

Standards for Histocompatibility Testing

Notice and Disclaimer

These standards set forth only the minimum requirements for accredited histocompatibility laboratories. These standards do not set forth all that may be required of a facility to conform to federal or state laws or regulations (or non US equivalent) or the standard of care prevailing in the relevant community. Each facility must determine whether additional practices and procedures should be used in their particular locale. UNOS expressly disclaims any warranty that compliance with these standards meets all federal or state laws or regulations (or non US equivalent) or the standard of care that may prevail in any relevant community.

- A General Policies
- B Personnel Qualifications
- C Quality Assurance
- D HLA Antigens/Alleles
- E HLA Typing
- F Mixed Leukocyte Culture Tests
- G Antibody Screening
- H Renal and Pancreas Organ Transplantation
- I Other Organ Transplantation
- J Red Cell Typing for Organ Transplantation
- K Immune Function/Response Monitoring
- L Chimerism Analysis
- M Nucleic Acid Analysis
- N Flow Cytometry
- O Enzyme Linked Immuno Sorbent Assay (ELISA)

C- Quality Assurance

C1.000 Facilities, Equipment Maintenance and Function Checks

C1.100 Laboratory space must be sufficient so that all procedures can be carried out without crowding to the extent that errors may result. Adequate facilities for refrigerator and freezer storage of reagents and specimens must be immediately available to the laboratory.

C1.200 Lighting and ventilation must be adequate.

C1.300 Refrigerators and freezers must be monitored to ensure maintenance of optimal temperatures for storage of each type of sample or reagent. The laboratory's storage and maintenance of both reagents and recipients' sera must use a temperature alarm system and have an emergency plan for alternate storage. In laboratories where liquid nitrogen is utilized for storage of frozen cells, the level of liquid nitrogen in the cell freezers must be monitored at intervals that will ensure an adequate supply at all times. Ambient temperature and/or the temperatures of incubators in which test procedures are carried out must be monitored each day of use to ensure that these procedures are carried out within temperature ranges specified in the laboratory's procedure manual.

C1.400 Laboratories performing procedures that require mammalian cell culture must have a laminar flow hood or other appropriately aseptic work area. Incubators must be appropriately monitored as to temperature and CO₂ concentration and must be appropriately humidified.

C1.500 Laboratories performing amplification of nucleic acids must establish and employ protocols to prevent DNA contamination using physical and/or biochemical barriers. Pre-amplification procedures must be performed in an area that excludes amplified DNA that has the potential to serve as a template for amplification in any of the genetic systems tested in the laboratory.

C1.600 The laboratory must establish and employ policies and procedures for the proper maintenance of equipment, instruments and test systems by 1) defining the preventive maintenance program for each instrument and piece of equipment, and by 2) performing and documenting function checks on equipment with at least the frequency specified by the manufacturer. Instruments requiring calibration must be verified at least every 6 months.

C1.700 Adequate facilities to store records must be immediately available to the laboratory.

C1.800 The laboratory must be in compliance with all applicable Federal, State and local laws that relate to laboratory employee health and safety; fire safety; and the storage, handling and disposal of chemical, biological and radioactive materials.

C1.900 The laboratory must have a process to ensure that all computer-assisted analyses are accurate before results are issued.

C1.910 The computer software program used for analyses must be documented and validated for accuracy.

C2.000 Specimen Submission and Requisition

C2.100 The laboratory must have available and follow written policies and procedures regarding specimen collection.

C2.110 The laboratory must perform tests only at the written or electronic request of an authorized person. The laboratory must assure that the requisition includes: 1) the test subject's name or other unique identifier to assure accurate reporting of results; 2) the name and address or other suitable identifiers of the authorized person who ordered the test; 3) date of specimen collection; 4) time of specimen collection, when pertinent to testing; and 5) the tests ordered. Oral requests for laboratory tests are permitted only if the laboratory subsequently obtains written authorization for testing within 30 days of the request.

C2.120 Each container of a blood or tissue sample must be individually labeled with the name or other unique identification number (e.g., UNOS ID number) for the individual and the date of collection. When multiple containers are collected, each container must be individually labeled.

