

Good transfusion practices in Hospital

Transfusion medicine,
AIIMS, New Delhi

Transfusions

Invasive procedure

Biological product

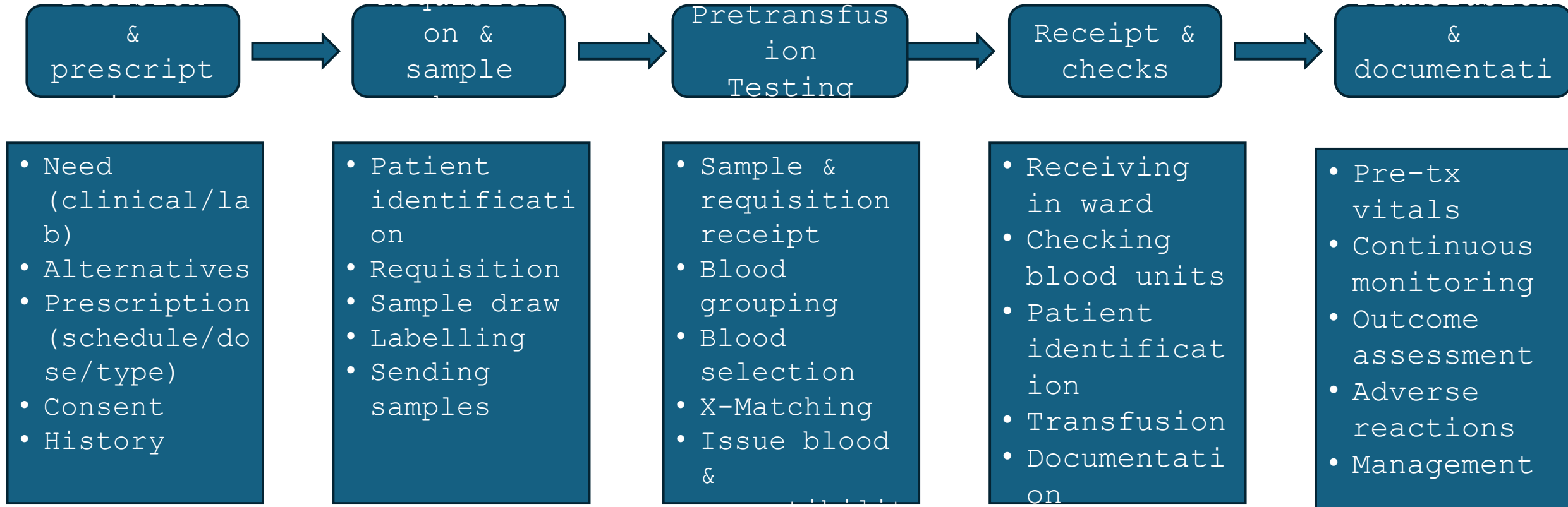
Perishable scarce
resource

Multi-step procedure

Multiple persons

Adverse effects

Transfusion Chain



Patient blood management

	PILLAR ONE Optimise RBC mass	PILLAR TWO Minimise blood loss	PILLAR THREE Manage anemia
preoperative	• detect and treat – anemia – iron deficiency • cease medications	• detect and treat – bleeding – bleeding risk • minimise phlebotomy • timing of procedure	• bleeding history and management plan • estimate anemia tolerance • optimise cardio-pulmonary function
intraoperative	• time surgery for optimisation of erythropoiesis and red cell mass	• meticulous haemostasis (surgical + anaesthetic) • cell salvage • avoid coagulopathy • patient positioning / warming • pharmacological agents	• optimise cardio-pulmonary function • optimise oxygenation • restrictive transfusion strategies
postoperative	• manage anemia and iron deficiency • manage medications and potential interactions	• monitor and manage post OP bleeding • patient warming • minimise phlebotomy • treat infections	• maximise O₂ – delivery • minimise O₂ – consumption • restrictive transfusion strategies

Key features

- Tranexamic acid “**game changer**”
 - CRASH-2 trial: 15% reduction in mortality from hemorrhage
 - WOMAN trial: 31% reduction in mortality from hemorrhage
 - Without increasing the risk of deep venous thrombotic events.
- **Optimize triggers**
 - ✓ Restrictive strategy: 9 RCTs (TRICC, TRISS, TRIGGER, TRACS, FOCUS, TRIFE, Etc.)
- **Evidence-based practice**
 - International/ National/ (**Regional/ Institutional**)
 - Endorsed by the hospital's transfusion committee.
- **Single unit transfusion: “Why give 2 when 1 will do?”**
 - Resulted in a 50% decrease in double-unit RBC transfusion



1. DOCTORS ORDER

R_x

- Need for transfusion (rationale)
- When and where ?
- Type of Component
- No of units and rate of transfusion
- Taking of informed consent
- Special instructions (irradiation/leukofiltration/small vol)
- Reviewing the previous transfusion records
- Lab investigations

DOCUMENTED



Getting informed consent ?

