# BLOOD TRANSFUSION

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# OBJECTIVES

**Consent for receiving blood products**

**Positive Patient Identification – error prevention (wrong blood in tube)**

**Administration of Blood Products**

# PRE-TRANSFUSION

- **Consent for blood**
  - Responsibility of prescriber versus nurse
  - When to transfuse without consent

# PRE-TRANSFUSION

**Hospital should have risks of transfusion outlined so that providers can inform their patient's appropriately**

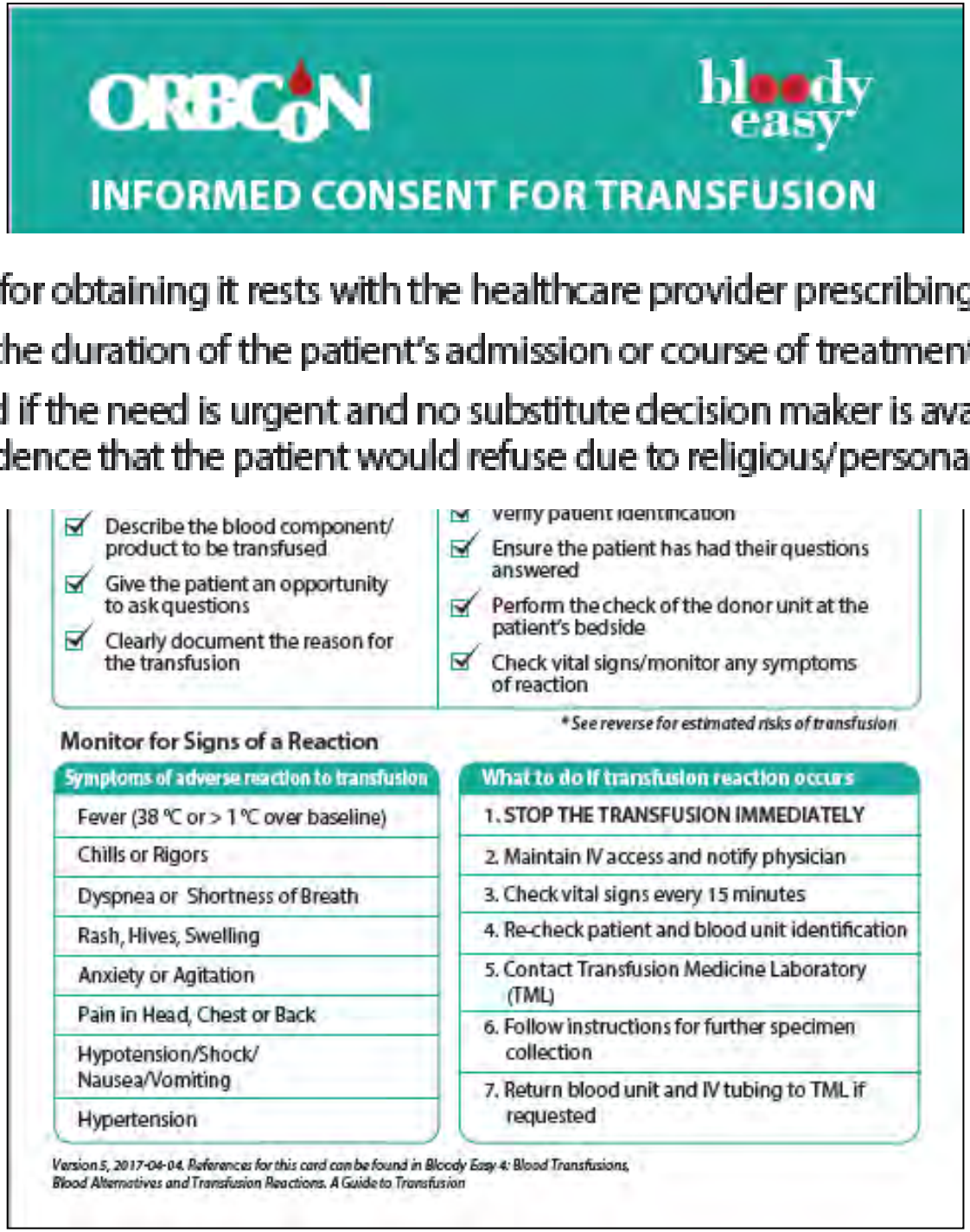
# INFORMED CONSENT

**Prescriber with patient or substitute decision:**

- Nature of the transfusion
- Risks and benefits of transfusion
- Possible side effects
- Alternatives available
- Consequences of not having the transfusion

