

# Blood Bank Orientation

Grace C. Tenorio MD  
Transfusion Medicine  
Robert Wood Johnson University Hospital  
August 1, 2016

# What's in Your Folder

- *RWJUH* Blood Transfusion Criteria Guidelines
  - Guidelines in ordering blood transfusions
  - Transfusion of special products
    - Irradiated or leukoreduced
    - “CMV seronegative donors” vs. “CMV safe”
  - Massive Transfusion Protocol
    - For trauma or OR use
    - Units issued in coolers “in fixed sequential order and numbers”
  - Donor Source
    - Allogeneic (volunteer): Bank or Directed
    - Autologous Only

# Prior to ordering blood or blood component

- The patient must have a valid “TYPE AND ANTIBODY SCREEN” sample
  - Each sample is valid only for **3 days** and expires midnight of the 3<sup>rd</sup> day
- VERIFY THAT INFORMED CONSENT FOR TRANSFUSION OF BLOOD PRODUCTS IS CURRENT & SIGNED IN THE CHART
  - Consent is valid for the duration of each hospitalization
  - Outpatient consent is valid only for **30 days**
  - If the patient refuses transfusion of blood for any reason (i.e., Jehovah’s Witness), check the corresponding box
- For indications other than “Acute Blood Loss”: One unit is released per order.
  - If more units are needed, contact the Blood Bank (extension: 2060)

# Blood Type and Antibody Screen

- Includes a Compatibility and Crossmatch specimen
  - Lavender Top test tube
  - Valid for 3 days only
- A confirmatory sample is drawn:
  - If a patient does **not** have a historical blood type in our Blood Bank
  - As a separate (2<sup>nd</sup>) venipuncture
  - By a different person at a different time

# RWJUH Informed Consent for Blood Products include the following:

- Benefits of blood transfusion
- Risks of blood transfusion
- Potential adverse effects....
  - ...infection with Hepatitis B and C, HIV...
- Alternatives to volunteer/donor blood...
- Consent
- Refusal of blood products is governed by the policy of “Center for Innovations in Bloodless Surgery and Medicine: Program Guidelines.” This must be reviewed with patient and/or family.

**Estimated Risks of Transfusion Transmitted Infection in the US  
based on Window Period and Incidence Estimates  
(AABB Technical Manual 18<sup>th</sup> Ed)**

<b>Study Period</b>	<b>Agent</b>	<b>Window Period (days)</b>	<b>Residual Risk per Donated Unit</b>
2007-2008*	HIV	9.1	1:1,467,000
2007-2008*	HCV	7.4	1:1,149,000
2009-2011†	HBV	26.5-18.5	1:843,000 to 1:1,2018,000

\* *HIV and HCV risks based on minipool of 16 by Nucleic Acid Testing*

† *HBV risk estimates based on minipool of 16 using Novartis Ultrio Plus assay, WP range reflects uncertainty in minimum infectious dose of HBV (1 copy/20 mL plasma or 10 copies /20 mL plasma)*

**FORLABUSE PATIENTONE**

4N-Rm 10-01 x3420  
Allergies: sulfa drugs, Dust, Eggs

004995712 / 960004313  
Harangozo, Andrea M

52y (Oct-12-1960) M

# SCM Screen for Ordering Blood/Blood Components

Order:  ID:

Requested By: Harangozo, Andrea M

Messages: Patient must have a valid Type and Antibody Screen sample (less than 3 days old). For indications OTHER THAN "Acute Blood Loss," one unit is released per order. If more is needed, please contact the Blood Bank. VERIFY THAT CURRENT SIGNED CONSENTS ON CHART.

Conditional Order  Max # of activations:

**Emergency Release (UnCrossmatched):**

Reason (Required) for Emergency Release:

Relevant Results:

NEEDED FOR (Required):  From ED Stock:

Transfuse Date:  When Needed:  Donor Source:

Number of Units:  Number of mls (Total) for Peds:  Number of Allqods:  Special Needs (\*):

Transfusion Indicator:

**Acute Blood Loss**  
 Hemodynamically Stable: Hgb < or equal to 7 g/dL in ICU pts or Hgb < or equal to 8 g/dL in other pts  
 Symptoms (chest pain, orthostatic hypotension or tachycardia unresponsive to fluid resuscitation) irrespective of Hgb.  
 Acute coronary syndrome, with symptoms attributable to anemia irrespective of Hgb  
 Hyper OR exchange transfusion OR sickle cell OR Thalassemia variants  
 Transfusion dependent chronic anemia  
 Whole Blood Exchange  
 Other Red Cell Indicator (specify below)  
 Special Instructions:

- Note: for Emergency Release:
1. Uncrossmatched Type O blood and AB plasma will be issued
  2. Must specify blood components
  3. Must specify number of units per component

