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Serologic Crossmatching of Red Blood Cells

Document Type: Procedure

I. PURPOSE AND OBJECTIVE:

This document will provide the Blood Bank staff with instructions for serologic crossmatching.

II. SCOPE:

A. There are numerous variations of serologic crossmatch procedures, but all have the goal of detecting incompatibility between the transfusion recipient and the intended donor. All serologic crossmatch procedures involve mixing patient plasma with donor red blood cells (RBCs). The immediate-spin crossmatch is ideal for detecting ABO incompatibility. However, if unexpected antibodies were historically present or are currently reactive, then the crossmatch must include the antihuman globulin (AHG) phase. The gel crossmatch is the standard serologic crossmatch.

B. A serologic crossmatch must be performed on all patients who are not eligible for electronic crossmatching, as determined in Transfusion Medicine policy, RBC Crossmatch Guidelines / *Criteria for Determination of Whether to Perform Electronic or Serologic Crossmatch*. In addition, a serological crossmatch must be performed during computer downtimes; see site specific Transfusion Medicine policy, Blood Bank Computer Downtime.

C. Gel crossmatches may be performed manually, as described in this document, or on the Ortho Vision™. Refer to Transfusion Medicine policy, Routine Testing on the Ortho Vision™ Analyzer for additional information.

D. The policies found in Transfusion Medicine policy, RBC Crossmatch Guidelines is referred to extensively through out this document and apply to both electronic and serologic crossmatching.

III. DEFINITIONS / ACRONYMS:

1. **BBIS:** Blood Bank Information System; Blood Bank Computer System
2. **Directed donor unit**: An allogeneic RBC donation intended for a specified recipient.
3. **Incompatible crossmatch**: Agglutination and/or hemolysis evident at any stage of the crossmatch test.
4. **LISS**: Low ionic strength solution.
5. **ABO/Rh Discrepancies**: An ABO or Rh discrepancy occurs when:
    a. The ABO or Rh of the current sample is not in agreement with the ABO or Rh of a historical sample, or ABO or Rh graded reactions are not valid, or
    b. Graded reactions do not yield a valid interpretation.
    c. For additional information, refer to the Results and Interpretation section of Transfusion Medicine policy, *Determining the ABO and RhD of Patients Who are at least Four Months Old*.
6. **Current sample**: A sample that was collected no more than 3 days before the current date. For example, if a sample is drawn on Monday (day 0), then the sample remains "current" all day Mon., Tues., Wed., and Thur.
7. **Designee**: A Blood Bank Technical Director or Blood Bank fellow.

IV. POLICIES:

A. Pre-Crossmatch Sample Labeling and Testing Requirements

1. Before serologic crossmatching may be performed several requirements must be met:
    a. Patient must have a current properly labeled sample.
    b. ABO/Rh Testing must be complete on the current sample.
        i. All patients must have two (2) complete, separate sets of ABO/Rh results in the Blood Bank computer before crossmatching or issuing type specific units to a non-group O patient.
        ii. Any ABO discrepancy must be resolved before crossmatching non-group O RBCs.
            1. If an ABO discrepancy remains unresolved and a RBC transfusion is necessary, then Group O immediate-spin (I.S.) crossmatch-compatible RBCs should be used.
    c. Antibody screen must be performed on current sample.
        i. If the antibody screen is positive then antibody identification studies must be performed and complete, if indicated.

B. Historical Record Check

1. A historical record check must be performed before RBCs are crossmatched as indicated in Transfusion Medicine policy, Historical Blood Bank Record Check. If a discrepancy exists between the current and historical results, the computer will warn the technologist. Any discrepancies must be resolved before crossmatching RBCs. To resolve the discrepancy:
    a. See Transfusion Medicine policy, *Resolution of ABO and RhD Discrepancies*.
    b. See Transfusion Medicine policy, Antibody Screening / *Comparison of Current Antibody Screen to Historical Record*
    c. Consult Blood Bank leadership, if necessary.

C. Policies Relating to Incompatible Crossmatches

1. Agglutination and/or hemolysis at any stage are considered indicative of incompatibility.
2. If a crossmatch is incompatible, then investigational studies may be required. If necessary, refer to Transfusion Medicine policy, Investigation of Incompatible Crossmatches.

D. Providing Incompatible RBCs / Physician Notification

1. If incompatible units must be transfused, then the ordering physician must be notified and approval must be received prior to releasing the units for transfusion. This approval should be documented with signature of the approving physician on the blood product dispense form. The notification should also be documented as a profile note in the BBIS. The note should include the notifying technologist, the date/time of notification, the physician or nurse accepting the notification.