**Nurse/clinician transfusing:**

- Ensure the consent is complete and inform the prescriber if it is not
- Help facilitate the consent process – contact SDM




- Responsibility for obtaining it rests with the healthcare provider prescribing the transfusion
- Is in effect for the duration of the patient's admission or course of treatment
- May be waived if the need is urgent and no substitute decision maker is available and there is no evidence that the patient would refuse due to religious/personal reasons

# ESTIMATED RISKS OF TRANSFUSION

| NON-INFECTIOUS COMPLICATIONS | ESTIMATED RISK |
|---|---|
| Red cell sensitization | 1 in 13 |
| Minor allergic reaction (hives, urticaria) | 1 in 100 |
| Transfusion-associated circulatory overload (TACO) | 1 in 100 |
| Febrile non-hemolytic transfusion reaction per unit of RBC /per pool of platelets | 1 in 300/1 in 20 |
| Delayed hemolytic transfusion reaction | 1 in 7,000 |
| Transfusion-related acute lung injury (TRALI) per unit of component transfused | 1 in 10,000 |
| ABO- incompatible transfusion per unit of RBC | 1 in 40,000 |
| Serious allergic reaction per unit of component | 1 in 40,000 |
| Post transfusion purpura | 1 in 100,000 |

| INFECTIOUS COMPLICATIONS | ESTIMATED RISK |
|---|---|
| Symptomatic bacterial sepsis per pool of platelets | 1 in 10,000 |
| Death from bacterial sepsis per pool of platelets | 1 in 200,000 |
| Symptomatic bacterial sepsis per unit of RBC | 1 in 250,000 |
| Death from bacterial sepsis per unit of RBC | 1 in 500,000 |
| West Nile virus | <1 in 1,000,000 |
| Hepatitis B virus per unit of component | 1 in 7,500,000 |
| Human T-lymphotropic virus (HTLV) per unit of component | 1 in 7,600,000 |
| Hepatitis C virus per unit of component | 1 in 13,000,000 |
| Human immunodeficiency virus (HIV) per unit of component | 1 in 21,000,000 |

| COMPARISON OF NON-TRANSFUSION RISK EVENT | ESTIMATED RISK |
|---|---|
| Annual risk of death in a motor vehicle crash | 1 in 10,000 |
| Death from anesthesia in fit patients | 1 in 200,000 |
| Annual risk of death from accidental electrocution in Canada | <1 in 1,000,000 |

# EMERGENCY UNCROSSED BLOOD

- If emergency treatment exists, it must be documented that the situation warranted treatment without consent
- When ABO and Rh is unknown and clinical situation cannot wait – phone call to the lab to prepare

| O Positive (39%) | O Negative (7%) |
|---|---|
| Male patients | Women of Child Bearing Years (less than 45 years old) |
| Women older than 45 years | Patients with known anti-D |
| AB Plasma (4%) | |

- Prescriber must authorize (documentation needed in the lab) – separate signage from ‘consent’ as per hospital

# PRE-TRANSFUSION

**Review the indication for the blood transfusion:**

| Blood Product | Laboratory Test (Indication) |
|---|---|
| Red Blood Cells | Hemoglobin |
| Platelets | Platelets |
| Plasma | International Normalizing Ratio (INR) |
| Cryoprecipitate | Fibrinogen |

# PRE-TRANSFUSION - TYPE AND SCREEN

- **Red blood cells and plasma require a in-date Type and Screen**
- **Platelets and IVIG, usually onset of therapy**
- **Factors that effect expiry of Type and Screen:**
  - patient's recent blood exposure
  - pregnancy history

In the past 3 months = T/S in-date for approximately 28 days, otherwise 3 days (96 hours)

