Crossmatch (Request for Red Cells, Patients > 4 months)

Purpose

This process describes how to process TRANSFUSE orders for red cells products on patients over 4 months old.

Policy Statements

- Compatibility testing is required for all red cell products, including granulocytes, on all potential transfusion recipients ≥ 4 months of age. Compatibility testing options:
  1. Electronic crossmatching
     Sunquest checks for electronic crossmatching eligibility at the start of Blood Order Processing and Blood Product Issue, and when results in Blood Order Processing are filed.
     For a patient/unit order to be eligible for an electronic crossmatch, the following criteria must be met:
     - There must be two blood type resulted from grids in the system
       a. One of the blood types must be from the current specimen
       b. The other blood type can be a historic typing or a current re-type (ARC) performed on the same campus
     - There must be a completed antibody screen on the current specimen
     - The current antibody screen cannot be positive
     - The **Eligible for Electronic Crossmatch** field in the BAD file must be blank or set to Yes

     Electronic crossmatching will be blocked or removed if any of the following are true:
     - Laboratory personnel excluded the patient from electronic crossmatching in the patient's BAD file.
     - The current specimen is expired.
     - There are antibodies or antigens listed in the patient's BAD file.
     - The current blood type does not match the most recent historic blood type.
     - The qualifying battery is missing a required test, or testing is incomplete.
     - A disqualifying QA failure is generated.
  2. Immediate spin crossmatch, tube testing
     An immediate spin crossmatch will be performed:
     - For the allocation of red cell products during a Sunquest downtime including if a AHG crossmatch (tube or gel card) is required.
     - As an alternative to an electronic crossmatch for patients with no evidence or history of clinically significant antibodies.
  3. Antiglobulin crossmatch
     An antiglobulin crossmatch is required for all transfusion recipients who currently demonstrate or have a history of clinically significant antibodies.

- ABO grouping and Rh typing as well as testing for unexpected antibodies must be performed on each specimen collection prior to or in conjunction with compatibility testing for the crossmatch procedure to be considered complete. See TS 13.0 Emergency Release if testing cannot be completed.
- Red cell products must be allocated under the same accession number as the corresponding specimen workup. E.g. TYAS, HOLD.
  - Do NOT allocate units under a TRANSFUSE order.
  - Additional specimen collections must be tested under a new accession number.
- Products must be released from allocation within three calendar days from the date of the pre-transfusion testing specimen collection if the patient has been transfused or pregnant within the preceding three months or if history is uncertain.
  - Specimen expiration may be extended at the request of the physician if the patient is confirmed not to have been transfused or pregnant in the past 3 months.
    - Crossmatches may be extended up to 7 days at the discretion of the technologist.

- Crossmatches may be extended longer than 7 days at the discretion of the pathologist.

- All patients shall receive leukocyte reduced (pre-storage red cells).
  - Leukocyte reduced red cells are considered CMV safe.
  - Transfusion of Directed Donor units not collected as leukocyte reduced must be approved by the attending provider.
  - Autologous red cells do not need to be leukocyte reduced.
- Antigen negative red cell products crossmatched through AHG must be provided for patients with clinically significant antibodies. Refer to Appendix C.
- Chronically transfused patients (Thalassemias, Blackfan diamond, Sickle Cell) need RBCs ≤14 days old