E. Crossmatching Red Blood Cells Post-Issue

1. When RBCs are emergency issued, compatibility testing and a serologic post-issue crossmatch must be performed as soon as possible. The Blood Bank is required to document the completion of post-issue crossmatches for all units that were issued uncrossmatched and transfused to the patient. Post-Issue crossmatches are not required for units that are returned after issue.
2. In all cases in which post-issue crossmatches are indicated, they are performed by a serologic method. The standard post-issue crossmatch is an immediate-spin crossmatch. However, if the patient has a history or current indication of unexpected antibodies then an immediate spin crossmatch and antiglobulin crossmatch must be performed as directed in Transfusion Medicine policy, Policies for Providing Red Blood Cells to Patients with Unexpected Antibodies.
3. A serologic post-issue crossmatch must be performed for the first 12 RBC units issued and transfused under the massive transfusion protocol as described in site specific Transfusion Medicine policy, *Providing Blood Components for Massive Transfusion*. It is not necessary to perform a post-issue crossmatch for units dispensed after the first 12 under the massive transfusion protocol, unless the patient has a historical or current indication of unexpected

antibodies. In these cases, post-issue gel crossmatches must be performed on every RBC that is emergency issued, if possible.

4. All post-issue crossmatches are documented in the Blood Bank computer as described in the Transfusion Medicine Policy, Safe Trace (Blood Bank) Application; Adding Crossmatch to Emergency Issued RBCs
5. Unable to obtain a sample.
    a. If unable to obtain a Blood Bank sample for compatibility testing (e.g., patient expired), then the compatibility testing / post-issue crossmatch may be performed using a CBC sample.
    b. If unable to obtain a sample for compatibility the requested crossmatches may be canceled. Do not cancel any requested tests (e.g., the Type & Screen) until it has been reviewed by Blood Bank Leadership. Canceling tests prior to this may cause the transfused products and Medical Director consult to not interface to EPIC properly.
6. Incompatible post-issue crossmatches.
    a. Incompatible crossmatches are investigated as described in Transfusion Medicine policy, *Investigation of Incompatible Crossmatches*.
    b. If an incompatibility is discovered on completion of a post-issue crossmatch, the responsible physician must be notified in a timely manner and this notification documented on the communications log / board.
    c. The Blood Bank Medical Director or designee should be consulted immediately in the following cases:
        i. If the cause of an incompatible post-issue crossmatch cannot be determined.
        ii. If the investigation reveals that the patient who has a clinically significant antibody received red cells that are positive for the antigen corresponding to the clinically significant antibody. Refer also to Transfusion Medicine policy, Transfusion Reaction Investigation and Workup.
7. Post-Issue Crossmatches for Neonates
    a. If there are no maternal / neonatal antibodies, then a serologic crossmatch is not required post-issue. The NEO crossmatch is added to the crossmatch order that reflexes in the BBIS.
    b. If there are maternal or neonatal antibodies, then serologic crossmatches are performed.

        Refer to Transfusion Medicine policy, *Newborn Compatibility Testing Guidelines (Dearborn, Royal Oak, Troy)*.

V. SPECIMEN COLLECTION AND HANDLING:

The preferred specimen is a 6ml EDTA sample with affixed identifying label. See Transfusion Medicine policy, Triaging and Identifying Acceptable Samples for Testing, for acceptable alternatives.

VI. EQUIPMENT:

A. Tube crossmatch methods
    1. Table top centrifuge
    2. Lighted viewing mirror
    3. Heat block incubator
    4. Timer
    5. Automatic cell washer

B. Manual GEL crossmatch
    1. MTS incubator
    2. MTS centrifuge
    3. MTS Workstation
    4. Automatic or manual pipette

VII. SUPPLIES:

A. Tube crossmatch methods
    1. Commercial reagents
        a. Low ionic strength additive solution (LISS)
        b. Monospecific IgG anti-human globulin reagent (AHG)
        c. IgG coated check cells
    2. Normal saline
    3. 10 x 75 mm or 12 x 75 mm test tubes
    4. Segment processors
    5. Disposable pipettes

B. Manual GEL crossmatch
    1. MTS diluent 2
    2. MTS anti-IgG cards
    3. Pipette tips
    4. 12 x 75 mm test tubes
    5. Automatic or manual pipette

VIII. QUALITY CONTROL (QC):

A. Quality control of all reagents used in testing is performed as described in site specific Transfusion Medicine policy, *Quality Control of Blood Bank Reagents* and documented in the BBIS or on paper per site specific procedures.

