard is claimed. This includes activities performed outside the main laboratory such as POCT, mobile laboratories and sample collection.

II. Grossing/staining is expected to be part of the laboratory's activities if they are accredited for Histology/Cytology. However, some activities may be contracted out if necessary, but this must be to an accredited laboratory and clearly indicated on test reports. It is acceptable to refer slides for

IHC/ISH or blocks for FISH/Mass Array to another laboratory if the laboratory is not performing it or only performs a limited range.

III. For the clinical chemistry with sample type of body fluids testing, the sample type shall be validated to be included as part of the accreditation certificate.

NOTE As a guideline example, reference description of the publication: Darci D.R. Block et al. An approach to analytical validation and testing of body fluid assays for the automated clinical laboratory. Clinical Biochemistry 58 (2018) 44 – 52, can be used.

5.3.2 Conformance with requirements

No additional explanatory commentary.

5.3.3 Advisory activities

I. Laboratory management should ensure they have suitably qualified personnel able to provide appropriate advice and interpretation of test results that meet the needs of patients and users of laboratory services.

NOTE For some testing, a clinical scientist may be appropriate for providing advice. Examples are Flow Cytometry, LCMS, Cytogenetics, and Genetic Testing.

II. Arrangements for communicating with laboratory users should be established and the effectiveness of the communication forums should be regularly evaluated.

5.4 Structure and authority

5.4.1 General

I. The laboratory is required to define its organisational and management structure in an organisational chart or similar.

II. The relationships between management, clinical and technical personnel, along with any support services, such as Information Technology, shall also be defined.

III. Deputies for key laboratory roles should also be defined.

IV. If the management structure is responsible for a laboratory operating at more than one location, with each one performing tests and issuing test reports, these should be considered as separate laboratories unless agreed otherwise.

V. For individual locations, the laboratory is required to submit a separate application form for accreditation and a separate accreditation certificate will be issued for different locations.

VI. Any change in the structure and authority shall be notified to EIAC.

5.4.2 Quality management

I. There is now no specific requirement to have an appointed quality manager, however there is a requirement to have personnel that have the training, authority, and resources to carry out the duties of a quality manager.

II. This can be a designated quality manager role, or the duties delegated to a number of defined personnel or roles. This role or roles are required to be defined in the organisation structure.

5.5 Objectives and policies

I. The objectives shall be measurable and be defined in the management system documentation.

II. These need to relevant to the needs and requirements of the users of the service, such as turnaround time and accuracy of test results.

III. The defined objectives shall be regularly monitored and reviewed.

5.6 Risk management

I. The laboratory is required to establish processes for identifying risks to patients across all activities of the laboratory, including pre-examination, examination, and post-examination.

II. Controls and actions are required to be implemented to mitigate the risks and develop opportunities for improvement.

III. Risk management processes shall be regularly evaluated and updated as required.

6 Resource requirements

6.1 General

No additional explanatory commentary.

6.2 Personnel

6.2.1 General

I. The laboratory shall be operated and managed by suitably qualified and competent personnel.

II. Designated personnel with primary responsibility for management, quality, clinical and technical activities of the laboratory should be defined.

III. Any changes to key personnel shall be notified to EIAC.

NOTE Key personnel for the purposes of accreditation and details of their roles will be retained by EIAC, along with other records pertinent to the accreditation of the laboratory.

6.2.2 Competence requirements

I. The laboratory is required to specify the competence requirements for managerial, clinical, technical and administration personnel. This includes minimum education and qualifications, along with training required to attain the necessary skills and experience.

II. During all working hours an accredited laboratory shall have at least one staff member who is competent for the testing work being done.

NOTE Prior to the assessment visit, EIAC require submission of a list of laboratory staff details with their working hours for the purpose of accreditation cycle assessment.

III. All technical staff members are required to have a regulatory license to practice as a Laboratory Technologist/Technician.

IV. Frequency of competency assessments and methods used for demonstrating competencies shall be documented. For new staff members, competency assessments would be expected after three months. Once trained and deemed competent, annual competency assessments would be expected.

V. Staff members who undertake technical duties intermittently are expected to undergo retraining and reassessment as necessary. Staff members working only out-of-hours shall have regular contact with

supervisory personnel. As a guide, one day per quarter spent in the laboratory during normal working hours would be considered appropriate.

VI. Each testing discipline shall receive professional direction and control, under the auspices of the laboratory directorship, by an appropriately trained pathologist who is competent to interpret all of the tests that are completed by the discipline and is also competent to complete specialised procedures where relevant.

VII. In some circumstances it may be appropriate for the professional direction to be provided by either a consultant from a specialty other than pathology or a specialised clinical scientist of equivalent status.

VIII. The appropriate level of pathologist/clinical input to any laboratory should be determined by its scope of testing and the expertise of the on-site technical staff members.

6.2.3 Authorization

Only authorised personnel can perform specific laboratory activities, and this shall be clearly defined. This includes approving test methods used, reviewing IQC and EQA results, reporting test results, and access to patient data and information in the LIS along with ability to make amendments.

6.2.4 Continuing education and professional development

No additional explanatory commentary.

6.2.5 Personnel records

No additional explanatory commentary.

6.3 Facilities and environmental conditions

6.3.1 General

I. Specific facility and environmental conditions for the range of testing provided shall be defined and regularly monitored. This also applies to patient sample collection rooms and premises where POCT is performed.

NOTE Accommodation and environmental condition requirements vary greatly depending on the nature of the samples to be examined or tested and the order of accuracy required of the examinations or tests.

II. The laboratory and its personnel shall follow local and international bio-safety requirements, compliance with conditions required by the test or examination method, and international best practice.

6.3.2 Facility controls

I. The laboratory shall only be accessible by authorised personnel, with systems installed such as swipe card or fingerprint access.

II. The laboratory should have adequate lighting, power plugs and uninterrupted power supply (UPS).

III. UPS should be installed for automated equipment to ensure no interruption in power supply that may lead to interruption in testing or compromise of stored data.

IV. The laboratory shall also have procedures in place to ensure the integrity of refrigerated and/or frozen stored samples/reagents/consumables in the event of an electrical failure.

V. There is expected to be clear demarcation between 'clean' areas, such as areas used for clerical aspects of laboratory work, and 'dirty areas', such as areas used for testing procedures.

VI. Laboratories performing molecular testing shall have designated areas for pre-PCR, PCR, and post-PCR activities with a one-way flow of specimens and personnel.

VII. The appropriate level of containment, including air flow and pressure, shall be maintained when a laboratory is testing for high-risk pathogens. Such examples are Mycobacterium Tuberculosis, Brucella, Meningococcal bacterium, and Coronaviruses.

VIII. The laboratory shall ensure that appropriate environmental conditions are maintained to ensure personnel comfort and safety as well as optimal operating of equipment. Temperature and humidity shall be monitored regularly to ensure they are within FDA recommended optimal limits of 20 – 25 °C for temperature and 30% - 50% for humidity.

IX. Air quality checks should meet regulatory Workplace Exposure Standards and should be performed in various work areas such as Histology laboratories and Mortuary facilities to verify compliance with legislative requirements.

X. The laboratory shall provide a quiet and uninterrupted work environment where it is needed. Examples include blood transfusion testing, cytopathology screening, microscopic differentiation of blood cells and microorganisms, data analysis from sequencing reactions and review of molecular mutation results.

6.3.3 Storage facilities

I. Storage of chemicals shall be evaluated considering the compatibility of chemicals during prolonged storage.

II. Adequate containment of larger volumes of chemicals shall be designed and implemented. Use of spill proof trays is advised where specifically designed chemical cabinets are not available.

III. Prevention of cross-contamination in key areas shall be practiced. Examples of sample storage where cross-contamination shall be prevented include pre and post PCR samples, tissue cultures and known infectious samples.

6.3.4 Personnel facilities

No additional explanatory commentary.

6.3.5 Sample collection facilities

I. Sample collection facilities are required to be a designated area separate from the laboratory testing area.

II. Patient reception and waiting area shall be provided, with designated male and female areas if required.

III. Sample reception area for the receipt of semen samples shall take into consideration the privacy of the patient.

6.4 Equipment

6.4.1 General

NOTE Laboratory equipment encompasses all hardware and software of instruments along with any systems or equipment that influences the results of laboratory activities which should be applicable to this clause requirements.

6.4.2 Equipment requirements

I. The laboratory is required to have access to, and not necessarily be furnished with, equipment required for the provision of specified services.

NOTE 1 Hospital laboratories are required to have a contingency plan based on risk assessment for provision of urgent/critical tests when equipment is not operational.

NOTE 2 Medium to large hospital laboratory should have backup analysers to ensure 24 hour service for urgent testing.

NOTE 3 Smaller hospital laboratories, this may not be practical, and shall have an arrangement with another laboratory in close proximity. The contingency plan should be tested to confirm appropriate turnaround times for urgent results.

II. If equipment is used that is outside the laboratory's direct control, laboratory management shall ensure that all requirements of this standard for equipment processes are met with appropriate copies of records maintained. This also applies to any equipment used as POCT which is under the oversight of laboratory management.

III. The laboratory shall maintain a register of all equipment used and each item shall be uniquely identified to eliminate confusion and to ensure traceability of records.

IV. All equipment shall be well maintained and replaced as required, with expected length of service defined in the equipment register. Processes for decommissioning of equipment shall also be defined.

V. Interfacing of key items of equipment should be considered where possible in order to provide a continuous back-up, ready access to data and eliminate the necessity of manual transcriptions.

6.4.3 Equipment acceptance procedure

I. All new equipment used in the laboratory or as POCT, or equipment returned after being sent away for repair or calibration, is required to be verified as meeting specified acceptability criteria. Where relevant, the calibration certificate with the returned item of equipment is acceptable as verification.

II. Acceptance testing shall be comprehensive enough to verify that the equipment is capable of the required measurement accuracy of measurement uncertainty to provide a valid result.

III. Verification of all automated / semi-automated systems should be performed by checking precision, accuracy, carryover and if applicable, linearity.

