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Resolution of ABO and Rh Discrepancies - Blood Bank

Document Type: Policy

I. PURPOSE AND OBJECTIVE:

The purpose of this document is to provide instructions that will enable the Blood Bank staff to resolve the ABO and Rh discrepancies that are most commonly encountered at Corewell Health East.

II. POLICY STATEMENT:

The Blood Bank Staff will use this document for the resolution of ABO and Rh discrepancies that occur while testing in the department.

III. CLINICAL SIGNIFICANCE:

A. ABO discrepancy is a generic term for a variety of situations in which the interpretation of a patient or donor's ABO group is unclear. ABO testing is a two-part process, involving testing a person's red cells for the presence of A and or B antigens, also known as forward typing. The same person's serum is tested for the presence of anti-A and anti-B antibodies, also known as reverse typing. If the results of these two parts of the tests do not agree (for example, if the cell grouping suggests blood group A while the serum grouping looks more like blood group AB), an ABO discrepancy has occurred.

B. Rh discrepancy is a generic term for a variety of situations in which the interpretation of a patient or donor Rh results are unclear. Rh testing is a process involving testing a person's red cells for the presence of D antigens and a control. If the result of this test is not valid, a Rh discrepancy has occurred.

C. ABO/Rh discrepancies happen for a wide variety of reasons, including technical errors,

problems with red cell antigens, or problems with serum antibodies. Discrepancies may also result from recent transfusions of blood products that are of a dissimilar ABO or Rh type than the recipient, or from stem cell transplants. Note that stem cell donors may be ABO or Rh dissimilar to the recipient. ABO and Rh discrepancies may also be caused by numerous technical factors, including sample drawing errors and testing errors.

IV. Causes of ABO or Rh Discrepancies

Discrepancy	Possible Causes
Forward/ Cell Typing Problems	Recent RBC transfusions of dissimilar ABO or Rh type
	Weak ABO subgroups (most commonly A_2 subgroup, may present as mixed-field or invalid reaction with the forward A cell typing).
Weak/Missing Red Cell Reactivity	Stem Cell Transplants
Forward /Cell Typing Problems Extra Red Cell Reactivity	Autoagglutinins
	Excess protein (may present as rouleaux formation)
	Stem Cell Transplants
Reverse Typing Problems	Pediatric patients older than 4 months old but less than 2 years old frequently have low levels of ABO antibodies; the ABO "discrepancy" may remain unresolved until the pediatric patient is older.
	Elderly or immunosuppressed patients
Missing serum activity	Stem Cell Transplants
Reverse Typing Problems	Cold reacting antibodies
	Anti-A^1 (presents as unexpected reactivity on the A reverse cell in an apparent group A or AB patient)
	Excess protein (may present as rouleaux formation)
Extra serum activity	Transfusion of non-cellular blood products that are a dissimilar ABO type to the patient For example: a type A patient received multiple type O platelets.
	Stem Cell Transplants
Rh Typing Discrepancies	Failure to add Anti-D reagent or other technical testing errors
	Recent RBC transfusion with a dissimilar Rh type
	Weak D or partial D phenotype
	Different results obtained with different anti-D reagents containing different formulations/clones of the anti-D reagents.
All Categories	Rouleaux formation
	WBIT
	Mistyped current or historical sample

	Consider other factors or technical errors that may explain the results.

V. DEFINITIONS:

A. **ABO discrepancy**: Generic term for a variety of situations in which the interpretation of a patient or donor ABO group is unclear.

B. **Rh discrepancy**: Generic term for a variety of situations in which the interpretation of a patient or donor Rh results are unclear.

C. **BBIS**: Blood Bank Information System

D. **Mixed field (MF):** Sample that contains 2 distinct populations of red cells, usually as a result of recent RBC transfusions of a dissimilar ABO or Rh type as the patient.

E. **Rouleaux:** Red cells that assume a stacked-coin formation in testing due to an abnormality with the patient's serum protein. Rouleaux is most readily observed on microscopic examination.