# PRE-TRANSFUSION - TYPE AND SCREEN

**How to collect a sample and mitigate errors:**

- Take sample labels to the patient when collecting
- Verify the labels match the patient's hospital identification (armband)
- After collecting the sample(s), label the tubes before leaving the patient
- Print your identifiers on the label/requisition as per hospital policy

**Never label samples away from the patient**

# PRE-TRANSFUSION

1. Orders – communicated to the lab
2. Lab prepares blood product - (may use T/S to crossmatch red cells, find compatible units for hard to match patient's, thaw plasma, pull lot number product and label)
3. Coordinate getting blood from the lab (nursing)
4. Communicate patient identifiers (name and hospital identification #) to ensure right blood for the right patient

# PRE-TRANSFUSION

Ensure the patient is ready for transfusion (consent is signed, IV is patent)

- ❖ If blood needs to be returned – it may be wasted (60 minutes + temperature)

Assess if patient has had previous:

- transfusions, reactions, pregnancies

Administer pre-transfusion medications i.e. acetaminophen, diphenhydramine, furosemide

- Allow enough time for therapeutic effect

# PRE-TRANSFUSION

| Patient Classification: | Route and Dosage Recommendation |
|---|---|
| **High Risk**<br>• History of congestive heart failure<br>• On daily Furosemide<br>• Diastolic/systolic LV dysfunction by imaging<br>• Prior acute myocardial infarction<br>• Renal dysfunction<br>• Age greater than 70 years | • If not on daily Furosemide, Furosemide 20 mg IV prior to each unit (RBC unit/platelet pool); maximum dose 40 mg<br>• If patient is already on daily Furosemide, consider additional IV Furosemide to maximum total IV dose of 80 mg daily |
| **Lower Risk**<br>• Age greater than 60 years with no other high risk features | • Furosemide 20 mg PO prior to each unit (RBC unit/platelet pool) – total dose given prior to transfusion<br>• Maximum dose 40 mg PO daily |

❖ Positive Fluid Balance

# PRE-TRANSFUSION - ESTABLISH IV ACCESS

| Vascular Access Chart | | |
|---|---|---|
| **Blood Product and Category** | | Intravenous Access |
| **Red Blood Cells** | Rapid transfusions in adults | 16-18G (Gauge) |
| **Red Blood Cells** | Routine transfusions in adults | 20-22G |
| **Other Blood Products and Plasma Derivatives** | Adults | Any size adequate |
| **All Blood Products and Plasma Derivatives** | Neonates and Pediatrics | 22-26G |
| **All Blood Products and Plasma Derivatives** | All patients | Central Venous Access Devices (CVAD) |

# PRE-TRANSFUSION

**Blood only compatible with 0.9% Sodium Chloride**

**Do not mix with other fluids or medications**

- If a stat medication is required during the blood transfusion – flush with 10 mL 0.9% Sodium Chloride pre and post administration

**Coordinate with timing of other medications – may need to initiate another IV site**

# TRANSFUSION

- One unit of Red Blood Cells at a time, then reassess Hemoglobin
- If more than one unit – validated cooler - only remove the unit you are transfusing and close the cooler to maintain temperature
- Blood must be transfused within 4 hours of leaving the lab (or cooler)

# TRANSFUSION

Blood components (Red cells, plasma, platelets, cryoprecipitate) must be administered:

- IV tubing containing a filter (170-260 microns)
- Only compatible with 0.9% Sodium Chloride

Blood products such as IVIG and albumin do not require further filtering (any solution from a glass bottle requires vented tubing)

- Most IVIG brands are compatible only with D5W

# TRANSFUSION

- Factor concentrates i.e. Prothrombin Complex Concentrate (Octaplex/Beriplex), Factor 7, 8, 9 do not require further filtering but must be reconstituted with supplies provided
  - The transfer devices from vial to syringe usually offer filtering – so use them!
  - Follow instructions provided for reconstitution – if something goes wrong ask for a new product

# SPEED FOR ADMINISTRATION

- The rate at which we transfuse historically has not been communicated as an ‘order’
- The rate should be included in the order
- When transfusing a clinically stable patient, the transfusion should begin slowly at a rate of **50 mL/hour x 15 minutes = 12.5 cc**
  - Neonate and Pediatric patient slow infusion = half the hourly rate for the first 15 minutes (to a max of 50 mL/hour)