IV. Any changes in key equipment shall be notified to EIAC along with a commissioning and acceptance testing report.

V. If more than one testing platform is used, or if there is an automated and a manual testing system, for a test or tests, then comparability studies shall be performed, and statistical data produced shall be reviewed and deemed acceptable by a relevant pathologist or clinical scientist.

NOTE For Andrology, use of Computer Aided Semen Analysis (CASA) can be considered provided there is full validation against the approved manual method and use of algorithmic extrapolation to 37°C is avoided.

6.4.4 Equipment instructions for use

I. Instructions for use shall be readily accessible for all equipment used in the laboratory and as POCT.

II. All operators of laboratory equipment and POCT equipment shall be trained and deemed competent prior to being authorised to use it.

6.4.5 Equipment maintenance and repair

I. Major analytical instrumentation and any critical items of equipment necessary for testing shall be under preventive maintenance contracts with the suppliers of their agents.

II. Preventive maintenance programs shall also be established for all major ancillary items of equipment required for testing.

III. Maintenance schedules for all equipment shall be documented and meet the supplier's recommendations where applicable.

IV. All thermo-regulated equipment (refrigerators, freezers, incubators, water baths) are required to have temperatures monitored and recorded at least once daily.

NOTE Continuous temperature monitoring system preferred to support requirements, particularly during out of hours service.

6.4.6 Equipment adverse incident reporting

No additional explanatory commentary.

6.4.7 Equipment records

No additional explanatory commentary.

6.5 Equipment calibration and metrological traceability

6.5.1 General

I. All items of equipment that are used in processes to report an examination result and having a direct or indirect effect on the accuracy or validity of the results need to be calibrated to a metrological traceable standard.

II. The laboratory shall evaluate and determine and document the list of equipment required to be calibrated. Such evaluations require the knowledge on how the measurements obtained using that item of equipment affect the final measurement uncertainty or validity of the final results.

III. All automated equipment shall be calibrated by the manufacturer.

6.5.2 Equipment calibration

I. Instructions for calibration procedures shall be documented, including whether it can be performed in-house by suitably trained personnel or shall be performed by an accredited calibration service.

NOTE 1 The laboratory carrying out in-house calibration activities shall comply with EIAC Requirements on Metrological Traceability of Measurement Results (EIAC-RQ-LB-012).

NOTE 2 Specialist calibration assessors along with the assessment team will be used if the in-house calibration activities are carried out. The assessment process will include document review and on-site witnessing as appropriate. On-site witnessing of in-house calibration activities can be expected at least at initial assessment, reassessment visits and when changes occurred to the in-house calibration.

II. All data and records pertaining to equipment calibrations shall be retained, including any correction factors to be applied.

NOTE: Annex D provides a Guideline on Implementation of Equipment Calibration Correction factor

III. Guidelines relating to equipment calibration for laboratory equipment are detailed in Table 1. The guidelines set out maximum periods of use before equipment shall be recalibrated or checked. Where a test method or environment requires more frequent calibration, this consideration will over-ride these guidelines.

NOTE: ILAC-G24 provides guidelines for the determination of recalibration intervals of measuring equipment

IV. It is noted that calibration requirements will vary depending on method specification. For equipment not listed specifically, reference shall be made to manufacturer's specifications.

6.5.3 Metrological traceability of measurement results

I. All measurement results shall have metrological traceability and to International System of Units (SI), through an unbroken chain of calibrations, to a higher order reference material or reference procedures. This includes, where possible, all laboratory results and POCT results.

NOTE 1 The certified values assigned to Certified Reference Materials are covered by entries in the Joint Committee for Traceability in Laboratory Medicine (JCTLM) database, website https://www.jctlmdb.org.

NOTE 2 Recognizing that the accreditation of Reference Materials Producers (RMPs) is still developing, and Certified Reference Materials (CRMs) may not be available from accredited RMPs, where CRMs are produced by non-accredited RMPs, the laboratory shall demonstrate that CRMs have been provided by a competent RMP and that they are suitable for their intended use.

II. Where it is not possible for quantitative results and for qualitative results, traceability may be established by alternative approaches.

III. Equipment calibration, where relevant, shall be performed by an accredited calibration laboratory.

NOTE 1 ISO/IEC 17025 accredited calibration laboratory is considered to be competent to ensure traceability of equipment measurements. The accreditation certificate of the calibration laboratory is included of scope, range and CMC (Calibration and Measurement Capability) which should be verified against the method tolerance limit prior to put in service.

NOTE 2 EIAC accredits calibration laboratories based on ISO/IEC 17025. The directory of accredited calibration labs with the scope are available in www.eiac.gov.ae.

IV. Manufacturers of examination systems often provide information of traceability for calibration material or procedures, which is acceptable if the laboratory operates the system and procedures without modification.

NOTE To establish traceability for microbiology examinations, laboratories shall hold and maintain a collection of cultures of organisms required to perform verification checks on methods and to conduct performance checks on batches of media prepared. Cultures used by laboratories shall be traceable to a recognized culture collection World Data Collection Microorganisms (WDCM) such as American Type Culture Collection (ATCC), and National Collection of Type Culture (NCTC). Additional wild strains, such as isolates from samples, may only be used to supplement reference strains, but not to replace them.

6.6 Reagents and consumables

6.6.1 General

No additional explanatory commentary.

6.6.2 Reagents and consumables – Receipt and storage

I. All reagents and consumables for laboratory testing and for POCT are required to be checked on receipt that they have arrived undamaged, within expiry date and transported within an acceptable temperature range. Date of receipt and acceptance of condition shall be recorded.

II. Storage temperatures shall be regularly monitored and recorded to ensure optimal conditions, as specified by the supplier, are maintained.

III. Any reagents or consumables that are stored outside the laboratory area, such as hospital stores, should be verified as being optimal conditions for storage.

IV. Stains and reagents shall be labelled with the date opened and stored accordingly to manufacturer's instructions. They should not be used beyond their expiry date or if they show signs of deterioration, such as abnormal turbidity and/or discoloration.

6.6.3 Reagents and consumables – Acceptance testing

I. Each new lot and shipment of kits, cartridges, reagents and materials, including those prepared in-house, shall be subjected to quality control checking wherever possible. These acceptance checks may be completed on arrival or before being put into use.

II. For shipment between parent and satellite laboratories, or from the main laboratory to the location where POCT is performed, may not be necessary, however effective transport monitoring shall be in place. This does not negate the expected periodic checks, where applicable, to ensure performance.

III. If a kit/cartridge, such as for POCT, has not been used for greater than one month a repeated QC is expected.

IV. Antibiotic discs are to be verified with reference organisms and known MICs for acceptance testing. They should also be checked for performance at weekly intervals.

NOTE 1 Culture media is to be verified with relevant reference organisms, if the supplier has not provided verification data for the batch received. If data is provided, this shall be reviewed and acknowledged as being acceptable.

NOTE 2 For laboratories performing andrology examinations, consumables shall be verified as being nontoxic to sperm if they come into direct contact with semen samples during the pre-examination and examination process.

6.6.4 Reagents and consumables – Inventory management

I. The laboratory shall have an inventory management system that ensures reagents and consumables can be clearly identified as when they were received, their expiry date, acceptance testing completed, and when put into use.

II. A reagent/consumable policy shall be developed regarding use of reagents or consumables that have passed their expiry date. This does not apply to expired QC materials and calibrators which shall not be used after their expiry date.

III. There shall be regular monitoring of expiry dates to prevent use where it may adversely affect testing. This also applies to specimen collection tubes which shall not be used passed their expiry date.

6.6.5 Reagents and consumables – Instructions for use

No additional explanatory commentary.

6.6.6 Reagents and consumables - Adverse incident reporting

No additional explanatory commentary.

6.6.7 Reagents and consumables – Records

When a reagent is made up of a number of components, traceability of the individual component lot number and expiry date details, along with the identity of the person preparing the reagent and the date made, shall be maintained.

6.7 Service agreements

6.7.1 Agreements with laboratory users

I. A contract in its simplest sense involves a test request form presented to the laboratory by a patient or clinician.

II. The requirements of the users of the laboratory service, both requesters and patients, shall be clearly understood and agreed.

NOTE This is either captured in Directory of Service or User Handbook (some cases Hospital/Laboratory App)

III. The laboratory shall ensure they have the resources and capability to provide the agreed service.

IV. Information regarding the range of testing that can be requested, testing performed on-site, accreditation status of each test, tests that are referred, expected turnaround times and measurement accuracy shall be readily available.

V. Any changes to the services provided shall be communicated effectively through appropriate channels to the users of the service.

VI. Policies for patient requested examinations shall be defined and understood by all relevant staff members.

6.7.2 Agreements with POCT operators

When POCT is supported by the laboratory there shall be a documented service agreement between the laboratory and relevant parties that clearly defines responsibilities and authorities for POCT activities.

6.8 Externally provided products and services

6.8.1 General

The laboratory shall maintain a register of all externally provided products and services.

6.8.2 Referral laboratories and consultants

I. The laboratory shall have a documented policy and procedure for selecting and referring tests to other laboratories and for second opinion to consultants.

NOTE Referral laboratory is an external laboratory to which the laboratory management chooses to submit a sample or sub sample for testing which cannot be performed in-house. This differs from a laboratory to which submission of samples is required by structure or regulation, such as Public Health, Forensic examinations, Tumor Registry, or a Central (Parent) Facility.

II. A list of referral laboratories and consultants shall be maintained.

III. Ideally, the referral laboratory should be an ISO 15189 accredited laboratory in the relevant field of testing.

IV. It is the responsibility of the referring laboratory to provide the original report from the referral laboratory or to transcribe the test results without alterations of clinical interpretation, with additional remarks if required.

V. The original report, if transcribed, shall clearly identify that the tests were performed by a referral laboratory and the accreditation status of the tests reported.

VI. It may be clinically appropriate for the referral laboratory to contact requesting clinicians directly to discuss results of to request additional information. With this in mind, the referring laboratory shall ensure that request forms sent to referral laboratories include all relevant information required.

6.8.3 Review and approval of externally provided services

I. Relevant records relating to the selection and review of externally provided services, including referral laboratories or consultants, shall be retained.

