Guidelines for Validation & Qualification, including Change Control, for Hospital Transfusion Laboratories

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Introduction
This is a general guideline aimed at providing laboratories a practical framework required for the introduction or use of any new or change/relocation of established critical process, equipment, facilities or systems in the transfusion laboratory. The following areas are covered in detail:

Change Control - a formal system for managing change
Validation - documented evidence that the process meets predetermined specifications
Qualification - refers to equipment, facilities and systems

This guideline replaces ‘Recommendations for evaluation, validation and implementation of new techniques for blood grouping, antibody screening and cross-matching’\(^1\) and is based on the European Union (EU) Directives\(^2\) as implemented in the UK through the Blood Safety and Quality Regulations SI 2005:50, as amended.\(^3\)

Validation is a requirement of the Blood Safety and Quality Regulations SI 50/2005 (as amended). This guideline should be read in conjunction with:

- 2005/61/EC
- EudraLex - Volume 4, Good manufacturing practice (GMP) Guidelines, including Annex 15 and 20
- Good Automated Manufacturing Process (GAMP)- Guide for Validation of Automated Systems\(^5\)
- Pharmaceutical Inspection Co-operation Scheme PIC/S. GMP Guide for Blood Establishments 2007\(^6\)
- European Commission Working Party on Control of Medicines and Inspections Final Version of Annex 15 to the EU Guide to Good Manufacturing Practice 2001\(^7\)

As there are many terms and abbreviations/acronyms used in this guideline which the reader may be unfamiliar with we have included the glossary and abbreviations and acronyms used within the document at the beginning of the guideline to aid the reader. Also included in the main body of text are references to example documents which can be found on separately on the BCSH website

1. Glossary

Acceptance Criteria
The criteria a software product must meet to successfully complete a test phase or to achieve delivery requirements.
Accreditation
Procedure by which an authoritative body e.g. Clinical Pathology Accreditation (CPA) UK gives formal recognition that an organisation e.g. hospital transfusion laboratory or blood establishment is competent to carry out specific tasks against defined standards.

Blood component
Therapeutic component of blood prepared at blood establishment includes red cells, white cells, fresh frozen plasma, cryoprecipitate and platelets

Blood Establishment
Any organisation that is involved in collection and testing of blood or blood components and their processing, storage and distribution e.g. National Blood Service Centres. Blood Establishments must be authorised by the Competent Authority.

Blood product
Therapeutic product derived from human blood or plasma e.g. Anti-D, Intra Venous Immunoglobulin (IVIg), albumin, plasma derived factor concentrates

Calibration
Demonstration that a particular measuring device produces results within specified limits by comparison with those produced by a reference standard device over an appropriate range of measurements. This process results in corrections that may be applied to optimise accuracy.

Certificates of calibration
Document signed by qualified authorities that testify that a system’s qualification, calibration, validation or revalidation has been performed appropriately and that the results are acceptable.

Change Control
A formal system of reviewing and documenting proposed or actual change that might affect the validated status of a system, equipment or process followed by action to ensure ongoing validated state.

Competent Authority
The designated Competent Authority for the Blood and Safety Quality Regulations 2005 is the Medicines and Healthcare Products Regulatory Agency (MHRA) acting on behalf of the Secretary of State.

Design qualification (DQ)
The documented verification that the proposed design of the equipment and system is suitable for the intended purpose

Design specification for hardware:
Description of the architecture and configuration of the hardware. It includes controllers, PCs, instrumentation and interfaces
Design specification for software
Description of logical and physical structures of the program, the standards to be used for file naming, label allocation and module naming. It defines how the software implements the requirements based on the functional specification.

Good Laboratory Practice (GLP)
This embodies a set of principles that provides a framework within which laboratory activities are planned, performed, monitored, recorded, reported and archived. GLP helps assure regulatory authorities that the data submitted are a true reflection of a laboratory’s activities and forms a reliable basis for making risk/safety assessments.

Good Manufacturing Practice (GMP)
Good Manufacturing Practice is that part of Quality Assurance which ensures that Products and/or services are consistently produced and controlled to the quality standards appropriate to their intended use and as required by the relevant Regulations.

Process Validation
The documented evidence that the process, operated within established parameters, can perform effectively and reproducibly to produce a product/result meeting its predetermined specifications and quality attributes.