B. Gel cards must be visually inspected before use. Do not use gel cards if the gel matrix is absent or if the liquid level in the microtube is at or below the top of the gel matrix. Do not use gel cards that show signs of drying, discoloration, bubbles, crystals, or other artifacts. Do not use cards if foil seals appear damaged or opened.

C. When testing by a tube AHG crossmatch method, check cells must be used if the reaction at the AHG phase is negative. The graded reactions of check cells are expected to react at any strength. If the check cells do not react as expected, the crossmatch is invalid and must be repeated.

D. A visual inspection is performed on RBCs at the time of crossmatch. If a technologist notices that any RBC is of questionable purity or quality, it will be discarded or placed into quarantine. Refer to Transfusion Medicine Procedure, Blood Product Quarantine or Discard.

IX. SUMMARY OF SEROLOGIC CROSSMATCH METHODS:

Following is a summary that may be a useful source for determining the type of serological crossmatch to perform. It indicates the phases at which the method is read and lists related reference sources.

Code	Crossmatch Method	Indications	Phase				XM Composition	Incubation
			IS	37C	AHG	CC		
IS	Immediate Spin (Tube)	In place of electronic crossmatch during computer downtime, post-emergency issue, ABO discrepancies.	**X**				2 drops plasma and 1 drop donor cells (Washed not required)	No incubation, spin and read.
AHG	Tube/LISS Antihuman Globulin	Alternative method for GEL testing. (GEL is the standard AHG method). Used only if directed by specific procedure or Medical Director.			**X**	**X**	1 drop washed donor cells, 2 drops plasma, 2 drops LISS	15 minutes at 37°C Note: Tubes **are not** read at the 37°C phase.
PW	Pre-warmed	PW XM should rarely be used, and only with Medical Director approval.			**X**	**X**	1 drop donor cells and 3 drops plasma	60 minutes at 37°C Note: Tubes **are no**t read at the 37°C phase.
AA	Autoabsorbed AHG (tube)	Crossmatching patient with warm		**X**	**X**	**X**	1 drop washed donor cells and	60 minutes at 37°C

		autoantibody using auto adsorbed plasma.					3 drops auto-absorbed plasma	
NL	60 Minute NO-LISS Tube	Patient with warm autoantibody.		X	X	X	1 drop washed donor cells and 3 drops plasma	60 minutes at 37°C Note: Tubes **are** read at 37°C.
GEL	Gel	The standard crossmatch for patients with unexpected antibodies.			X		50 µL of 0.8% cell suspension and 25 µL of patient plasma	15 minutes at 37°C Note: Centrifuge gel cards for 10 minutes.
SR	Saline Replacement	Patient with rouleaux forming properties in plasma causing incompatible IS XMs.	X				2 drops plasma and 1 drop donor cells – see *Saline Replacement* procedure for details	No incubation, spin and read.
AP	All Phase	Patients with Anti-A_1, also used infrequently with both cold and warm reactive antibodies.	X	X	X	X	1 drop washed donor cells, 2 drops plasma. After IS add 2 drops LISS.	After IS, incubate 15 minutes at 37°C Note: Tubes are read at all phases.

X. PROCEDURE:

For all serologic tube crossmatch, begin with *Crossmatch Preparation.*

A. Crossmatch Preparation

1. Compare the following information on the sample label to the data in the computer:
    a. **Medical record number**
    b. **Name** (spelled correctly)
    c. **Wristband #**
    d. Birthdate
    e. Sample in-date
        i. All information on the sample label must be accurate. Refer to Transfusion Medicine policy, Triaging and Identifying Acceptable Samples for Testing.

ii. Investigate and correct any discrepancy before proceeding.