II. These shall include evaluations against defined criteria, current accreditation status, investigations of complaints and nonconformances, and any actions taken.

III. Review of performance should be conducted at least annually.

7 Process requirements

7.1 General

I. The laboratory is required to identify risks to patient care, which are to be assessed and effective controls implemented, for all pre-examination, examination, and post-examination processes.

II. Risk assessment shall be documented and regularly monitored for effectiveness of mitigation.

7.2 Pre-examination processes

7.2.1 General

No additional explanatory commentary.

7.2.2 Laboratory information for patients and users

Information relating to the laboratory's scope of activities and requirements relevant to both patients and users can be provided on a website or as a directory or handbook.

7.2.3 Requests for providing laboratory examinations

7.2.3.1 General

I. The test request form may be in hard copy format or electronically requested. If electronic requesting is utilised, it is essential that a back-up system is readily available.

II. Test request forms shall include at least two unique identifiers which shall also be present on the accompanying specimens collected. Identifiers include full name of the patient, their date of birth and a unique identity number. Test request forms shall be designed to allow the requesting clinician to include all the relevant information, including clinical details.

III. It is expected that users are consulted prior to any significant changes to the format of request forms.

7.2.3.2 Oral requests

No additional explanatory commentary.

7.2.4 Primary sample collection and handling

7.2.4.1 General

I. It is the responsibility of the laboratory to ensure, or to endeavour to ensure, that primary samples are collected optimally.

II. Specific instructions for the proper collection and handling of primary samples shall be documented in a primary sample collection manual. This shall be applicable for the collection facility at the main laboratory and the sites/clinics other than the main laboratory from where samples are collected and sent to the laboratory for testing and reporting.

7.2.4.2 Information for pre-collection activities

For patient self-collected specimens, the instructions provided shall be in terms that are clearly understood by the patient or caregiver. Use of an information sheet or similar, where relevant, regarding pre-collection and collection activities is expected. These should be available in different languages where required.

7.2.4.3 Patient consent

The laboratory shall develop a policy on how they obtain informed consent from a patient for specimen collection. For most routine procedures, consent can be inferred by the patient willingly presenting for the collection procedure. However, some special or more invasive procedures, may need documented consent.

7.2.4.4 Instructions for collection activities

I. Patients presenting for specimen collection, once they have given consent, shall be positively identified by the collector by asking them to state their full name and date of birth.

II. In situations where there is doubt about the identity of the patient, such as when a patient is unconscious or is unable to communicate effectively and consent cannot be obtained, alternative mechanisms shall be used, and the means of identification recorded. This may involve having an appropriate caregiver or family member provide confirmation of identity and consent on behalf of the patient.

III. Specimens shall all be labelled with at least two identifiers and shall match the details on the request form. When specimens for POCT are collected one patient at a time and the specimen is retained by the collector throughout all stages, labelling requirements may be relaxed.

IV. In general, to minimise errors, specimen collection containers shall not be pre-labelled. An exception may be when a sample container is provided directly to the patient for a non-blood collection. When

pre-labelling occurs, adequate systems shall be in place to accurately confirm the identity of the patient and the sample.

7.2.5 Sample transportation

I. Instructions for sample transportation shall ensure the importance of sample integrity and that risk to the general public is recognised.

II. For samples that are transported from external locations, the transport container shall have a temperature data logger to confirm that transport conditions have been maintained within an acceptable temperature range.

III. For samples that are required to be frozen immediately after collection or maintained at 37°C, systems shall be in place for expedient transport to the laboratory.

7.2.6 Sample receipt

7.2.6.1 Sample receipt procedure

I. The laboratory shall have a clearly defined acceptance and rejection sample receipting policy, which shall be applied to all samples receipted into the laboratory.

II. Where possible, request forms should be receipted into the laboratory via a time stamp or similar. For electronic requests, the time of sample receipt shall also be recorded electronically linked to the request.

III. When a number or specimens arrive together, such as in large laboratories, these may be collated as a group and the time of receipt of the group be attributed to each request form for ease of reference.

IV. The identity of the person responsible for taking any aliquots or sub-samples from the primary sample shall be recorded.

7.2.6.2 Sample acceptance exceptions

I. If, having the best interests of the patient, specimens which do not meet minimum acceptability criteria are accepted and tested, a record shall be kept of the circumstances and any subsequent action taken.

II. Where possible, the requestor or person responsible for the sample collection shall be contacted and shall formally accept responsibility for verifying the identity of the sample/s. Where this is not possible, the laboratory director, or delegate, shall authorise the continuation of processing and testing. These circumstances shall be formally recorded.

7.2.7 Pre-examination handling, preparation and storage

7.2.7.1 Sample protection

Stored samples for further examinations shall ensure sample integrity is maintained and are readily retrievable.

7.2.7.2 Criteria for additional examination requests

No additional explanatory commentary.

7.2.7.3 Sample stability

The sample integrity and stability for each test of stored samples shall be determined by the laboratory.

NOTE The laboratory may choose to retain samples longer than specified in the regulations, but shall only use samples for re-examination or additional testing within the determined and specified sample stability timeframes.

7.3 Examination processes

7.3.1 General

I. A complete audit trail of who has performed each activity in an examination procedure, including for POCT, shall be retrievable. This can either be in hard copy records, such as worksheets, or within the Laboratory Information System (LIS).

NOTE Accreditation is normally granted only for internationally or nationally standard test procedures or non-standard procedures or in-house methods that have been appropriately validated, and which are performed regularly.

II. Periodic review of requests and the testing methods provided to evaluate ongoing suitability should be conducted. The expectation is for these reviews to occur annually as part of overall management review.

7.3.2 Verification of examination methods

I. When standard methods are used or followed, such as reagent kits for autoanalyzer, the laboratory is required to maintain current versions, such as package inserts, of these methods and ensure laboratory procedures are in accordance and updated when required.

II. Verification of the manufacturer's performance data, and that the examination is suitable for the required performance for the laboratory's users, is required to be conducted. This is expected when

a new instrument or new method is introduced, an instrument is relocated, or the manufacturer makes some changes to an existing method.

III. Verification shall include the following performance characteristics, where relevant: accuracy, precision, limit of detection, linearity, carry over, interfering substances, specificity, selectivity, and sensitivity.

IV. All records pertaining to verification of examination methods shall be retained.

V. Verification for POCT examination methods need to include relevant performance specifications, with comparability to laboratory testing essential.

VI. All verification data shall be reviewed and approved by a pathologist or clinical scientist.

VII. Any significant differences between POCT and laboratory test results shall be evaluated and approved or rejected by a pathologist or clinical scientist.

VIII. If the POCT examination is approved, requesters shall be made aware of the differences.

7.3.3 Validation of examination methods

I. Commercial test kits, in-house or non-standardised methods will require validation if the laboratory is unable to source the validation data from manufacturers with a recognised quality assurance system or a reputable validation based on collaborative testing.

II. Validation should include both analytical and clinical evaluations.

III. If accreditation of an in-house method is required, the following information shall be available:

a) A copy of the fully documented test method.

b) Details of the origin of the in-house test method.

c) Details of the reason for its development and application.

d) The results of comparative tests with standard methods and/or other laboratories where possible.

e) Full details of test method validation regarding relevant performance characteristics.

7.3.4 Evaluation of measurement uncertainty (MU)

I. The laboratory shall identify and control the important sources of uncertainty and devise some parameters/boundaries of the results where practicable.

NOTE 1 The extent to which MU will be applicable in medical laboratories will vary between tests and between disciplines.

NOTE 2 ISO/TS 20914 provided guidance on MU for medical laboratories.

II. The laboratory shall document how estimates of measurement uncertainty is determined, with reference to published procedures.

III. Measurement uncertainty shall be estimated for all quantitative tests and qualitative tests based on a quantitative result at the decision/cut-off values. For tests that do not have measurement uncertainty estimated, the rationale for exclusion shall be documented.

NOTE Measurement uncertainty is often estimated based on QC data or patient replicates as 2 x CV.

IV. Measurement uncertainty shall be specified as to whether it is defined as a % or in the units of the analyte. Measurement uncertainty data should be reviewed at least annually.

V. Where the laboratory uses different instruments and/or methods for the same test, measurement uncertainty shall be documented for each instrument/method combination.

VI. Significant differences in measurement uncertainty will need to be taken into account when interpreting and reporting test results.

7.3.5 Biological reference intervals and clinical decision limits

I. In reviewing biological reference intervals, the laboratory shall consider the intervals used by other laboratories within its geographic and ethnic catchment.

II. Laboratories shall make all attempts to minimise risk to patients who are commonly tested by more than one laboratory within a region, by avoiding potential confusion amongst clinical requesters when biological reference intervals differ.

7.3.6 Documentation of examination procedures

I. Each new/updated procedure or set of procedures shall be approved by an authorised staff member.

II. All staff members are expected to be aware of any significant changes to relevant procedures, and familiarisation of documented procedures shall be recorded in competency records, manual lists, or similar systems.

III. Method documentation shall be reviewed at regular intervals to ensure the procedures are still current and applicable for intended use.

IV. Where procedures are not immediately available for use at the workstation or POCT location, they shall be readily accessible either in soft or hard copy format.

7.3.7 Ensuring the validity of examination results

7.3.7.1 General

I. The procedures for monitoring the validity of results shall include running internal quality control (QC) samples at regular intervals and participating in regular external quality assessments (EQA).

II. The results shall be recorded in such a way that trends and shifts are readily detectable and appropriate corrective action initiated. QC protocols shall be guided by established best practice in each discipline.

7.3.7.2 Internal quality control (IQC)

I. As appropriate for the test, QC materials shall be combinations of low abnormal, normal, high abnormal; negative and positive; or reactive and nonreactive. Wherever possible, the QC material should be matrix matched to the type of samples being examined.

II. The frequency of running QC samples shall be based on the stability and robustness of the examination method, along with the hours of operation and number of tests processed. QC shall always be performed after a new reagent kit and after calibration.

