

HEMATOLOGY • PHARMACOLOGY • CRITICAL CARE

Blood Transfusion: *Standard & Massive*

Comprehensive nursing care, complications, priorities, and patient education for routine and massive blood product administration — built for the NGN NCLEX 2026 test plan.

NGN 2026

NCJMM FRAMEWORK

PRIORITY SKILL

HIGH YIELD

1

Definition & Overview

What it is and why it matters

STANDARD TRANSFUSION

Routine Blood Component Therapy

Replacement of **specific blood components** (PRBCs, FFP, platelets, cryo) for anemia, surgery, or controlled bleeding.

- Typical order: **1–2 units PRBCs** over 2–4 hours
- One unit PRBCs $\uparrow$ Hgb by ~ 1 g/dL
- Goal: oxygen-carrying capacity, volume, clotting

MASSIVE TRANSFUSION

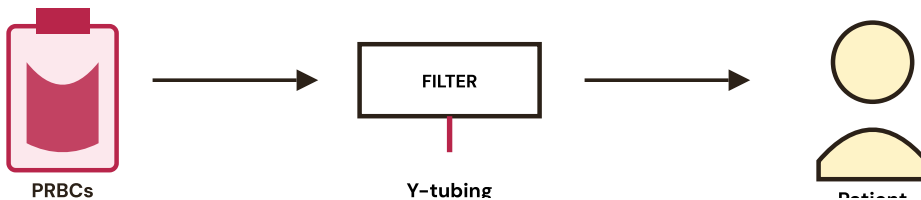
Massive Transfusion Protocol (MTP)

Activated for **life-threatening hemorrhage** — trauma, GI bleed, OB hemorrhage, ruptured aneurysm.

- ≥ 10 units PRBCs in 24 hr, OR
- ≥ 4 units in 1 hr with ongoing bleeding, OR
- Replacement of total blood volume in 24 hr

WHY THIS MATTERS

Standard transfusion errors most often cause reactions and overload; **massive transfusion** errors most often cause the lethal triad of *hypothermia, acidosis, and coagulopathy*. The nursing priorities differ — and NCLEX expects you to know which scenario you're in.



2

Pathophysiology of Massive Hemorrhage

Why MTP exists — the lethal triad

1

Massive hemorrhage → loss of RBCs, plasma proteins, and clotting factors faster than the body can replace them.



2

Aggressive crystalloid + PRBC-only resuscitation **dilutes clotting factors and platelets** → dilutional coagulopathy.



3

Cold stored blood + tissue hypoperfusion → **hypothermia** (impairs platelet function and enzymatic clotting).



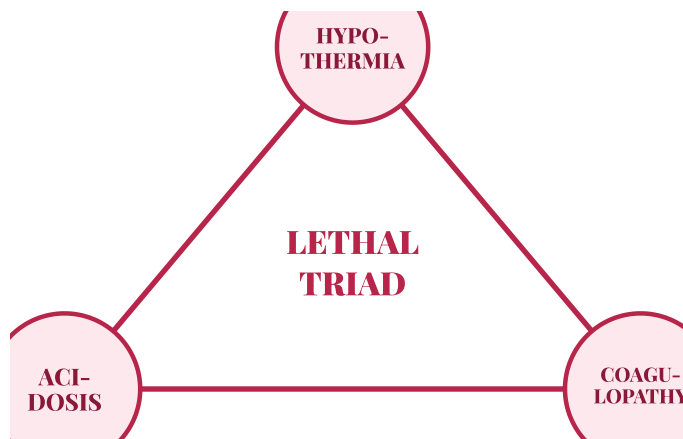
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Anaerobic metabolism from poor perfusion → **lactic acidosis** (further inhibits clotting cascade).



5

LETHAL TRIAD = Hypothermia + Acidosis + Coagulopathy → bleeding worsens → cycle continues → death.



MTP SOLUTION — 1:1:1 RATIO

To prevent dilutional coagulopathy, MTP delivers balanced resuscitation: equal units of PRBCs, fresh frozen plasma (FFP), and platelets. This mimics whole blood and supports clotting alongside oxygen-carrying capacity.