F. **WBIT (wrong blood in tube):** When a sample is drawn from the wrong patient, so that the identifying information of the patient on the label does not correlate with the patient from whom the blood in the tube was drawn.

G. **GND (Group not determined):** If the forward typing and the reverse typing do not agree, an ABO discrepancy has occurred. If the discrepancy cannot be resolved at that time, then the patient's group is considered "Not Determined".

H. **RND (Rh not determined):** If the Rh typing discrepancy of a patient cannot be resolved at that time, then the patient's Rh type is considered "Not Determined".

I. **Health information system (HIS):** Refers to a system designed to manage health care data. This includes systems that collect, store, manage and transmit a patient's electronic health record, a hospital's operational management or a system supporting health care policy decisions.

J. **ERS :** Patient Quality Safety Report (QSR) made in the hospital event reporting system (i.e. RL Solutions) regarding any process/incident inconsistent with the routine operation of the hospital or the routine care of patients in any setting. This includes errors that result in actual or potential injury to a patient or visitor, including near misses or unsafe conditions.

K. **Internal Variance**: Report made internally in the Blood Bank for documentation of an incident such as error detected, accident, complaint, unplanned deviation, or incident for review, evaluation, investigation, and correction.

L. **Designee**: Any Blood Bank technical director, or transfusion medicine fellow.

VI. POLICIES:

A. Valid Graded Reactions

1. To be valid, reactions obtained during ABO/Rh testing must be of the strength indicated in the following tables:

Valid Grading (Tube Method)	
If the test is:	Then the graded result must be:
Forward ABO Typing	0 or 1-4+
Rh Typing	0 or 2-4+
Control	0
Reverse ABO Typing	0 or 1-4+

Valid Grading (Gel Method)	
If the test is:	Then the graded result must be:
Forward ABO Typing	0 or 3-4+
Rh Typing	0 or 4+
Control	0
Reverse ABO Typing	0 or 1-4+

**Mixed Field Reactions with tube/gel method are considered invalid and must be investigated.

B. Documentation of Resolved ABO or Rh Discrepancies

1. The following policies apply to the documentation of an ABO or Rh discrepancy that is resolved after the applicable investigation:
    a. Observations of all test results must be recorded properly at the time the test is performed (including discrepant results). The test code ABODIS is used to document additional testing used to resolve the discrepancy.
    b. The results should not be interpreted until the investigation is complete and the discrepancy is resolved.
    c. Any steps that were taken to resolve the discrepancy should also be documented in a Patient profile note; e.g., by adding the **ABODISC** profile note and details such as, "4°C reverse incubation" “saline-replaced reverse” or “washed cell suspension for forward typing.”
    d. In most cases the discrepancy will be documented on the attached *ABO/Rh Discrepancy Form*.

C. Editing the Patient’s ABO or Rh in the Patient at a Glance Window

1. A technologist may only edit the patient’s ABO or Rh on the patient profile if directed by Transfusion Medicine policy or with Medical Director approval.

2. If a patient's demographic screen is populated with the incorrect ABO/Rh due to a clerical or testing error, the ABO or Rh may be blanked out by a lead medical technologist or supervisor without Medical Director approval.

VII. Procedure

A. Repeat Testing

1. Upon encountering an ABO/Rh discrepancy, the technologist should repeat the testing with consideration for the following;
    a. Several factors or technical errors may cause ABO or Rh discrepancies. These include but are not limited to those listed below.
        i. Sample collection errors or WBIT events
        ii. Invalid or positive Rh Control
        iii. Improperly made cell suspensions
        iv. Failure to add reagents or follow directions of manufacturer's inserts
        v. Improper centrifugation
        vi. Variation in reagents or methodologies used to perform testing
        vii. Improper interpretation or documentation of test results
        viii. Previous transfusions with blood products that are a dissimilar ABO or Rh to the patient
        ix. Failure to observe hemolysis