Qualification
Action of proving any equipment works correctly and leads to the expected results. There are 3 phases of qualification listed below.

Installation Qualification (IQ)
The documented verification that the equipment and system as installed or modified, comply with the approved design and the manufacturer’s recommendations.

Operational Qualification (OQ)
The documented verification that the equipment and system, as installed or modified, perform as intended throughout the anticipated operating ranges.

Performance Qualification (PQ)
The documented verification that the equipment and system, as connected together, can perform effectively and reproducibly, based on the approved process method and product specification.

Quality
Consistent and reliable performance of services or products conforming with specified standards.

Quality control
Quality Control is that part of Good Manufacturing Practice which is concerned with sampling, specifications and testing, and with the organisation, documentation and release procedures which ensure that the necessary and
relevant tests are actually carried out and that materials are not released for use until their quality has been judged to be satisfactory.

Quality assurance
Quality Assurance is a wide-ranging concept, which covers all matters, which individually or collectively influence the quality of a product. It is the sum total of the organised arrangements made with the objective of ensuring that products/services are of the quality required for their intended use. Quality Assurance therefore incorporates Good Manufacturing Practice.

Quality Management System
A quality management system provides the integration of organisational structure and all procedures, processes and resources needed to fulfil a quality policy.

Quality Manager
The quality manager is the individual who ensures that the quality management system functions correctly.

Quality Manual
A quality manual describes the quality management system and includes the quality policy and arrangements for its implementation.

Quality Risk Assessment
A systematic process for the assessment, control, communication and review of risks to the quality of the drug (medicinal) product across the product lifecycle.

Standard Operating Procedure (SOP)
Written and approved description of essential steps, their sequence, responsibilities and precautionary measures necessary to assure that operations can be accomplished routinely and in a standardised manner.

User Requirements Specification (URS)
Provides a clear and precise definition of what the user wants the system to do. It defines the functions to be carried out, the data on which the system will operate and the operating environment. The URS defines also any non-functional requirements, constraints such as time and costs and what deliverables are to be supplied. The emphasis should be on the required functions and not the method of implementing those functions.

Validation
The documented evidence that the process, equipment, facilities or systems, operating within established parameters, can perform effectively and reproducibly giving results meeting predetermined specifications.

Validation Master Plan
Describes the areas of activities within which validation is to take place and provides an overview of the status of planning. It lists the areas, systems and projects being managed, defines the status of validation for each and gives a broad indication of when validation is to be completed. It is a general plan and
would normally cover all equipment and processes. It should include all systems for which validation is planned.

**Validation Plan**
Description of the validation activities, responsibilities and procedures. It describes specifically how the validation is to be done and details responsibilities if the Validation Team.

**Validation Protocol**
Outlines the objectives of validation of a specific equipment or process, testing protocol including elements such as installation, operational and performance qualification and documentation.

**Validation Report**
Presentation of the results of validation activities, interpretation of the results and the conclusions drawn. If unexpected results are obtained during validation testing, it defines what changes will need to be made or what workarounds will be implemented to mitigate risk.

### 2. Acronyms and Abbreviations

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<th>Acronym</th>
<th>Description</th>
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<tr>
<td>BSQR</td>
<td>Blood Safety and Quality Regulations</td>
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<td>CPA</td>
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<td>DQ</td>
<td>Design Qualification</td>
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<td>FDS</td>
<td>Functional Design Specification</td>
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<td>GAMP</td>
<td>Good Automated Manufacturing Practice</td>
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<td>GxP</td>
<td>Good Practice</td>
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<td>IQ</td>
<td>Installation Qualification</td>
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<td>MHRA</td>
<td>Medicines and Healthcare products Regulatory Agency</td>
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<td>NPSA</td>
<td>National Patient Safety Agency</td>
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<td>OQ</td>
<td>Operational Qualification</td>
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<td>PQ</td>
<td>Performance Qualification</td>
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<td>Quality Assurance</td>
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<td>QMS</td>
<td>Quality Management System</td>
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<td>Standard Operating Procedure</td>
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<td>Validation Master Plan</td>
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### 3. Overview
The following flowchart identifies all the stages which should be followed when validating/qualifying facilities, equipment or process within the laboratory. A further flowchart showing the steps in change control is included within section 7.
Validation Flowchart

