University of Washington Medical Center 1959 NE Pacific Street. Seattle, WA 98195 Transfusion Services Laboratory Policies and Procedures Manual	Original Effective Date: 03-14-16 Revision Effective Date:	Number: PC-0055.02

TITLE: **Transfusion Reaction Investigation**

PURPOSE:
To describe the process for investigating, evaluating and reporting suspected transfusion reactions (complications of transfusion).

PRINCIPLE & CLINICAL SIGNIFICANCE:
Any adverse signs and/or symptom occurring during or subsequent to the transfusion of blood or blood components should be considered a potential part of a life-threatening reaction.

POLICIES:
- Transfer all phone notifications of a suspected transfusion reaction to a Medical Laboratory Scientist (MLS) or (TSL) manager to obtain information necessary for initiation of a suspected reaction workup
- Testing associated with a suspected transfusion reaction workup is considered **STAT** and any positive test results are reported immediately to the Transfusion Service Laboratory (TSL) resident on-call or TSL MD
- Except in the case of life threatening bleeding, or as indicated by the TSL covering physician, further transfusion should be deferred until the initial work-up is completed and the TSL resident on-call or TSL MD has approved further transfusions. In this case, ONLY group O RBCs, AB plasma and non-group O platelets may be provided until a hemolytic transfusion reaction has been ruled out
- Any adverse reaction experienced by a patient in association with a transfusion should be regarded as a suspected transfusion reaction and must be evaluated promptly and to the extent considered appropriate by the medical director. The evaluation should not delay proper clinical management of the patient (e.g. issuing blood to severely bleeding patients
- The following symptoms do **NOT** require a post reaction specimen:
    - Mild urticarial rash, hives, redness or itching/pruritus only
- Blood components associated with a suspected transfusion reaction are stored in the appropriate quarantine shelves and should be placed in storage as soon as possible to prevent deterioration or bacterial growth
- Transfusion Support Service (TSS) at SCCA is notified of suspected transfusion reactions by nursing staff. TSS staff will fax the Report of Suspected Transfusion Reaction to UW TSL , and send the post transfusion samples with the next courier to UW TSL
- The blood supplier is notified by the medical director in the event of a transfusion related fatality; transfusion transmitted infectious disease or other serious adverse transfusion event that may be related to the donor. Initial notification will be performed as soon as such reactions are recognized, followed by written notification

SPECIMEN REQUIREMENTS:
EDTA is preferred and if not tested soon after collection, should be stored at 1-6°C.
Red top tubes are acceptable**.** See SOP *Specimen Acceptability and Order Receipt*

REAGENTS/SUPPLIES/EQUIPMENT:

Reagents:	Supplies:	Equipment:
• Anti-A, -B, -D • A1 & B cells • Anti-IgG, C3b • IgG coated control cells • Blood Bank Saline	• 12 × 75 glass tubes • Blood bank transfer pipettes	• Calibrated serologic centrifuge • Agglutination viewer

QUALITY CONTROL:
Quality Control is performed daily

INSTRUCTIONS

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Initial Workup

STEP	ACTION
1	**If initial notification is by** / **Then** Phone • Record the following information on a blank ***Report of Suspected Transfusion Reactions*** **(RSTR)** form: ○ Patient Name and HID ○ Date and time of reaction ○ Symptoms ○ Amount of product transfused ○ Name of nurse/clinician reporting the transfusion reaction ○ Date and time of notification • Instruct the nurse/clinician to send the following to the TSL ASAP ○ *Report of Suspected Transfusion Reaction* form ○ Copy of the *Transfusion Record* ○ Component bag(s) and attached infusion set and IV fluid ○ Labeled post reaction EDTA specimen **NOTE**: Post reaction sample is not required for the following: ▪ Mild urticarial rash, hives, redness or itching/pruritus only ○ Any un-spiked components that are pending transfusion