B. Test History Mismatch

1. When the ABO or Rh of a current sample does not match the historical ABO or Rh, the Blood Bank must consider the possibility of a WBIT event. The technologist should (if possible):
    a. Repeat the ABO/Rh of the historical sample (if available) and
    b. Repeat the ABO/Rh on the current sample, and
    c. Redraw the sample and repeat the ABO/Rh on this new sample.
2. If the redraw specimen and the initial specimen reactions are consistent with each other and patient identification has been verified:
    a. Result the interpretation of the initial specimen.
    b. Result the interpretation of the repeat specimen
    c. Approve the blood type change by selecting "Post Test Results" in the Test History Mismatch window.
    Note: An * will appear next to the new blood type in the Patient-At-A-Glance bar.
    d. File an internal variance report.
    e. Notify the Supervisor or Lead Medical Technologist of the event.

3. If the redraw specimen is consistent with the historical blood type and patient identification has been verified:
    a. Document all testing results on the initial specimen and enter the interpretation as INV.
    b. DO NOT CHANGE THE PATIENT'S BLOOD TYPE.
    c. Document the interpretation of the repeat specimen.
    d. Invalidate all testing performed on the incorrect sample in the Blood Bank computer and credit any charges associated with the testing on that sample.
    e. Ensure that the patient's ABO and Rh of record (demographic screen) corresponds to the correct testing from the correct sample(s).
    f. File a quality report for WBIT event in the hospital ERS system.
    g. Notify the Supervisor or Lead Medical Technologist of the WBIT event.

C. Mistyped Samples/Technical Issues

1. The Blood Bank should consider the possibility of a mistyped sample if the ABO or Rh results obtained from the first typing of a current sample do not match the ABO or Rh results from the second typing of the same/current sample.
2. If the technologist suspects a mistyped sample, the following steps shall be performed:
    a. Repeat the ABO/Rh on the current sample/new sample
3. If a mistyped sample is suspected after the above repeat testing, then the Blood Bank shall invalidate all test results that are considered to be mistyped in the Blood Bank computer and ensure that the patient's ABO and Rh of record on the Patient at a glance bar correspond to the correct results.
    a. Document the mistype on an Internal Variance.
    b. Note that apparent Rh typing "mistypes" can occur due to the use of different reagents and methodologies.

D. Mixed Field Reactivity with Anti-A, Anti-B or Anti-D

Patient with Mixed Field A typing

1. If a mixed-field appears in the forward A typing of a patient who otherwise appears to be group A or AB, consider the possibility of A subgroup.

    Refer to section, *Patients with A Subgroups or Anti-A_1*

Patient Blood Type On File (ON)

1. Check BBIS or CareEveryWhere for confirmed RBC transfusion history within 90 days.
2. If the mixed-field reactivity may be explained by the combined ABO/Rh of the recipient's and the donor's RBCs then interpret the ABO/Rh to correlate with the recipient's historical blood type, despite the mixed-field.

a. Add **CWTRF** patient profile note; *Historical type ___, patient recently transfused with ___ cells at _____ on _[date]_.*

3. If there is history of stem cell transplant proceed to section K, *Resolution of ABO and Rh Discrepancies for Patients Patients Who Have Received Stem Cell Transplant History*.

Patient Blood Type Not On File (NOF)