Validation Policy (Strategic Document) → Validation Master Plan (Operational Document) → Risk Assessment and Change Control → Validation Process

- Plan
- Protocol
- Records
- Summary report

Perform qualification of equipment, facilities and systems

Document via document control system

Perform validation of processes (e.g. methods and reagents)

- DQ - design qualification
- IQ - installation qualification
- OQ - operational qualification
- PQ - performance qualification

Training to SOPs, Competency assessments

Validation Summary Report Sign off

Implement

Maintenance of Validated State
3.1 Within the laboratory there should a **Validation Policy** which is a strategy document that clearly defines what the validation process is and its purpose within the laboratory. The policy should make a commitment to maintaining critical processes and systems in a valid state and should mention applicable regulations, standards and guidelines that underpin the laboratory’s approach to validation. The validation policy will specify what should be validated and how validation is executed as defined in the validation master plan.

3.2 The **Validation Master Plan** (VMP) details all of the critical processes, equipment, facilities and systems, when they were last validated and when re-validation is due. The VMP is the operational document which allows the laboratory to turn the Validation Policy into practice and provides a route map to how the laboratory ensures critical processes and systems remain valid and fit for purpose throughout their life-cycle from initial procurement, installation and routine operation to withdrawal, or replacement. The VMP is a key document which can be used by laboratories to serve as a tool for ensuring compliance and may be used by regulatory authorities to check the robustness of the processes employed in laboratories. The validation policy and VMP may be two separate documents or integrated as a single document. The VMP should form part of, or be referenced in, the laboratory quality manual (CPA (UK) Requirement).

3.3 Management of a new (or changed) process, equipment, facilities and systems should be through **Change Control**, incorporating a documented **Quality Risk Assessment**. Risk assessment is required alongside change control in order to assess the possible impact of the change so that action can be taken to reduce or eliminate risk and determine and justify the extent of validation required.

3.4 **Validation Plan**. The validation master plan will define the requirement for a discrete validation plan or in the case of complex systems a series of plans to validate each component or process. The validation plan will define the need for a validation protocol(s) describing the scope of the validation and procedures used.

3.5 A **Validation Protocol** should be established that specifies how qualification (Installation, Operational and Performance) of equipment, facilities and systems or process validation will be conducted. The protocols should be reviewed and approved both prior to and following execution. The protocol should specify critical steps and acceptance criteria. The phases of Validation/Qualification are explained in detail in section 12.2

3.6 Following execution of the protocols a **Validation Summary Report** should be prepared detailing the outcome of the validation process. Once all appropriate **training** and **documentation records** are in place the equipment, facility, system or process can be authorised for use.
Summary of Key Recommendations

- Validation, Qualification and Change Control must be an integral part of the quality management systems in hospital transfusion laboratories.
- Each Hospital Transfusion Laboratory should develop its own Change Control and Validation Policy.
- The communication and documentation required for these areas to be GMP compliant must be written within a formal policy document reflecting the specific intended use of the process.
- There should be documentation to record each step of the validation process which is adequate, legible, complete, reproducible and traceable.
- All processes should be adequately challenged and demonstrated to be robust under most conditions.
- All staff working within hospital transfusion laboratories should have documented training in using these policies and protocols within their own organisation.
- It is essential to have processes that ensure the maintenance of the validated state.

4. PURPOSE AND SCOPE

4.1 This document refers to all processes and activities that are performed by hospital transfusion laboratories. It follows the same principles of Good Manufacturing Practice (GMP) used for the manufacture of medicinal products and will assist laboratory managers to identify key principles and outlines for Validation, Qualification and Change Control and the documentation required for the hospital transfusion laboratory with reference to some practical examples.

5. VALIDATION POLICY

5.1 There must be a written policy that clearly defines what the validation and qualification process is and its purpose within the laboratory. The policy should make a commitment to maintaining critical processes, equipment, facilities and systems in a valid state and should mention applicable regulations, standards and guidelines that underpin the laboratory’s approach to validation.