# TRANSFUSION

**Why a test dose?**

- Blood is a liquid transplant - this time allows patients to show signs of a serious reaction i.e. hemolytic, anaphylaxis, bacterial contamination

**Once the patient has received the test dose**

- Recheck patient's vital signs (temperature, heart rate, blood pressure, respiratory rate and oxygen saturation) as well as signs of reaction (rash, hives, trouble breathing, pain)

**If patient tolerates the test dose, increase to prescribed rate**

# TRANSFUSION SAFETY

- Routine, non-urgent transfusions should occur during day-time hours

- Slow transfusions over 3-3.75 hours (accounting for travel time from bench to bedside, checking procedure, and keeping within the 4 hour time limit)

# TRANSFUSION

| Vital Sign Chart | |
|---|---|
| **Adult Population** | Neonates and Pediatrics Population |
| • **Baseline (within 30 minutes prior to initiating the transfusion)** | • Baseline |
| • **15 minutes after the blood product entering the vein** | • 15 minutes after the blood product entering the vein |
| • **Hourly** | • Every 30 minutes |
| • **At the completion of the transfusion** | • At completion |
| | • One hour post transfusion |
| **Note: More frequent vital signs may be necessary for patients: who cannot communicate to staff, or are at risk for circulatory overload, or are experiencing a transfusion reaction.** | |

| Red Blood Cells | Platelets | Plasma | Cryoprecipitate |
|---|---|---|---|
| 1 unit = 300 mL<br>Infuse over: 2 – 3 hours | 1 unit = 300 mL<br>Infuse over:<br>1 – 2 hours | 1 unit = 250 mL<br>Apheresis unit = 500 mL<br>Infuse over 30 minutes – 2 hours | 1 pool = 100 mL<br>Infuse over 10-30 minutes |

- Double check by Clinical Staff
- Test dose first 15 minutes:
  - Adults: 50 mL per hour (12.5 mL)
  - Neonate/Pediatrics: half the hourly dose (to a maximum of 50 mL per hour)
- Use tubing with an in-line filter (170-260 microns):
  - Adults Y-type – one side primed with 0.9% Sodium Chloride
  - Neonates – prime tubing with blood or syringe pump
- Dedicated IV/IO/lumen of CVAD – compatible only with NS (no meds)
- Tubing change as per policy – Bloody Easy 2-4 units – hang time varies (4 hours)
- Complete transfusion within 4 hours from time product left monitor environment (Transfusion Lab or cooler)

