**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)**

[**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)**

**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 |  |
|  |  |  |  |