**Purpose:**

To provide guidance for resolving ABO and Rh testing discrepancies. A discrepancy exists when:

* Results of the forward group do not agree with the reverse group
* Unexplained weak or mixed field reactivity
* Current testing is not in agreement with previous records

**PRINCIPLE & CLINICAL SIGNIFICANCE:**

The test methods employed depend on the type of discrepancy detected. Failure to resolve a blood typing discrepancy accurately can lead to transfusion of incompatible blood components which can result in hemolytic transfusion reactions.

* Discrepancies may arise from patient identification or labeling errors, intrinsic problems with red cell (forward type), serum (back type), patient disease, treatment or technical errors in test performance.
* Weak D positive donors are considered Rh positive which can lead to Rh discrepancies between the patient and autologous unit.

**POLICIES:**

* Difficulty in typing must be documented in the LIS
* Discrepancy resolution does not need to be repeated for each ABORh performed on the same admission.

**SPECIMEN REQUIREMENTS:**

EDTA is preferred and if not tested soon after collection, should be stored at 1-6°C.

Red top tubes are also acceptable. See SOP *Specimen Acceptability*

**REAGENTS/SUPPLIES/EQUIPMENT:**

Refer to the SOP specific for the test being performed.

**QUALITY CONTROL:**

Refer to the SOP specific for the test being performed.

**INSTRUCTIONS:**

**Table of CONTENTS:**

**[All Discrepancies](#All)**

**[Unexpected positive reactions in the forward type (patient cells)](#posforward)**

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**[Rh Discrepancy](#Rh)**

**All Discrepancies**

| **STEP** | **ACTION** | | |
| --- | --- | --- | --- |
| 1 | Review the patient’s history in the LIS and/or HIS for indications of the cause of the discrepancy  **NOTE:** It may be necessary to contact other facilities where the patient may have been treated to obtain transfusion and/or transplant history.   |  |  | | --- | --- | | **If** | **Then** | | Patient has received a BMT or other type of HSCT | * If the discrepancy is explained by a mixed population of donor and recipient cells and/or antibodies -report as No Type Determined (NTD). * Go to Reporting Results | | Patient received out of group blood | * If the discrepancy is explained by a mixed population including the donor RBCs, report as the patient’s original blood type * Go to Reporting Results | | Current doesn’t match historical | Request a new sample and repeat testing.   |  |  | | --- | --- | | **If new sample** | **Then** | | Agrees with historical | * Proceed to interpretation and reporting results. Reject first sample as MISLABEL * Look for a reciprocal mislabeled specimen * Notify a manager or lead * Write a QI | | Disagrees with historical | * Examine historical for misinterpretation * Ask RN to verify photo-ID * Notify department management and obtain Manager/Lead approval before issuing any products to patient if current and new samples both disagree with historical type | | | Discrepancy not resolved | Go to next step | | | |
| 2 | Prepare a new 3-4% patient cell suspension and repeat the ABO/Rh testing using the manual test method | |
| **If discrepancy is** | **Then** |
| Resolved | Proceed to interpretation and reporting results |
| NOT resolved | * Save reaction results, but do not enter an interpretation in Sunquest * Go to next step |
| 3 | Review patient’s transfusion/transplant/age history for cause of the discrepancy. The following sources may be used to obtain relevant patient information:   * Sunquest BBI * ORCA/Epic * Contact the patient, patient’s physician or caregiver * Contact other medical facilities where the patient was provided care | | |
| 4 | Select the type of discrepancy below and follow the suggested technique as appropriate to resolve the discrepancy   * [**Unexpected positive reactions in the forward type (patient cells)**](#posforward) * [**Weak or unexpected negative reaction in the forward type (patient cells)**](#negforward) * [**Unexpected positive reactions in reverse type (patient serum)**](#posreverse) * **[Weak or unexpected negative reaction in the reverse type (patient serum)](#negreverse)** * [**Rh Discrepancy**](#Rh) | | |