- Dialogue
 - ✓ Understand
 - ✓ Risks and Benefits
 - ✓ Possible consequences
 - ✓ Alternatives
 - ✓ Opportunity to ask questions
 - ✓ Right to refuse
- Language
- Documented

CONSENT FORM FOR TRANSFUSION OF BLOOD AND BLOOD PRODUCTS

NAME: _____ AGE: _____ SEX: _____

Hospital No: _____ Date: _____ Time: _____

Name of the treating Doctor: _____

I hereby give consent to the transfusion of blood / PRC / Platelet / plasma / granulocyte / special products like Cryo, glue, CPP.

I understand that transfusion of blood and blood products is necessary for my disease/surgery/procedure planned.

I understand that the blood products transfused to me are negative for transmissible infections like HIV, Hepatitis B and C, syphilis and malaria though may not be absolutely free of these infections and of other infections which can be transmitted by blood for which it is not routinely tested.

I have also been explained of the untoward complications that may occur during and follow transfusion. I was able to ask questions and raise concerns with the doctor about the proposed procedure and its risks, and my treatment options. My questions and concerns have been discussed and answered to my satisfaction.

I understand the need for blood donation and switching of Blood groups with compatibility in case of emergency and nonavailability of specific groups.

All the above points have been explained to me in the language that I can understand.

Signature of the patient

(If the patient cannot sign or is a minor)

Signature of the spouse/parents/Guardian :

Relationship with the patient :

Witnesses:

Signature

Name:

Address:

Signature

Name:

Address:

2. REQUISITION PROCESS

- Immediate <15 min
- Urgent 15-45 min
- Routine 45-4 hrs

Request form				RBC	
BLOOD BANK AIIMS NEW DELHI-110029 BLOOD AND COMPONENT REQUEST FORM					
Blood required on :	Type of Request	SR-Name/Sign.	Patient Transfusion Details		
	Indicate No. of Units required against component		Shock:	BP : mm/Hg	
Red Blood Cell			Hb: gm%/dl	PT : sec	
			Platelet Count : cu/mm	APTT : sec	
			Weight : Kg	FVIII Level :	
Remarks			If overriding "Indication for Transfusion" Give reason		
Patient's Name :		Age :	Gender :	Ward/Bed :	
UHID:		Clinical Diagnosis		Pro/Unit	
Previous Transfusion	Date:	Patient's Blood Group	Total Replacement Donation/Card no /		
Date & Time Request Sent		Signature of Requesting Doctor			
Name & Designation of Requesting Dr.					
INCOMPLETE AND MULTILATED FORMS WILL NOT BE ACCEPTED					
FOR BLOOD BANK USE ONLY			CROSSMATCHED UNITS		
Received In Blood Bank by :			Date and Time :		
COMPATIBILITY TESTS					

Sample collection

Reducing Mis-collected samples /
Wrong blood in the tube (WBIT)

Blood sample collection protocol

Follow the given steps “*One patient at a time*”



Step 1: Check for tests ordered & select the vacutainers to be used.



Step 2: Collect the desired equipment's including the needle, syringes, vacutainers, pre-printed bar codes (**with at least 2 patient identifiers; patient name & TC Number**), alcohol swabs, cotton rolls, etc.



Step 3: Perform hand hygiene and put-on well-fitting gloves.

Step 4: Confirm the Identify of patient by asking his/her details or use patient identification band (if patient is unconscious).

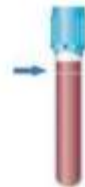


Step 5: Confirm or match the details of the patient with the information on the barcodes.



Step 6: Select the site (vein/ IV cannula) for sample collection and disinfect it using alcohol swabs.

Step 7: Collect the desired amount of sample and mix sample by inverting it 2-3 times.