5.2 The policy should cover at least the following:

- In the transfusion laboratory, validation must comply with the requirements of Regulation 9 (1) c of the Blood Safety and Quality Regulations (SI 2005 no. 50) as amended and should also satisfy the CPA (UK) Medical Laboratory Standards.
- An outline of the organisational responsibility for validation.
- An outline of the key principles to be applied to the validation programme, such as the use of risk and criticality* assessment in planning what should be subject to validation and how it should be validated.
• A commitment to documenting what process, equipment, facilities and systems are subject to validation and how they will be validated in the form of a Validation Master Plan supported by written validation procedures or protocols and validation records.

* criticality – determines the critical nature of the process, equipment, facilities or systems in relation to the safety of the overall transfusion process

Recommendation:
• There should be a Validation Policy, which is an over arching management document that details the arrangements for undertaking validation and qualification.

6 VALIDATION MASTER PLAN

6.1 The Validation Master Plan (VMP) is a quality management system document. It should be a controlled document, approved by senior laboratory management and regularly reviewed and, if necessary, revised in response to organisational and operational changes.

6.2 The VMP should be based on and refer to the Validation Policy (See section 5). The VMP should clarify:
• under what circumstances
• who is responsible
• how the validation will be performed and documented
• how the validated state will be maintained through regular servicing and calibration and re-qualification.

6.3 A VMP should be produced for each laboratory or network of laboratories if they are operating under a common quality system and should cover the processes and systems in use.

6.4 For large projects such as the implementation of a new Laboratory Information System or relocation of the laboratory to new facilities, it may be appropriate to have a project-specific VMP. The VMP will inform those working as part of the project team to ensure that the project delivers processes and systems that are in a validated state and fit for use. Also, it may be desirable for reasons of complexity to have separate VMPs covering different systems such as computer systems and automated test systems.

6.5 As a minimum, a VMP should cover:
• The organisational structure and responsibilities for validation activities
• Summary or list of process, equipment, facilities or systems to be validated and qualified
• How validation is planned and scheduled
• The formats for validation documentation
• The role of validation in change control (See section 7) and project management.
• Links to other relevant Quality System processes (e.g. supplier control, document control, training, equipment calibration and maintenance.)

6.6 An example of a what should be included in VMP is available in Appendix 1
An example of a specific VMP is available in Appendix 2

Recommendation:
• Each organisation should have a VMP in place as part of its Quality System
• The VMP should outline responsibilities for ensuring all process, equipment, facilities and systems remain validated

7. CHANGE CONTROL
7.1 Uncontrolled change carries significant risk of loss of the validated state for laboratory processes, equipment, facilities or systems. Therefore Change Control should be initiated by a proposed change that impacts upon any laboratory process, equipment, facilities or systems. The steps of change control are shown in Figure 2. Changes may result from:

- a planned change in a laboratory process or inputs (e.g. equipment, materials),
- the systematic review of a procedure
- audit finding(s)
- quality incident(s)
- complaint(s)

7.2 Some laboratory changes e.g. using new equipment of the same type, or relocating the process may not require any alteration to documented procedures, but these changes should still be subject to change control.

7.3 Minor amendments to written procedures may not need to be subject to Change Control, but must be managed through the document control process.

7.4 Each change must be planned and records maintained to confirm the successful outcome of each stage. When all stages are complete there must be an independent review and formal approval by a person designated by the laboratory Responsible Person, for the new or changed process to go live in the laboratory.
7.5 An example of a change request form is available in Appendix 3. This is completed for changing of a reagent but the same template could be used for any change request.

Recommendation:

- **Change Control** must be an integral portion of the transfusion laboratory quality system
- Change Control should be achieved through a formal, documented system to ensure that compliance and quality standards are maintained during and following a change.
- After completion of each stage of change control a formal release for the next step should be made as a written authorisation.
Change control flowchart

REQUEST FOR CHANGE

Impact and Risk Assessment on laboratory processes/system

Is validation / qualification required?

YES

Perform Validation / qualification

Approve

Update documentation via document control system

Training - task based SOP Competency assessment

IMPLEMENT CHANGE

Review, “sign off” and close change

NO

Does documentation need changing?