**Unexpected positive reactions in the forward type (patient cells)**

| **STEP** | **Action** |
| --- | --- |
| 1 | Perform an IgG DAT   |  |  | | --- | --- | | **If** | **Then** | | Positive | Treat with EGA and repeat testing with EGA treated cells | | Negative | Wash patient cells with warm saline 4X and repeat testing | |
| 2 | |  |  | | --- | --- | | **If resolved** | **Then** | | Yes | Go to Reporting | | No | Consult with TSL management or submit to IRL | |

**Weak or unexpected negative reaction in the forward type (patient cells)**

| **STEP** | **Action** |
| --- | --- |
| 1 | |  |  | | --- | --- | | **If** | **Then** | | Weak subgroup of A or B or depression of antigen expression | Try the following in order and discontinue additional testing once the discrepancy is resolved:   * Incubate patient’s cells with anti-A, anti-B, 7% albumin and anti-A,B (if applicable) for 15-20 minutes at RT and repeat testing * Incubate the tubes from repeat ABO/Rh testing (along with 1 drop group O screen cells and two drops of patient’s plasma as a control) at 4°C for 10 min * Try using a different manufacturer of antisera if available | | Suspect neutralization of blood group antisera | Wash patient cells 3-4 times in blood bank saline and repeat testing | |
| 2 | |  |  | | --- | --- | | **If resolved** | **Then** | | Yes | Go to Reporting | | No | Consult with TSL management or submit to IRL | |

**Unexpected positive reactions in reverse type (patient serum)**

| **STEP** | **Action** |
| --- | --- |
| 1 | Perform a microscopic evaluation of the reaction to look for rouleaux   |  |  | | --- | --- | | **If rouleaux is** | **Then** | | Observed  (retractile stacking of red cells resembling a stack of coins) | Perform Saline Replacement and repeat testing | | Not Observed | Go to next step | |
| 2 | Perform an antibody screen at IS phase   |  |  | | --- | --- | | **If Antibody screen is** | **Then** | | Positive | Suspect possible cold antibody :   * Perform a cold panel to detect cold-reacting antibodies – If identified repeat testing with antigen negative reverse cells * Prewarm reverse typing for cold agglutinin | | Negative | Suspect isoantibodies such as anti-A1   * Type patient cells with A1 lectin and test patient plasma with A2 cells | |
| 3 | |  |  | | --- | --- | | **If resolved** | **Then** | | Yes | Go to Reporting | | No | Consult with TSL management or submit to IRL | |

**Weak or unexpected negative reaction in the reverse type (patient serum)**

| **STEP** | **Action** |
| --- | --- |
| 1 | Suspect depressed antibody production and try the following in the order listed and stop once discrepancy is resolved:   * Incubate patient’s plasma with A1 and B cells, screen cells and an autocontrol for 10 minutes at room temperature (RT) * Incubate at 4°C for 10 minutes * Increase the serum to cell ration by using 3-4 drops of patient’s plasma and one drop of reagent A1 and B cells and repeat testing |
| 2 | |  |  | | --- | --- | | **If resolved** | **Then** | | Yes | Go to Reporting | | No | Consult with TSL management or submit to IRL | |

**Rh Discrepancy**

|  |  |
| --- | --- |
| **STEP** | **ACTION** |
| 1 | |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  | | --- | --- | | **If** | **Then** | | Historical anti-D result is positive and new sample is negative | Perform the following in the order listed and stop if the discrepancy is resolved:   * Perform Weak D Testing * Repeat testing using anti-D from a different manufacturer and/or clone | | Tango anti-D is negative and previous type is positive | Repeat Tango sample using the ABO/Rh manual testing method | | Control is positive | Go section **Unexpected positive reactions in the forward type (patient cells)** | | |
| 2 | |  |  | | --- | --- | | **If resolved** | **Then** | | Yes | Go to Reporting | | No | Consult with TSL management or submit to IRL | |