C2.130 The laboratory must maintain a system to ensure reliable specimen identification throughout collection, processing, testing and reporting to assure that accurate test results are recorded.

C2.140 The laboratory must have criteria for specimen rejection and a mechanism to assure that specimens are not tested when they do not meet the lab's criteria for acceptability.

C2.200 Blood samples must be obtained using a procedure that ensures minimal possibility of infection of the donor or contamination of the sample. All needles and syringes must be disposable.

C2.210 All blood and tissue samples must be handled and transported in accordance with the understanding that they could transmit infectious agents.

C2.220 The anticoagulant/preservation medium used must be shown to preserve sample integrity for the length of time and under the storage conditions the laboratory permits between sample collection and testing. The limits must be established on the basis of documented or published stability tests. It must be demonstrated that the anticoagulant does not interfere with test performance.

C2.300 Reagents

C2.310 All reagents must be properly labeled and stored according to manufacturers' instructions or locally specified conditions to maintain reactivity and specificity.

C2.320 Reagents, solutions, culture media, controls, calibrators and other supplies, as appropriate, must be labeled to indicate 1) identity and, when significant, titer, strength or concentration; 2) recommended storage requirements; 3) preparation and/or expiration date and other pertinent information.

C3.000 Laboratory Procedure Manual

C3.100 All procedures in use in the laboratory must be detailed in a procedure manual that is readily available where the procedures are carried out. The use of product inserts provided by manufacturers is not acceptable in place of a written procedure.

C3.200 The procedure manual must be reviewed at least annually by the Director and written evidence of this review must be in the manual. Any changes in procedures must be initialed and dated by the Director at the time they are initiated.

C4.100 Proficiency Testing and Competency Evaluation

C4.110 The laboratory must participate in at least one external proficiency testing program, if available, for each clinical test. If an external proficiency program is not available, the laboratory must have other procedures used to validate performance at least semi-annually for each clinical test used for UNOS testing. This may be accomplished through blind testing of specimens with known results, exchange of specimens with other laboratories or other equivalent systems approved by the laboratory director that meet CLIA requirements.

C4.120 The laboratory must determine and document the cause for each unsatisfactory proficiency test result. If a laboratory's performance in an external proficiency testing program is unsuccessful, the laboratory must participate in an enhanced proficiency testing program in that area until performance is deemed satisfactory.

C4.130 Proficiency test samples must be tested in a manner comparable to that for testing clinical samples.

C4.140 The laboratory must, at least once each month, give each individual performing tests a characterized specimen as an unknown to verify his or her ability to reproduce test results. The laboratory must maintain records of these results for each individual. Each individual must test an unknown for each clinical test that he/she performs at least once per year.

C4.150 The Director/Technical Supervisor or designee must evaluate the competency of each technologist and technician annually.

C4.160 The Director/Technical Supervisor and technical staff must participate in continuing education relative to each area for which UNOS approval is sought at least at a level to meet the minimum requirements established for ASHI accreditation and local and state regulations.

C4.200 Quality Assurance Evaluation of Test Management Systems

C4.210 The laboratory must establish and employ policies and procedures, and document actions taken when 1) test systems do not meet the laboratory's established criteria including quality control results that are outside of acceptable limits; and when 2) errors are detected in the reported clinical results. In the latter instance, the laboratory must promptly a) notify the authorized person ordering or individual utilizing the test results of reporting errors; b) issue corrected reports, and c) maintain copies of the original report as well as the corrected report for a minimum of two years or the interval required by local, state and federal regulations.

C4.220 The laboratory must have an ongoing mechanism for monitoring and evaluating the quality assurance program including an ongoing mechanism to evaluate corrective actions taken. The laboratory must document and assess problems identified during quality assurance reviews, discuss them with the staff, and take corrective actions necessary to prevent recurrences. Ineffective policies and procedures must be revised based on the outcome of the evaluation.

C4.230 The laboratory must maintain documentation of all quality assurance activities including problems identified and corrective actions taken, for a minimum of two years or the interval required by local, state, federal and UNOS regulations.