2. In the BBIS ensure that the antibody screen and ABO/Rh testing requirements are met as outlined ab.
3. Determine whether the patient has unexpected antibodies.
    a. Antibodies display in the "ABY" tab of the patient's profile in the BBIS.
    b. If unexpected antibodies are present, units selected for crossmatching must comply with Transfusion Medicine policy, Policies for Providing Red Blood Cells to Patients with Unexpected Antibodies.
        i. The patient is not eligible for electronic crossmatching,
        ii. A serologic crossmatch must be performed, and
        iii. It may be necessary to provide antigen negative RBCs.
4. Determine whether the patient has autologous or directed units.
    a. These units will display in the "a/d/r" tab of the patient profile in BBIS.
    Refer to Transfusion Medicine policy, *Autologous and Directed Donations* for additional policies and requirements.
5. Determine whether the patient has any other special transfusion requirements (i.e., irradiated or washed).
    a. These requirements display in the "SPECIAL RQMTS" tab of the patient's profile in the BBIS.
    b. RBC units selected for crossmatching must meet the patient's special transfusion requirements, if applicable.
    Refer to Transfusion Medicine policy, Special Transfusion Requirements for Patients Greater than Four Months Old.
6. Select RBC units for serologic crossmatching with consideration for ABO, Rh and other requirements as outlined above. Refer to table *RBC Unit Selection Based on ABO, Rh and Inventory Concerns* in the Transfusion Medicine policy, RBC Crossmatch Guidelines.
7. Ensure that the selected RBCs meet quality control specifications as outlined in the *Quality Control* section above.
8. Select the units and order the appropriate crossmatch in the BBIS to the patient using the Transfusion Medicine Policy, Safetrace (Blood Bank) Application; Production Selection and Crossmatching .

B. Tube Crossmatch Preparation

1. Label two (2) test tubes for each crossmatch as follows:
    a. Tube #1 (crossmatch tube): Patient name and donor number, and
    b. Tube #2 (cell suspension): Donor number.
        i. Tubes should be labeled in a manner that allows for identification of the tubes' contents. For example:

A. The first three letters of the patient's last name and

B. A sticker with the donor unit number, or the last three numbers of the donor unit number.

2. Obtain a segment from each unit and place in corresponding tube #2.
    a. Use a segment of tubing that was originally attached to the blood unit container.
3. Choose the appropriate serologic crossmatch procedure.
    a. Refer to the *Summary of Serologic Crossmatch Methods* table above.
4. Prepare the appropriate cell suspension in tube #2. Discard unit segment.
    a. Refer to Transfusion Medicine policy, Making a Test Red Cell Suspension.
    b. If a tube method of crossmatching requires an AHG phase reading, then the RBC suspension must be washed.
5. Proceed to appropriate serological crossmatch procedure/table.
    a. The appropriate procedure/table is indicated in the *Summary of Serologic Crossmatch Methods* table above.

C. Immediate-Spin Crossmatch

1. Continue from the *Tube Crossmatch Preparation* above.
2. In tube #1 (crossmatch tube) combine:
    a. Two (2) drops of patient's plasma with
    b. One (1) drop of donor cell suspension.
3. Agitate tube to mix contents and centrifuge according to the calibrated time of the centrifuge.
4. Observe the supernate for hemolysis (consider whether the sample itself was hemolyzed).
    a. If the supernate shows hemolysis, wash donor cells and repeat test.
    b. If hemolysis persists, initiate antibody identification process; refer to Transfusion Medicine policy, *Antibody Identification*.
5. Resuspend the cell button. Read, grade, and record test results.
    a. See Transfusion Medicine policy, Reading, Grading, and Recording Test Reactions.
    b. Record results directly in the BBIS using Patient>Test>Results. Refer to Transfusion Medicine Policy, Safetrace (Bloodbank) Application.
6. Interpret the crossmatch.
    a. Refer to the *Interpretation* section.
7. Complete the immediate-spin crossmatch in the BBIS and print transfusion tags of compatible units.
    a. If the crossmatch is incompatible, refer to Transfusion Medicine policy, Investigation of Incompatible Crossmatches before proceeding.

8. Tag compatible RBC units and place in the appropriate crossmatch refrigerator.
    a. See Transfusion Medicine policy, Tagging Blood Components.

