

Guidelines for the Blood Transfusion Services

2.6: Quality management system

<http://transfusionguidelines.org/red-book/chapter-2-quality-in-blood-and-tissue-establishments-and-hospital-blood-banks/2-6-quality-management-system>

2.6: Quality management system

Note that where key advice is given elsewhere in the guidelines, the relevant sections have been cross-referenced. Where there is not a direct cross-reference, the reader should investigate further the relevant chapters of these guidelines and the standards in Table 2.1.

2.6.1: Personnel and organisation

The Blood Service must ensure that adequate resources are provided to implement and operate the quality management system, to continually improve its effectiveness and to satisfy customer requirements. The physical resources to undertake the work must be suitable to attain the required standards; this will include equipment, consumables, work areas, utilities etc. (see section 4.2 on staffing and training principles for donation sessions).

All personnel shall have up-to-date job descriptions that clearly set out their tasks and responsibilities. Organisations shall assign the responsibility for processing management and quality assurance to different individuals who function independently.

All personnel shall receive initial and continued training appropriate to their specific tasks. Training records shall be maintained. Training programmes shall be in place and shall include good practice.

The contents of training programmes shall be periodically assessed and the competence of personnel evaluated regularly.

There shall be written safety and hygiene instructions in place adapted to the activities to be carried out and in compliance with requirements.

2.6.2: Premises

2.6.2.1: General

Premises including mobile sites shall be adapted and maintained to suit the activities to be carried out. They shall enable the work to proceed in a logical sequence so as to minimise the risk of errors, and shall allow for effective cleaning and maintenance in order to minimise the risk of contamination (see section 6.4 on component processing).

2.6.2.2: Donation area

There shall be an area for confidential personal interviews and assessment of individuals to determine their eligibility to donate. This area shall be separated from all processing areas (see section 4.1 on premises at blood donor sessions).

2.6.2.3: Collection area

Collection shall be carried out in an area intended for safe donation, appropriately equipped for the initial treatment of donors experiencing adverse reactions or injuries from events associated with donation, and organised in such a way as to ensure the safety of both donors and personnel as well as to avoid errors in the collection procedure (see section 4.1 on premises at blood donor sessions).

2.6.2.4: Testing and processing areas

There shall be a dedicated laboratory area for testing that is separate from the processing area with access restricted to authorised personnel.

2.6.2.5: Storage areas

Storage areas shall provide for properly secure and segregated storage of different categories of blood, blood components, tissues and materials including quarantine and released materials and donations collected under special criteria (e.g. autologous donation).

Provisions shall be in place in the event of equipment or power failure in the main storage facility (see section 6.7.1 on the specifications for component storage areas).

2.6.2.6: Waste disposal area

An area shall be designated for the safe disposal of waste, disposable items used during the collection, testing and processing, and for rejected blood or blood components.

2.6.3: Equipment and materials

2.6.3.1: Equipment checks and record keeping

All equipment shall be validated, calibrated and maintained to suit its intended purpose. Operating instructions shall be available and appropriate records kept.

2.6.3.2: Selection of equipment

Equipment shall be selected to minimise any hazard to donors, personnel or blood components.

2.6.3.3: Selection of materials

Only reagents and materials from approved suppliers that meet the documented requirements and specifications shall be used. Critical materials shall be released by a person qualified to perform this task. Where relevant, materials, reagents and equipment shall meet the requirements of Directive 93/42/EEC⁹ for medical devices and Directive 98/79/EC⁸ for *in vitro* diagnostic medical devices or comply with equivalent standards in the case of collection in third countries (see section 4.7 on the control of purchased material and services).

2.6.3.4: Inventory records

Inventory records shall be retained for a period acceptable to and agreed with the Competent Authority.

2.6.3.5: Computerised systems

When computerised systems are used, software, hardware and back-up procedures must be checked regularly to ensure reliability, be validated before use, and be maintained in a validated state. Hardware and software shall be protected against unauthorised use or unauthorised changes. The back-up procedure shall prevent loss of or damage to data at expected and unexpected downtimes or function failures.