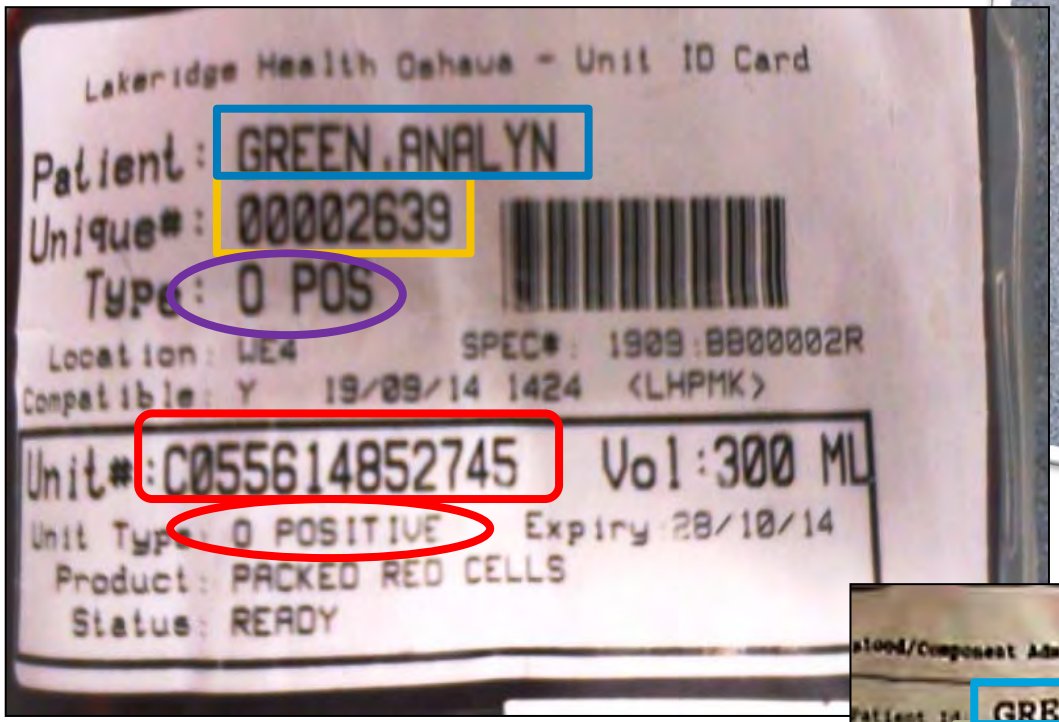
# TRANSFUSION

Check must be completed by 2 clinical staff:

- ✓ Check product received against original order (special requests)
- ✓ Have patient state full name and date of birth and verify against Hospital ID band
- ✓ Check Hospital ID number from ID band, full name and date of birth against Blood Administration Record
- ✓ Check Hospital ID number, full name and patient's blood type on the Blood Administration Record matches Blood Product Label
- ✓ Check donor information: donor unit number, blood type and expiry date – is this compatible?
- ✓ Flip the Bag over and recheck donor unit number, blood type and expiry date against the Blood Administration Record

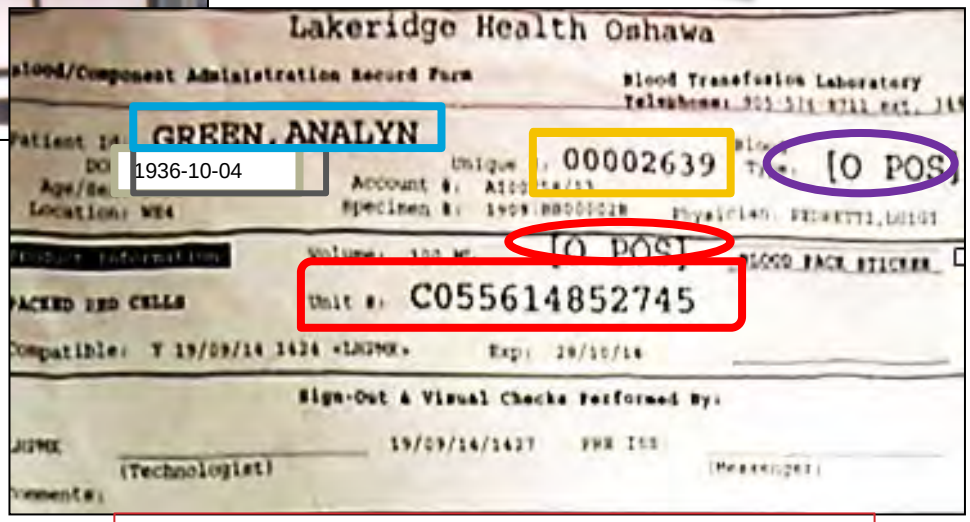
If any discrepancy DO NOT proceed!

