UK NEQAS
Blood Transfusion Laboratory Practice

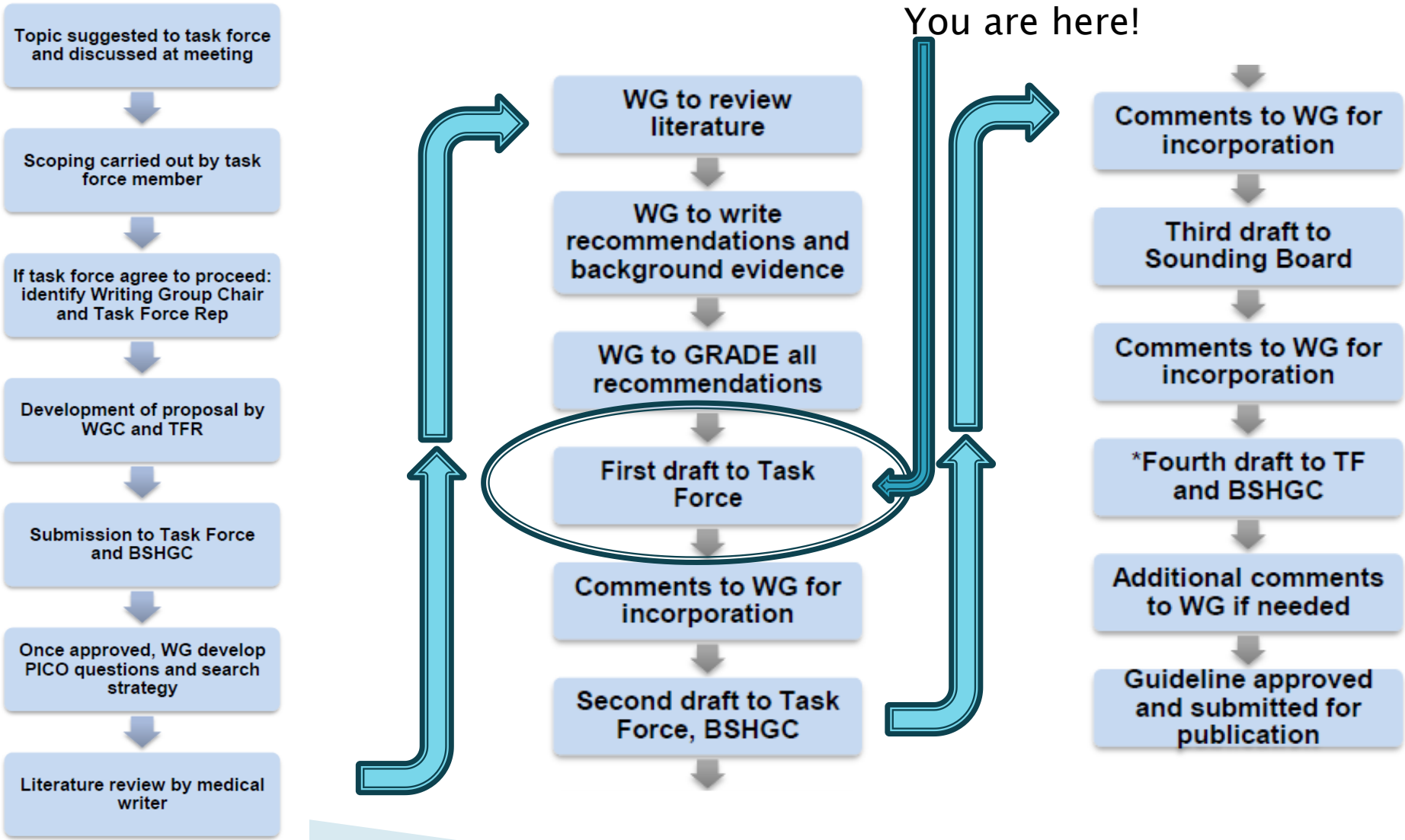
Compatibility Guideline update

Richard Haggas
Director UK NEQAS BTLP
Chair of BSH Writing Group For Pre-Transfusion Compatibility Guidelines

Summary

- The BSH Guideline Process
- The BSH Writing Group
- Feedback received regarding the previous guidelines
- What are we suggesting changing / clarifying