1. If it is a patient with no blood bank history, check Care Everywhere for any history from outside hospitals
2. Information gathered from outside facilities is to only be used for investigative purposes, not for final blood type determination. Final blood type determination must be based on current reactivity demonstrated.
    a. If there is history of stem cell transplant proceed to section K, *Resolution of ABO and Rh Discrepancies for Patients Patients Who Have Received Stem Cell Transplant History*.
3. If an ABO discrepancy remains unresolved after the investigation then do the following:
    a. Result initial tube or analyzer blood type with an interpretation of INV.
    b. Order the ABO Discrepancy test (ABODIS).
    c. Document reactions as seen.
    d. Interpret the blood group as O if mixed field reactivity is observed with Anti-A and/or Anti-B
        i. Add the result comment ID **MFOCELLS:** *Mixed-field reactivity preventing the ability to determine blood type at this time. O interpretation will be used until the type discrepancy has been resolved. Will provide O red blood cells and A/AB plasma products until discrepancy is resolved.*
        ii. Add special requirements to give O RBCs and A/AB plasma products.
        iii. Add patient antibody code **NEX t**o patient antibody file to prevent electronic crossmatches. (This antibody code will remain on the patient profile until the discrepancy is resolved.)
    e. Interpret the Rh type as Rh negative if mixed field reactivity is observed with Anti-D
        i. Add result comment: **RND:** *Unable to determine patient Rh, patient will be considered Rh negative for transfusion and RhIG purposes.*
        ii. Add patient antibody code **NEX** to patient antibody file to prevent electronic crossmatches. (This antibody code will remain on the patient profile until the discrepancy is resolved.)
    f. Add patient profile note documenting the above information.
    g. File an internal variance report for follow up.

E. Resolution of Missing Reverse Typings

1. Result initial type with an interpretation of INV.

2. Order an ABO/Rh Discrepancy test (ABODIS).
3. If the expected reverse typing reactions obtained on the analyzer are missing then repeat the testing in manual tube.
4. If the expected reverse reactions obtained in the tube method are 1+ or greater in strength, then record results in the ABODIS. The discrepancy is resolved and additional testing is not required.
5. If discrepancy remains unresolved label 3 test tubes as follows:
    a. Tube 1: Last name and “a”
    b. Tube 2: Last name and “b”
    c. Tube 3: Last name and ”O”. The “O” tube will be used as the control and must be non-reactive.
    If the control is reactive then a cold reacting antibody may be present and further investigation for a possible cold antibody must occur.
6. Add 3 drops of patient’s plasma to each of the 3 test tubes.
7. Add 1 drop of reagent “a” and “b” cells (reverse cells) and 1 drop of an “O” cell (from 3% screening or panel cells) to the correspondingly labeled test tubes.
8. Agitate all tubes to mix, then centrifuge.
9. Read, grade, and record test results.
    a. Do not interpret or verify results yet.
10. Determine whether adding 3 drops of plasma sufficiently enhanced the weak reverse.
    1. If there is only reactivity in the expected reverse cells, interpret the ABODIS . Omit remaining steps.
    2. If the group O control is reactive, then further investigation for a possible cold antibody must occur.
    3. If the weak reverse was not sufficiently enhanced by adding 3 drops plasma, then do not interpret the ABO or Rh and proceed to the next step.
11. Incubate the three test tubes at room temperature (RT) for 15 minutes, and then repeat steps 8 and 9.
12. Determine whether the 15-minute RT incubation sufficiently enhanced the weak reverse.
    1. If there is only reactivity in the expected reverse cells after incubation interpret the ABODIS. Omit remaining steps.
    2. If the group O control is reactive, then further investigation for a possible cold antibody must occur.
    3. If the weak reverse was not sufficiently enhanced with the 15-minute RT incubation, then do not interpret the ABO or Rh and proceed to the next step.
13. Incubate the three test tubes at 4°C for 15 minutes, and then repeat steps 8 and 9.
14. Determine whether the 4°C, 15-minute incubation sufficiently enhanced the weak reverse; refer to the *Interpretation* section.

1. If there is only reactivity in the expected reverse cells after incubation interpret the ABODIS. Omit remaining steps.
2. If the group O control is reactive, then further investigation for a possible cold antibody must occur.
3. If the weak reverse was not sufficiently enhanced with the 4°C, 15-minute incubation, then the discrepancy is not resolved.
    a. If patient has a blood type on file enter the results as seen and interpret the ABODIS as the historical blood type.
        i. Add the result comment **HISTYP** : *Type interpretation provided based on historical blood type. Will provide O red blood cells and A/AB plasma products*
        ii. Add special requirement to give O RBC and A/AB plasma only
        iii. Add patient antibody code **NEX** to patient antibody file to prevent electronic crossmatches.
    b. If patient blood type is not on file enter the results as seen and interpret the ABODIS as Group O.
        i. Add the result comment; ***GND***: *Unable to determine blood typing . Will provide O red blood cells and A/AB plasma products until discrepancy is resolved.*
        ii. Add special requirement to give O RBC and A/AB plasma only.
        iii. Add patient antibody code **NEX** to patient antibody file to prevent electronic crossmatches.