2.6.4: Change control

There shall be a system of change control in process. The system's aims shall be to ensure that changes are evaluated and made only if they provide tangible benefits to the organisation as judged by, for example, benefit to patients through risk reduction. It may also be driven by efficiency savings to ensure that maximum resources are devoted to patient care.

The system shall then ensure that the change is planned and implemented in a controlled way, incorporating training for staff in new procedures, and demonstration that the expected outcome has been delivered. Supporting documentation, including for example standard operating procedures (SOPs), shall ensure there is a record of the processes operated before and after the change, that the date of the change is known, and that material processes through the changed system can be identified.

There shall also be a system to ensure that the effectiveness of the newly implemented process is monitored and opportunities for further improvement are investigated and, where relevant, implemented. It shall support the organisation in trying to learn from incidents, complaints and other event information, as analysis of this will help identify potential beneficial changes.

2.6.5: Validation

Validation is a pre-defined exercise to ensure that equipment or a procedure (either current or proposed) is fit for its intended purpose and meets its pre-defined specification. The benefits of validation include assurance that critical aspects of a process are in control, increased probability of uniform product quality, reduced product waste and reduced customer complaints. New equipment, blood packs and manufacturing processes are examples where validation is essential before they are introduced into routine application.

2.6.6: Documentation

Effective documentation, whether in written or electronic format, must be accurate, authorised, controlled at issue and reviewed on a regular basis to ensure that it remains relevant. It provides clear instructions on what to do and prevents errors that may result from spoken communication. Records must be legible and made at the time actions are completed using indelible ink; corrections shall be signed and dated and made so that the original entry can be seen. This ensures consistency of manufacture and service provision, provides objective evidence that tasks have been correctly performed, permits investigation if problems arise and facilitates traceability from donor to patient and vice versa.

Records can be transferred to other media following procedures which meet applicable British or international standards.

Comprehensive documentation includes a hierarchy of documentation starting with:

- a quality manual
- policies
- specifications
- SOPs
- forms and worksheets, batch processing records, labels, equipment logbooks and investigation /validation records.

Effective document control must be practised to ensure that documents being used are current and an archive of superseded documents shall be established to provide an historical record.

2.6.7: Collection

2.6.7.1: Donor eligibility

- Procedures for safe donor identification, suitability interview and eligibility assessment shall be implemented and maintained. They shall take place before each donation and comply with legislative requirements (see section 3.2 on blood donation, and section 20.1 on tissue donation).
- The interview shall be conducted in such a way as to ensure confidentiality (see section 3.4 on informed consent for blood donation, and section 20.2 for tissue donation).
- The donor suitability records and final assessment shall be signed by a qualified health professional (see section 3.4 on informed consent for blood donation, and section 20.3 for tissue donation).

2.6.7.2: Collection of donated blood, blood components and tissues

- The collection procedure shall be designed to ensure that the identity of the donor is verified and securely recorded and that the link between the donor and the blood, blood components and blood samples is clearly established (see Chapter 5 on the collection of a blood component).
- The sterile systems used for the collection of donations and their processing shall be CE marked or comply with equivalent standards if the donations are collected in developing countries. The batch number of the key consumables shall be traceable for each blood component (see section 4.7 on the control of purchased material and services).
- Collection procedures shall minimise the risk of microbial contamination.
- Laboratory samples shall be taken at the time of donation and appropriately stored prior to testing.
- The procedure used for the labelling of records, donations and laboratory samples with donation numbers shall be designed to avoid any risk of identification error and mix-up.
- After collection, the donations shall be handled in a way that maintains their quality at a storage and transport temperature appropriate to further processing requirements.
- There shall be a system in place to ensure that each donation can be linked to the collection and processing system into which it was collected and/or processed.