III. There shall be defined criteria for acceptability of QC results and procedures to follow for unacceptable results.

IV. Acceptable ranges for QC results shall be defined for each test parameter that are statistically valid and clinically relevant. Means and standard deviations supplied by the manufacturer of the QC material shall be verified to ensure adequate control of assays is achieved. However, laboratories are required to establish means and standard deviations using their own data to derive performance based acceptable limits.

NOTE Manufacturer provided ranges are generally too wide to effectively monitor performance of the assay, as they take into consideration different testing platforms and reagents.

7.3.7.3 External quality assessment (EQA)

I. Where applicable, the laboratory shall establish a documented plan for the level and frequency of EQA participation within the accreditation cycle based on EIAC certificate validity. The plan shall be reviewed at regular intervals based on key changes which could include but not limited to equipment, methodology, scope, staff etc.

NOTE It is recommended that automated Biochemistry and Haematology tests to be participated monthly, with Microbiology, Molecular, Immunohaematology, and Histology/Cytology at least quarterly. Specialist Biochemistry, Specialist Haematology, and Specialized Immunology are recommended to be participated at least quarterly if possible. Genetics/Cytogenetics is often only available once a year but if there is a more frequent programme then it is recommended.

II. Where available, the laboratory shall participate in an EQA or Proficiency Testing (PT) programme for every accredited test, and where suitable, the interpretation of the results, that fulfils ISO/IEC 17043 requirements. The laboratory shall investigate the EQA programs availability and determine the appropriateness of the available schemes.

NOTE 1 The primary purpose of EQA or PT programmes is to provide information on aspects of uncertainty associated with patient samples, including the competency of staff members carrying out testing work.

NOTE 2 EPTIS is a PT scheme database worldwide which may be used under the website https://www.eptis.org/

NOTE 3 Common practice is to retain PT/EQA material if there is sufficient to be retested if required for follow up of discordant results or to be used for verification/validation studies. The material must be stored appropriately. If results are reported in 2-3 days it can be stored in a refrigerator or in a freezer for longer storage.

III. The laboratory shall participate in PT scheme which is part of the PT provider accredited scope, wherever available. The accreditation certificate of the PT provider should be issued by ILAC MRA accreditation body with the scope of ISO/IEC 17043.

NOTE 1 Clause 6.8 require suppliers' evaluation which includes PT providers. The international recognized standard by ILAC for PT providers' competency is ISO/IEC 17043 accreditation.

NOTE 2 Laboratories can refer to ILAC search website for the recognized ILAC MRA accreditation bodies with their recognized scopes, the website address of *ILAC MRA Signatory Search* is https://ilac.org/signatory-search/.

IV. When there is no suitable EQA or PT programme, one of the acceptable alternative methods can be adopted. The procedures for any alternate methods shall be documented.

V. All staff members who are directly involved in testing patient samples shall participate fully in the testing of EQA samples.

VI. A secondary purpose of EQA testing is to provide a challenge to staff members for purposes of ongoing training. Consequently, slides and samples may be examined, tested, and discussed for educational purposes.

VII. Records of individual participation shall be maintained, particularly for cases of individual opinion such as ABO blood grouping and antibody screens, blood films, microscopy, crystals, and cytology screening. This is to evaluate performance as an adjunct to continuing quality improvement.

VIII. Consensus decisions shall be avoided unless the same would apply to patient samples.

IX. POCT is also required to be enrolled in an EQA or PT programme and where possible EQA samples should be processed by the operators of the POCT instrument or device.

X. When there is the same POCT instrument in more than one location or site, it may be acceptable to have one reference instrument enrolled in an EQA programme, with regular sample comparisons between the other instruments.

XI. EQA/PT reports on interlaboratory comparisons are required to be reviewed by appropriate senior personnel, with any discordant results fully investigated for root cause and clinical significance.

XII. Records of the investigation and any corrective actions shall be maintained.

7.3.7.4 Comparability of examination results

I. When test results can be reported from different methods or instruments, regular patient comparisons shall be performed to determine comparability.

II. Records of the comparisons shall be maintained with defined acceptable variations.

III. Where there a clinically significant difference in test results, the users shall be informed and the reference range or interpretation on the test report shall be amended as necessary.

7.4 Post-examination processes

7.4.1 Reporting of results

7.4.1.1 General

No additional explanatory commentary.

7.4.1.2 Result review and release

I. Persons providing clinical and/or scientific/technical evaluation of results shall be documented and shall be approved as having an appropriate level of competence.

II. Details of who may release results and/or comments shall be detailed either in procedural documentation or in competency records.

III. Any manually transcribed test results shall be verified by a second person and an audit trail maintained. If it is not feasible for a second person to verify, such as when working solo on a shift, the transcription can be verified as a separate activity.

7.4.1.3 Critical result reports

I. The laboratory shall determine critical/alert levels for each test where applicable. These levels shall be clearly documented and readily available.

II. There shall be procedures in place for reporting or critical results as soon as possible and all communications shall be recorded.

III. It may be appropriate to have separate critical/alert levels for hospital and non-hospital patients in discussion with the users of the service.

7.4.1.4 Special considerations for results

No additional explanatory commentary.

7.4.1.5 Automated selection, review, release, and reporting of results

It is essential that the integrity of data and confidentiality requirements are met during the transfer of results by any electronic means. A delta check system against predefined criteria, to alert any significant changes in patient's results, shall be in place.

7.4.1.6 Requirements for reports

I. The laboratory shall have documented reasons for omitting any of the listed requirements for reports.

II. Where relevant, age and gender specific biological reference intervals should be provided when reporting results. Generally, such reference intervals shall be verified or determined by the laboratory.

III. If a reference interval study is not possible or practical, then the laboratory shall carefully evaluate the use of published data or data provided by the equipment manufacturer for its own reference intervals and retain record of this evaluation.

IV. As appropriate, the description of the examinations performed, their results and reports should follow the vocabulary, syntax and nomenclature recommended by recognised bodies.

V. Reporting of results with accreditation symbol shell be as per EIAC-RQ-GEN-002 for requirements for the use of the EIAC Accreditation Symbol on reports**.**

VI. The accredited laboratory's EIAC Symbol combined with ILAC MRA Mark can only be used after signing the "EIAC Agreement with CAB for the use of ILAC MRA MARK (EIAC-PR-002/FM-007)".

NOTE In case the laboratory is certified with management system standards i.e., ISO 9001, the use of certification symbol in the issued test reports is not permitted as per EIAC-RQ-GEN-002.

7.4.1.7 Additional information for reports

I. Report interpretation comments shall include comments on discrepancies when testing is performed by different procedures or in different locations. All test results performed by POCT shall be clearly identified on the report.

II. Comments relating to the quality or adequacy of the primary sample, such as 'haemolysed', should make clear which tests may have been affected and the nature of the likely effects, such as positive or negative interference, if known.

7.4.1.8 Amendments to reported results

I. Authority to make amendments to reported results shall be clearly defined.

II. When the amended results may alter patient management, the laboratory shall ensure that persons with the authority to take action are contacted and duly informed.

7.4.2 Post-examination handling of samples

I. Storage of primary samples and sub-samples shall be defined in documentation to ensure traceability to the patient is maintained.

II. The retention time and storage conditions for each sample type shall be defined, along with the stability of the sample for additional testing. Retention times shall comply with local regulations if applicable.

III. All laboratories handling tissue and cellular material shall have formally documented policies and procedures for the return of tissue and cellular material if requested. Appropriate consideration shall be given to various cultural contexts for methods of retention, handling, and disposal of human tissue.

IV. Samples, without prior consent, may be used for research studies or as QC material provided the patient's details are rendered anonymous or samples are pooled.

V. All biological/medical waste, including liquid waste, shall be disposed of as per local/international and legal regulations after onsite segregation and/or treatment.

7.5 Nonconforming work

I. Any identified nonconformities shall be investigated, and root cause evaluated to determine if the incident is an isolated occurrence or is a symptom of a more widespread issue.

II. Risk assessment of all nonconformities shall be completed for any potential impact on patient safety.

III. Appropriate corrective action shall be implemented and the effectiveness to reduce the risk of occurrence shall be evaluated.

IV. A review of nonconforming work for any trends should be presented and discussed at a management review meeting.

7.6 Control of data and information management

7.6.1 General

Refer to ISO 22367:2020 for risks associated with computerised laboratory information systems.

Refer to ISO/IEC 27001:2022 for security controls to main integrity of information.

7.6.2 Authorities and responsibilities for information management

If the laboratory information management system is subcontracted or maintained off-site, it is still the responsibility of laboratory management that all requirements of this standard are met.

7.6.3 Information systems management

I. The laboratory shall perform data integrity checks of electronically transmitted test reports compared to the original information in the LIS at defined intervals, with at least annual checks performed.

NOTE 1 This interval may vary according to the frequency and mode of transmission and the complexity of the test data.

NOTE 2 EIAC may assign IT Security Expert once during the accreditation cycle to participate in the assessment process for the related clauses.

II. Data integrity checks shall also be completed after any changes made in the LIS and when new equipment interfaces are implemented.

III. The checks are expected to include biological reference ranges and automated comments.

IV. Records of data integrity checks shall be kept.

7.6.4 Contingency plans

No additional explanatory commentary.

7.6.5 Off site management

No additional explanatory commentary.

7.7 Complaints

7.7.1 Process

A description of the process for handling complaints shall be readily available for all staff members and publicly available for users of the service.

7.7.2 Receipt of complaint

There shall be a defined timeframe for acknowledging receipt of complaints and the progress of the resolution. The complainant shall be kept informed in a timely manner.

7.7.3 Resolution of complaint

Impartiality shall be maintained through the process of complaint resolution.

7.8 Continuity and emergency preparedness planning

I. Continuity of services in an emergency situation or other conditions of limited activities needs to focus on testing that is essential or life preserving.

NOTE 1 Examples of critical testing are crossmatching and providing essential blood products, Electrolytes, Haemaglobin, Glucose, and Troponin.

NOTE 2 Contingency process should be verified periodically, at least annually.

