

Zooming in on laboratory errors

UK NEQAS for Blood transfusion Laboratory Practice

Clare Milkins, Scheme Manager

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What is EQA?

External assessment of results from a group of laboratories, where each laboratory tests identical specimens of 'known' but undisclosed content.



Purpose of UK NEQAS

- Monitor performance
 - Inter-laboratory - individual participants
 - Overall
 - Comparison by techniques etc.
- Provide advice and guidance
- Education through exercises, reports and meetings
- Promote high standards of practice
- Inform national guidelines

SHOT – actual errors

EQA – potential for error



Near miss



BTL P

Antibody screening

Red cell
phenotyping

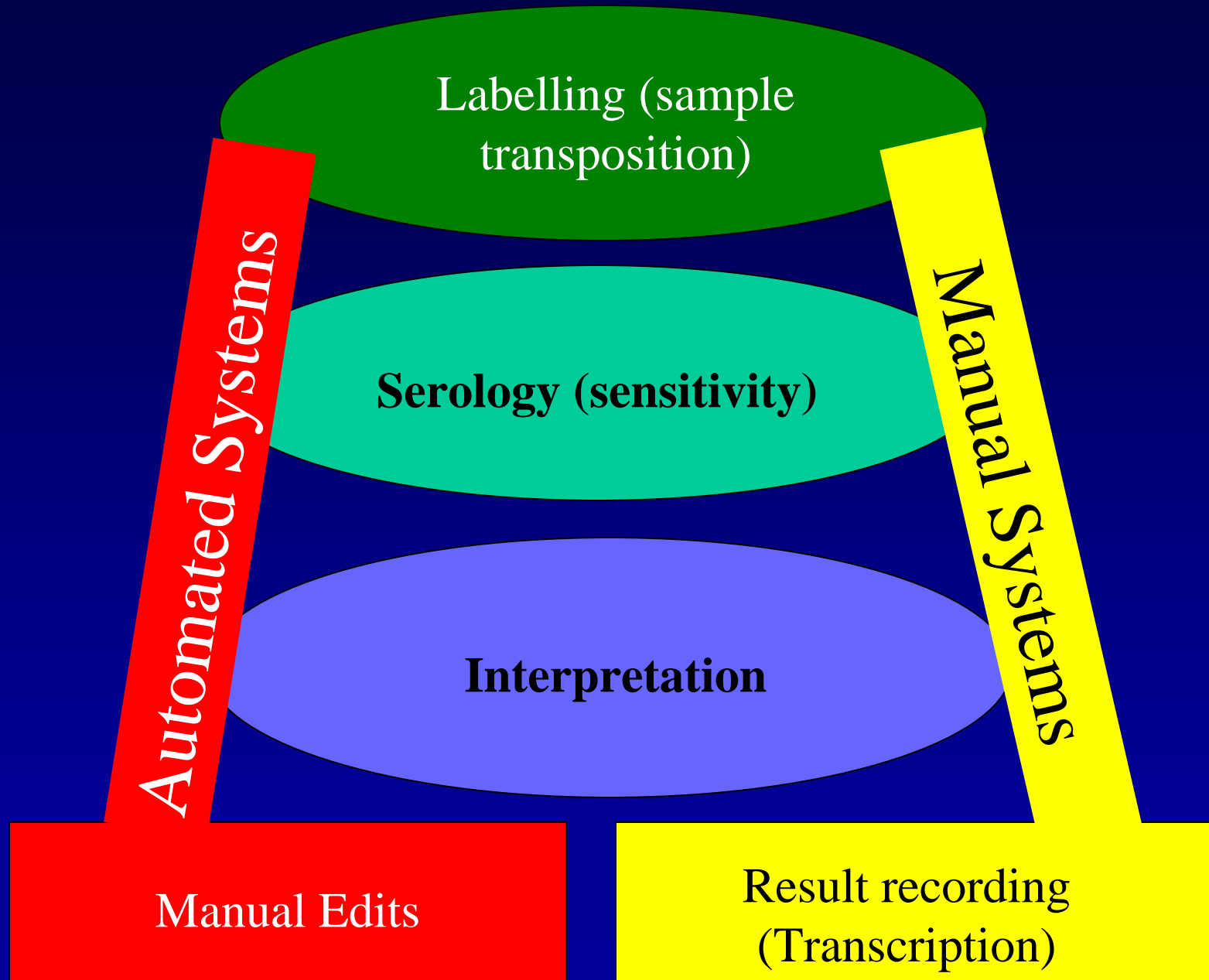
ABO/D
typing

Emergency testing

Crossmatching

Antibody
identification

Practice (through
questionnaires)