2.6.8: Manufacture

2.6.8.1: Procedures and controls

Manufacturing processes must follow clearly defined procedures in order to obtain products or services of the requisite quality. The inputs to any process must be controlled: for example the use of approved suppliers to agreed specifications. Goods requiring incoming inspection must be held in quarantine until the inspection has been performed. During manufacture any in-process controls shall be carried out and recorded (see Chapter 7 on specifications for blood components). Statistical techniques may be used to provide confidence that processes remain in control.

2.6.8.2: Calibration

Calibration is a procedure that confirms, under defined conditions, the relationship between values obtained from an instrument or system and those obtained using an appropriate certified standard. Examples include any equipment from which physical measurements are obtained, for example weights, scales, temperature loggers, thermometers, light sources etc.

2.6.8.3: Quality control and quality monitoring

These provide confirmation either during or at completion of a process that manufacturing materials, processes and products meet their pre-defined specification. They may be release requirements (quality control tests), such as a non-reactive microbiological test results or demonstration of the effectiveness of a new batch of reagents (see Chapter 9 on microbiology tests for donors and donations, and section 20.5 on tissue donor testing). They may provide evidence that systems are operating as expected (quality monitoring), such as meeting a stated leucodepletion requirement by random sampling of finished product, or testing white cell content and then subjecting the result to statistical analysis perhaps by the use of control charts (see section 6.3 on component and process monitoring tests). These latter tests would not normally prevent the issue of material.

2.6.8.4: Proficiency testing

Proficiency testing monitors the capability to perform procedures within defined limits of accuracy by analysis of unknown samples. Successful outcomes are dependent on the combined outputs of operators, equipment and process. Proficiency testing exercises are applied to a wide spectrum of laboratory procedures and may be managed on a local or national basis. National External Quality Assurance Schemes (NEQAS) are widely used in the UK.

2.6.8.5: Contract manufacture

When contract manufacture/testing are undertaken the company supplying the goods or service shall have been employed following a formal contracting process. This shall include supplier audit, if the goods or service had been deemed critical, on the basis of a GMP risk assessment, by the organisation letting the contract. The goods and services provided shall be subject to regular monitoring to ensure they comply with the service specified in the original contract and may be subject to ongoing audit depending on the quality of the service/goods provided and their criticality to the organisation letting the contract.

2.6.9: Labelling

At all stages, all containers shall be labelled with relevant information of their identity. In the absence of a validated computerised system for status control, the labelling shall clearly distinguish released from non-released units of blood and blood components (see section 6.6 for labelling of blood components).

The labelling system for the collected donations, intermediate and finished blood components, tissues and samples must unmistakably identify the type of content, and comply with the labelling and traceability requirements.

For autologous blood and blood components, the label also shall comply with requirements.

2.6.10: Release of blood and tissue components

There shall be a safe and secure system to prevent release until all mandatory requirements have been fulfilled (see Chapter 9 on microbiology tests for donors and donations for blood, and section 20.11 on release criteria for tissues). Each establishment shall be able to demonstrate that each blood, blood component, tissue, reagent or diagnostic test result has been formally released by an authorised person. Records shall demonstrate that before a blood component or tissue is released, all current declaration forms, relevant medical records and test results meet all acceptance criteria.

Before release, blood and blood components, tissues and reagents shall be kept administratively and physically segregated from released items. In the absence of a validated computerised system for status control a labelling system shall identify the release status.

In the event that an item fails release due to a confirmed positive infection test result, a check shall be made to ensure that other components from the same donation and components prepared from previous donations given by the donor are identified. There shall be an immediate update of the donor record.

2.6.11: Storage and distribution

Procedures for storage and distribution shall be validated to ensure blood and blood component quality during the entire storage period and to exclude mix-ups of blood components (see section 6.7 on component storage).

Autologous blood, blood components and tissues as well as blood components and tissues collected and prepared for specific purposes shall be stored separately.