<table>
<tr><th>STEP</th><th>ACTION</th></tr>
<tr><td></td><td>Receipt of Report of Suspected Transfusion Reaction Form with/without component bag and post-transfusion specimen
• Recall any issued and un-spiked components immediately
<table>
<tr><th>If Post-Transfusion specimen</th><th>Then</th></tr>
<tr><td>Sent</td><td>Go to next step</td></tr>
<tr><td>Not Sent</td><td>Call the nurse/clinician and request a labeled post reaction EDTA specimen and/or component bag
NOTE: Post reaction sample is not required for the following:
▪ Mild urticarial rash, hives, redness or itching/pruritus only</td></tr>
</table></td></tr>
<tr><td>2</td><td>Page Lab Medicine resident on call for Transfusion Service through paging operator at 598-6190 to notify of the suspected transfusion reaction.</td></tr>
<tr><td>3</td><td>Open ‘Blood Order Processing’ and select ‘Unit information (UNO)’ and enter the following:
<table>
<tr><th>If</th><th>Then free text</th></tr>
<tr><td>One component is involved</td><td>• The unit number
• Component type: RBC, PLT, plasma, CRYO, granulocyte</td></tr>
<tr><td>Multiple components are involved</td><td>• “Multiple, see report”
• Print a BBI printout of the patient’s transfusion history and attach to the Report of Suspected Transfusion Reactions form</td></tr>
<tr><td>Component bag was not returned</td><td>• Tab to a new line and enter “bag not returned”</td></tr>
</table></td></tr>
<tr><td>4</td><td>Perform a Clerical Check (CLCK) by examining the request form, blood components, administration set and IV fluids, Transfusion Records and pre and post-transfusion patient samples and records to determine if any discrepancies exist
<table>
<tr><th>If discrepancy is</th><th>Then enter English text code</th><th>SQ Hot Key</th></tr>
<tr><td>NOT detected</td><td>;CLCKP (passed clerical check)</td><td>C</td></tr>
<tr><td>Detected</td><td>;CLCKF (failed clerical check)
and tab to a new line to free text an explanation of the discrepancy</td><td>F</td></tr>
</table></td></tr>
<tr><td>5</td><td>Add test POSTSP (Hot key = T) and perform a visual hemolysis inspection of the spun post-transfusion specimen (if provided)</td></tr>
<tr><td>6</td><td>Inspect sample for evidence of hemolysis or icterus
<table>
<tr><th>If hemolysis/ icterus is</th><th>Then</th></tr>
<tr><td>NOT observed</td><td>Result POSTSP (SQ Hot Key <Y>) test as English text code ;HEMNO</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>STEP</th><th>ACTION</th></tr>
<tr><td></td><td>
<table>
<tr><td>Observed</td><td>Add test PRESP (SQ Hot Key <S>)and perform a visual inspection of the spun pre-transfusion specimen for hemolysis, if available
<table>
<tr><th>If the pre specimen is</th><th>Then</th></tr>
<tr><td>Hemolyzed</td><td>• Enter the results for both post and pre specimen as ;HEM (hemolysis present)
• Refer to section Additional Workup - Suspected Hemolytic Transfusion Reaction</td></tr>
<tr><td>Not hemolyzed</td><td>Request a redraw to rule out a traumatic stick and repeat the inspection of the new sample
<table>
<tr><th>If hemolysis/ icterus is</th><th>Report</th><th>SQ Hot Key</th></tr>
<tr><td>NOT observed</td><td>• Post sample ;HEMNO (no visible hemolysis)
• Cancel the PRESP</td><td>Y</td></tr>
<tr><td>Observed</td><td>• Report as ;HEM
• Refer to section Additional Workup - Suspected Hemolytic Transfusion Reaction</td><td>E</td></tr>
</table></td></tr>
</table></td></tr>
</table></td></tr>
<tr><td>7</td><td>Add test ABR and perform an ABO and Rh type on the post transfusion specimen (if provided) (refer to SOP ABO/Rh Manual Tube Method)
<table>
<tr><th>If the pre & post ABO/Rh</th><th>Then</th></tr>
<tr><td>Matches</td><td>Enter the post sample results in Sunquest following SOP ABO/Rh Manual Tube Method</td></tr>
<tr><td>Does not match</td><td>Notify the TSL MD of a possible ABO incompatible transfusion (as applicable) and call the floor to draw a new sample (if not already requested in step 7)
<table>
<tr><th>If the pre & second post ABO/Rh</th><th>Then</th></tr>
<tr><td>Match</td><td>• Enter the second post sample results in Sunquest following SOP ABO/Rh Manual Tube Method
• Follow procedure for mislabeled samples regarding the 1st sample</td></tr>
<tr><td>Does not match</td><td>• Immediately notify the TSL Lead or manager and the TSL MD on-call
• Refer to section Additional Workup - Suspected Hemolytic Transfusion Reaction</td></tr>
</table></td></tr>
</table></td></tr>
<tr><td>8</td><td>Add test DBS and perform a direct antiglobulin test (DAT) on the post transfusion specimen (refer to SOP DAT (Direct Antiglobulin Test) by Tube Method)</td></tr>
</table>