1 : 1 : 1

PRBCS : FFP : PLATELETS

+/- Cryoprecipitate & Tranexamic acid (TXA) when fibrinogen is low or trauma < 3 hr old

3

Signs & Symptoms — Transfusion Reactions

Pattern recognition for the 6 reaction types

H

Hemolytic

 LIFE-THREATENING

- **LOW BACK / FLANK PAIN** (hallmark)
- Fever, chills, tachycardia
- Hypotension, flushing, tachypnea
- Dark/red urine (hemoglobinuria)
- Sense of impending doom

ONSET: FIRST 5–15 MIN

F

Febrile Non-Hemolytic

- **Fever $\geq 1^\circ\text{C}$ (1.8°F) rise**
- Chills, headache
- Flushing, tachycardia, anxiety
- Caused by recipient antibodies vs. donor WBCs

MOST COMMON REACTION

A

Allergic / Anaphylactic

- **Hives, itching, flushing** (mild)
- Wheezing, bronchospasm
- Severe: shortness of breath, anaphylaxis
- Anxiety, hypotension if severe

MILD → SEVERE RANGE

L

TRALI

 #1 FATAL

- **Acute dyspnea within 6 hr**
- Hypoxia, bilateral pulmonary edema
- Fever, hypotension
- **Lungs $\neq$ overload** — leaky capillaries

TRANSFUSION-RELATED ACUTE LUNG INJURY

C TACO (Circulatory Overload)

- **Crackles, dyspnea, cough**
- Distended neck veins (JVD)
- Tachycardia, HYPERTENSION
- Risk: elderly, CHF, renal disease

VOLUME PROBLEM — SLOW RATE, GIVE DIURETICS

B Bacterial Sepsis

- **HIGH fever (rapid spike)**
- Severe hypotension, shock
- Chills, GI symptoms
- Most common with platelets (room temp)

ONSET: VERY RAPID

MASSIVE TRANSFUSION-SPECIFIC RED FLAGS

Hypocalcemia (citrate binds Ca^{2+}) → tingling around mouth, muscle twitching, prolonged QT, tetany • **Hyperkalemia** (cell lysis in stored blood) → peaked T waves, weakness, dysrhythmias • **Hypothermia** (cold blood) → coagulopathy, dysrhythmias, shivering

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Priority Nursing Interventions

ABCs first — pre, during, post, and reaction response

► BEFORE Transfusion

CHECK **Type & crossmatch** verified; **2 RNs verify** at bedside — patient name + DOB + ID band + blood band + unit number + ABO/Rh + expiration.

ASSESS **Baseline VS** (T, HR, BP, RR, SpO₂) + lung sounds + skin. Document before starting.

CONSE Verify **signed informed consent** on chart.

ACCESS Establish **18-gauge IV** (large bore); prime tubing with **0.9% Normal Saline ONLY**. NEVER dextrose, NEVER LR (calcium causes clotting).

TIME Start within **30 minutes** of release from blood bank — return if delayed.

► DURING Transfusion

FIRST 15 **Stay with patient first 15 minutes**. Run at **≤ 2 mL/min** — most fatal reactions occur in the first 50 mL.

VS VS at: baseline → 15 min → every 30–60 min → on completion.

TIME LIMIT Complete each unit within **4 hours** (bacterial growth risk).

RATE After 15 min, infuse at ordered rate. Adults usually 2–4 hr/unit; CHF/elderly slower.

NO MEDS **NEVER add medications** to blood or piggyback meds into the line.

► IF REACTION SUSPECTED — Priority Order

1 **STOP THE TRANSFUSION IMMEDIATELY**. This is ALWAYS the first action.

2 **Maintain IV patency with 0.9% NS using NEW tubing** (do not flush old tubing — sends more reactant in).

3 **Assess patient** — VS, ABCs, breath sounds.

4

Notify HCP and blood bank immediately.

5

Send blood bag, tubing, and labels back to blood bank. Collect **blood + urine samples** from patient (check hemoglobinuria).

6

Document; complete transfusion reaction form.

► MASSIVE TRANSFUSION — Additional Priorities

WARM

Use a **blood warmer** for ALL units in MTP and for any blood given through a central line — prevents hypothermia & dysrhythmias.

MONIT

Frequent labs every 30–60 min: CBC, PT/INR, PTT, fibrinogen, ionized Ca^{2+} , K^+ , lactate, ABG.

CALCIU

Anticipate **IV calcium gluconate** per protocol — citrate in stored blood binds Ca^{2+} → hypocalcemia.

ECG

Continuous ECG — watch for peaked T waves (K^+) and prolonged QT (Ca^{2+}).

TEAM

Coordinate with **blood bank, lab, OR, and rapid response**. Use a runner; document all units.

TARGET

Goal MAP ≥ 65 , temp $\geq 36^\circ\text{C}$, pH ≥ 7.2 , $\text{Ca}^{2+} \geq 1.1$ mmol/L, plt $\geq 50\text{K}$, fibrinogen ≥ 150 – 200 mg/dL.

5

Pharmacology — Blood Products & Reaction Meds

What's in the bag and what's in the crash cart

PRBCs

PACKED RED BLOOD CELLS

ACTION

Restore O₂-carrying capacity. ↑ Hgb ~1 g/dL per unit.