Appropriate records of inventory and distribution shall be kept.

Packaging shall maintain the integrity and storage temperature of blood or blood components during distribution and transportation (see section 6.11 on transportation of blood components).

Return of blood, blood components and tissues into inventory for subsequent reissue shall only be accepted when all quality requirements and procedures laid down by the Blood Establishment to ensure tissue and blood component integrity are fulfilled.

2.6.12: Traceability

There must be a system to ensure that material can be traced through the procurement, testing, and production and issue systems to a patient (for blood, see sections 5.2.1 on donor identification, and 5.5.3 on labels). If the material is donated then traceability must be maintained from the donor to the patient. Any products must be uniquely identified to help support traceability. For example, for reagents this can be to batch level. Where appropriate this should be to individual units, for example apheresis donations split into multiple doses. Any material obtained from outside the EU must maintain a standard of traceability to its origin equivalent to that expected within a Blood Establishment. Under the terms of the BSQR, traceability records of blood components must be maintained for a minimum of 30 years. A similar requirement is in place for tissues and cells under the terms of the Tissues and Cells Directive.¹²

2.6.13: Continuous improvement

It is important to take a holistic view using all available information, including information derived from analysis of incidents, errors, near misses and complaints as well as from audit processes, litigation and peer organisations. This approach will help prioritise those improvements that will be most beneficial to patients, donors and staff. As root cause analysis places a significant drain on expert resources it should be targeted on activities that on the balance of risk are most critical to the organisation. This process should be linked to the Blood Establishment's planning process so that improvements that require significant resources can be given sufficient consideration and support in their implementation.

2.6.14: Non-conformance

2.6.14.1: Deviations

Blood components or tissues deviating from required standards shall be released for transfusion only in exceptional circumstances and with the recorded agreement of the prescribing physician and the Blood Establishment physician.

2.6.14.2: Complaints

All complaints and other information, including serious adverse reactions and serious adverse events, which may suggest that defective blood components or tissues have been issued, shall be documented, carefully investigated for causative factors of the defect and, where necessary, followed by recall and the implementation of corrective actions to prevent recurrence. Procedures shall be in place to ensure that the Competent Authorities are notified as appropriate of serious adverse reactions or serious adverse events in accordance with regulatory requirements.

2.6.14.3: Recall

A system (usually, but not necessarily, computer software) shall be in place to allow full traceability of products. This will ensure that efficient recall of products can be effected and that look-back studies can be undertaken. The recall operation shall be capable of being initiated promptly and at any time. It is essential that all recalled products are stored separately and securely until a decision is made on the fate of the product. Records of recall must be maintained. A review of the recall procedures for effectiveness needs to be carried out periodically (for blood, see section 6.12 on component recall and traceability).

2.6.14.4: Serious adverse events and reactions

Serious adverse events (SAEs) and serious adverse reactions (SARs) (as defined in the EU Directives) must be reported to the relevant Competent Authority through the relevant website reporting tool:

- For blood and blood components, these are reported to the MHRA as serious adverse blood reactions and events
- For tissues, these are reported to the HTA as serious adverse events and reactions.

2.6.15: Audit (self-inspection)

Quality audit is a planned process of inspection conducted in an independent and detailed way by competent, trained individuals to ensure that procedures and associated quality assurance comply with the principles of GMP. The results of such inspections shall be recorded and non-compliances reported in writing to a designated individual whose responsibility it is to ensure corrective and preventive actions are applied in an effective and timely manner.

There will also be an opportunity to learn from the problems identified through audit, to identify underlying root cause and possibly to support conclusions on areas to improve, identified through incidents and error reporting. As noted above this process should also be linked to the Blood Service's planning process so that improvements that require significant resources can be given sufficient consideration and support in their implementation.

For Blood and Tissue Establishments, audits shall extend to suppliers of goods and services. The frequency or appropriateness of audit shall be decided on the basis of risk. This can be incorporated into the procurement system.