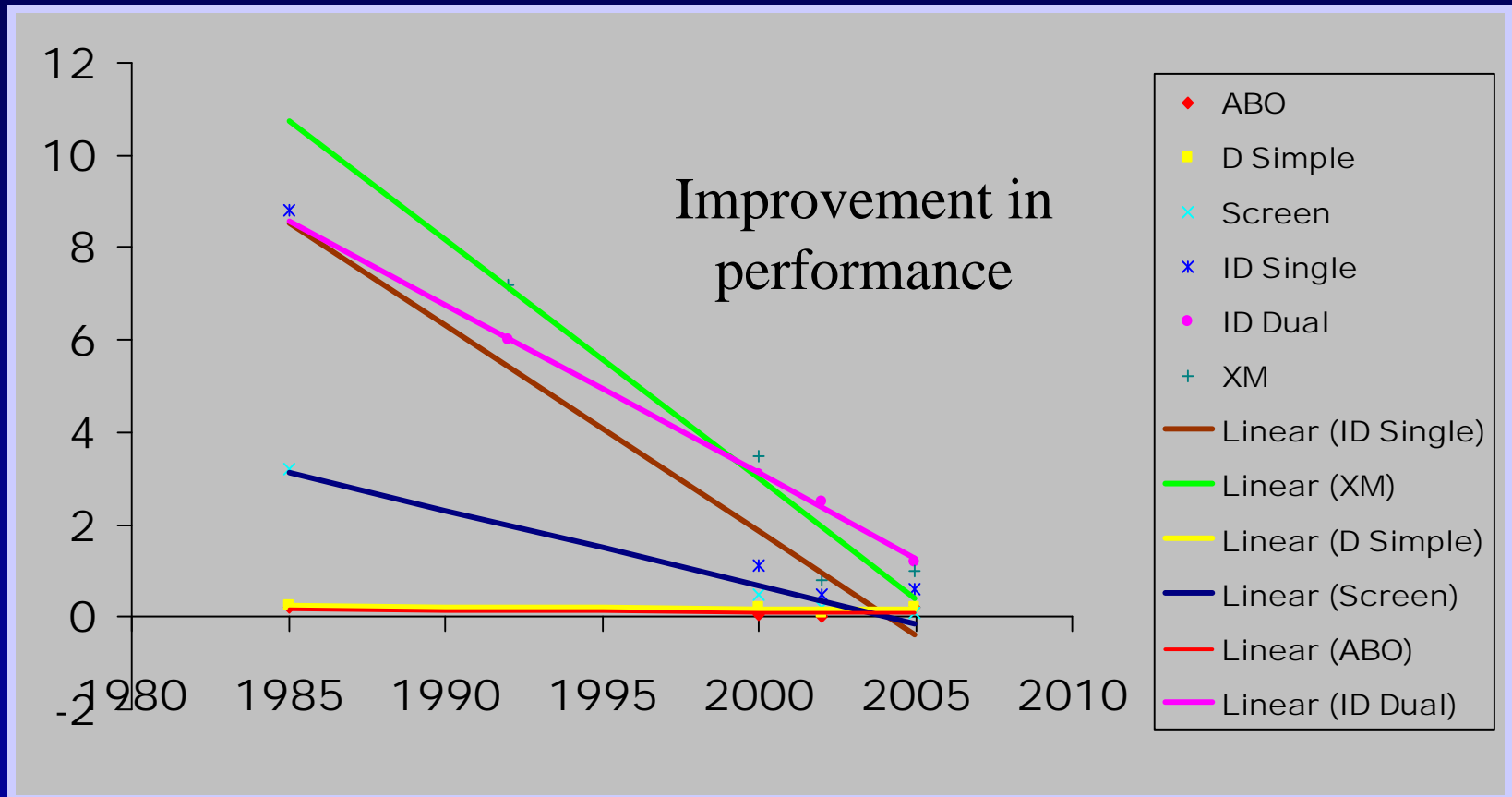
Unwanted area of assessment

EQA induced errors

Form filling

Non-standard testing protocols

UK NEQAS Error Rates (UK)