15. Add the patient profile note **ABODISC** to the patient.
    1. Document the manufacturer, lot number, cell number, and observed reaction of the group O control.
    2. Detail the methodology used e.g., 3 drops plasma, or RT incubation, or 4°C incubation.

F. Elevated Serum Proteins (Rouleaux)

Elevated levels of serum proteins in patients with disorders such as multiple myeloma or macroglobulinemia may produce formation of rouleaux and false positive agglutination during testing:

1. If rouleaux is observed in the forward ABO or Rh typing, then:
    a. Result initial tube or analyzer blood type with an interpretation of INV.
    b. Order the ABO Discrepancy (ABODIS).
    c. Wash the patient's red cells with saline a minimum of 3 times by hand or with an automated cell washer.
    d. Resuspend to a 2 - 4% suspension in saline.
    e. Repeat the forward ABO and Rh types.

f. Record results in the BBIS.

Note: If Forward typing is not resolved with routine cell washing, it may be beneficial to wash with warm saline.

2. If rouleaux is observed in the reverse ABO typing then:
    a. Result initial tube or analyzer blood type with an interpretation of INV.
    b. Order the ABO Discrepancy (ABODIS).
    c. Repeat testing using saline replacement technique to eliminate the interference. Refer to Transfusion Medicine Policy, Saline Replacement Technique.
        i. A group O panel cell shall be used as a control when performing a prewarmed reverse. This control must be non-reactive in order to interpret the ABO as A, B, AB, or O.
    d. Record results in BBIS.
    e. Add patient profile note **ABODISC** to document lot# and results for the O control cell.

G. Resolution of ABO Discrepancies for A Subgroups and Patients with Anti-A_1- Blood Bank

ABO subgroups can result in irregularities or discrepancies observed during ABO typing of a red blood cell donor unit or a patient sample. A subgroups may present with a mixed-field or invalid graded reaction in the forward A typing or unexpected reactivity with the A_1 reverse cell.

1. If a mixed-field or invalid graded reaction appears in the forward A typing of a patient who otherwise appears to be group A or AB:
    a. Order the ABODIS
    b. If not previously tested or recently transfused, type the patient's RBCs with anti-A_1 lectin in accordance with Transfusion Medicine procedure, Antigen Typing.
    c. Order Antigen Type and result the A_1 typing in the BBIS.
        i. If A_1 lectin result is negative then patient is considered an A subgroup, proceed to step 2.
            1. Result the ABODIS accordingly.
            2. Add patient profile note indicating patient is a A subgroup.
        ii. If A_1 lectin reaction strength is weak+ to 1+:
            1. Result the interpretation as IND (indeterminate).
            2. Add result comment **WEAKA1**.
            3. Add patient profile note **A1IND**: *A_1 lectin reaction is indeterminate. Consider the patient an Asub or AsubB.*

iii. If A_1 lectin reaction strength is 2+ to 4+ then look for other causes of mixed field or weak forward typing.

2. If there is unexpected reactivity with the A_1 reverse cell:
    a. Perform an all-phase tube panel to identify Anti-A_1 if indicated.
        i. If anti-A_1 is identified, then attempt to resolve the ABO discrepancy by performing the reverse type with an A_2 reverse cell.
            1. Result ABO discrepancy with A_2 cells reaction in the A cell field.
            2. If A_2 cells were negative, append the result comment ID **ABODISA2;** *ABO Discrepancy resolved using A_2 cells.*
            3. Add patient note to "Perform reverse typing with A2 cells."
        ii. If anti-A_1 is not identified then look for other possible causes of reverse / serum typing problems.