INDICATIONS

Hgb < 7 (or < 8 with cardiac dz), acute blood loss, symptomatic anemia.

NURSING

Infuse 2–4 hr; NS only; 18-G; 170-µm filter.

FFP

FRESH FROZEN PLASMA

ACTION

Replaces ALL clotting factors + plasma proteins.

INDICATIONS

Coagulopathy, warfarin reversal (urgent), MTP, DIC.

NURSING

Must be ABO-compatible; thaw → infuse within 24 hr.

Platelets

RANDOM OR APHERESIS

ACTION

Restores platelet count for clotting/bleeding.

INDICATIONS

Plt < 10K (or < 50K w/ bleeding/procedure), MTP.

NURSING

Stored at room temp → highest sepsis risk; infuse fast (15–30 min).

Cryoprecipitate

"CRYO"

ACTION

Concentrated fibrinogen, factor VIII, vWF, factor XIII.

INDICATIONS

Fibrinogen < 150–200, DIC, hemophilia A, vWD.

NURSING

Pooled units; infuse rapidly; ABO–preferred match.

Tranexamic Acid

TXA — ANTIFIBRINOLYTIC

ACTION

Inhibits plasminogen → stabilizes clots.

INDICATIONS

Trauma < 3 hr, OB hemorrhage, MTP adjunct.

NURSING

Give within 3 hours of injury; monitor for thrombosis.

Calcium Gluconate

ELECTROLYTE

ACTION

Replaces Ca^{2+} bound by citrate preservative.

INDICATIONS

MTP hypocalcemia (per protocol/ionized Ca level).

NURSING

Slow IV push; cardiac monitor; never IM (necrosis).

Diphenhydramine

BENADRYL — H1 BLOCKER

ACTION

Blocks histamine; reduces allergic symptoms.

INDICATIONS

Mild allergic reaction; pre-medication for known reactors.

NURSING

Sedation, dry mouth; fall precautions.

Acetaminophen

TYLENOL — ANTIPYRETIC

ACTION

Reduces fever via central COX inhibition.

INDICATIONS

Pre-medication for febrile reaction history.

NURSING

Max 4 g/day; check liver function.

Epinephrine

SYMPATHOMIMETIC

ACTION

$\alpha + \beta$ agonist → bronchodilation, vasoconstriction.

INDICATIONS

Anaphylactic transfusion reaction.

NURSING

IM 1:1000; monitor BP/HR; tachycardia/HTN expected.

Furosemide

LASIX — LOOP DIURETIC

ACTION

↑ $\text{Na}^+/\text{H}_2\text{O}$ excretion at loop of Henle.

INDICATIONS

TACO (circulatory overload).

NURSING

Monitor K^+ , BP, urine output, ototoxicity if pushed fast.

6

NCLEX Test Traps ⚠️

Common wrong-answer patterns and what's actually correct

⚠️ TRAP

"Slow the rate" when reaction is suspected.

✓ CORRECT

STOP the transfusion FIRST, then maintain line with NS via NEW tubing. Slowing keeps the reactant flowing.

⚠️ TRAP

Hang blood with D5W or LR.

✓ CORRECT

0.9% NS only. Dextrose hemolyzes RBCs. LR contains calcium → can clot the line.

⚠️ TRAP

Treat TACO and TRALI the same way.

✓ CORRECT

TACO = volume problem (slow rate, give Lasix). **TRALI = lung injury** (stop, support O₂/ventilation; diuretics don't help).

⚠️ TRAP

"Notify HCP first" when reaction occurs.

✓ CORRECT

Stop transfusion FIRST → assess patient → THEN notify HCP. The bedside action protects the patient before the phone call.

⚠️ TRAP

Premedicate every patient before transfusion.

✓ CORRECT

Premedication (Tylenol/Benadryl) is **only for patients with documented reaction history**. Routine premedication isn't standard.

⚠️ **TRAP**

"Add the antibiotic to the blood for efficiency."

✓ **CORRECT**

NEVER add anything to a blood unit or its line. Use a separate line for medications.

⚠️ **TRAP**

One nurse can verify blood at bedside.

✓ **CORRECT**

TWO licensed nurses must verify blood product at bedside per facility policy/standard of care.

⚠️ **TRAP**

Hang blood up to 6 hours.

✓ **CORRECT**

4 hours maximum. If not done at 4 hr → discontinue and return remaining unit.

⚠️ **TRAP**

Massive transfusion = "just give more PRBCs faster."

✓ **CORRECT**

MTP requires **balanced 1:1:1 (PRBCs:FFP:Platelets)** to prevent dilutional coagulopathy.