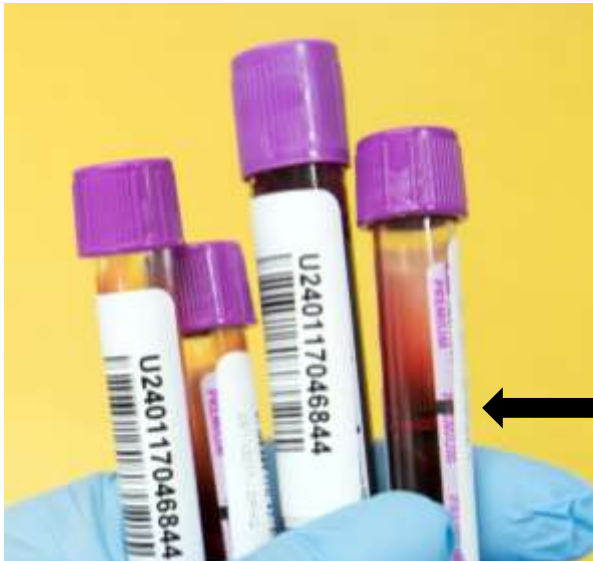
Step 8: Attach the barcodes on the vacutainers (or write patient identifiers manually) and put your initials along with date & time of sample collection.

Step 9: Send the sample to the lab/blood bank along with requisition forms and discard the blood sampling devices and swabs.



Ensuring sample appropriateness

- For cross match: 3-5ml blood in EDTA tube
- For blood group: 2-3 ml blood in EDTA tube
- For < 4 months of age
 - 5 ml mothers' sample & 0.5-1 ml sample
- Always check for adequacy of sample



- ☞ Patients surname, given name(s) in full
- ☞ Hospital record number and / or date of birth
- ☞ Date & time of collection
- ☞ Signature or initials of collector

- ✓ Samples that do not conform
 - Mislabelled
 - Partially labelled
 - Incompletely labelled
 - Illegibly labelled

Sending request & sample

1. Physically (electronic/telephonic)
2. Dedicated porter/hospital attendant
3. Transport box (for sample) - smudging of forms
4. Use a receiving register



3. PRE-TRANSFUSION TESTING

Sample/request receipt

- Sample and request form received
- Information is matched
- Adequacy of sample
- Timing of receipt is noted
- Component requirement is assessed
- Type of cross-match

Donations ??

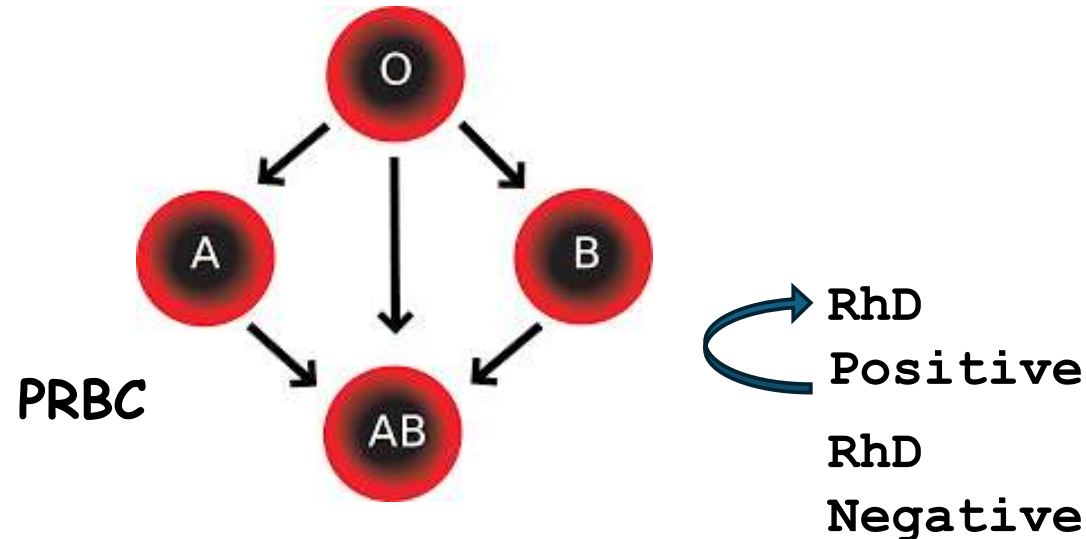
Process at blood centre

- Blood grouping
- Selection of blood components
- Cross-matching / compatibility testing
- Cross-match report
- Compatibility labels
- Visual inspection and clerical checks before issuing
- Details (& time) of collection

3. PRE-TRANSFUSION TESTING

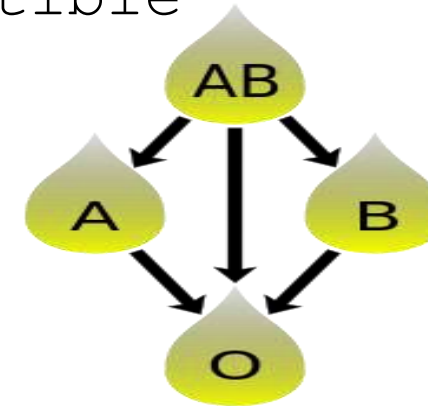
RBC – XM (patient sera x RBC blood unit)