            Attached Job Aid - *Resolution of ABO Discrepancies for A Subgroups and Patients with Anti-A_1* is available for use.

H. Cold Reacting Antibodies

Cold reacting antibodies can cause unexpected agglutination in the forward or Rh typing, or in the reverse typing.When observed in the forward typing, this agglutination may often be dispersed by washing the patient's cells multiple times with saline, or with warm saline if necessary.

1. If unexpected agglutination is observed in the reverse typing, a tube panel will be performed to determine whether the unexpected antibody is a cold reacting antibody and to attempt to identify the specificity.
    a. If unexpected antibody reactivity is observed in the tube reverse typing, a tube panel will be performed every 90 days regardless of the reaction strengths observed.
        i. For the initial workup, enter result comment ID **DISCAB** *type discrepancy due to [insert antibody]* on the result comment of the ABODIS.
        ii. For subsequent workups within previous 90 days, enter result comment ID **DISCABRV** and insert date of the initial workup and antibody in the applicable fields on the result comment of the ABODIS. *Example: Assessed on 7/31/2024. The discrepancy is suspected to be due to anti-M and was not re-evaluated at this time.*
    b. If the patient has a prior history of a cold reacting antibody of known specificity, then 3 test cells that are positive for the corresponding antigen should be included in the tube panel to help prove whether the unexpected reactivity in the reverse type is due to the previously identified cold reacting antibody.
    c. If a specificity is identified in the tube panel, then the reverse typing will be performed with reverse cells that are negative for the antigen corresponding to the cold reacting antibody that was identified.

i. If anti-M or anti-P_1 is identified, then the reverse typing will be performed with A and B reverse cells that are negative for the corresponding antigen.

ii. If anti-I is identified, then the reverse typing will be performed with reverse cells from group A and B neonatal samples.

d. If a cold reacting antibody with no specificity was detected, the reverse typing may be performed by prewarm technique in accordance with Transfusion Medicine policy, Prewarm Technique. Note: A group O panel cell must be used as a control when performing a prewarmed reverse. This control must be non-reactive in order to interpret the ABO as A, B, AB, or O.

e. Add the **ABODISC** profile note to detail resolution steps “prewarm technique" or "reverse typing with antigen negative cells" and lot# and results of O control if appropriate.

I. Resolution of ABO or Rh Discrepancies for Patients Who Have Received Stem Cell Transplants

Patients who have received an allogeneic stem cell transplant with a blood type different than the patient’s original blood type may show an ABO typing discrepancy. If a stem cell transplant is suspected:

1. Obtain the patient history and complete section 1 of the attached *Stem Cell Transport History Form.*
2. Consult the Blood Bank Medical Director or designee to determine how ABO/Rh of the current sample and patient demographic ABORh should be interpreted and obtain any special transfusion requirements for the patient .
3. Until the Blood Bank Medical Director or designee determines that post-BMT blood type results confirm donor engraftment the patient should receive pRBCs and plasma compatible with both the patient and donor ABO blood types. For example, i*f BMT patient is type O and stem cell donor is type A, pRBCs for transfusion should be type O and FFP for transfusion should be type A or AB.*
    a. Blood bank considers the patient engrafted if the patient’s current blood type is consistent with the engrafted blood type and the follow criteria is met:
        i. The patient has not been transfused within the last three months.
        ii. Two ABO/Rh types performed, on samples that were collected from the post-transplant recipient at different times match. Note: These samples may be collected on the same date.
        iii. The ABO/Rh types of these two samples must agree with no ABO/Rh discrepancies on these samples.
        iv. The MD provides written approval in Section II of the Stem Cell Transplant History Form to edit the stem cell transplant recipient’s ABO/Rh.
        v. Add the patient profile note **BMTHX :** *History of hematopoietic progenitor cell transplant from [site] on [date]. Patient historically was [type] and*

received [type] to the patient profile along with any specific requirements determined by the Medical Director or designee.