Yes

No change to documentation No additional training required

No

Documentation
8. Quality Risk Assessment

8.1 Quality risk assessment is required alongside change control in order to assess the possible impact of the change so that action can be taken to reduce or eliminate risk. This must include all risks to patients, environment and laboratory systems. The assessment may be used to determine the extent of validation required. Consideration should be given to Annex 20 of the EU GMP\(^9\).

Further information on Risk Assessment is available in the NPSA Healthcare Risk Assessment made easy 2007\(^10\).

8.2 Quality risk assessment consists of the identification of hazards and the analysis and evaluation of risks associated with exposure to those hazards (as defined below). Quality risk assessments begin with a well-defined problem description or risk question. When the risk in question is well defined, the types of information needed to address the risk question will be more readily identifiable. As an aid to clearly defining the risk(s) for risk assessment purposes, three fundamental questions are often helpful:

1. What might go wrong?
2. What is the likelihood (probability) it will go wrong?
3. What are the consequences (severity) of its going wrong?

Risk is the combination of likelihood and consequence of a hazard being realised.

Risk assessment can be complex and requires input from persons who both understand risk assessment and the processes and systems being assessed.

8.3 There are four basic steps in a risk assessment

Step 1 – Risk Identification – Identify the hazards - (what might go wrong?)
Step 2 – Risk Analysis – Evaluate the risks (how bad? how often?) and decide on the precautions (is there a need for further action?)
Step 3 – Record your findings and any proposed risk control or risk reduction (action to mitigate against the risk).
Step 4 – Review assessments and update as necessary.

8.4 Risk identification is a systematic use of information to identify hazards referring to the risk question or problem description. Information can include historical data, theoretical analysis, informed opinions, and the concerns of stakeholders. Risk identification addresses the “What might go wrong?” question, including identifying the possible consequences. This provides the basis for further steps in the quality risk management process.
8.5 **Risk analysis** is the estimation of the risk associated with the identified hazards. It is the qualitative or quantitative process of linking the likelihood of occurrence and severity of harms. In some risk management tools, the ability to detect the harm (detectability) is also a factor in the estimation of risk.

8.6 **Risk Control** includes decision making to reduce and/or accept risks. The purpose of risk control is to *reduce* the risk to an acceptable level. The amount of effort used for risk control should be proportional to the significance of the risk. Decision makers might use different processes, including benefit-cost analysis, for understanding the optimal level of risk control.

Risk control might focus on the following questions:

a. is the risk above an acceptable level?
b. what can be done to reduce or eliminate risks?
c. what is the appropriate balance among benefits, risks and resources?
d. are new risks introduced as a result of the identified risks being controlled?

8.7 **Risk reduction** focuses on processes for mitigation or avoidance of quality risk when it exceeds a specified (acceptable) level. Risk reduction might include actions taken to mitigate the severity and probability of harm. Processes that improve the detectability of hazards and quality risks might also be used as part of a risk control strategy.

8.8 **Review**: the implementation of risk reduction measures can introduce new risks into the system or increase the significance of other existing risks. Hence, it might be appropriate to revisit the risk assessment to identify and evaluate any possible change in risk after implementing a risk reduction process.

8.9 An example of a risk assessment is available at [www.transfusionguidelines.org.uk](http://www.transfusionguidelines.org.uk), as part of the change control documentation. The risk assessment form has been completed to assess the risks of changing screening panel cells but this form could be used to assess any risk within the blood transfusion laboratory.

**Recommendation:**
- A quality risk assessment must be performed when any planned change to laboratory processes/systems is undertaken
- Staff who undertake the risk assessment should have been trained in risk assessment and should have knowledge of the processes and systems being assessed.

9.1 The User Requirement Specification is an essential document produced by, or on behalf of your organisation, before the purchase of new or replacement process, equipment, facilities or systems. The URS should be written by the end users in conjunction with the quality department.

9.2 The URS:
- documents the purposes for which a process, equipment, facilities or systems is required
- describes essential (musts) and desirable (wants) requirements.
- defines the functions to be carried out
- defines the operating environment within which the system will operate
- defines any non-functional requirements such as time and costs and what deliverables are to be supplied.

9.3 **Functional Requirements**: Statements that specify what the process, equipment, facilities or systems must be able to do.

9.4 **Non-Functional Requirements**: Covering the way in which the process, equipment, facilities or systems should behave in respect of the compliance to external requirements (e.g. legislative requirements) and elements of “good practice” (GxP).