- Cross-matched (AHG XM)
 - Saline matched (IST XM)
 - Group specific/ “O” blood
 - ABO identical vs ABO compatible
- Immediate <15 min
 - Urgent 15-45 min
 - Routine 45-4 hrs



Plasma/platelet

- ABO identical vs ABO compatible



CRYOPRECIPITATE: Non-specific



Product label

Cross-match label

Department of Transfusion Medicine Blood Bank, JPNATC, AIIMS, Raj Nagar, New Delhi-29 License no. 1891 on Form 28C CROSSMATCH LABEL Check before transfusion, transfuse as soon as possible (if not to be used, return immediately to blood bank)	
Blood bag No. _____	ABO/Rh _____
Patient name _____	Age/sex _____
ABO/Rh _____	T.C. no. _____ Ward/bed no. _____
Date and time of issue _____	Issued by _____

Department of Transfusion Medicine Blood Bank, JPNATC, AIIMS, Raj Nagar, New Delhi-110029 License no. 1891 on Form 28C	
A Rh (D) positive Non reactive for HBsAg, anti-HIV-1/2 ab+P₂₄ Ag, anti-HCV ab, Syphilis & ID- NAT. MP – Negative	Donation no. _____ Date of collection: _____ Date of expiry: _____
	Voluntary/ Family voluntary/ Replacement donor
PACKED RED BLOOD CELLS I.P. (210-380 ml) (CPD-Anticoagulant & SAGM- additive solution) <u>Instructions for use</u> •Refrigerate continuously at 1 to 6 °C. •Do not dispense without prescription. •Transfuse only cross matched blood. •Do not add any medications to this bag. •Do not warm before administration. •Shake gently before use. •Use sterile blood transfusion set with filter. •Do not transfuse if the contents show visible signs of deterioration. •Check blood group of recipient & blood bag before administration. •Tally unit no. on the product and issue report	

Compatibility report

1

Check details

Department of Transfusion Medicine
Blood Bank, JPNATC, AIIMS, Raj Nagar, New Delhi-110029
License no. 1891 on Form 28C (011-26731166)
COMPATIBILITY REPORT

Name :	Age / Sex :	TC No :
Blood Group :	Ward :	Bed No :
Blood Components Request No :		

S/No.	Component Name	Unit No	Blood Group	Antibody Screening	Compatibility		Issue Date and Time
					Saline	AHG	

Remarks : _____

Special precautions : _____

Signature (Technologist)

TRANSFUSION REACTION DETAILS (To be sent to Transfusion Medicine Department)

PATIENT DETAILS		
Name :	Age / Sex :	TC No :
Blood Group :	Ward :	Bed No :
Receipt of blood (time):	Starting time for transfusion:	

In the event of Transfusion reaction, please specify signs / symptoms of patient for suspected transfusion reaction as mentioned below:

S/N	Signs and Symptoms	Tick one	Remarks
1	Increase in temp of $>1^{\circ}\text{C}$ from pre transfusion temp	Yes / No	
2	Chills (Rigors), with or without fever	Yes / No	
3	Pain at infusion site, or in chest or at back (Flanks)	Yes / No	
4	Change in BP (Hypotension / hypertension)	Yes / No	
5	Respiratory distress / dyspnoea, tachypnoea, hypoxemia	Yes / No	
6	Oozing from IV site/open wounds/suture lines	Yes / No	
7	Haemoglobinuria	Yes / No	
8	Oliguria, anuria, Shock	Yes / No	
9	Rash / Urticaria	Yes / No	
Others			

Date : _____ Signature (JR/SR) : _____

In the event of Transfusion reaction:

- Stop the transfusion immediately.
- Keep the intravenous (IV) line open with a drip of normal saline.
- Contact the Blood Transfusion Officer/Resident immediately.
- Collect 3-4 ml of blood in EDTA vials from a vein away from transfusion site, and send it to blood bank for "Investigation of transfusion reaction" along with suspected blood component and the blood transfusion set.
- Collect the next specimen of urine passed by the patient and send it to the Laboratory Medicine department.
- Detailed report on the complained Transfusion Reaction will be made and provided to the patient as soon as possible with further investigations, suggestions, and precautions for subsequent transfusions
- Possible causes of such event, if identified will also be provided to the patient.
- It is to be noted, that each and every blood transfusion will carry risks of allergies and infections - due to their innate properties and window period status of infections.

