Validation.

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What do we mean by validation?

“The establishment of documented and objective evidence that the particular requirements for a specific intended use can be consistently fulfilled”

Statutory Instrument 2005 No. 50
The Blood Safety and Quality Regulations 2005
Guidelines

- BCSH guidelines
  - Recommendations for evaluation, validation and implementation of new techniques for blood grouping, antibody screening and cross-matching (1995)


Guidelines

- ISBT guidelines
  - Guidelines for the Validation and Maintaining the Validation State of Automated Systems in Blood Banking Version 1.1

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‘CPA Requirements’

• F1 Selection and validation of examination procedures
  – All procedures shall be validated prior to introduction
But haven’t we always done this before?
What we used to do

- Have a look at systems see which we prefer (get them into the lab to try (if we were lucky!))

- Test the system using some patient samples
  - Difficult cases
  - Complex antibodies
  - Weak antibodies
  - Normal samples

- Purchase system

- Train staff to use it – Document this?

- Put into operation
What’s right with that?

• In general serological validation has been already done by the manufacturer

• The relatively small number of samples we put through give us ‘extra’ confidence that it is doing what we expect re:

  – Blood grouping
  – Antibody detection
What’s wrong with that?

• There are many other aspects to validation than just the serology

• Have we assessed **all** the potential risks

• Have we checked all the machines functions

• What about transfer of data from LIS to automation and back again
A thought?

- Serological validation showed that the machine could detect the patient’s weak anti-M

- Serological validation did not show that the interface changed the patient’s blood group from an O Pos to an A Pos

- Which was more important?
What does full validation involve?
When should we do this?

• When a new process or equipment is to be performed or used in the laboratory

• When there is a change to the current process or equipment (e.g. software upgrades)
System selection

- Based on how well supplier meets user requirements
- Get systems in to try out
  - We had 4 systems demonstrated in the Lab
    - DiaMed
    - Biotest (TANGO)
    - IBG (Galileo)
    - Ortho (AutoVue)
System selection

• Staff asked to rate each system
  – Weighted scoring system for 27 parameters: - e.g.
    • Quality control
    • Safety
    • Security
    • Throughput
    • Maintenance
    • Ease of use

• Based on how well supplier meets user requirements

• Financial Considerations
System selection

• Financial Considerations
  – One time costs
    • Installation
    • Licensing
    • Hardware and peripherals
    • Training

  – On-going costs
    • Support
    • Maintenance
    • Staffing
    • Consumables
Risk Assessment

• Process for determining acceptable risks

• Allows maximising of testing resources through better / smarter testing

• Looks at critical points in software

• Need to assess risks
  – High (risks intolerable)
  – Medium (risks are undesirable)
  – Low (risks negligible)
Risk Assessment

• Critical Areas
  – Serological
    • ABO and RhD grouping
    • Antibody screening
  – Operational
    • Does the machine do what it is supposed to?
  – IT (interface)
    • Transfer of patient and request information from LIS to AutoVue
    • Transfer of patient and result information from AutoVue to LIS
Validation

- Training
- Validation protocols (Test cases)
- Testing
- Continuity plan
- Problem resolution
Serological Validation

- We tested one weeks’ (5 days) samples in parallel with our existing system on each site (distributing samples equally between the machines) Approx 1500 – 2000 samples
Serological Validation

• ABO & RhD grouping
  – at least three examples of each of the following
    • O Pos, O Neg, A Pos, A Neg, B Pos, B Neg, AB Pos, AB Neg.
    • R1r cells
    • RhD weak
Serological Validation

- Antibody screening
  - Patient’s samples containing anti-D, C, c, E, e, Fya, Fyb, K, Jka, Jkb, S or s
  - Weak antibodies (titrated from neat to 1 in 4)
    - 0.1iu/ml anti-D (NBS reagent)
    - Weak anti-c (NBS reagent)
    - Weak anti-Fya (NBS reagent)
Serological Validation

- Samples for the following patient groups
  - Neonates
  - Geriatric patients
  - Haematology patients
  - BMT patients
  - Solid organ transplant patients
  - Different ethnic groups

- A range of sample ages (1 to 6 days old)
Operational Validation

- Produce a list of test cases based on how you use the machine:
  - Testing that the machine does what it is supposed to: - e.g.
    - Batch creation
    - Batch deletion
    - Storing results
    - Producing audit reports (reagents used etc)
    - Saving cassettes
    - etc
Operational Validation
Using the Ortho AutoVue® System validation guide
Using the Ortho AutoVue® System validation guide

• Large document – 497 pages plus appendices, 171 Test cases

• Deals with testing the functionality of the AutoVue

• Only need to perform the test cases that relate to the way you are using the machine

• Most of the test cases are covered in the training – and can be documented at that time
IT Validation

• Transfer of Data between LIS and AutoVue via a bidirectional link

• Produce a set of test cases
  1. Does patient data transfer to AutoVue
  2. Does test results transfer across to LIS correctly
  3. Do critical results get highlighted / held
IT Validation

- Does patient data transfer to AutoVue
  - name, hospital number, date of birth
  - Sample number
  - Request

- Does test results transfer across to LIS correctly
  - The test cases chosen in this section are done so to reflect a full range of ABD blood groups and a full range of antibody screening result patterns with the screening cells used.

- Do critical results get highlighted / held
  - Positive antibody screens
  - Current group does not match previous group
  - Positive Direct Antiglobulin tests
  - Previous known antibodies
Problem Resolution

- Highlight
- Evaluate (Risk decision)
  - High risk
  - Medium risk
  - Low risk
- Investigate
- Resolve
- Retest
Problem resolution

HAVE YOU TAKEN THE LIDS OFF THE SAMPLES?
ARE YOU SURE?
Final Report and Review

• Checks that
  – Validation data complete
  – Documentation complete
  – Training requirements met
  – Non-conformances resolved

• Outcomes
  – Release
  – Conditional release
  – Do not release
Operation

- Validation review and sign off complete
- Implementation date
- SOPs / System instructions
- Validation state maintenance in place
Validation state maintenance

- Assures that the system continues to be usable
  - Calibration and monitoring
  - Preventative maintenance
  - On going training
  - Periodic review
    - Audit of equipment
    - Audit of procedures
  - Performance monitoring
    - Quality control procedures
Summary

- Validation assures you that your system is working as it should
- It will largely eliminate problems in the future
- You’ve got to do it!!
  - Requirement of CPA and the Blood Safety Regulations