9.5 The URS should express requirements and not design solutions

9.6 Each requirement should be testable or verifiable in some way.

9.7 Wherever possible, requirements should be prioritised with essential requirements and desirable features distinguished.

9.8 The URS should be reviewed and approved then authorised by an appropriate person within the organisation.

9.9 An example of what should be included in a URS in Appendix 4 and a specific URS for purchasing a grouping analyser is available in Appendix 5.

**Recommendation:**
- A URS should be written for all new purchases

10. **Function Design Specification (FDS)**

10.1 The FDS is a description of the system to be supplied/implemented in terms of:
- a) the functions it will perform and
- b) facilities required in order to meet the user requirements as defined in the URS.
10.2 A system acceptance test specification should be produced based on the FDS, it is often beneficial to produce these documents in parallel.

10.3 The FDS is normally written by the supplier as part of the supplier response although further revisions may be prepared in conjunction with the user. The FDS links to operational qualification (OQ), which tests all the functions specified.

10.4 A table giving suggested sections and sub-sections that can be included in the FDS is available in Appendix 6

Recommendation:

- A FDS should be written when purchasing large, multi-functional process, equipment, facilities or systems

11. Validation Process:

Each part of the validation process should be documented. There should be a written plan for performing each validation to specify who is responsible for managing and performing the various validation tasks such as production of validation protocols and approvals of validation documentation. Validation protocols should be written for each phase of the validation to include acceptance criteria. The validation plan and the validation protocols may be combined into a single document. The outcome of each phase of validation should be recorded and the overall conclusions, with a scientific assessment of any failures should be documented in a validation summary report. The validation records and summary report must be reviewed and approved before putting the process or system affected into use.

11.1 Validation Plan

11.1.1 The plan should first identify:
- What is being validated
- where the validation will take place
- why the validation is taking place providing reference to any relevant change control records, risk assessments, URS and FDS.
- the validation stages required
- validation time-frames

11.1.2 The plan should also identify the validation team and define responsibilities for:
- overall management of the validation
- production of protocols
- performing the validation and recording the outcome
- reviewing and approving the protocols and validation records
- reviewing the validation outcomes and signing off the validation as acceptable.
11.1.3 The review, approvals and sign-off should be assigned to a senior member of staff who is independent of those performing the validation tasks.

An example of a validation plan is available Appendix 7

11.2 Validation Protocol

11.2.1 A validation protocol is an integral element of the validation plan. The protocol describes:

- the qualification/validation phase (IQ, OQ, PQ or method process validation)
- that tests will be performed
- the test procedures
- the objectives of the validation in terms of acceptance criteria for each test
- records to be completed.

11.2.2 What needs to be tested, how many tests to do and the acceptance criteria at each validation phase will be specific to each validation and must be founded on the scientific and technical basis of the processes and systems involved. It should be possible to establish the specific requirements by reference to the relevant risk assessments, URS, FDS, published standards, regulations & guidelines.

11.2.3 Validation record proformas should be completed as part of the protocol and approved along with the protocol.

11.2.4 The phases of qualification for process, equipment, facilities or systems are:

a. **Installation Qualification (IQ)**

   This involves verification of good engineering practice in installation of equipment, and should consider electrical safety, safety issues, location siting, maintenance/calibration schedules and should confirm that the installation has been carried out as specified with the appropriate supporting documentation. This activity can be delegated to the supplier, provided that the content of the IQ document is approved in advance by the laboratory.

b. **Operational Qualification (OQ)**

   This is the verification of process, equipment and facilities over its operating range and is assessed against the specifications as defined in the URS. During this stage, a range of tests will be carried out to demonstrate the integrity and functionality of the system, including the ability to operate under worst case conditions. Confirmation that all calibration, operating and cleaning processes have been defined and tested will be required. Definition of the required programme of planned preventative maintenance (PPM)
should be considered. OQ can be carried out by the supplier and/or by laboratory, or a combination of both. In any case, this must be performed using an agreed OQ protocol.

c. **Performance Qualification (PQ)**

This is performed to demonstrate that the process, equipment or facility performs as required under routine operational conditions and as defined in the URS. This is sometimes referred to as Process Validation and is the stage of the exercise when the equipment or process is assessed in its practical application, with operational outputs/product being assessed for acceptability.