Transfusion details

Pre - Transfusion vitals of the patient					
Time	B.P	Pulse	Resp. Rate	Temp	Remarks

(Pulse, BP and Resp. Rate should be recorded half hourly and temp. hourly during transfusion and 3 hrs. after transfusion.)

Transfusion Chronology				Vitals during transfusion				Remarks
Time	Blood Component type	Unit No	Volume transfused	B.P	Pulse	Resp. Rate	Temp	

Post - Transfusion vitals of the patient					
Time	B.P	Pulse	Resp. Rate	Temp	Remarks

Signature (JR/SR)

2

4

4. BLOOD ORDERING

- Dedicated porter/hospital attendant
- Receiving Register or a slip
- Transport box (temp controlled/cold box)
- Checking: Patient details should match = Documents received from blood center = blood component type & no. should also match
- Documented time of issue (hospital attendant name/sign)

5. PRE-ADMINISTRATION CHECKS

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Blood Bank, JPNATC, AIIMS, Raj Nagar, New Delhi-110029
License no. 1891 on Form 28C (911-10731146)
COMPATIBILITY REPORT

Name	Age / Sex :	TC No :
Blood Group :	Ward :	Bed No :
Blood Component Request No :		

S.No.	Component Name	Unit No	Blood Group	Antibody Screening	Compatibility		Issue Date and Time
					Saline	ABG	

Remarks : _____
Special precaution : _____
Signature (Technologist) : _____

TRANSFUSION REACTION DETAILS
(To be sent to Transfusion Medicine Department)

PATIENT DETAILS

Name :	Age / Sex :	TC No :
Blood Group :	Ward :	Bed No :
Receipt of blood (time) :	Starting time for transfusion :	

In the event of Transfusion reaction, please specify signs / symptoms of patient for suspected transfusion reaction as mentioned below:

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7	Haemoglobinuria	Yes / No	
8	Oliguria, anuria, Shock	Yes / No	
9	Rash / Urticaria	Yes / No	
Others : _____			

Date : _____ Signature (JR/SR) : _____

Cross-match label

Department of Transfusion Medicine
Blood Bank, JPNATC, AIIMS, Raj Nagar, New Delhi-29
License no. 1891 on Form 28C
CROSSMATCH LABEL
Check before transfusion, transfuse as soon as possible
(if not to be used, return immediately to blood bank)

Blood bag No. _____ ABO/Rh _____

Patient name _____ Age/sex _____

ABO/Rh _____ T.C. no. _____ Ward/bed no. _____

Date and time of issue _____ Issued by _____

Department of Transfusion Medicine
Blood Bank, JPNATC, AIIMS, Raj Nagar, New Delhi-110029
License no. 1891 on Form 28C

A Rh (D) positive

Non reactive for HBsAg, anti-HIV-1/2
ab+P₂₄ Ag, anti-HCV ab, Syphilis & ID-
NAT. MP – Negative

Donation no. _____

Date of collection: _____

Date of expiry: _____

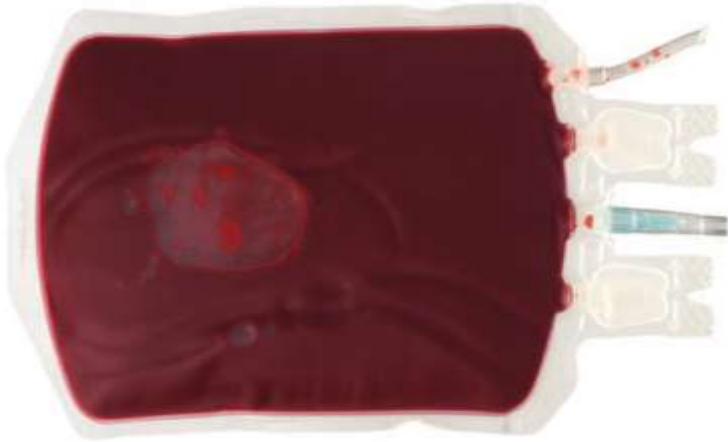
Voluntary/ Family voluntary/
Replacement donor

PACKED RED BLOOD CELLS I.P. (210-380 ml)
(CPD-Anticoagulant & SAGM- additive solution)
Instructions for use