D. Tube Antihuman Globulin (AHG) Crossmatch

1. Continue from the *Tube Crossmatch Preparation* above.
    a. The following variations of tube AHG crossmatches are performed using this procedure: the LISS/tube **AHG, AA and NL**.
    b. The donor cells should be washed, as indicated in the *Tube Crossmatch Preparation* procedure above.
2. Combine donor cells, patient plasma, and LISS (if applicable) in the following order:
    a. Add patient plasma to each of the test tubes.
        i. Two drops plasma for tube/LISS XM.
        ii. Three drops plasma for 60-minute no-LISS XM and XMs with auto adsorbed plasma.
    b. Add one (1) drop of the washed donor cells to the correspondingly labeled tubes,
    c. If applicable, add two (2) drops LISS to each of the test tubes.
        i. LISS is added for the LISS/tube AHG XM, and is omitted for the NL and AA crossmatches.
        ii. The order in which patient plasma, cells, and LISS are added is important to prevent hemolysis of the cells.
3. Agitate the tubes to mix.
4. Incubate the tubes for the times indicated below:
    a. Tube/LISS AHG.
        i. Incubate for 15 minutes at 37°C.
        ii. Incubation may not exceed thirty (30) minutes. Tubes **are not read** at the 37°C phase.
    b. 60-minute No-LISS (NL) or Autoadsorbed Plasma (AA).
        i. Incubate for 60 minutes at 37°C.
        ii. Centrifuge tubes and resuspend the cell button. Read, grade, and record results for the 37°C phase.
            A. Tube **are** read at the 37°C phase.
            B. See Transfusion Medicine policy, Reading, Grading, and Recording Test Reactions.
5. Wash tubes in an automatic cell washer four (4) times.
    a. Alternatively, wash by hand three to four times with large volumes of saline.
6. Add two (2) drops of Anti-IgG AHG. Agitate tubes to mix. Centrifuge.

7. Resuspend the cell button. Read, grade, and record results for the AHG phase.
8. Add one (1) drop IgG coated check cells to all tubes that were negative at the AHG phase.
9. Agitate tubes to mix. Centrifuge tubes.
10. Resuspend the cell button. Read, grade, and record results for coated cells.
    a. The graded reactions of check cells are expected to react at any strength. If the check cells do not react, then the XM is invalid and must be repeated.
11. Interpret the crossmatch.
    a. Refer to the *Interpretation* section.
12. Complete the crossmatch in the computer and print transfusion tags of compatible units.
    a. Refer to Transfusion Medicine policy, Safetrace (Blood Bank) Application.
    b. If the XM is incompatible, refer to Transfusion Medicine policy, Investigation of Incompatible Crossmatches before proceeding.
13. Tag compatible RBC units and place in the appropriate crossmatch refrigerator.
    a. See Transfusion Medicine policy, Tagging Blood Components.

E. All Phase (AP) Crossmatch

1. Continue from the *Tube Crossmatch Preparation* above.
    a. The donor cells should be washed, as indicated in the *Tube Crossmatch Preparation* procedure above.
2. Combine donor cells, patient plasma, and LISS in the following order:
    a. Add two (2) drops of patient plasma to each of the test tubes.
    b. Add one (1) drop of the donor cells to the correspondingly labeled tubes.
3. Agitate tubes to mix and centrifuge.
4. Resuspend the cell button. Read, grade, and record results for the immediate-spin phase.
    a. Refer to Transfusion Medicine policy, Reading, Grading, and Recording Test Reactions.
5. Add two (2) drops LISS to each of the test tubes.
6. Incubate tubes for 15 minutes at 37°C. Centrifuge.
    a. Incubation time may not exceed 30 minutes.
7. Resuspend the cell button. Read, grade and record the 37°C phase results.
8. Wash tubes in an automatic cell washer for four (4) cycles.
    a. Alternatively, wash by hand four times being careful to decant completely after the last wash.
9. Add two (2) drops of Anti-IgG AHG to each tube. Agitate tubes to mix contents. Centrifuge.
10. Read, grade, and record the AHG results.

11. Add one (1) drop IgG coated check cells to all tubes that were negative at the AHG phase. Agitate tube to mix contents. Centrifuge.
12. Resuspend the cell button. Read, grade and record the check cells results.
    a. The graded reactions of check cells are expected to react at any strength. If the check cells do not react, then the AP XM is invalid and must be repeated.
13. Interpret AP crossmatch compatibility and verify test results.
    a. Refer to Transfusion Medicine policy, Safetrace (Blood Bank) Application.
    b. If the AP XM is incompatible, refer to Transfusion Medicine policy, Investigation of Incompatible Crossmatches before proceeding.
14. Complete the AP crossmatch in the computer and print transfusion tags of compatible units.
15. Tag compatible RBC units and place in the appropriate crossmatch refrigerator.
    a. See Transfusion Medicine policy, Tagging Blood Components.