\*\*\* FOR TRANSFUSION SERVICE Staff Use Only \*\*\* (Modify Order When Ready) \*\*\*

Quantity Ready:	Unit of Measure:	Product Type:	Time Ready:
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Comments:

Relevant Results Copy (at Order time):

# Under Relevant Results

- If NO results for Type and Antibody screen appear in “Relevant Result” field
  - MUST check (✓) : “Blood Type and Antibody Screen”



# Indicators for Blood Transfusion

- Acute Blood Loss
- Hemodynamically stable:
  - Hgb  $\leq$  7 g/dL in ICU patients or
  - Hgb  $\leq$  8 g/dL in other patients
- Symptomatic (chest pain, orthostatic HTON or tachycardia unresponsive to fluid resuscitation) irrespective of hemoglobin
- Acute coronary syndrome with symptoms attributable to anemia irrespective of Hgb
- Exchange transfusion for sickle cell disease
- Transfusion dependent chronic anemia
- Whole Blood Exchange (neonatal exchanges)
- Other red cell indicator (specify below)

## Special Needs:

- Irradiated
- Leukoreduced (considered CMV Safe)
- Leukoreduced and Irradiated

## Special Instructions (needs approval by Blood Bank MD)

- CMV Negative
- Washed red cells or single donor platelets (SDP)
- Antigen negative units (*i.e.* HPA-1a negative SDP)
- Crossmatched or HLA matched SDP
  - For patients refractory to random SDP
  - For patients with Positive Platelet Antibody screen (in House test)
- Half units for patients with fluid overload to prevent TACO

# When Transfusing Blood/Components

- Transfuse one unit at a time
- All blood components must be transfused **within four (4) hours** after release from the blood bank
- Check post-transfusion blood counts after each unit prior to transfusing another unit
- If not transfused, RETURN to the Blood Bank within:
  - 30 mins for RBCs issued without any cooler
  - 60 mins for FFP
  - 60 mins for Cryoprecipitate at RT\* (never in ice or in cooler)
  - 2 hours for platelets at RT\* (never in ice or in cooler)
  - RBCs in coolers are good for 6 hours with ice over the units

\* *Room temperature*

## 2016 Cost of Blood Products Charged to Patient

Product *	COST (\$\$)
Leukoreduced red cells	756.00
Leukoreduced Irradiated red cells	886.00
Frozen RBCs (washed, from rare donor registry)	1914.00
Leukoreduced single donor platelets (SDP)	2768.00
Crossmatched SDP (available in-house)	3018.00
HLA matched SDP w/irradiation (ordered outside)	3013.00
Fresh frozen plasma	513.00
Cryoprecipitate (5 U/bag)	1465.00
Average cost per antigen**	100.00

\* Without Additional Shipping Cost (for emergency transport add \$300.00)

\*\* If need antigen negative blood

# If you suspect a Transfusion Reaction...

- **STOP the TRANSFUSION**
- CONFIRM THE IDENTITY OF THE RECIPIENT
- All acute transfusion reactions must be evaluated promptly by a physician or a licensed individual practitioner (LIP) before additional products can be transfused
- Complete the Transfusion Reaction Report in the Transfusion Record
  - Need SIGNATURE of RN and MD/LIP

Pages

Attachments

Comments

1/4

ROBERT WOOD JOHNSON UNIVERSITY HOSPITAL  
One Robert Wood Johnson Place, New Brunswick NJ 08901

**TRANSFUSION RECORD**

STATEMENT OF IDENTITY OF PATIENT: We certify that the identity of this patient has been confirmed with the ARMBAND and there is no discrepancy between it and the information on this TAG and on the blood/blood component label.

SIGNATURES:

1) \_\_\_\_\_  
2) \_\_\_\_\_

Date: \_\_\_\_\_ Start Time: \_\_\_\_\_ End Time: \_\_\_\_\_

Completed By: \_\_\_\_\_ Volume Infused (in ml): \_\_\_\_\_

**BLOOD PRODUCTS NOT INFUSED MUST BE RETURNED TO TRANSFUSION SERVICE WITHIN 30 MINUTES**

Patient transfused in O.R. - See Anesthesia Flow Sheet

**VITAL SIGNS**

	PRE	1:30M				POST
TIME						
B/P						
PULSE						
TEMP						

2°F temperature increase >= 100.4°F notified to: \_\_\_\_\_

CHECK HERE IF TRANSFUSION REACTION IS SUSPECTED AND FOLLOW THE INSTRUCTIONS ON THE BACK OF THIS FORM TO REPORT A TRANSFUSION REACTION.