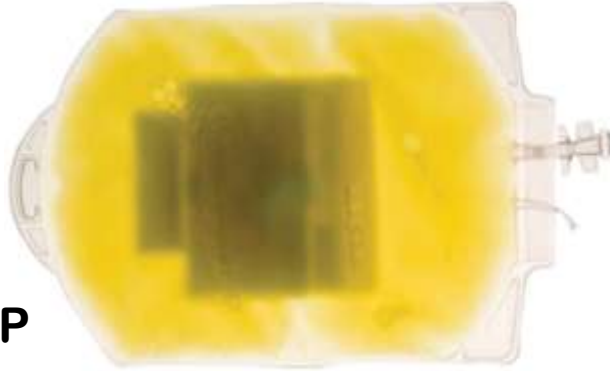
- Refrigerate continuously at 1 to 6 °C.
- Do not dispense without prescription.
- Transfuse only cross matched blood.
- Do not add any medications to this bag.
- Do not warm before administration.
- Shake gently before use.
- Use sterile blood transfusion set with filter.
- Do not transfuse if the contents show visible signs of deterioration.
- Check blood group of recipient & blood bag before administration.
- Tally unit no. on the product and issue report



Visual inspection



PRBC



RDP



FFP



Initiating a Transfusion: Final check

- **Step 1:** Check the patients notes for-
 - The component prescribed
 - Any special requirements e.g. leuco-depletion, warming, irradiation etc.
 - Any pre-medication ordered e.g. diuretic
- **Step 2:** Ask the patient for –
 - Identifiers (*Be extra vigilant for unconscious patient*)
 - Two health care personals to identify the recipient
- **Step 3:** Details on the Blood component:
 - compatibility label/compatibility report/blood unit/visual examination

Starting Transfusion

1. Record baseline vital signs and assessment before starting each unit:
 - Temperature / Blood pressure / Pulse / Respiration / SpO₂
2. Anti-sepsis
3. IV line
4. Blood transfusion set
5. Transfusion: Mixing before transfusion
6. Infusion devices, warmers
7. Medication

TRANSFUSION

Venous Access

- Dedicated for transfusion
- Peripheral or central access both can be used

Blood Product	Rate of infusion	IV Access	
Red blood Cells	Rapid Transfusion in adults	16-18 G	
Red blood Cells	Routine Transfusion in adults	20-22 G	
Other blood products		Any size adequate	
Pediatrics		22-24 G	

BT set

- Primed with NS or blood component
- 170-200 μ filter



Transfusion rate

- **Red cells:** Under **4 hours** from the time, the unit was taken out of fridge
- **Platelets:** Under **30 minutes**
- **FFP:** Under **30 minutes**

Suggested rate of transfusion: for first 15 min, Adults: 2ml/min

Pediatric: 1 ml/min

Adults	Rate	Paediatric patients	Rate
Whole blood	150-200 mL/hour	Whole blood / PRBC	2-5 mL/kg/hour
PRBC	100-150 mL/hour	Platelets / plasma	1-2 mL/minute
Platelets / plasma	150-300 mL/hour		

Changing BT set

- Most frequent recommendation for change after **every 4 units or 12 hourly**.
- Platelet concentrate should not be transfused with BT set which already used for other blood components.



Blood Warmers

- Temp range 37-42°C
- Accommodate flow rates up to 1000 ml/hr
- Over-heating protections & automatic cut off.
- Visual & acoustic alarm for malfunction.

Indications

Massive transfusion

Exchange transfusion

Patients with cold antibodies



Pressure infusion devices



Pneumatic Pressure devices are recommended for large volume rapid infusions (70-300 ml/min)



Exert pressure evenly over the entire bag (Vs. manual squeezing)



Gauge to measure pressure, (≤ 300 mmHg)



Rapid infusers usually incorporate a blood warmer.



Medications

- **Pre-medications:** should be given in advance (30-60 min for oral or 10 min for IV drugs)
- **During transfusion:** Use of antipyretics/ steroids/ anti-allergic may mask occurrence of transfusion reactions
- No medications or solution other than NS
 - Dextrose solution may lyse RBC
 - RL contains calcium may cause clotting
 - Exceptions (albumin, plasma protein fractions, plasmalyte-A, Normosol-R)

Delay in initiating transfusion ?

Return back

'30-minute rule'



Start transfusion within
'30-minutes' or return to
blood fridge

Blood out of the fridge for
> '30 minutes'?

Can still administer –
move to the '4-hour rule'

'4-hour rule'



Transfusion **must**
be complete within
30-minutes + 4-hours¹

Temporary storage

- RBC: domestic refrigerator: 2-6°C
- Plasma: domestic refrigerator: 2-6°C
- Platelet: clean shelf (22-24°C)
- Cryoprecipitate: clean shelf (22-24°C)



Clean, should
have no stool,
urine, food, etc.

Patient monitoring

For the first 15 minutes:

- Monitor patient closely.
- Start initially with a slow rate unless transfusion is extremely urgent.
- After 15 min. rate can increase up to 4 ml/min.