F. Gel Antiglobulin Crossmatch

1. Continue from *Crossmatch Preparation.*
2. Gel crossmatches may be performed manually, as described in this document. Gel crossmatches may also be performed on the Ortho Vision™. Refer to Transfusion Medicine policy, Routine Testing on the ORTHO VISION Analyzer
3. Label one 12 x 75 mm test tube and one well of an IgG gel card for each crossmatch. Tubes and gel cards should be labeled in a manner that allows for identification of their contents. For example:
    a. The first three letters of the patient's last name and
    b. A sticker with the donor unit number, or the last three numbers of the donor unit number.
4. Obtain a segment from each unit and place in the correspondingly labeled tube.
    a. Use a segment of tubing that was originally attached to the RBC unit.
5. Prepare a 0.8% cell suspension of the donor unit as follows:
    a. Dispense 1.0 mL of MTS Diluent 2™ into the labeled tube(s).
    b. Add 10 µL of the donor packed red blood cells.
    c. Mix gently to resuspend. The final red blood cell suspension should be approximately 0.8%.
        i. For additional information, refer to Transfusion Medicine policy, *Making a Test Red Cell Suspension*. In the alternative, program 6 on the Sartorius or BioHit Electronic pipette may be used to make the 0.8% suspension.
6. Visually inspect each gel card before use.
    a. Refer to the *Quality Control* section of this document.

7. Remove the foil seal from each gel card, exposing only enough wells needed for crossmatches.
    a. Foil should be removed immediately before testing. Testing must be initiated within 1 hour as the gel may dry out.
8. To the correspondingly labeled microtube:
    a. Add 50 µL of the 0.8% donor cell suspension.
    b. Add 25 µL of the patient plasma.
9. Incubate the gel cards at 37ºC ± 2 ºC for fifteen (15) minutes.
    a. Incubation may not exceed 30 minutes.
10. Centrifuge the gel card for ten (10) minutes at 895 ± 25 RPM in a MTS centrifuge or 1032 ± 10 RPM in an Ortho Workstation.
11. Read the front and back of each gel card macroscopically. Record results in the Blood Bank computer.
    a. See the *Interpretation* section of this document.
12. Interpret the gel crossmatch.
13. Complete the gel crossmatch in the computer and print transfusion tags of compatible units.
    a. Refer to Transfusion Medicine policy, Safetrace (Blood Bank) Application.
    b. If applicable, refer to Transfusion Medicine policy, *Investigation of Incompatible Crossmatches.*
14. Tag compatible RBC units and place in the appropriate crossmatch refrigerator.
    a. See Transfusion Medicine policy, Tagging Blood Components.

XI. INTERPRETATION:

A. For crossmatches performed by any of the tube methods:
    1. Serologic compatibility is established when donor red cells are not agglutinated or hemolyzed at any phase of the crossmatch.
    2. Serologic incompatibility is established if hemolysis or agglutination is observed at any phase of the crossmatch.

B. For crossmatches performed in gel:
    1. Serologic compatibility is established when unagglutinated donor red cells form a well-defined button at the bottom of the microtube and hemolysis is absent.
    2. Serologic incompatibility is established if hemolysis or any number of red cell agglutinates are observed in the microtube with or without unagglutinated red cell button on the bottom of the microtube.

C. Tube and gel reactions are read and graded as described in Transfusion Medicine policy, Reading, Grading, and Recording Test Reactions.

D. If incompatibility is observed at any stage of crossmatching, refer to Transfusion Medicine policy, *Investigation of Incompatible Crossmatches*
.

XII. LIMITATIONS:

A. The following may influence the validity of test results:
    1. Rouleaux may cause a reaction that could be misinterpreted as agglutination. If rouleaux is detected, refer to Transfusion Medicine policy, Saline Replacement Technique for Patients with Rouleaux.
    2. The presence of fibrin or clots in patient serum may cause a reaction in the gel test that could be misinterpreted as mixed field.

XIII. REFERENCES:

1. AABB, *Technical Manual*, current edition.
2. AABB, *Standards for Blood Banks and Transfusion Services*, current edition.

Attachments

Antibody Screens, Panels, and Crossmatch Job Aid

Approval Signatures

Step Description	Approver	Date
	Ann Marie Blenc: System Med Dir, Hematopath	8/9/2024
	Muhammad Arshad: Chief, Pathology	8/8/2024
	Kristina Davis: Staff Physician	8/8/2024
	Ryan Johnson: OUWB Clinical Faculty	8/5/2024
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	Teresa Lovins: Supv, Laboratory	7/29/2024
	Karrie Torgerson: Medical Technologist Lead	7/29/2024
	Kelly Sartor: Mgr, Division Laboratory	7/27/2024
	Kelly Sartor: Mgr, Division Laboratory	7/27/2024

Applicability

Dearborn, Farmington Hills, Grosse Pointe, Royal Oak, Taylor, Trenton, Troy, Wayne