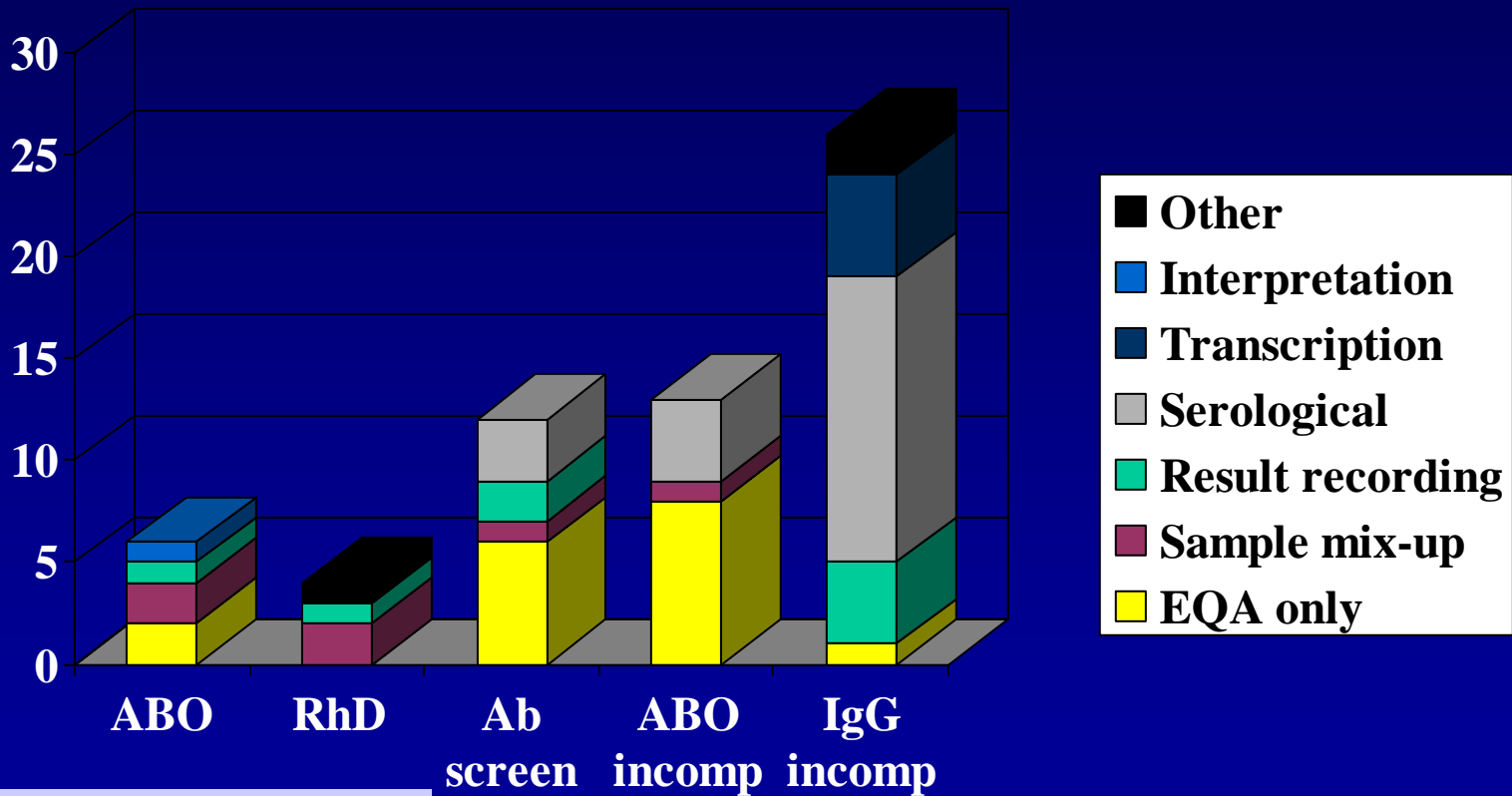
Improvement in performance

- Quality of reagents
- Automation
- BCSH guidelines
- Quality systems
- EQA

EQA errors 2006

- Demonstrate errors in all aspects

Number of errors by category in UK - 2006



64 Ab ID errors

Summary of Causes

- STAFF RESOURCES

- “Insufficient staff”;
- “Reliance on agency staff”
- “Poor skill mix” - want all BMS staff to participate in recognised BT training scheme