Frequency of vital observation

Before Starting



15 minutes



Every Hour



On completion



4 hours after

Blood Transfusion Sheet

Patient's Name _____ Reg. No. _____ Age _____

/Sex _____

Patient's Blood Group _____

	Blood Bag Number	Blood group and Type of Blood component	Vitals before starting Transfusion	Transfusion Starting Time and Date	Vital 15 min after of starting transfusion	Transfusion End Time and Date	Vitals at The end of Transfusion	Name and Signature of person Transfusing and counter checking	Remarks/Transfusion Reaction
1 st Blood Bag			Temp: PR: BP: RR		Temp: PR: BP: RR		Temp: PR: BP: RR		
2 nd Blood Bag			Temp: PR: BP: RR		Temp: PR: BP: RR		Temp: PR: BP: RR		
3 rd Blood Bag			Temp: PR: BP: RR		Temp: PR: BP: RR		Temp: PR: BP: RR		
4 th Blood Bag			Temp: PR: BP: RR		Temp: PR: BP: RR		Temp: PR: BP: RR		
5 th Blood Bag			Temp: PR: BP: RR		Temp: PR: BP: RR		Temp: PR: BP: RR		

Discard Empty Beg

- As per BMW 2016 guidelines
all blood bags discard in **YELLOW** colored dustbin