The BSH guideline writing process



Writing group

- Richard Haggas – Director UK NEQAS BTLP (Chair)
- Sue Robinson – Consultant Haematologist, Guys and St Thomas' (TTF Rep)
- Jennifer Laird – Consultant Haematologist, SNBTS
- Chris Elliott – Laboratory Manager, James Cook Hospital (now at NHSBT)
- Mark Williams – Head of Reference NHSBT (now retired)
- Tracey Tomlinson – Reference Lab Manager NHSBT (now in PBM at NHSBT)
- Nicola Polley – Laboratory Manager Rhyl (now at Haemonetics)
- Michael Makele – Pathology Quality Manager, Kings College Hospital

Disclaimer

- As the new guideline has four more reviews and redrafts to go through there is no guarantee that any of the following will still be in the final version.

Feedback on 2012 guidelines

- Main issues raised by guideline users
  - Controls
    - Automated crossmatch controls – UKAS findings
    - Immediate spin crossmatch controls
  - Storage of samples / Sample timing
    - Shared care
  - Gender identity
  - BMT / PBSCT patients
    - Previous allo antibodies
    - Passenger lymphocyte syndrome

Indirect feedback / queries received at UK NEQAS

- Clarification on rules for electronic issue
- Clarification on D typing
- Clarification on rules for antibody inclusion / exclusion

Structure

1. Organisation of the guidelines
2. Quality management in pre-transfusion testing
3. Samples and documentation
4. ABO and D grouping
5. Antibody screening
6. Antibody identification
7. Selection and issue of red cells
8. Testing and red cell issue in non-routine situations
9. Post issue of blood components

2012

1. Organisation of the guidelines
2. Quality management in pre-transfusion testing
3. Samples and documentation
4. ABO and D grouping
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7. Selection and issue of red cells
8. Testing and red cell issue in urgent situations (including concessionary release)
9. Actions to be taken after issue of red cells

New

2. Quality Management section

- Move all quality control into this section and out of the individual sections

- Automated Crossmatch control added
  - Frequency to be same as antibody screen controls
  - Use of a segment of a D positive donation (preferably hemizygous) vs. weak anti-D

- Checked for issues related to ISO 15189

3. Samples and Documentation

- Added
  - *Request and sampling guidance including minimum requirements and sample acceptance criteria is detailed in the administration of blood guideline (BSH 2017). The administration of blood guideline also details training and competency requirements in the UK by country including theory, training and knowledge assessment and practical observed competency assessment.*
  - *If there is an IT system used as part of any processes, this should be compliant with the IT Guidelines (BSH)*

4. ABO and D grouping

- Removed QC section – now in section 2

- Added
  - *Fully automated systems should be used where possible to reduce the risks of interpretation and transcription error. SHOT data (SHOT, 1996 – 2021) has demonstrated that the vast majority of ABO grouping errors occur in manual systems, and the UK Transfusion Laboratory Collaborative recommends the use of full automation for all but the smallest laboratories (Chaffe et al., 2014). Laboratories not using full automation at all times, should have assessed the risks associated with manual testing.*

  - *Prediction of ABO phenotype based on molecular methods is not currently recommended.*

  - *It should also be noted that some column agglutination technology (CAT) card/cassette profiles will give the wrong group if read in the wrong orientation; an example is shown in Fig. 2. Use of a card/cassette reader will remove this risk.*

5. Antibody screening

- Removed QC section – now in section 2

- Discussed Kp^a and C^w – should they be on the screening cells?
  - C^w not generally considered significant.
  - Anti-Kp^a – Looked at SHOT reports and not caused any serious reactions so felt current guidance adequate.

  - Need for awareness of carry-over (strong antibodies e.g. monoclonal antibody therapies)

6. Antibody identification

- *Antibody specificity should only be assigned when the plasma is reactive with at least two examples of reagent red cells expressing the antigen and non- reactive with at least two examples of reagent red cells lacking the antigen.*

- *Where an antibody specificity is suspected but cannot be positively identified under the above criteria, antigen negative red cells should be issued until confirmation or exclusion of the specificity is determined.*

- *The exclusion of additional antibody specificities can be demonstrated by choosing cells that are antigen negative for the recognised specificity, but antigen positive for other antigens to which clinically significant antibodies may arise.*
- *Failure to recognise all of the antibody specificities within a sample may lead to a haemolytic transfusion reaction (SHOT, 1996 – 2021). In particular, the presence of anti-c, anti-Jk^{a}, anti-Jk^{b}, anti-S, anti-s, anti-Fy^{a} and anti-Fy^{b} should be excluded using red cells having homozygous expression of the relevant antigen.* ***A single example only of each phenotype is sufficient for exclusion.***