II. POCT should be available as a contingency option for laboratories providing services for hospital-based care.

8 Management system requirements

8.1 General requirements

8.1.1 General

I. The management system shall meet the requirements of ISO 15189 and any additional requirements included in this EIAC and other related documents, along with ensuring compliance to relevant local and legal regulatory requirements.

II. The management system (previously referred to as quality management system) should provide laboratory management with continued confidence that the requirements of this standard and the needs of the users are being met.

III. The management system shall include actions to address risk and opportunities for improvement.

IV. Any significant change to the management system shall be notified to EIAC.

8.1.2 Fulfilment of management system requirements

No additional explanatory commentary.

8.1.3 Management system awareness

Laboratory management shall be responsible to ensure all personnel involved in laboratory activities are fully conversant with the management system requirements and their responsibilities to ensure compliance.

8.2 Management system documentation

8.2.1 General

The standard no longer prescribes a quality policy or specifically a quality manual. However, procedures still need to be maintained which include objectives and policies.

8.2.2 Competence and quality

No additional explanatory commentary.

8.2.3 Evidence of commitment

I. The success of a management system depends on the commitment of management and the active participation of each laboratory staff member. Adequate training shall be provided on its use and continual improvement.

II. Management staff with the responsibilities of laboratory director or other senior management roles should have had training in ISO 15189.

NOTE Clause 6.8 require suppliers' evaluation which includes training providers. Evidence of the competency of the training providers are required.

8.2.4 Documentation

No additional explanatory commentary.

8.2.5 Personnel access

When applicable management system documentation and related information is in electronic format, reasonable access by all staff members shall be assured.

8.3 Control of management system documents

8.3.1 General

No additional explanatory commentary.

8.3.2 Control of documents

I. All controlled documents both external and internal shall be updated, reviewed, and revised as required, with the authorised and current version available at the place of use.

II. Internal documents shall be reviewed at least once in 2 years, or according to local regulation.

III. Instructions posted on walls as out-takes from a standard operating procedure, posters or flow charts relating to laboratory work shall be considered as controlled documents. If a wall poster is only providing information and not instructions, it is not considered to be a controlled document. When documents are being updated, it is important that any out-takes are also updated.

IV. Worksheets that contain instructional material and/or calculations shall be controlled in a manner similar to procedural documentation.

V. Forms used to record results and other relevant information do not need to include full document control parameters expected for instructional material but shall contain sufficient information to preclude inadvertent use of superseded versions.

VI. The laboratory shall have a defined documentation system detailing the different levels or types of documents for both internal and external.

VII. Laboratories with sample collection centres and oversight of POCT shall also exercise control over documents/instructions provided to these locations.

8.4 Control of records

8.4.1 Creation of records

I. The laboratory shall retain records of original observations, derived data, and sufficient information to establish an audit trail for all test results reported.

II. All records shall remain legible and include the identity of the person making each entry.

III. It is recognised that a number of staff members may be involved in test processes or other laboratory procedures. It is the laboratory's responsibility to identify the critical steps in the procedure and to ensure that the identities of the staff members concerned are recorded.

NOTE These include activities such as maintenance and QC tasks, result recording and commenting, review and amendment of results, and reporting of results to requestors.

8.4.2 Amendment of records

I. When mistakes occur on paper records, they shall not be erased, made illegible or deleted by such means as correction fluid, but crossed out and the correct value/data or information entered alongside.

II. In the case of electronic records, equivalent measures shall be taken to avoid loss or change of original data. Spreadsheets may require annotation of the record to affect this expectation.

8.4.3 Retention of records

I. Defined retention times are required to be based on identified risk of early disposal and shall meet the minimum regulatory requirements.

NOTE The records can be but not limited to: test request forms, test reports, raw data, images, equipment data and history records, reagents and materials used, calibration data, IQC records, EQA records, communicable disease reports, evaluation forms, personal records, work sheets, incident records and action taken, risk management records; nonconformities identified, and immediate or corrective action taken, internal audits, management reviews.

II. Organisations shall ensure that records stored electronically can be retrieved throughout the stated retention period despite changes in technology that may occur.

III. When hard copy records are scanned and stored electronically the retention periods refer to the electronic versions. The hard copy records need to still be retained for a reasonable period, with 1-3 months suggested, to allow for clarifications of any anomalies in the electronic record.

IV. Adequate processes shall be in place to ensure all relevant records are appropriately stored prior to disposal, with extra care taken when storing records with sensitive patient information in shared facilities.

8.5 Actions to address risks and opportunities for improvement

8.5.1 Identification of risks and opportunities for improvement

I. Addressing both risks and opportunities for improvement establishes a basis for increasing the effectiveness of the management system.

II. The laboratory is required to complete a risk assessment of all pre-examination, examination, and post-examination activities for impact on patient care and safety, and identifying which risks and opportunities need to be addressed.

8.5.2 Acting on risks and opportunities for improvement

No additional explanatory commentary.

8.6 Improvement

8.6.1 Continual improvement

I. The laboratory needs to review periodically its contribution to patient care, having considered at least the following:

1. Test repertoire, including testing profiles, reflex testing, and procedures for follow-up and confirmatory procedures.

2. Methodology and instrumentation considerations, including specificity, sensitivity, and uncertainty of results, in relation to clinical decision making.

3. Appropriateness and timeliness of interpretation provided, including automatic comment generation, if relevant.

4. Follow-up of significantly abnormal test results.

5. Follow-up of adverse incidents resulting in incorrect information being made available for clinical use.

6. Quality of pre-examination services such as number of repeat collections, incorrect samples, poor quality samples, mislabelled samples, and registration errors.

7. Quality of post-examination services, such as number of test-add requests and amended reports.

8. Clinically relevant TAT, such as from collection of specimens to receipt into the laboratory, receipt into the laboratory to completion of examinations and results reported, to meet the user's needs and requirements particularly for urgent testing.

9. Systematic collection and evaluation of clinically relevant feedback.

II. Continual improvement activities shall be directed at areas of highest risk based on risk and opportunities.

III. A continual improvement plan needs to be developed, at least annually, to identify activities to be prioritised.

8.6.2 Laboratory patients, user, and personnel feedback

I. Methods may consist of surveys or feedback forms from patients, requestors, or laboratory staff. Feedback from requestors may also be through regular formal meetings.

II. Communication on the evaluation and any actions taken should be provided back to the participants where possible.

8.7 Nonconformities and corrective actions

8.7.1 Actions when nonconformity occurs

The impact of any nonconformity in relation to risks and opportunities shall be determined.

8.7.2 Corrective action effectiveness

No additional explanatory commentary.

8.7.3 Records of nonconformities and corrective actions

No additional explanatory commentary.

8.8 Evaluations

8.8.1 General

Evaluations shall be focused on determining that the laboratory's management system and activities meets the needs and requirements of patients and laboratory users.

8.8.2 Quality indicators

The Laboratory shall incorporate salient quality indicators for monitoring its performance. This shall describe the evaluation of various aspects of laboratory function.

8.8.3 Internal audits

I. The internal audit plan shall ensure all elements of its management system and technical operations are covered with consideration of clause 5.3.2 of ISO 15189: 2022 standard and should include both horizontal and vertical audits.

NOTE All elements and the entire laboratory do not necessarily have to be covered in a single audit but can be spread out over a defined timeframe based on risk assessment.

II. Comprehensive internal audits for each laboratory discipline, including each collection site and POCT activities, should be conducted at least annually.

III. Personnel responsible for audit planning and oversight or conducting an internal audit shall have participated in a recognised training course and shall be independent of the area being audited.

NOTE Clause 6.8 require suppliers' evaluation which includes training providers. Evidence of the competency of the training providers are required.

IV. Use of a checklist or similar is expected to ensure complete coverage of the important aspects of an audit and this also enhances objectivity of findings. A specific checklist may be used for collection sites and POCT activities.

NOTE: In addition to the standard requirement, checklist should include relevant EIAC requirements and local/national regulations.

V. The laboratory shall determine which elements of its operations are critically important to patient care and focus in particular on these areas.

8.9 Management reviews

8.9.1 General

I. The overall purpose of management review is to evaluate past and present performance, in order to develop strategies that will optimise the laboratory's contribution to patient care. A management review shall occur at least once a year.

8.9.2 Review input

I. Presentation of summarised data should be presented either prior to the meeting or as a PowerPoint presentation during the meeting.

II. POCT activities shall also be included as a review input where relevant.

III. Use of a standard template to facilitate the management review process is expected to be developed, with items to be reviewed and discussed clearly recorded.

8.9.3 Review output

Conclusions and actions arising from management review is required to be communicated to all laboratory personnel.

Annex A
(normative)

Additional requirements for Point-of-care Testing (POCT)

I. Service agreements are required between the laboratory and the area where POCT activities are provided, which defines the respective roles and responsibilities.

II. The laboratory shall appoint a person to be responsible for POCT activities including quality control, EQA and training of personnel who will be performing the testing.