b. If the patient's current blood type is demonstrating mixed-field reactivity or the patient was transfused within the last three months:
    i. Result initial tube or analyzer blood type with an interpretation of INV.
    ii. Order an ABO discrepancy test.
    iii. Document reactions as seen.
    iv. Interpret the blood type as directed by the blood bank Medical Director or designee

c. If the Blood Bank Medical Director or designee has not yet reviewed the *Stem Cell Transplant History Form,* then the ABO or Rh discrepancy is considered unresolved.
    i. Result initial tube or analyzer blood type with an interpretation of INV
    ii. Order an ABO discrepancy test.
    iii. Document reactions as seen .
    iv. if patient blood type is on file enter the results as seen and interpret the ABODIS as blood type on file
        1. Add the result comment **HISTYP** : *Type interpretation provided based on historical blood type. Will provide O red blood cells and A/AB plasma products.*
        2. Add special requirement to give O RBC and A/AB plasma only.
        3. Add special requirement to give D Negative RBCs if Rh type is undetermined.
        4. Add patient antibody code **NEX** to patient antibody file to prevent electronic crossmatches.

    v. If patient blood type is not on file enter the results as seen and interpret the ABODIS as Group O.
        1. Add the result comment; ***GND****: Unable to determine blood typing. Will provide O red blood cells and A/AB plasma products until discrepancy is resolved.*
        2. Add special requirement to give O RBC and A/AB plasma only.
        3. Add special requirement to give D Negative RBCs if Rh type is undetermined.
        4. Add patient antibody code **NEX** to patient antibody file to prevent electronic crossmatches.

J. Resolution of Rh Discrepancies

Rh Discrepancies can occur when graded reactions are not valid, can not be interpreted or Rh reactions obtained are different when using different reagents or methodologies. They are most commonly caused

by variants which cause either a reduced or partial expression of the D antigen.

1. Result initial type with INV interpretation and order the **ABODIS** test code.
2. **Resolution of Rh Discrepancy when the Inert Monoclonal Control and / or the Tube Control is Reactive**
    a. If the inert monoclonal control is reactive in gel testing, attempt to resolve the discrepancy by typing in the tube method.
    b. If the Rh control is reactive in tube testing, attempt to resolve the discrepancy as follows:
        i. Repeat the typing using a washed cell suspension.
        ii. If necessary, the cell suspension may be washed several times, and may be washed with warm saline.
        iii. If the inert control is reactive when performing Weak D Testing (AHG), perform a tube DAT. If this DAT is positive, the test is invalid and the patient must be considered RND until resolved with Rh D molecular genotype or repeat Weak D testing performed at a later date. If necessary consult the Medical Director.
3. **Resolution of Patients who are Weak D or Partial D Positive**
    1. **Initial Weak D Interpretation**
    If after other potential Rh discrepancy causes have been considered, the patient shall be considered weak D or partial D positive if the following conditions are met:
        a. The gel Rh reaction is w+, 1+, 2+, or 3+ and the inert monoclonal control is non-reactive, or
        b. The tube Rh reaction is w+ or 1+ and the Rh control is non-reactive, or
        c. The tube Rh reactions with antisera from two different manufacturer's do not agree. *Example If a neonate tests negative with Ortho reagent and positive with Gamma, they will be interpreted as Weak D and be considered a potential for Partial D Variant.*
        d. The gel and tube results do not agree when testing the same sample. For example:
            i. *In one method (most likely the gel) the patient appears to be Rh positive, and in the other method (most likely the tube) the patient appears to be Rh negative on the same sample.*
            ii. The weak D test of a neonatal sample is found to be positive (the weak D test was performed to determine maternal RhIG candidacy).
            iii. If anti-D is identified in a patient who otherwise appears to be Rh positive, consider the possibility that the patient is a partial D or that the patient has a warm autoantibody with D-like specificity and consult the Blood Bank Medical Director. Molecular D Variant studies may be indicated.

e. These patients will be interpreted in accordance with Rh Typing Interpretation and resulted with the appropriate comment found in the table below.