- Considered whether anti-M should be excluded using homozygous cells, but no haemolytic transfusion reactions due to anti-M reported to SHOT

7. Selection and issue of red cells

Saline spin crossmatch

- *Commonly known as the 'immediate spin' crossmatch, the saline spin crossmatch is now rarely used as a routine compatibility test. It is used mainly as a rapid means to detect ABO incompatibility in exceptional circumstances.*
- *It cannot be relied on to detect ABO incompatibility in patients with weak anti-A or anti-B*
- *It is not a suitable substitute for an IAT crossmatch because it does not detect incompatibility due to IgG antibodies.*
- *It should not be considered a suitable safe alternative to electronic issue*

Patients of child-bearing potential <51 years of age should receive K negative red cells unless serologically contraindicated (e.g. patients with anti-k) or they are unavailable in an emergency (Lee & de Silva, 2004; BSH, 2006a).

7. Selection and issue of red cells

SCD, Thalassaemia etc

- Referencing other guidelines where they exist

- BSH guidelines on red cell transfusion in Sickle Cell Disease, Davis et al 2016

- *Position paper on International Collaboration for Transfusion Medicine (ICTM) Guideline 'Red blood cell specifications for patients with hemoglobinopathies: a systematic review and guideline'* Sara Trompeter, Edwin Massey, Susan Robinson, on behalf of the Transfusion Task Force of the British Society of Haematology Guidelines Committee Jan 2020

8. Testing and red cell issue in urgent situations (including concessionary release)

- *It is recommended that testing used in urgent situations should be the same as for routine testing. If there isn't time to complete routine testing before red cells are needed: -*

Selection and issue of red cells

- *If a forward group has only been performed as a rapid group, at least one the following should be performed before issuing group specific red cells:*
  - *A second group on a new aliquot from the patient's sample (either full group or cell group)*
  - *Comparison to a historic group on the LIMS*
  - *A saline spin crossmatch*

8. Testing and red cell issue in urgent situations (including concessionary release)

- *The urgent provision of blood components is vital for life-threatening situations. There is a balance of risk between the provision and transfusion of uncrossmatched red cells and the delay in completing compatibility testing in life-threatening situations, Undue delay can cause harm to patients*

- ***The system for concessionary release should include situations where red cells need immediate issue***

- *Where it is not possible to obtain red cells meeting special requirements for a patient there needs to be a process which identifies how to proceed in situations of urgent transfusion or where no red cells are available that meet the full requirement for that patient.*

9. Actions to be taken after issue of red cells

- Serological investigation of a suspected haemolytic transfusion reaction (HTR)
- Processes and rationale for investigating suspected haemolytic transfusion reactions need to be robust. SHOT data shows that many reactions are under investigated.

- Serological investigation of HTRs should concentrate on looking for possible blood group mismatches and/or atypical antibodies. The exact testing requirements will vary depending on whether the reaction is acute (immediate) or delayed. Full serological investigation is only warranted where there is evidence of haemolysis, either clinical, e.g. post-transfusion fever and jaundice, or laboratory based, e.g. falling Hb, raised bilirubin or LDH.

- The use of serum samples is recommended wherever possible for the post-transfusion antibody investigation in order to identify weak antibodies (e.g. anti-Jk^a), which might only be detectable by the complement they bind to red cells. The post-transfusion antibody screen should involve a polyspecific (IgG and C3) antiglobulin reagent if serum is used.

- Investigation of an acute haemolytic reaction should begin with the following:
  - Rechecking of the pre-transfusion sample label and the crossmatch labels, which should match the post-transfusion samples.
  - Visual inspection of the transfused packs to look for signs of deterioration (haemolysis or discolouration); **if this is found it may indicate bacterial contamination and contact with the supplying blood centre done immediately to discuss the return of the implicated red cells and investigations required.**

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Some things we decided to not include

- Looking up patient records on SpICE.
  - UK wide guideline and SpICE only available in England

- Control for immediate spin crossmatch
  - Needs weak anti-A / B – not sure there's a standard out there

Acknowledgements

- Writing group
- BSH Transfusion Task Force
- UK NEQAS Participating laboratories

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International Quality Expertise

Thank you

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