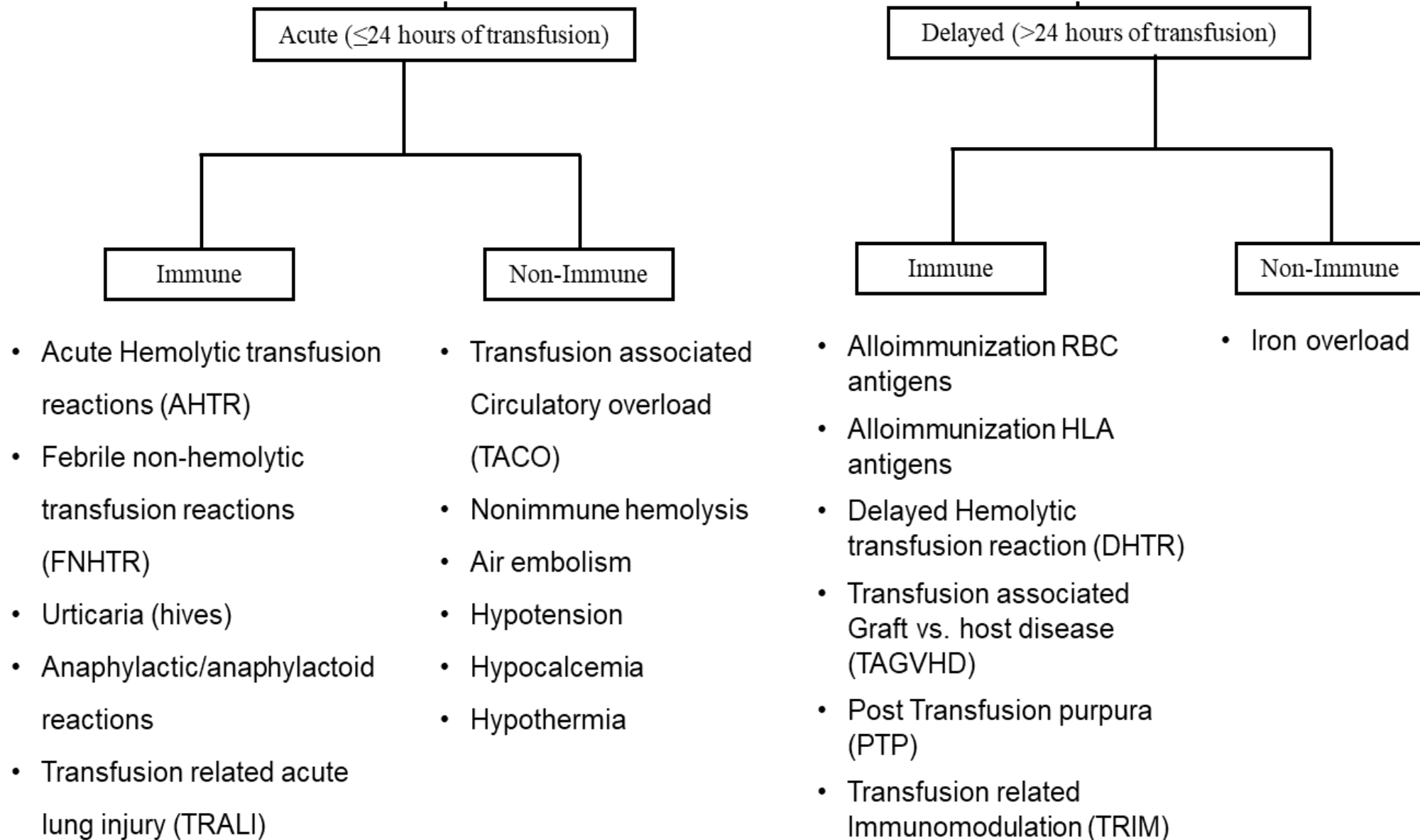
Documentation

1. Prescription
2. Consent
3. Type & volume of each component
4. Unit no.
5. Blood group
6. Time of starting
7. Sign. of the person starting
8. Patients' vitals (cont. monitoring)
9. Completion time
10. Any transfusion reaction

What is a transfusion reaction?

- “Any adverse outcome attributable to transfusion of blood component or components”.
- Considered as the precipitating event until proven otherwise.
- Can be definitely, probably or possibly related.

Transfusion reactions



Signs and Symptoms of TR

- Fever/chills/rigors
- Pain
- Dyspnea/respiratory distress
- Bleeding
- Hypotension
- Hypertension
- Headache
- Nausea and vomiting
- Rash/Hives
- Angioedema
- Anaphylaxis
- Cyanosis
- Bronchospasm
- Tachycardia
- Abdominal cramps
- Diarrhea
- Cough
- Red eye
- Anxiety
- Jaundice

RECOGNITION OF TRANSFUSION REACTION: is not easy...

- More than one predominant presenting symptom
- More than one reaction going on
- Atypical presentation
- Underlying comorbidities unrelated to transfusion



Getting prepared for Transfusion

- Aware of such risks
- Aware of possible reactions & signs/symptoms
- Prepared to mitigate reactions.

Reporting of transfusion reaction

- **Patient details**

- Registration no., name, age, gender, ward, bed no.
- Blood group,
- Diagnosis
- Medical history
- Previous transfusion history

- **Transfusion Reaction Details**

- Patient vital pre and post Tx
- Sign/symptoms

- **Transfusion Product(s) Details**

- Type of blood component
- Date & Time of receipt of Blood Component
- Date & Time of onset Transfusion
- Unit ID
- Blood group
- Volume transfused
- Expiry of blood bags
- Special processing was required (leukoreduction/irradiation/washing)

Compatibility report

Department of Transfusion Medicine
Blood Bank, JPNATC, AIIMS, Raj Nagar, New Delhi-110029
License no. 1891 on Form 28C (011-26731166)
COMPATIBILITY REPORT

Name :	Age / Sex :	TC No :
Blood Group :	Ward :	Bed No :
Blood Components Request No :		

S/No.	Component Name	Unit No	Blood Group	Antibody Screening	Compatibility		Issue Date and Time
					Saline	AHG	

Remarks: _____

Special precautions: _____

Signature (Technologist)

TRANSFUSION REACTION DETAILS (To be sent to Transfusion Medicine Department)

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- Collect the next specimen of urine passed by the patient and send it to the Laboratory Medicine department.
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Transfusion details

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Time	B.P	Pulse	Resp. Rate	Temp	Remarks

(Pulse, BP and Resp. Rate should be recorded half hourly and temp. hourly during transfusion and 3 hrs. after transfusion.)

Transfusion Chronology				Vital: during transfusion				Remarks
Time	Blood Component type	Unit No	Volume transfused	B.P	Pulse	Resp. Rate	Temp	

Post - Transfusion vitals of the patient					
Time	B.P	Pulse	Resp. Rate	Temp	Remarks

Signature (JR/SR)

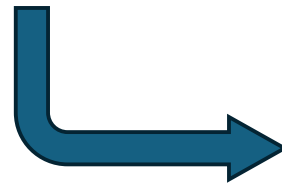
Preventing transfusion reactions

- Process of transfusion has several weak points due to human factors
- Clerical errors (both in transfusion service & bedside) are most common cause.
- Examples-
 - Errors in labelling
 - Misidentification
 - Wrong blood in tube
 - Samples getting exchanged
 - Inadequate checks



Quality improvement

- Regular audit (audit criteria)
- Identifying areas of concern
- Monitoring any interventions or changes
- Formulations of policies & guidelines



**Hospital Transfusion
Committee**
(multidisciplinary team)



- Determination of tx triggers
- Establishing MSBOS
- Policies regarding switch over from Rh-ve to Rh +ve
- Policies regarding autologous blood transfusion
- Consent for transfusion
- Patient identification
- Clinical alternatives to blood transfusion
- Blood product administration practices
- Management of massive transfusion.

THANK
YOU!