III. Annual competency reviews shall also be conducted for all operators of POCT instruments.

Annex B
(normative)

Calibration Requirements for Non-Analytical & Analytical Instruments

Equipment	Calibration Interval	Requirements
Pipettes & Dispensers	Yearlyat usage range	By ISO 17025 Accredited Calibration Laboratory by ILAC MRA Readings of as found and as left are required.
Pipettes (Used for re constitution of Controls, Calibrators, Reagents & Testing)	Six Monthly at usage range	By ISO 17025 Accredited Calibration Laboratory by ILAC MRA Readings of as found and as left are required.
Data Loggers Thermometers Wireless Thermometer Infrared Thermometer Thermo Hygrometers (Humidity gauges)	Yearly at working Ranges	By ISO 17025 Accredited Calibration Laboratory by ILAC MRA
Medical Laboratory Refrigerators & Freezers (Laboratory shall use only Medical Laboratory Refrigerator & Freezers for storage of samples, reagents, Calibrators & Controls)	Once during commissioning and when Repaired or Shifted at working ranges.	9/5 point temperature Profile check By ISO 17025 Accredited Calibration Laboratory by ILAC MRA External data-loggers/maximum-minimum temperature devices shall be used to continuously control, monitor and record temperature and to be calibrated once in year. Temperature mapping required at commissioning, significant malfunction and periodically (lab to risk assess and establish frequency, but no longer than 5 years).
Incubators Water Baths Ovens, Floatation Baths.	Yearly at working ranges	9/5 point temperature profile check By ISO 17025 Accredited Calibration Laboratory by ILAC MRA

		External data-loggers/maximum-minimum temperature devices shall be used to continuously control, monitor and record temperature and to be calibrated once in year. Temperature mapping required at commissioning, significant malfunction and periodically (lab to risk assess and establish frequency, but no longer than 5 years).
(Andrology) Microscope heated stages, Slide warmers	Daily before use	Internal verification ensure working ranges are within limits. Calibration of micrometer if used within laboratory.
Hybridization equipment	Six monthly	By ISO 17025 Accredited Calibration Laboratory by ILAC MRA or manufactures recommended procedure
Balances and weighing scales	Yearly at working ranges	By ISO 17025 Accredited Calibration Laboratory by ILAC MRA Intermediate checks daily or prior to use with clean stainless mass within the working range are required.
Autoclaves- Temperature, Pressure & Time	Yearly at working ranges	By ISO 17025 Accredited Calibration Laboratory by ILAC MRA Pressure, Temperature & Time shall be calibrated
Centrifuges, Cyto centrifuge Cytospin	Yearly at working ranges	By ISO 17025 Accredited Calibration Laboratory by ILAC MRA
Timers, Stop Watch Thermo Hygro Clocks	Yearly at working ranges	By ISO 17025 Accredited Calibration Laboratory by ILAC MRA
Electrophoresis Device	Yearly at working ranges	Any ISO 17025 accredited Calibration laboratory by ILAC MRA or manufactures recommended procedure
PCR Thermocyclers for temperature calibration.	As applicable	Each well of a thermocycler should be calibrated annually or according to the manufacturers advised plan. This can be conducted by a calibration laboratory or by the supplier's engineer.

Biological Safety Cabinets	Yearly at working ranges	Including sterility check at least weekly Internally & recommended ISO 17020 accredited Inspection body by ILAC MRA
pH	Daily prior to uses	Internal Verification by Certified Reference Material Guide 34 Agency accredited by ILAC MRA
TDS /Conductivity	As Applicable	As applicable
Fumigation Hood	As Applicable	As Applicable
Tissue Processor	Yearly	As Applicable
Microtome	Yearly	As Applicable
Paraffin Embedding Station	Yearly	As Applicable
Liquid Based Cytology	Yearly	As Applicable
Grossing Station	Yearly	As Applicable
EZ – Retrival (Microwave for IHC)	Yearly	As Applicable
Automated Immunohistochemistry	Yearly	As Applicable
Multistainer	Yearly	As Applicable
All chemistry analysers Pipette (Reagent probe & Sample probe) calibration Reaction chamber temperature devise calibration Filters calibration	Yearly	Recommended ISO 17025 Accredited Calibration Laboratory by ILAC MRA or Manufactures recommended procedure
All Immunology analyzers Pipette device (Reagent probe & Sample probe) calibration Reaction chamber temperature devise calibration	Yearly	or manufactures recommendation procedure performed as part of preventive maintenance servicing as required by suppliers service engineers.

Annex C
(informative)
Safety Guideline for Medical Laboratories

C.1 Designing for safety

a) There should be designated areas for different activities such as phlebotomy, administration, sample reception, laboratory examination areas and POCT.

b) Sample reception areas for the receipt of semen shall take into account the privacy of the patient.

c) Ensure active sinks are located away from electrical appliances.

d) Seating and bench height shall be ergonomically appropriate and safe.

e) Measures shall be taken to avoid repetitive strain injury from such activities as pipetting, uncapping/recapping samples, and data entry.

f) Laboratory design and infrastructure should take into consideration specific safety requirements for such activities as microbiological examinations, DNA technology, examinations using radioactive materials and histological processes.

g) The work benches should be constructed of a suitable and certified non-reactive material to meet safety requirements.

C.2 Staff and Training

a) Nomination of a safety officer who has appropriate training, with a detailed job description and well-defined responsibilities.

b) A documented and mandatory safety training program for all laboratory staff.

c) Laboratory staff shall sign acknowledgment that they have received adequate training and information.

d) Safety training is to include, but not limited to, chemical & biological spills as well as handling broken glass or specimen tubes.

e) Housekeeping procedures should be based on the highest degree of risk to which personnel and test integrity may be subjected. Laboratory personnel who are responsible for cleaning laboratory benches, equipment and areas that require specific procedures shall be trained in the requirements.

C.3 Health and Safety Manual

The laboratory shall have a safety manual which includes at least the following information:

a) Local or governmental regulation for safety, storage of dangerous materials and waste disposal.

b) Defines the types of hazards (e.g., chemical, biological, electrical, mechanical, radiation.) and how to deal with them.

c) Safety Data Sheets for all chemicals used in examination processes.

d) Staff immunisation records required.

e) Defines infection control policy, blood borne pathogens exposure control and notification program.

f) Frequency and criteria for health and safety audits of laboratory environment and activities.

g) Requirements for Personal Protective Equipment (PPE) for the various activities the laboratory performs.

h) Locations of PPE, safety showers, eye wash stations, first aid kits, spill kits, fume hoods and fire extinguishers

i) Locations of, and signs for, emergency exits, assembly points, any radiation areas, and any storage of flammable items. Regular drills should be conducted for emergency evacuations.

j) A list of national and local specific emergency telephone numbers related to health and safety issues.

k) The requirements for, and locations of, sinks designated as dirty or clean (clean being for hand washing only). A separate sink should be provided for any specific analytical requirements or for drainage of decontaminated liquids.

l) The requirements for monitoring air quality, temperature, and humidity.

m) The mandatory requirements for, and location of, certified safety storage cabinets for flammable, acidic, and corrosive chemicals.

n) The requirement for the laboratory to follow local health, safety, and environmental regulations.

o) Personnel responsibilities regarding no food or drink to be consumed, and the requirement to wear closed in footwear, within the laboratory.

p) The requirements for wearing lab coats within the laboratory only. If a staff member is required to go from the laboratory area into the sample collection facility, a new lab coat shall be changed into.

q) The PPE requirements for staff members performing maintenance tasks on items of equipment.

r) The health and safety induction, along with PPE requirements, for service engineers working within the laboratory.

s) Define types of waste and how they should be handled. All waste disposals should be handled as per local regulations.

t) Ideally laboratory waste should be autoclaved prior to disposal but if this is not an option then laboratories shall use certified infectious waste disposal companies, who can certify that they are incinerating or autoclaving the waste prior to sending out to landfill.

u) It is the responsibility of the laboratory producing the waste that they are convinced that their waste is being handled by a company with trained staff and that these staff are not exposed to needle-stick or any other exposure. All the liquid waste should be decontaminated in 1% hypochlorite solution or diluted in large quantities of water before being discharged into common municipal waste.

Annex D
(informative)

Implementation of Equipment Calibration Measurement Uncertainty and Correction factor Guideline

Reference to the ISO 15189:2022 standard requirement that the clause 6.5.2 (e) require ensuring the correction factors are applied for the equipment calibration.

Calibration certificates usually include set point, deviation/correction (error) and measurement uncertainty (MU). The overall adjustments required are established from deviation and MU.

D.1 Example on Fridge:

The fridge is set at 5.0°C for the calibration, the temperature is indicated on fridge display at 5.1°C.

NOTE – It is highly recommended that laboratory use independent calibrated temperature probe, rather than display reading as these are generally inaccurate. The independent probe is to be located in an appropriate position based on the temperature profiling/mapping data, this generally in the centre of the temperature controlled equipment, in a suitable diluent (to maintain stability).

During the calibration by the calibration lab, the "correct" temperature on calibrated reference (fully traceable) probe used by calibration laboratory shows 4.483°C.

NOTE – External calibration to be carried out at target temperature (mid-range of required tolerance) to ensure appropriate correction is applied.

Therefore, correction required based on calibration certificate data, is to shift range by adding 0.617°C (as lab fridge display reading too high).

Accordingly, the calibration laboratory provides a calibration certificate shows that the set point is 5.0C with display of 5.1°C, deviation with -0.617 (from display, so correction is +0.617 to lab tolerance) and MU +/-0.6°C.

So, example of typical fridge range is 2.0 to 8.0°C, therefore with correction, this then becomes 2.617 to 8.617°C. Then considering MU of +/-0.6°C (narrow range). Final adjusted range is therefore 3.217°C (added 0.6) to 8.017°C (subtracted 0.6). Based on 1DP, this would make it 3.3°C (not 3.2C as typically mathematical rounding adjustment not applied, as could be outside tolerance, so base on risk, this is rounded up), with upper tolerance 8.0°C (rounded down).

Target range 2.0°C – 8.0°C

Adjusted range 3.3°C – 8.0°C

D.2 Example on Incubator:

The incubator is set at 36.0°C with tolerance of +/-1.0°C, so 35.0°C to 37.0°C, the temperature is indicated on incubator display at 35.8°C.

NOTE – As mentioned in fridge example - It is recommended that laboratory use independent calibrated temperature probe, rather than display reading.

During the calibration by the calibration lab, the "correct" temperature on calibrated reference (fully traceable) probe used by calibration laboratory shows 36.2°C.

NOTE – External calibration to be carried out at target temperature (mid-range of required tolerance) to ensure appropriate correction is applied.

Therefore, correction required based on calibration certificate data, is to shift range by subtracting 0.4°C (as lab incubator display reading too low).

Accordingly, the calibration laboratory provides a calibration certificate shows that the set point is 36.0C with display of 35.8°C, deviation with +0.4 (from display, so correction is to -0.4 to lab tolerance) and MU +/-0.3°C.

So, example of typical incubator range is 35.0°C to 37.0°C, therefore with correction, this then becomes 34.6 to 36.6°C. Then considering MU of +/-0.3C (narrow range). Final adjusted range is therefore 34.9°C (added 0.3) to 36.3°C (subtracted 0.3).