Rh Typing Interpretation (for Weak Rh Reactions)			
Patient Age/Sex/ Description	Rh Interpretation	Result Comment Code	Message Description
Neonates (performed for RhIG purposes)	Rh Negative	**WKDPOS**	Weak D result is positive. Infant's mother should receive a post-partum dose of RhIG
Females ≤ 50 years old	Rh Negative	**DVAR**	The Rh results suggest a possible D variant. Without genotyping of the RHD gene for additional information, for purposes of transfusion, the patient will be treated as Rh negative. For pregnancy, consider managing the patient as Rh negative.
Males ≤ 15 years old	Rh Negative	**CDDVAR**	The Rh results suggest a possible D variant. Without genotyping of the RHD gene for additional information, for purposes of transfusion, the patient will be treated as Rh negative.
Females >50 or Males >15 years old	Rh Positive	**DVARP**	The Rh results suggest a possible D Variant, the patient will be treated as **Rh positive.**

i. D Variant Analysis will be performed on all pregnant females that are determined to be possible D variants. Refer to D Variant Testing for Pregnant Females in the Transfusion Medicine procedure, Weak D Testing.

ii. Once a patient has been determined to be a possible D variant, they must be treated as such until either molecular testing has been performed, the patient is over 50 for females or 15 for males unless otherwise determined by the Transfusion Service Medical Director or designee. If no D variant testing has been performed, once males are over 15 or females are over 50, they can be changed to D positive on subsequent type testing

performed.

2. **Weak D Testing**
   Weak D Testing is not indicated for the following:
   a. Weak D testing is not indicated for routine pre-transfusion testing or for obstetrical patients.
   b. Weak D testing is not indicated for patients who have developed anti-D.
      i. Some partial D patients are capable of developing anti-D.
   c. Weak D testing on a neonatal sample is indicated to determine whether a Rh negative or weak D positive mother is a candidate for RhIG administration.
   d. Although weak D testing is not routinely performed, it may be used to resolve a Rh discrepancy.
   For example: The historical record indicates that the patient was Rh positive. Current testing by both the gel and tube methods appear to indicate that the patient is Rh negative. The weak D test is performed on the current sample, and indicates that the patient is weak D positive.

   Refer to Transfusion Medicine Policy, Weak D Testing.

4. Add the ABODISC profile note to record all Rh discrepancy results.

VIII. REFERENCES:

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

Attachments

ABO/Rh Discrepancy Form (rev. 06/25/2024)

Resolution of ABO Discrepancies for A Subgroups and Patients with Anti-A1 Job Aid (rev 06/05/2024)

Stem Cell Transplant History Form (rev. 06/25/2024)

Approval Signatures

Step Description	Approver	Date
	Kristina Davis: Staff Physician	Pending

	Jeremy Powers: Chief, Pathology	Pending
	Hassan Kanaan: OUWB Clinical Faculty	Pending
	Ann Marie Blenc: System Med Dir, Hematopath	Pending
	Muhammad Arshad: Chief, Pathology	Pending
	Ryan Johnson: OUWB Clinical Faculty	7/16/2024
	Masood Siddiqui: Staff Pathologist	7/16/2024
	John Pui: Chief, Pathology	7/16/2024
Policy and Forms Steering Committe (if needed)	Kelly Sartor: Mgr, Division Laboratory	7/16/2024
	Kristen DiCicco: Mgr, Laboratory	7/16/2024
	Fatima Bazzi: Medical Technologist Lead	7/16/2024
	Katherine Persinger: Mgr, Laboratory	7/16/2024
	Karrie Torgerson: Medical Technologist Lead	7/13/2024
	Hilary Morey: Medical Technologist Lead	7/12/2024
	Ashley Beesley: Mgr, Laboratory	7/12/2024
	Suzanne Chahine: Medical Technologist Lead	7/12/2024
	Teresa Lovins: Supv, Laboratory	7/12/2024
	Kelly Sartor: Mgr, Division Laboratory	7/11/2024
	Kelly Sartor: Mgr, Division Laboratory	7/11/2024