<table>
<tr><th>STEP</th><th>ACTION</th></tr>
<tr><td></td><td>
<table>
<tr><th>If the DAT is</th><th>Then</th></tr>
<tr><td>Negative</td><td>Enter result following SOP DAT (Direct Antiglobulin Test) by Tube Method</td></tr>
<tr><td rowspan="3">Positive</td><td colspan="2">Perform a DAT on pre-transfusion sample</td></tr>
<tr><td>If</td><td>Then</td></tr>
<tr><td>Post is positive and pre is negative</td><td>• Perform a DAT with monospecific IgG reagent and an eluate
• Refer to section Additional Workup - Suspected Hemolytic Transfusion Reaction</td></tr>
<tr><td>Both pre and post are positive</td><td>Contact the TSL Lead for guidance and notify covering physician</td></tr>
</table>
</td></tr>
<tr><td>9</td><td>
<table>
<tr><th>If the following is suspected</th><th>Then</th></tr>
<tr><td>Hemolytic reaction

(Pre & Post ABO/Rh do not match, positive post hemolysis and/or positive DAT)</td><td>• Notify the TSL Lead or manager and TSL MD
• NOTE: Additional testing required. Refer to section Additional Workup–Suspected Hemolytic Transfusion Reaction</td></tr>
<tr><td>TRALI</td><td>• Inform TSL Lead or manager and TSL MD
• Search product inventory, immediately, for other components with the same unit number and quarantine any found
• Notify the blood supplier immediately
• TSL MD will determine if HLA/HNA typing of the recipient is required</td></tr>
<tr><td>Bacterial Contamination</td><td>• Await results of Gram stain and/or culture from Microbiology and report when available
•
<table>
<tr><th>If</th><th>Then</th></tr>
<tr><td>Positive</td><td>• Notify LMR (lab medicine resident) immediately for any positive results
• Notify the blood supplier immediately of positive results</td></tr>
<tr><td>Negative</td><td>• No further action required</td></tr>
</table>
</td></tr>
<tr><td>Anaphylactic Reaction</td><td>IgA levels or IgA antibody detection may be ordered by the TSL MD or patient’s physician</td></tr>
<tr><td>Other</td><td>Perform additional testing if ordered by the TSL MD</td></tr>
</table>
</td></tr>
<tr><td>10</td><td>Notify the TSL MD or resident on-call with the results of the investigation and to obtain approval to transfuse if additional products are requested
<table>
<tr><th>If</th><th>Then enter the following</th></tr>
<tr><td>Approved</td><td>BBC comment to the TRRX battery
• “Approved to receive additional blood component transfusion”
• Name of person approving further transfusion</td></tr>
</table>
</td></tr>
</table>

STEP	ACTION
	Not Approved: BBC comment to the TRRX battery " • "NOT approved to receive additional blood component transfusion" • Name of person who does not approve further transfusion **NOTE**: If only the following symptoms are noted, further blood products may be released prior to approval: rash, urticaria, itching/pruritus, temperature rise <1°C with no other symptoms, or flushing
11	Upon approval, enter a BBC comment to the TRRX battery: "Approved to receive additional blood component transfusion"
12	**If** / **Then** NOT a suspected hemolytic reaction → Go to section "Interpretation" Suspected hemolytic reaction → Go to next section Additional Workup–Suspected Hemolytic Transfusion Reaction

Additional Workup - Suspected Hemolytic Transfusion Reaction

STEP	ACTION
1	Perform an Antibody Screen on the post transfusion specimen
2	**If antibody screen is** / **Then** Negative → Continue to next step Positive → Perform an Antibody Screen on the pre transfusion specimen and perform antibody identification if not already completed on the pre-transfusion sample
3	**If** / **Then** Post-reaction IgG DAT is positive and the pre-reaction IgG DAT is negative → • Perform an eluate • Go to the next step Post-reaction IgG DAT is more strongly positive than the pre-reaction IgG DAT → • Perform an eluate • Go to the next step None of the above → Go to next step
4	**If the reaction is to** / **Then** RBC component → • Perform an antiglobulin crossmatch with the pre and post transfusion samples • Antigen type the component for antigens to any newly detected clinically significant antibodies Component other than a RBC component → Continue to next Step
5	Go to section "Interpretation"

FDA Notification of a Transfusion Related Fatality

STEP	ACTION	Responsible Person
1	Notify a TSL Medical Director immediately	TSL Staff
2	Notify the manager and Compliance Analyst	
3	Notify the FDA within 24 hours of fatality ○ Voice-mail: 240-402-9160 ○ E-mail: fatalities2@fda.hhs.gov ○ Fax: 301-827-0333 Send a subsequent written report within 7 days to the following address: U.S. Food and Drug Administration Center for Biologics Evaluation and Research Document Control Center 10903 New Hampshire Avenue WO71, G112 Silver Spring, MD 20993-0002	TSL Medical Director or TSL Management
4	Notify the blood supplier in the event of a transfusion related fatality, transfusion transmitted infectious disease or other serious adverse transfusion event that may be related to the donor. Initial notification will be done as soon as such reactions are recognized, followed by written notification.	