Blood Product Label



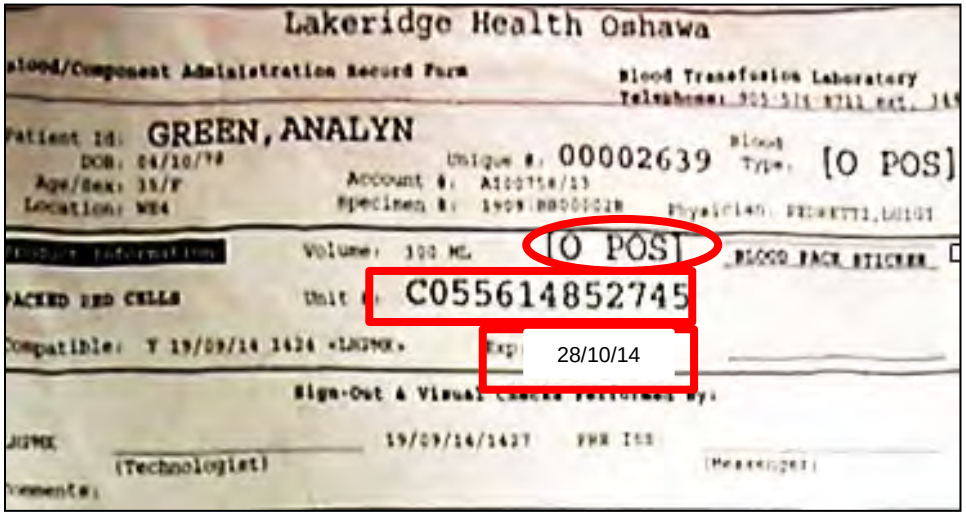

- ✓ Name and DOB
- ✓ Unique #
- ✓ Patient Blood Group
- ✓ Unit #
- ✓ Donor Blood Group
- ✓ Expiry Date

Patient


Blood Administration Record

Blood Administration Record




- ✓ Unit #
- ✓ Donor Blood Group
- ✓ Expiry Date

Blood Product Manufacturer Label

# COMPATIBILITY

| ABO/Rh Compatibility | | |
|---|---|---|
| **Patient ABO Group** | Red Blood Cells | Plasma |
| **O Positive** | O Pos, O Neg | Any Group |
| **O Negative** | O Neg | Any Group |
| **A Positive** | A Pos, A Neg, O Pos, O Neg | A, AB |
| **A Negative** | A Neg, O Neg | A, AB |
| **B Positive** | B Pos, B Neg, O Pos, O Neg | B, AB |
| **B Negative** | B Neg, O Neg | B, AB |
| **AB Positive** | Any Group Pos/Neg | AB |
| **AB Negative** | Any Group Neg | AB |

ABO compatibility does not guarantee that a patient will not experience an acute or delayed hemolytic transfusion reaction.

Platelets or cryoprecipitate for which the plasma within these components is not compatible with the patient is considered safe due to the relatively small quantity of anti-A and/or anti-B

# POST-TRANSFUSION

- Flush the remainder of blood with 0.9% Sodium Chloride

- If the patient is leaving the hospital, review the signs/symptoms of a reaction and the actions to take
  - TTISS heading home document

TTISS ON
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Transfusion
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Surveillance System

# Heading Home After a Transfusion

**There is a small risk of having a reaction to the blood when you have a transfusion. When you go home you need to watch for a possible reaction for the next few hours.**

| What you might notice after a blood transfusion: | What to do if you have a reaction: |
|---|---|
| **Mild symptoms:** | |
| Mild fever – temperature less than 39°C (102.2°F)<br>Mild chills<br>Mild headache | **Do not take any of the medication below if your doctor has told you not to. Always follow the directions on the package.**<br>A non-prescription medication for fever or headache like Tylenol® (acetaminophen) may help your symptoms go away. |
| Mild rash, hives, itching | |
| | **If there is no change within 1 hour of taking medication follow the instructions below.** ⬇ |
| **Serious symptoms:** | |
| High fever – temperature of 39°C (102.2°F) or higher<br>Nausea or vomiting | Contact your doctor if you can or go to the nearest Emergency Department. Tell them you might be having a transfusion reaction.<br>Do not drive yourself. |
| Shaking (severe chills)<br>Problems breathing or feeling short of breath<br>Blood in urine or dark coloured urine (even a few days later)<br>Migraine or serious headache | Go immediately to the nearest Emergency Department. Tell them you might be having a transfusion reaction.<br>Do not drive yourself. |

# Q1. WHAT IS THE MOST COMMON REASON SPECIMENS ARE LABELLED WITH INCORRECT PATIENT IDENTIFIERS (WRONG LABEL)?

a) The patient is wearing the incorrect ID band.
b) The patient is not able to self-identify (altered cognitive state/unconscious patient).
c) There is miscommunication and error in the tests that should have been ordered.
d) Samples are not labelled immediately at time of collection, in the presence of the patient.

# Q2. WHAT IS THE PURPOSE OF A ‘TEST DOSE’

a) To allow a slow introduction into the patient so that a serious reaction can be intercepted.
b) To allow the blood to come to room temperature before infusing into the vein.
c) To allow time to check the blood after the infusion has begun.
d) To test if the intravenous tubing and filter are working correctly.

# REFERENCES


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