Target range 35.0°C – 37.0°C

Adjusted range 34.9°C – 36.3°C

Annex E
(informative)

Implementation of validation/verification requirements of examination methods Guideline (RNA detection)

As per ISO 15189:2022 clauses 7.3.2 and 7.3.3, this guidance annexure provides an example of SARS-CoV-2 RNA detection 15189:2022 validation/verification requirements.

E.1 Contents

- Kit manufacturer approvals and validation
- ISO 15189:2022 validation and verification requirements
- Consideration for different workflows
- Consideration for equipment performance comparability
- Consideration of sample types and transport media
- Test performance including uncertainty of measurement
- Ensuring the quality of results

E.2 CE marking/FDA and other approvals

Look for approvals such as:

- CE marking
- FDA approval or emergency use authorisation (EUA)
- Other recognised approvals e.g. WHO COVID-19 listings
- https://www.who.int/diagnostics_laboratory/EUL/en/
- Product conformity to national/international standards
- Independent technical review of validation data

E.3 Examples of approvals and kits

- ThermoFisher/ABI: TaqPath COVID-19 Combo Kit
- Seegene Allplex 2019-nCoV kit
- Emergency Use Authorisation only (FDA)
- Primerdesign COVID-19 kit
- CE marked

E.4 Manufacturer's validation

- Specific sample types and transport media
- May have specific extraction kits or platforms including manual extraction
- Specific detection kits
- Specific detection systems or thermocyclers

E.5 Manufacturer's approval (Example 1: Samples)

- The 'Brand A' RT-PCR COVID-19 Kit performance was established using nasopharyngeal and oropharyngeal swab, nasopharyngeal aspirate, and bronchoalveolar lavage samples only. Other specimen types have not been evaluated and should not be tested with this assay.
- NB: Nasopharyngeal and nasal or nose swabs
- What media were included?

E.6 Example 1: Extraction

- MagMAX™ Viral/Pathogen Nucleic Acid Isolation Kit or the MagMAX™ Viral/Pathogen II Nucleic Acid Isolation Kit.
- Nucleic acid isolation can be performed manually or via an automated process using the KingFisher™ Flex Purification System (KingFisher).

E.7 Example 1: Detection

'Brand A' RT-PCR COVID-19 Kit and one of the following real-time PCR instruments:

- Applied Biosystems™ 7500 Fast Dx Real-Time PCR instrument
- Applied Biosystems™ 7500 Fast Real-Time PCR Instrument
- Applied Biosystems™ 7500 Real-Time PCR Instrument
- Applied Biosystems™ QuantStudio™ 5 Real-Time PCR Instrument,

E.8 Manufacturer's approval (Example 2)

- Oropharyngeal swab
- The 'Brand B' COVID-19 Real-Time PCR assay is to be used with the following extraction system: Automated extraction system GenoXtract® from HAIN Lifescience GmbH (Brucker) using GXT DNA/RNA Extraction kit
- The 'Brand B' COVID-19 Real-Time PCR assay is to be used with the following Real-Time PCR instruments:
- Applied Biosystems® 7500 Real-Time PCR System
- Roche® LightCycler 480 II
- Bio-Rad CFX Connect™ Real-Time PCR Detection System

E.9 For Lab to Consider…

- What sample and media types are used?
- What extraction platforms and kits are used?
- Is manual extraction included?
- What detection platforms and kits are used?
- Do any of the above differ to that of the manufacturer's validation process and approval?
- If yes: validation is required (clauses 7.3.1/7.3.3)
- If no: verification is required (clause 7.3.1/7.3.2)

E.10 ISO 15189 clause 7.3 Examination Process, clause 7.3.1 General

- The laboratory shall **select and use examination methods** which have been **validated** for their intended use to assure the clinical accuracy of the examination for patient testing.

- NOTE *Preferred methods are those specified in the instructions for use of in vitro diagnostic medical devices or those that have been published in established/authoritative textbooks, peer-reviewed texts, or journals, or in **international and national consensus standards or guidelines, or national or regional regulations.***

- The performance specifications for each examination method shall relate to the intended use of that examination and its impact on patient care.

E.11 ISO 15189 clause 7.3.2 Verification of examination methods

- The laboratory shall have a procedure to **verify** that it can properly perform examination methods before introducing into use, by ensuring that the required **performance**, as specified by the manufacturer or method, can be achieved.

- The **performance specifications*** for the examination method confirmed during the verification process shall be those relevant to the intended use of the examination results.

  **i.e. sensitivity/LoD, specificity, precision, accuracy etc.*

- The laboratory shall ensure the extent of the verification of examination methods is sufficient to ensure the validity of results pertinent to **clinical decision making**.

E.12 ISO 15189 clause 7.3.3 Validation of examination methods

- The laboratory shall validate examination methods derived from the following sources:

1) laboratory designed or developed methods;
2) methods used outside their originally intended scope (i.e. outside of the manufacturer's instructions for use, or original validated measurement range; third party reagents used on instruments other than intended instruments and where no validation data are available);
3) **validated methods subsequently modified**. *For example, a different extraction process or thermocycler.*

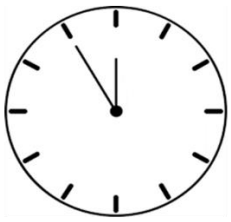
- The validation shall be as extensive as is necessary and confirm, through the provision of objective evidence in the form of **performance specifications**, that the specific requirements for the intended use of the examination have been fulfilled. The laboratory shall ensure that the extent of validation of an examination method is sufficient to ensure the validity of results pertinent to clinical decision making.

- Reference to: 3 Terms and definitions, 3.31 validation, Note 3 to entry: Specified requirements of an examination method may include the following performance specifications: measurement trueness, measurement precision including measurement repeatability, and measurement intermediate precision, analytical specificity, including interfering substances, detection limit and quantitation limit, measuring interval, clinical relevance, diagnostic specificity and diagnostic sensitivity.

E.13 Do Not Forget…

- Sample types, transport media and stability or integrity.





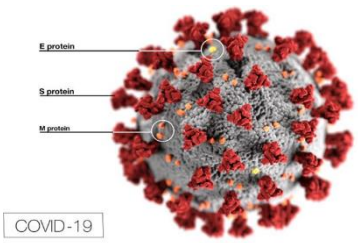

- See clause 7.2.6.2, sample stability due to delay in transport or inappropriate container(s)….

E.14 Verification of Sensitivity and Limit of Detection

- Critical parameter
- Use of reference materials with known values e.g. from International supplier such as NIBSC or 3rd party such as ThermoFisher, Biorad, Qnostics, JRC, ZeptoMetrix, Twist BioScience and many more.
- EIAC does not recommend any particular supplier. The list is to show what is available.

E.15 Verify Specificity

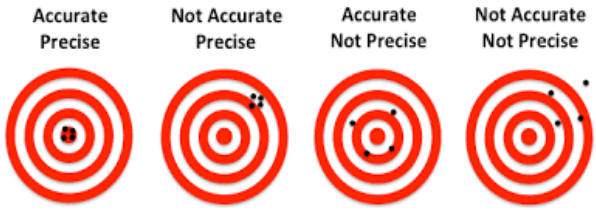
- To demonstrate no cross reactivity with other respiratory viruses



- To demonstrate no false positive results

E.16 Verify Precision

- Demonstrate repeatability and reproducibility.



E.17 Verify Accuracy – 1

Clause 7.3.7.3 External quality assessment (EQA)

- The EQA programme(s) selected by the laboratory shall, to the extent possible:

1) have the effect of checking pre-examination, examination, and post-examination processes;
2) provide samples that mimic patient samples for clinically relevant challenges;
3) fulfill ISO/IEC 17043 requirements.

- Participation in PT (EQA) schemes, For example: INSTAND, CAP, LGC, QCMD*…etc, Preferably ISO/IEC 17043 accredited as per availability of the providers.

**EIAC does not recommend any particular supplier. The list is to show what is available.*

E.18 Verify Accuracy -2

Clause 7.3.7.3.f Alternative approaches

- Only if PT is not available.
- 'Whenever EQA is not available, the laboratory shall develop other approaches and provide objective evidence for determining the acceptability of examination results'.
- Use of independent reference materials
- Exchange of samples with other laboratories: However, consider:

1. Competency of chosen laboratory (ISO 15189 accredited or equivalent)
2. Discrepant results: which laboratory is correct? Your lab's or the other lab's? How will discrepant results be investigated and managed?

E.19 Fitness for Purpose

- Analytical and Clinical suitability are required to be demonstrated
- Limitations need to be made clear
- Clinical governance is essential

E.20 Prevention of cross contamination

- Risk assess and minimise the technical process e.g. use of pipettes with filtered tips; handling practices, decontamination practices, carry over - splashes etc.
- Consider clause 6.3 Facilities and environmental conditions.
- Consider clauses 5.6 Risk management, 8.5 Actions to address risks and opportunities for improvement, 8.5.1 Identifications of risks and actions taken, 8.5.2 Acting on risks and opportunities for improvement.

E.21 ISO 15189 Clause 7.3.4 Evaluation of measurement uncertainty

- Where examinations include a measurement step but do not report a measured quantity value (i.e. a Ct value), the laboratory should calculate the uncertainty of the measurement step (variability of Ct value) where it has utility in assessing the reliability of the examination procedure or has influence on the reported result (detected or not detected).

- Consider risks of false negative and false positive results
- Consider what happens with results near or at the cut-off

E.22 Workflows

Consider:

- Usage of two or more different extraction platforms
- Usage of two or more detection kits
- Usage of two of more detection systems (thermocyclers)
- All workflows and permutations need validating

- All workflows need to demonstrate equivalence
- Multiple platforms (same model) need to demonstrate comparability e.g. two or more Biorad CFX thermocyclers

Annex F
(informative)

Implementation of validation/verification requirements of examination methods Guideline (antibody detection)

As per ISO 15189:2022 clauses 7.3.2 and 7.3.3, this guidance annexure provides an example of SARS-CoV-2 antibody detection 15189:2022 validation/verification requirements.

Although the provided information relates to ELISA-type assays, the principles also apply to rapid devices (POCT).