11.2.5 Following the qualification of process, equipment and systems full process or method validation may be desirable, which involves a period of routine operation

11.2.6 Examples of applications of the IQ, OQ and PQ portion of the testing are available in Appendix 8 and 9 and these identify the component parts of the qualification and an example of the validation protocol document.

An example of each phase of the qualification (IQ, OQ and PQ) is available in Appendix 10

11.3 **Validation Records:**

11.3.1 The outcome of the various validation tests described in the protocol must be recorded at the time the tests are performed.

11.3.2 The Validation record pro-formas or test scripts should be used for recording the outcomes.

11.3.3 When the testing for each validation phase is complete the result must be reviewed and a summary report produced. The summary report should confirm that acceptance criteria have been achieved and provide the overall conclusions.

11.3.4 There should be a scientific assessment of any failures.

11.3.5 At the end of each phase, the validation/qualification records and summary report must be reviewed by the appointed responsible person and the decision regarding the acceptability of the validation recorded.

11.3.6 Records should be maintained for minimum of the life of the validated process/equipment etc.

11.3.7 An example of a validation report is available in Appendix 11.

**Recommendation:**
• Each stage of the validation process should be fully documented, reviewed, authorised and “signed off”
• There should be a formal review of each stage of validation and documented approval before proceeding to the next stage

12. Implementation

12.1 Documentation
All the documentation which is part of the validation process should be maintained by the document control system and retained for a minimum of 15 years or the life time of the process, equipment, facilities or systems, whichever is the longest. SOPs should be written and authorised prior to the equipment/method/system being brought into routine use.

12.2 Training
All staff who may be involved in using the equipment that has been qualified or the system validated must be trained before using the former. Training and competency assessments should be completed and the records kept.

12.3 Validation Final Summary Report
A Validation Summary Report that cross-references the qualification and/or validation protocol should be prepared, summarising the results obtained, commenting on any deviations observed, and drawing the necessary conclusions, including recommending changes necessary to correct deficiencies. Any changes to the plan as defined in the protocol should be documented with appropriate justification. This report should be cross referenced to the change control document and the quality risk assessment matrix.

Retention of all records and documents from the validation/qualification should be retained and easily available to reconstruct the entire validation history.

The whole process should be reviewed, each step formally authorised and “signed off” before accepting into routine use.

12.4 Maintaining the validated state
It is imperative that the information which has been collected at the PQ stage of the validation process is used to determine how the maintenance of the validated state can be attained. The VMP must also be updated to account for any new process, equipment, facilities or systems. Issues for consideration should include:

• maintenance
• cleaning schedules
• internal quality controls
• manufacturer’s instructions
• software/hardware upgrades

12.5 Revalidation
Revalidation should be determined and included in the VMP. Revalidation may occur when no changes, upgrades have occurred and therefore may not require change control to be undertaken. The timescale for revalidation should be clearly indicated in the VMP e.g. annual revalidation of transport boxes
13. List of Appendices
The appendices to this guideline have been compiled as a separate document that can also be downloaded from the BCSH website.

1. Information to be included in the Validation Master Plan (VMP)
2. Example of a VMP currently in use in an NHS Hospital
3. Change Control Request Form
4. Specifications of what could be included in a User Requirement Specification
5. Example of a User Requirement Specification
6. Specifications for inclusion in FDS
7. Example of a Validation Plan
8. Installation Qualification, Operational Qualification and Process Qualification
9. Example of Validation Protocol
10. Example of a qualification Proforma
11. Validation sign off report

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15. References


3. The Blood Safety & Quality Regulations 2005 No. 50 as amended (the principal Regulations) were signed by authority of the Secretary of State for Health, as were the amending Regulations (SI 2005/1098, SI 2005/2898, SI 2006/2013 & SI 2007/604).
   [http://www.opsi.gov.uk/stat.htm](http://www.opsi.gov.uk/stat.htm)

4. ISBT – Guidelines for validation and maintaining the validation state of automated systems in blood banking. *Vox Sanguinis* (2003) 85 (Suppl. 1), S1–S14


8. CPA 2007. Standards for Medical Laboratories