C4.240 If a laboratory performs the same test using different methodologies or instruments or performs the same test at multiple sites, the laboratory must compare the test results obtained at least twice a year.

C4.250 The laboratory must have a mechanism to identify and evaluate test results that appear inconsistent with relevant information such as patient demographics, pertinent clinical data when provided, or other test results.

C4.260 Prior to reporting patient test results the laboratory must verify or establish for each method the performance specifications for the following performance characteristics: accuracy, precision, analytical sensitivity and specificity, if applicable, the reportable range of patient test results, the reference ranges, and any other applicable performance characteristic.

C4.270 For qualitative tests the laboratory must include a positive and negative control with each run of patient specimens.

C4.300 Client Service Evaluation

C4.310 All complaints and problems reported to the laboratory must be documented. Complaints must be investigated and corrective action taken when necessary.

C4.320 The laboratory must have a system in place to document problems that result from breakdowns in communication between the laboratory and the authorized individual who orders tests or receives results.

C4.330 The laboratory must, upon request, make available to clients a list of the test methods employed by the laboratory, a list of performance specifications for each method (including normal ranges, if applicable) and a list of interfering factors that could affect interpretation of test results. Pertinent updates on testing information must be provided whenever changes occur that affect test results or the interpretation of test results.

C4.400 Every UNOS histocompatibility laboratory must verify the Waiting List histocompatibility data (HLA, ABO, PRA, unacceptable antigens, and ROP tray data, where applicable) for every patient whose test results the laboratory has been responsible for. The data for every patient must be reviewed initially. Thereafter, on a monthly basis, the data for newly listed patients must be reviewed. Documentation of such review must be kept for at least 2 years or the interval required by local, state and federal regulations and must be available for audit by UNOS.

C5.000 Records and Test Reports

C5.100 Records for all subjects tested must be maintained for a minimum of two years or the interval required by local, state and federal regulations.

C5.110 The record system must provide documentation including test requisition, subject identification number, accession number or unique identification of the specimen, the tissue source of the specimen, the date and time (if relevant) of specimen receipt, the condition and disposition of the specimens that do not meet the laboratory's criteria for acceptability, the records and dates for specimen testing including the personnel that performed the tests, the type of specimen used for testing, tests data and results, legally reproduced copies of preliminary and final reports and the documented review of these by the Director/Technical Supervisor or designee who meets at a minimum the requirements of General Supervisor.

C5.120 Records may be saved in computer files only, provided that back-up files are maintained to ensure against loss of data.

C5.130 The laboratory must have adequate systems in place to report results in a timely, accurate reliable and confidential manner and ensure subject confidentiality throughout those parts of the total testing process that are under the laboratory's control.

C5.140 The report must contain

- a. The name and address or other unique identifier of the laboratory and/or Institution.
- b. The date of collection and/or testing of sample when pertinent to the interpretation of the test.
- c. The name or unique identifier of each individual tested.
- d. The date of the report.
- e. The test results.
- f. The units of measurement if applicable.

C5.150 Reports must be reviewed by the Director/Technical Supervisor or a designee prior to release.

C5.160 The laboratory must report any information regarding the condition and disposition of specimens that do not meet the laboratory's criteria for acceptability.

C5.170 The laboratory must maintain records of all internal and external quality control tests for a minimum of two years depending on State and Federal regulations.

C5.180 Laboratories must have a mechanism in place for addressing any tissue typing discrepancies that may occur between laboratories.

C6.000 A UNOS approved laboratory may engage another laboratory to perform testing by subcontracting the work to that laboratory. In that event, if histocompatibility and/or transplantation immunology testing is referred, the subcontracting laboratory must be CLIA certified/exempt and either UNOS approved or ASHI accredited for that testing. If other testing is subcontracted, the subcontracting laboratory must document expertise and/or accreditation in those tests. The results must be returned to the referring laboratory and are to be released only after the review and approval of the director of that laboratory. The identity of the subcontracting laboratory and that portion of the testing for which it bears responsibility must be noted in the report of the UNOS laboratory. A copy of the testing laboratory's report must be kept on file by the laboratory receiving the results.