- TRAINING

- “Policy in place, but BMS did not follow it”
- “More in-house training and competency assessment required”

Summary of Causes

- KNOWLEDGE
 - Interpretation
 - Understanding of reagents and test systems
- UNSAFE POLICIES AND PROCEDURES
 - Manual back-up procedures thought through?
 - Outwith guidelines

Human Error

Two Examples

RhD grouping of a rr DAT
positive sample

Selection of blood in an
emergency situation

Example 1

RhD grouping of a rr DAT
positive sample

DAT+ rr sample – 07R8

- A D negative rr cells coated with anti-c (2-3+ DAT)
- 16 UK participants (3.5%) recorded D positive or D variant (weak or partial D)

DAT+ rr sample – 07R8

- All used BioVue anti-D reagent potentiated with sufficient PEG to give a false positive result
- 11 used full automation
 - All brought forward for review
 - 9 undertook confirmatory testing
 - 2 edited results to positive
- All recorded a positive reaction with the control reagent at least retrospectively

Confirmatory testing

- Five used ABD/ABD cassettes
 - Potentiated and no control
- Four (+ one above) used saline reacting IgM monoclonals in tubes
 - Four non repeatable false positives
 - One transcription error!

Incorrect interpretation - causes

- Latent conditions
 - Potentiated reagents
 - Reagent control giving weaker reactions
- Knowledge
 - Significance of pos control
 - Interpretation of D pos based on a wk or MF reaction
 - Understanding of test system
- Training
 - Policy for confirmatory policy not followed
- Policies and procedures
 - Using same/similar reagent for confirmatory testing
 - Editing cell group on automation
- Human error
 - Over-reading of confirmatory tests

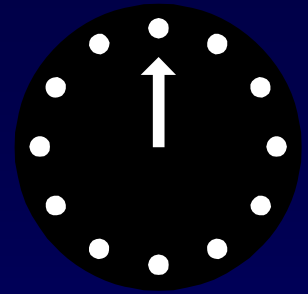
Example 2

Selection of blood in an
emergency situation



06R5 – UK NEQAS Emergency Exercise

The aim of this **non-scoring**
emergency exercise and
associated questionnaire was to
establish
**what pre-transfusion testing is
performed when blood is
requested in an emergency
situation**



SCENARIO

- You're on your own in the laboratory at midnight
- Three family members arrive in your emergency room following a car accident
 - **Clark** (38 M) has internal injuries and requires 2 units of red cells for theatre in 10 - 15 minutes of sample receipt, and may need more later
 - **Jenny** (40 F) has leg fractures and requires 2 units of red cells for theatre in 1 hour from receipt of sample
 - **Dalila** (14 F) requires a group and save but may need blood for theatre in the morning