Time of Reaction: \_\_\_\_\_

Check Appropriate Boxes:

Discrepancy in Patient Identification  Yes\*  No

Previous:  Pregnancy  Transfusion  Reaction

\*A clerical discrepancy is a potential Medical Emergency. Consult the Transfusion Medicine Physician on call and Transfusion Service

SYMPTOMS RELATED TO TRANSFUSION:

Anaphylaxis (Hives)  Dyspnea  Hematuria  Chills  Nausea  
 Headache  Pain  Fever

Other information \_\_\_\_\_

SIGNATURE OF NURSE \_\_\_\_\_ DATE/TIME \_\_\_\_\_

SIGNATURE OF LP or PHYSICIAN \_\_\_\_\_ DATE/TIME \_\_\_\_\_

Affixed Label

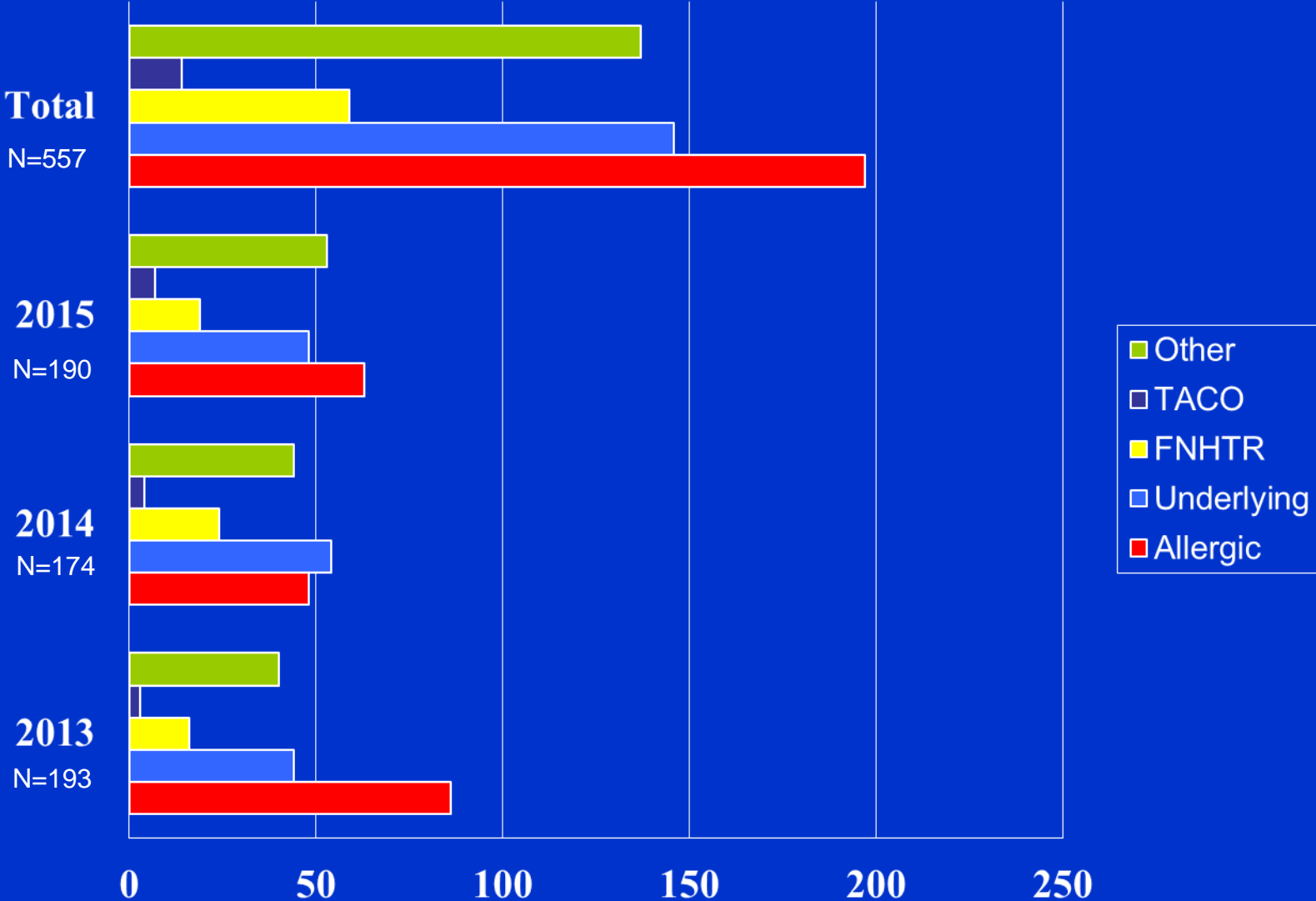
**RN sign here**  
**MD sign here, date & time**

CHART COPY (A)