Test Codes TRCG-Transfuse Red Cell Grp

Process

	Activity	Key Considerations	Related Document
1	Review the request for transfusion.	• Note the urgency of the red cell order. • Evaluate the amount of red cells requested to dosing guidelines or surgical blood order guidelines. • Evaluate the blood product request based upon the indication for transfusion to the patient diagnosis, symptoms, or current lab values. **If** / **Then** Appropriate → Proceed to step 3 Inappropriate → Consult with the patient care area or refer the request to the technical specialist or a pathologist as soon as possible.	TSf 03.0.6 Dosing TS Staff Surgical Red Blood Cell Ordering Recommendations TS 12.6 Analyzing Transfusion Appropriateness
2	Review patient order history in function BOP	• Determine if required pre-transfusion testing (ABO/Rh/AS) has been completed on a current specimen order (TYAS, HOLD, DCAS). Notify patient care area if testing is required. • Record the related pre-transfusion workup accession number on the TRANSFUSE order or attach the workup order slip • Record the patient's ABO/Rh, antibodies, attributes, problems, and pertinent comments on the patient's TRANSFUSE order.	TS 5.2 Blood Order Processing
3	Select product(s).	• Refer to Appendix A and Appendix C for red cell selection criteria. • Inspection selected red cell product(s). **If** / **Then** Product is not available on site. → Order as needed. Anticipate delay in product availability. → Notify patient caregiver.	TS 7.3 Blood Product Ordering-MBC TS 7.4 Blood Product Ordering-ARC

7	Select type of crossmatch and perform associated procedure.	• Refer to Appendix B.	
9	Evaluate results.	<table><tr><th>If</th><th>Then</th></tr><tr><td>Compatible</td><td>Prepare and allocate product(s) under the specimen pre-transfusion testing accession number or reserve product</td></tr><tr><td>Incompatible</td><td>Investigate and resolve</td></tr></table>	TSf 0.3.4.1 Reserve Tag TS 4.34 Investigating an Incompatible Crossmatch
10	Store product until issue.	Notify the patient care unit that the product is ready as needed.	TS 7.18 Storage of Blood Products
11	Extend to 7 days if requested by ordering provider.	Extend crossmatch in function BOP, under the patient specimen tab by entering the new expiration date in the Crossmatch Expiration cell.	

Must confirm that the patient has not been transfused or pregnant in the past 3 months.

Appendices

Appendix A: Selection of Red Cells for Crossmatch
Appendix B: Selecting Type of Crossmatch
Appendix C: Patients with Antibody(s) and Provision of RBCs

Approval Workflow

Transfusion Service/Medical Director

Historical Record

Version	Written/Revised by:	Effective Date:	Summary of Revisions
1	J Mumm	7/1987	Initial Version
2	J Wenzel	9/1991	
3	J Wenzel	9/1994	
4	J Wenzel	10/1997	Merger
5	J Wenzel	9/1999	
6	J Wenzel	8/10/2001	
7	J Wenzel	6/19/2009	New format
8	L Ziebell	8/01/2011	Deleted policy requirement of obtaining pathology approval to extend to 7 days. Added policy statement regarding performing an IS tube XM during Sunquest downtime. Added that ABO/Rh recheck must be performed on same campus for EXM. Corrected Appendix B by deleting Pos AS/Clinically insignificant Ab and allowing EXM Revised Appendix C regarding clinically insignificant Abs and xming and Ag negative requirements.
9	S Cassidy	12/01/2015	Added age requirement of RBCs for chronically transfused patients

Appendix A: ABO/Rh Red Blood Cell Selection Criteria

Patient	Unit Selection			
	1st choice	2nd choice	3rd choice	4th choice
Unknown or unable to determine	O Rh Negative			
O Rh Positive	O Rh Positive	O Rh Negative		
O Rh Negative	O Rh Negative			
A Rh Positive	A Rh Positive	A Rh Negative	O Rh Positive	O Rh Negative
A Rh Negative	A Rh Negative	O Rh Negative		
B Rh Positive	B Rh Positive	B Rh Negative	O Rh Positive	O Rh Negative
B Rh Negative	B Rh Negative	O Rh Negative		
AB Rh Positive	AB Rh Positive	AB Rh Negative	A Rh Positive	O Rh Positive
AB Rh Negative	AB Rh Negative	A Rh Negative	O Rh Negative	B Rh Negative

Transfuse group O Rh Negative red cells if patient type is unknown.