ABO and D Group

Using a rapid technique

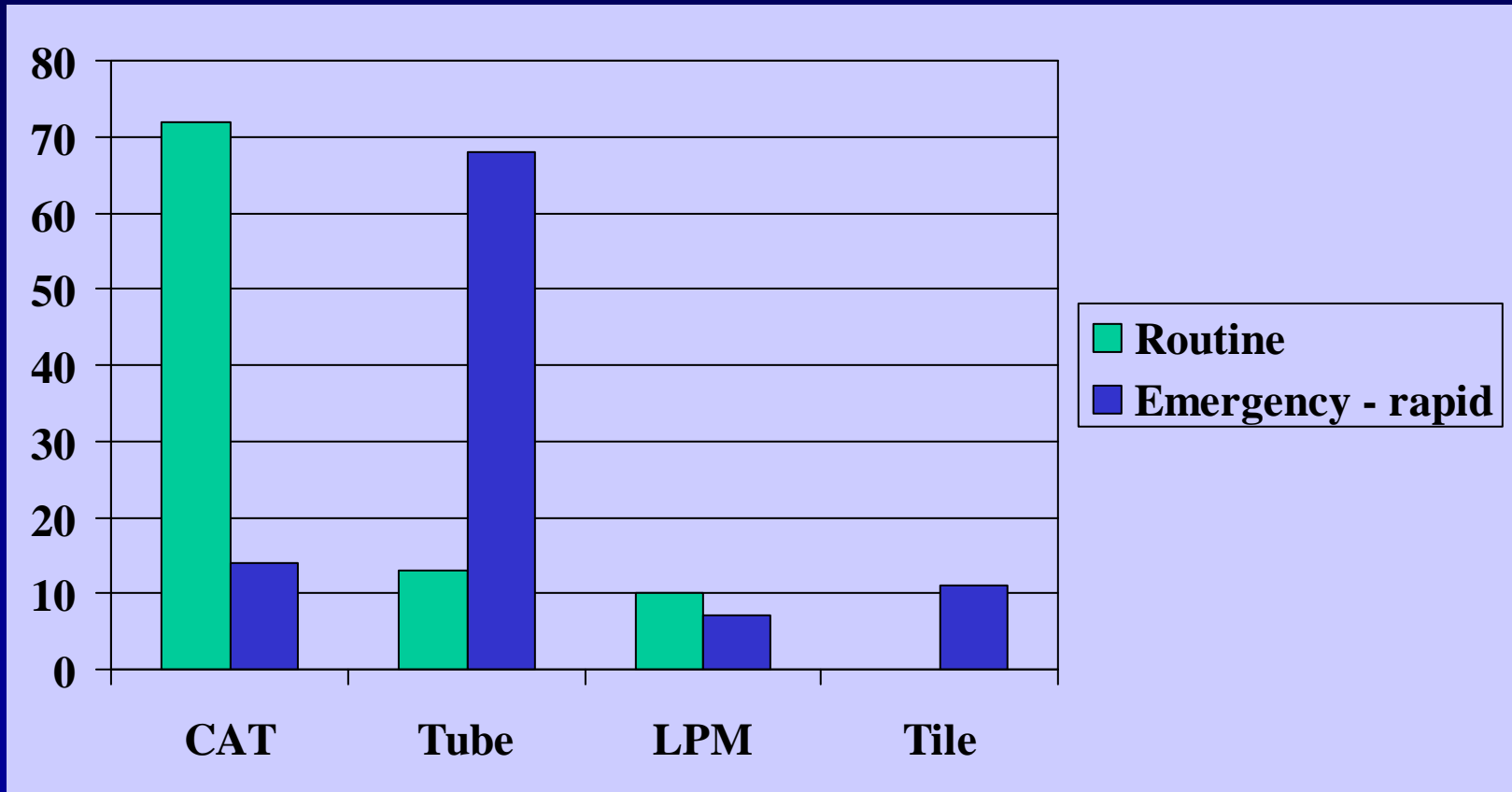
- Cell group must include testing with anti-A, anti-B and anti-D
- Appropriate controls should be included

Confirmation before ABO matched blood is issued

- Either a reverse group (resample)
- Or repeat cell group (resample)
- Or an immediate-spin crossmatch

A 2nd shot at testing the right sample

ABO Grouping techniques



Clark (40 yr old Male) - Group within 10 -15 minutes

- No group: 4% - all gave O D negative
- Initial group: 96%

Further testing prior to issue

- 46% cell group only
- 394 O pos, 1 A pos
- 59% 2nd group
- 45% I/S xmatch
- 63 (16%) did neither
 - 25 did a cell group only, no control or auto
 - (3 checked the donor groups)

But 26 (12%) used the same aliquot

This included the lab that got it wrong – A D pos was selected for transfusion



“Jenny” (40 yr old female)

- A D negative with anti-D

- One hour available for testing but 9% of laboratories selected group **O D negative** (rather than A red cells)
 - all of these completed blood grouping, antibody screening and IAT crossmatching
- 90% selected group specific **A D negative**
- One selected **A D positive blood**
 - Used anti-A,B instead of anti-D

Conclusions

- EQA highlights potential for error
 - ‘free’ lesson
- Identifies weaknesses in test systems
- Demonstrates problems with resources, knowledge and training
- Supports and informs BCSH guidelines