**CALCULATIONS/INTERPRETATIONS/RESULTS REPORTING/NORMAL**

**VALUES/CRITICAL VALUES**

**Results Reporting**

| **STEP** | **Action** |
| --- | --- |
| 1 | Record all reactions immediately in Sunquest or the appropriate manual result form.   |  |  | | --- | --- | | **If** | **Then** | | Discrepancy is resolved following additional testing | Refer to interpretation and reporting results according to SOP *ABO/Rh Testing by Tube Method* | | Discrepancy is due to a BMT with discrepant forward/reverse reactions or in between typing | Report the ABO/Rh interpretation as NTD  **NOTE:** In some cases the patient may not make the new isoantibody following conversion. Testing may still be reported with the new blood group with TSL MD approval on file. | | Discrepancy is due to recent transfusion of blood components that were not identical to the patient’s own ABO/Rh | Result the patient’sactual blood type and add a BBCS comment explaining the cause of the mixed cell population | | Discrepancy is resolved by an Immunohematology Reference Lab (IRL) | TSL manager or designee will enter the results | |
| 2 | Add a PB comment indicating the cause of the discrepancy in SQ for future reference  **NOTE:** If the cause of the discrepancy is already noted in the BAD file, the PB comment is not required |
| 3 | Determine if the new blood type is discrepant with the type of record in the BAD file   |  |  | | --- | --- | | **If** | **Then** | | Does match the historical type or the historical type is NTD | No action needed | | Does NOT match the historical type | Refer the discrepancy to TSL management for evaluation for record correction.  **NOTE:** BMT patient’s historical record should not be updated following type conversion until the conversion is verified to be complete and approved by the TSL MD | |

**CALIBRATION:**

NA

**PROCEDURE NOTES AND LIMITATIONS:**

**REFERENCES:**

* Standards for Blood Banks and Transfusion Services, Bethesda, MD; AABB, current edition
* Technical Manual, Bethesda, MD; AABB, current edition

**RELATED DOCUMENTS:**

SOP Specimen Acceptability and Order Receipt

SOP Quality Control for Manual Testing Reagents

SOP Labelling for Manual Testing

SOP ABO/Rh Manual Tube Method

SOP Antibody Identification

SOP Grading Reactions

SOP Saline Replacement

SOP Weak D Manual Tube Testing Procedure

SOP EGA Treatment of Red Blood Cells

SOP DAT (Direct Antiglobulin Test) by Tube Method

SOP Cold Panel

FORM Extended Workup

**APPENDIX: Possible Causes of ABO Typing Discrepancies**

|  |  |
| --- | --- |
| **TYPE OF DISCREPANCY** | **POSSIBLE CAUSES** |
| Mixed-field forward type | * Recent transfusion * Transplantation * Fetomaternal hemorrhage * Twin or dispermic (tetragametic) chimerism |
| Extra reaction in the forward type (includes positive control) | * Autoagglutinins/excess protein coating red cells * Unwashed red cells:   + plasma proteins   + antibody in patient’s serum to reagent constituent * Transplantation * Acquired B antigen * B(A) phenomenon * Out-of-group transfusion |
| Negative and/or weak forward type | * ABO subgroup * Leukemia/malignancy * Recent transfusion * Intrauterine fetal transfusion * Transplantation * Excessive soluble blood group substance |
| Extra reaction in the reverse type | * Cold autoantibody * Cold alloantibody * Serum antibody to reagent constituent * Excess serum protein * Recent transfusion of plasma components * Transplantation * Infusion of intravenous immune globulin |
| Negative, weak reverse type | * Age related (<4-6 months old, elderly) * ABO subgroup * Hypogammaglobulinemia * Transplantation |
| Rh does not match historical Type | * Weak D antigen * Differences in antisera specificity * Recent transfusion * Transplantation |

|  |  |  |  |
| --- | --- | --- | --- |
| **UWMC SOP Approval:** | | | |
|  |  |  |  |
| **UWMC CLIA Medical Director** |  |  |  |
|  | Mark H. Wener, MD | Date |  |
|  |  |  |  |
| **Transfusion Service Manager** |  | Date |  |
|  | Deanne Stephens |  |  |
|  |  |  |  |
| **Compliance Analyst** |  | Date |  |
|  | Christine Clark |  |  |
| **Transfusion Service**  **Medical Director** |  | Date |  |
|  | John R. Hess, MD |  |  |
|  |  |  |  |
| **UWMC Biennial Review:** | |  |  |
|  |  |  |  |
|  |  | Date |  |
|  |  |  |  |
|  |  | Date |  |
|  |  |  |  |