F.1 Content

- Kit manufacturer approvals and validation
- ISO 15189:2012 validation and verification requirements
- Consideration of sample types and transport
- Test performance including uncertainty of measurement
- Ensuring the quality of results

F.2 CE marking/FDA and other approvals

Look for approvals such as:

- CE marking
- FDA approval or emergency use authorisation (EUA)
- Other recognised approvals e.g. WHO COVID-19 listings
- https://www.who.int/diagnostics_laboratory/EUL/en/
- Peer-reviewed publications
- Product conformity to national/international standards
- Independent technical review of validation data

F.3 Manufacturers' Validation, what is covered? (1)

- Sample types: Serum and/or plasma (EDTA/heparin/citrate)
- Antibody type: IgG or Total (IgM, IgA, IgG) or IgM/IgG
- Analytical specificity: Cross reactivity evaluation for other medical conditions
- Antibody class specificity: Reacts only to specified human isotype(s)
- Analytical sensitivity
- Precision (repeatability and reproducibility)

F.4 Manufacturers' Validation, what is covered? (2)

- Clinical performance:
- Defining patient groups and testing purpose
- Correlation of SARS-CoV-2 PCR positive patients who also presented with COVID-19 symptoms, by testing sera collected at different times (PPA)
- Sera samples collected pre COVID-19 outbreak, from negative SARS-CoV-2 PCR individuals with respiratory symptoms (NPA)

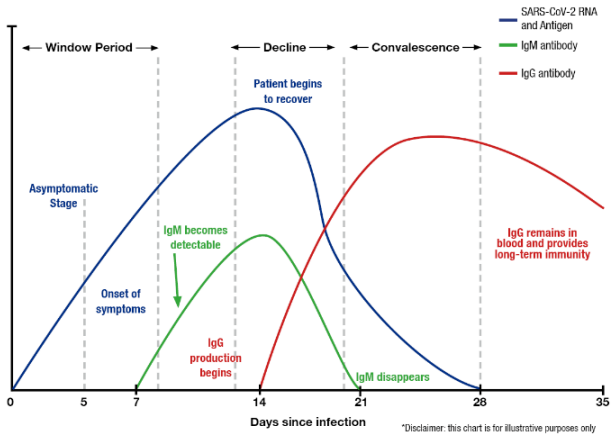
F.5 For Lab to Consider (1) Examples

Sample types:

- serum
- plasma (anticoagulant? E.g. EDTA, heparin, citrate)

Timing of sample collection and testing:

- How many days post symptom onset?



F.6 For Lab to Consider (2) Examples

Patient groups and testing purpose:

- Patients that have had COVID-19 disease (PCR positive and typical symptoms)
- Patients that might have had COVID-19 disease (not proven by testing)
- Patients that have had no evidence of COVID-19 disease (but wish to know antibody status)
- Patients who are immunosuppressed
- Patients on hyperimmune therapy for COVID-19 disease
- Patients on vaccine clinical trials

F.7 For Lab to Consider (3) Examples

What are the laboratory's (or user's) clinical and analytical specifications? E.g.

- Specificity ≥98%
- Sensitivity ≥95% at day 21+
- Reliable estimation of antibody concentrations across the working range of the assay
- No significant interference
- Inter-assay and intra-assay CV of ≤15%
- Satisfactory PT/EQA/IL performance
- Calibration against standard/working calibrant/reference material
- Uncertainty of measurement

F.8 Antibody kit selection and review of manufacturers' performance characteristics

- Does the laboratory's assay specification match that of the assay manufacturer's performance characteristics and approvals? E.g. for sensitivity and specificity
- Are there any differences between the laboratory's requirements and the manufacturer's validation and approval?

- If no: verification is required (clause 7.3.1/7.3.2)
- If yes: validation is required (clause 7.3.1/7.3.3)

F.9 ISO 15189 clause 7.3 Examination Process, clause 7.3.1 General

- The laboratory shall **select and use examination methods** which have been **validated** for their intended use to assure the clinical accuracy of the examination for patient testing.
- NOTE *Preferred methods are those specified in the instructions for use of in vitro diagnostic medical devices or those that have been published in established/authoritative textbooks, peer-reviewed texts, or journals, or in* ***international and national consensus standards or guidelines, or national or regional regulations.***
- The performance specifications for each examination method shall relate to the intended use of that examination and its impact on patient care.

F.10 ISO 15189 clause 7.3.2 Verification of examination methods

- The laboratory shall have a procedure to **verify** that it can properly perform examination methods before introducing into use, by ensuring that the required **performance**, as specified by the manufacturer or method, can be achieved.
- The **performance specifications*** for the examination method confirmed during the verification process shall be those relevant to the intended use of the examination results.

  * *i.e. sensitivity, specificity, precision, accuracy for specific groups of individuals etc.*
- The laboratory shall ensure the extent of the verification of examination methods is sufficient to ensure the validity of results pertinent to **clinical decision making**.

F.11 ISO 15189 clause 7.3.3 Validation of examination methods

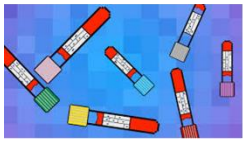
- The laboratory shall validate examination methods derived from the following sources:

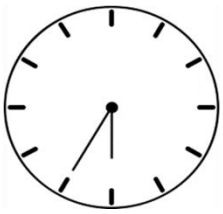
1) **laboratory designed or developed methods**.
   (*E.g. In-house developed ELISA)*
2) **methods used outside their originally intended scope** (i.e. outside of the manufacturer's instructions for use, or original validated measurement range; third party reagents used on instruments other than intended instruments and where no validation data are available);
   (*E.g. Used for vaccine clinical trial or on patients without COVID-19 proven symptoms)*
3) **validated methods subsequently modified**.
   (E.g. plasma has not been validated or different sample volumes used.)

- The validation shall be as extensive as is necessary and confirm, through the provision of objective evidence in the form of **performance specifications**, that the specific requirements for the intended use of the examination have been fulfilled. The laboratory shall ensure that the extent of validation of an examination method is sufficient to ensure the validity of results pertinent to clinical decision making.
- Reference to: 3 Terms and definitions, 3.31 validation, Note 3 to entry: Specified requirements of an examination method may include the following performance specifications: measurement trueness, measurement precision including measurement repeatability, and measurement intermediate precision, analytical specificity, including interfering substances, detection limit and quantitation limit, measuring interval, clinical relevance, diagnostic specificity and diagnostic sensitivity.

F.12 Do Not Forget…

- Sample types, transport media and stability or integrity.






- See clause 7.2.6.2, sample stability due to delay in transport or inappropriate container(s)….

F.13 Verification of Sensitivity and Specificity Examples

F.13.a Analytical:

- Use of reference materials e.g. NIBSC* reagents.
- Performance compared with other assay kits or other published evaluations
- PT/EQA performance e.g. UKNEQAS pilot scheme, CAP*

  **EIAC does not recommend any particular supplier. The list is to show what is available.*
- Interlaboratory exercises

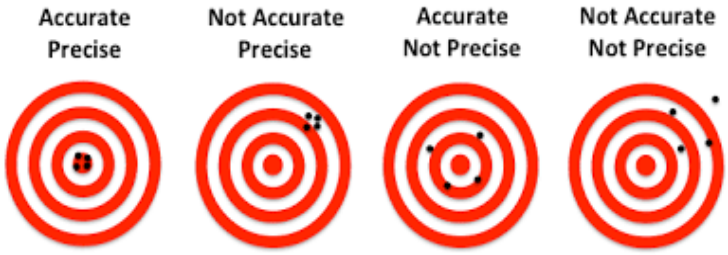
F.13.b Diagnostic: positive and negative predictive values

- Performance correlation with clinical history and other testing

- Performance using samples from patients with other respiratory infections e.g. pre Covid-19 outbreak

F.14 Verify Precision

- Demonstrate repeatability and reproducibility



F.15 Verify Accuracy – 1

Clause 7.3.7.3 External quality assessment (EQA)

- The EQA programme(s) selected by the laboratory shall, to the extent possible:

1) have the effect of checking pre-examination, examination, and post-examination processes;
2) provide samples that mimic patient samples for clinically relevant challenges;
3) fulfill ISO/IEC 17043 requirements.

F.16 Verify Accuracy -2

Clause 7.3.7.3.f Alternative approaches

- Only if PT is not available.
- Whenever an interlaboratory comparison is not available, the laboratory shall develop other approaches and provide objective evidence for determining the acceptability of examination results.
- Use of independent reference materials
- Exchange of samples with other laboratories: However, consider:

1. Competency of chosen laboratory (ISO 15189 accredited or equivalent)

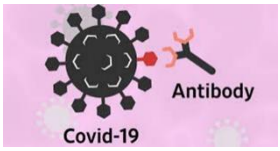
2. Discrepant results: which laboratory is correct? Your lab's or the other lab's? How will discrepant results be investigated and managed?

F.17 ISO 15189 Clause 7.3.4 Evaluation of measurement uncertainty

- Where examinations include a measurement step but do not report a measured quantity value (ELISA reading), the laboratory should calculate the uncertainty of the measurement step (variability around the cut-off value) where it has utility in assessing the reliability of the examination procedure or has influence on the reported result (detected or not detected).
- Consider risks of false negative and false positive results
- Consider what happens with results near or at the cut-off

F.18 Fitness for Purpose

- Analytical and clinical suitability must be demonstrated
- Limitations should be clearly stated
- Clinical governance is essential



F.19 ISO 15189 Clause 7.4.1 Reporting of results

7.4.1.1 General

a. Examination results shall be reported **accurately, clearly, unambiguously** and in accordance with any specific instructions in the examination procedure. The report shall include all available information necessary for the interpretation of the results.

7.4.1.7 Additional information for reports

d. When applicable, a report shall include **interpretation of results and comments*** on:

1) sample quality and suitability that can compromise the clinical value of examination results;

2) discrepancies when examinations are performed by different procedures (e.g. POCT) or in different locations;

3) possible risk of misinterpretation when different units of measurement are in use regionally or nationally;

4) result trends or significant changes over time.

**Reporting for diagnostic purposes must make it clear that the immunity status is unknown so must not be assumed.*