CALCULATIONS/INTERPRETATIONS/RESULTS REPORTING/NORMAL VALUES/CRITICAL VALUES

Interpretation

STEP	ACTION	Responsible Person
1	Make a copy of the *Report of Suspected Transfusion Reaction* and all additional paperwork **Route** / **To** Originals: TSL Medical Director for review and completion of written consultation report Copies: Retain in lab in appropriate pending file until consult is completed	MLS staff
2	Perform interpretation of the reaction and entering the full report in ORCA (Cerner) and return copies of all paperwork to the TSL lab	TSL Medical Director
3	Enter the TSL Medical Director transfusion reaction interpretation and medical director associate code in Sunquest along with the comment “See Cerner for full report”	MLS staff

RESULTS REPORTING:

Reactions are entered at the time of reading in Sunquest or on the appropriate manual form

Test	Enter	Entered by
Post Reaction Specimen Testing	Test reactions and results on the TRRX battery or appropriate manual form	Trained TSL MLS staff

Test	Enter	Entered by
Pre Reaction Specimen Testing	Test reactions and results on the original test battery	
TXRINT (TSL MD interpretation)	TSL MD interpretation of the reaction in Sunquest using the U.S. Biovigilance designation	
TXPATH	Resulted with the code associated with the Medical Director performing the interpretation	
Transfusion Reaction Interpretation in ORCA	Full report and interpretation	TSL MD

NOTES AND LIMITATIONS:

- If a delayed hemolytic transfusion reaction is suspected, testing should be performed in the same manner as for suspected acute hemolytic transfusion reactions. The evaluation should be ordered and reported in Sunquest. Page the Lab medicine resident (through the paging operator 598-6190) to notify this reaction.

- English text codes are for Sunquest entry only and should not be used when filling out manual forms.
- Additional tests such as the following may be ordered by the TSL MD or patient's physician, as part of the work. The testing will be performed by the appropriate UWMC Lab Medicine departments

○ Haptoglobin	○ Plasma hemoglobin	○ Bilirubin
○ Creatinine	○ BNP	○ BUN

REFERENCES:

- Standards for Blood Banks and Transfusion Services, Bethesda, MD; AABB, current edition
- Technical Manual, Bethesda, MD; AABB, current edition
- Guidance for Industry: Notifying FDA of Fatalities Related to Blood Collection or Transfusion, FDA CBER 9, 2003

RELATED DOCUMENTS:

FORM Report of Suspected Transfusion Reaction
FORM Clinical Lab Request Transfusion Reaction Culture
SOP Specimen Acceptability and Order Receipt
SOP Quality Control for Manual Testing Reagents
SOP Labelling for Manual Testing
SOP FDA-CBER Event Reporting
SOP DAT (Direct Antiglobulin Test) by Tube Method

APPENDIX:

Table 1: Sunquest Transfusion Reaction Type Codes

SQ Code	Reaction Type
DLHRX	Delayed hemolytic transfusion reaction
DSTRX	Delayed serologic transfusion reaction
HYTRX	Hypotensive transfusion reaction
OTH	Other
PTPUR	Post transfusion purpura
TAGVH	TA-Graft versus host disease
TRALI	Transfusion related acute lung injury
TRDYN	Transfusion related dyspnea
TRPUNK	Unknown pathophysiology
TXALL	Allergic Reaction
TXCULT	Transfusion associated infection (bacterial, viral, parasitic, other)
TXFEB	Febrile non-hemolytic transfusion reaction
TXHEM	Acute hemolytic transfusion reaction
VOLO	Transfusion associated circulatory overload

UWMC SOP Approval:

UWMC CLIA Medical Director	Mark H. Wener, MD	Date	
Transfusion Service Manager	Nina Sen	Date	
Compliance Analyst	Christine Clark	Date	
Transfusion Service Medical Director	Monica B. Pagano, MD	Date	

UWMC Biennial Review:

	Date	
	Date	

REVISION HISTORY:
01/15/21 **–** Clarified instructions for reporting positive gram stain results to the lab medicine resident