- Bone Marrow Transplant Recipients (BMT)

  In post-transplant situation when the bone marrow recipient and donor do not have identical ABO and Rh types, the recipient must receive blood products compatible to both the recipient and donor type. Consult with the Fairview University Medical Center Diagnostic Labs Blood Bank (612-626-5367) or Children's Transfusion Service Technical Specialist in blood selection.

  The patient / recipient may officially have the Blood Bank record changed from the patient's original type to the donor type and receive "new-type" products:

  a. If at least 120 days post-transplant and the patient is typing completely as the bone marrow donor type; i.e., no mixed-field front typing results, and no Anti-A or Anti-B that is incompatible with the donor type red cells.
  b. Patient has not been transfused for 120 days.

- Refer to the specific process document for the additional product selection information for the following:
  - TS 3.15 ECMO Oders
  - TS 3.16 Sickle Cell Patients Red Cell Orders
  - TS 3.17 iMRI Surgical Procedures
  - TS 3.18 Cardiac Surgery
  - TS 3.19 Units on Hold (Pre-procedure) Orders
  - TS 3.21 Exchange Transfusions, Patients < 1 year
  - TS 3.22 Exchange Transfusions, Patients > 1 year
  - TS 3.23 Massive Transfusion Events
  - TS 13.0 Emergency Release
  - TS 3.27 Directed Donor Products
  - TS 3.28 Autologous Products

Appendix B: Crossmatch Method

Select the appropriate crossmatch method from the table below.			Related Documents Title
If the patient's antibody screen is	**And there is a history of**	**Then crossmatch red cells by method listed below, following established procedures.**	TS 4.21 Compatibility Testing-Electronic Crossmatch TS 4.22 Compatibility Testing-IS Tube Testing TS 4.24 Compatibility Testing – AHG, Gel Testing TS 4.23 Compatibility Testing – AHG, Tube Testing
negative	***no*** clinically significant antibodies	Electronic crossmatch or IS Crossmatch- Sunquest downtime	
negative	clinically significant antibody(ies) *Note: Consult* **Appendix C**	Gel AHG Crossmatch or Tube AHG crossmatch	
negative	clinically insignificant antibody(ies) *Note: Consult* **Appendix C**	Electronic crossmatch *Note: The history of clinically insignificant antibody(s) must be removed from the Antigen/Antibody field of the patient's BAD file for an EXM. Change "Eligible for Electronic Crossmatch" from yes to no in the patient's BAD file. Please refer to procedure TS 5.3 Making changes to a blood administration record.* or IS Crossmatch- Sunquest downtime	
If the patient's antibody screen is	**Antibody Identification studies find a**	**Then crossmatch red cells by method listed below, following established procedures.**	
positive	clinically significant antibody(ies) *Note: Consult* **Appendix C.**	Gel AHG Crossmatch or Tube AHG crossmatch	
positive	clinically insignificant antibody(ies)	Defer to reference lab recommendation or consult with Technical Specialist. *Note: EXM will not be possible with a Antibody screen with a positive interpretation even if attributed to a clinically insignificant antibody.*	

Appendix C: Clinical Significance of Allo-antibodies and Provision of Red Cells

	History or Current Identification of Antibodies to the Following:	Is Antigen Negative Blood Required?	Is a AHG Serologic Crossmatch Required?
Clinically significant antibodies	D, C, E, c, e ,K, k, S, s, Jk^a, Jk^b, Fy^a, Fy^b	Yes	Yes
Clinically insignificant antibodies	M, N, P_1, Le^a, Le^b, Lu^a, A_1,	No*	Yes if reactivity seen at 37C or AHG * May require antigen negative unit if NOT crossmatch compatible
Potentially clinically significant antibodies	Kp^a, Wr^a, Js^a, Di^a, Co^b, C_w	No	Yes
	Antibody to the above low-incidence antigens plus pan-reactive warm autoantibody	Yes, if antisera available	Yes
Passive anti-D	D	Yes	Yes
Warm autoantibodies		Yes (reference lab determination is required)	Yes
Unidentified or in-conclusive antibody(ies)	All major blood group systems excluded	Not applicable	Yes