# Types of Transfusion Reactions

- Hemolytic reactions
  - Acute or Delayed
- Non hemolytic reactions
  - Allergic
  - Anaphylaxis
  - FNHTR (febrile non hemolytic transfusion reaction)
  - Microbial Contamination
  - TACO (transfusion associated circulatory overload)
  - TRALI (transfusion related acute lung injury)
  - TAGVHD (transfusion associated GVHD)

# RWJUH Transfusion Reactions from 2013-2015





# Acute Hemolytic Transfusion Reaction (AHTR)

- A major cause of transfusion-related morbidity & mortality
- Commonly from **ABO** incompatibility
- Frequently preventable: policies are made to prevent occurrence
- The most common cause: **CLERICAL ERROR**
  - BB ONLY ACCEPTS PROPERLY LABELED SPECIMENS
  - BB REJECTS ALL MISLABELED SPECIMENS

# Acute Hemolytic Transfusion Reaction

- Hemolysis occurs within 24 hours of transfusion
- Commonly intravascular hemolysis from ABO incompatibility
- Fever, chills, N & V, hypotension, dark urine (hemoglobinuria), pain in infusion site or flank
- Mortality depends on volume transfused
- Stop transfusion, send a purple top for hemolysis check
- Avoid transfusions until work-up is completed

# Allergic Reactions

- Spectrum of “allergic to anaphylactoid to anaphylaxis”
- Involve skin, GI or respiratory
  - Skin: pruritus, hives, flushing
  - GI: nausea, vomiting, diarrhea, cramps
  - Respiratory: wheezes, dyspnea, stridor
- Anaphylaxis with hypotension
  - Recipients with IgA deficiency and anti-IgA antibodies
- Etiology: from donor soluble plasma proteins or infusion of vasoactive substances
- Premedication for prophylaxis (diphenhydramine or hydrocortisone)

# Febrile Nonhemolytic Transfusion Reaction

- $\geq 1^{\circ}\text{C}$  or  $2^{\circ}\text{F}$  rise in temperature
- Etiology: recipient antibodies against donor leukocytes or cytokine accumulation in the bag
- Chills, rigors, headache, nausea & vomiting
- Need to R/O hemolysis
  - Clerical and hemolysis check for blood
    - Hemolysis check: includes direct Coombs or DAT and visual hemolysis
- Need to R/O bacterial contamination, AHTR
  - Culture unit for any  $3^{\circ}\text{F}$  rise in temperature

# Microbial Contamination

- Dramatic and catastrophic presentation
- Immediate reaction (within 24 hrs)
- High fever, hypotension (shock), chills, nausea and vomiting
- Complications: shock, renal failure, DIC, death
- Risk factors: organism, volume and patient's underlying clinical condition
- Stop transfusion and draw blood cultures from patient. BB will culture unit.

# Transfusion Associated Circulatory Overload (TACO)

- Common but preventable
- Rate of transfusion exceeds capacity of a compromised cardiovascular system
- Risk: pre-existing heart disease, CHF
- Dyspnea, cyanosis, JV distension
- LAB: CXR showing pulmonary edema or bilateral infiltrates and high BNP
- Prevention: Split unit and transfuse each half unit slowly

# Transfusion Related Acute Lung Injury (TRALI)

- Acute life threatening respiratory distress within 6 hours of a transfusion of a plasma containing product (RBCs, SDP, FFP)
- Severity disproportionate to volume transfused
  - Must differentiate from a TACO
- Etiology: donor antibodies (anti-HLA, anti-HNA)
- Bilateral noncardiogenic pulmonary edema
- Management: O<sub>2</sub>, ventilatory support

# Transfusion associated Graft vs Host Disease (TA-GVHD)

- Very rare, incidence affected by genetic diversity
- Occurs 8-10 days after transfusion (3-30 days)
- Donor lymphocytes in unit recognize host as foreign and mount an attack on host tissues:
  - Fever, rash, diarrhea, elevated liver enzymes, pancytopenia
- High (99%) mortality rate
- Prevention: **Irradiation** of cellular products (only RBCs and platelets) for patients at risk



# Indications for Irradiation (to prevent TA-GVHD)

- Intrauterine transfusions and neonatal exchange transfusions
- Premature and low birth weight infants
- Congenital immunodeficiency syndromes
- Peripheral blood stem cell or marrow transplantation
- Hematologic malignancies (i.e., leukemia, lymphoma, multiple myeloma, myeloproliferative and myelodysplastic syndromes)
- Blood products from blood relatives, crossmatched, HLA-matched or partially matched products
- Solid tumors (only for neuroblastoma, sarcoma, Hodgkin lymphoma)
- Granulocytes
- Medications: Fludarabine, Cladribine, Pentostatin and Campath (anti-CD52)

For questions or more information call  
Transfusion Services at ext. 2060