⚠️ **TRAP**

Low back pain = musculoskeletal — give Tylenol.

✓ **CORRECT**

Low back/flank pain during transfusion = **HEMOLYTIC REACTION until proven otherwise**. Stop immediately.

⚠️ **TRAP**

MTP labs every 4 hours is fine.

✓ CORRECT

MTP requires **labs every 30–60 minutes** (CBC, coags, ionized Ca^{2+} , K^+ , lactate, ABG).

⚠ TRAP

A small temperature rise means stop the transfusion.

✓ CORRECT

$\geq 1^\circ\text{C}$ (1.8°F) rise with chills = febrile reaction → stop. Tiny variations alone may not require stopping but should be reassessed.

7

NCJMM Clinical Judgment Framework

Six-step model applied to transfusion scenarios (NGN 2026)

1

RECOGNIZE CUES

↑ HR, low back pain, hives, dyspnea, fever $\geq 1^\circ\text{C}$, hypotension, SpO_2 drop, crackles, anxiety, dark urine.

2

ANALYZE CUES

Cluster cues to reaction type: low back pain + fever + hypotension = hemolytic; crackles + JVD + HTN = TACO; bilateral edema + hypoxia + hypotension = TRALI.

3

PRIORITIZE

ABCs first. Hemolytic + TRALI + anaphylaxis = highest priority. STOP transfusion is always first action when reaction suspected.

4

GENERATE SOLUTIONS

Stop & switch to NS, new tubing, O_2 , position upright (TACO/TRALI), call HCP, send labs/bag, prepare meds (epi, Lasix, Ca^{2+}).

5

TAKE ACTION

Stop blood → NS w/ new tubing → assess → notify → labs/urine → return bag → document. MTP: warm blood, give Ca^{2+} , balance ratio.

6

EVALUATE

Reassess VS, breath sounds, SpO_2 , urine output, mental status, labs (Hgb, Ca^{2+} , K^+ , coags). Resolution of cues = effective response.

8

Patient & Family Education

What to teach before, during, and after transfusion



Before the Transfusion

- Explain the purpose, expected outcome, and approximate length (2–4 hours per unit)
- Confirm signed consent — patient may refuse for personal/religious reasons (e.g., Jehovah's Witness — alternatives like cell saver, EPO, iron)
- Review prior transfusion history and reaction history
- Encourage patient to **eat, void, and get comfortable** before start
- Explain monitoring: VS frequency, staying with you the first 15 minutes



Symptoms to REPORT IMMEDIATELY

- **Low back / flank pain** (key red flag!)
- Chills, fever, sweating, flushing
- Itching, hives, rash anywhere
- Difficulty breathing, chest tightness, cough
- Headache, dizziness, anxiety, "feeling weird"
- Dark or red-colored urine



During the Transfusion

- Stay in bed with the call light within reach
- Do not adjust IV pump or tubing
- Report any new sensation right away — even if mild
- Stay covered/warm (cold blood may cause chills)



After Transfusion

- Some delayed reactions can occur up to **24 hours later** — call if fever, jaundice, dark urine, fatigue
- Expect VS monitoring for at least 1 hour after
- Lab draws (Hgb/Hct) often follow to assess effectiveness
- Report rash or pruritus that develops the next day
- Follow-up labs may be needed

CULTURAL / RELIGIOUS CONSIDERATIONS

Jehovah's Witnesses typically refuse blood products. Always honor the patient's right to refuse. Alternatives include erythropoietin, iron supplementation, intra-operative cell salvage (cell saver), volume expanders, and recombinant clotting factors.

9

Memory Boosters & Mnemonics

Anchors for priority sequences and reaction recognition

🔴 STOP — What to do when a reaction is suspected

S

STOP the transfusion (always first!)

T

TUBING — switch to new tubing with 0.9% NS to keep IV open

O

OBSERVE & assess patient (VS, ABCs, mental status)

P

PHONE the HCP & blood bank; send bag, tubing, urine, blood samples

❄️ The "1-2-3" of Massive Transfusion Pitfalls

1

One temp drop — Hypothermia (warm the blood!)

2

Two ions to watch — Hypocalcemia (citrate) & Hyperkalemia (cell lysis)

3

Three to balance — 1:1:1 PRBCs : FFP : Platelets

🚑 "BLOOD" — Pre-Transfusion Checklist

B

Baseline VS + lung sounds + temperature

L

Large bore IV — 18-gauge minimum

O

Only NS — no D5W, no LR

O

One unit at a time within **4 hours**

D

Double-check — 2 RNs verify at bedside

🔥 TACO vs. TRALI — Quick Distinction

T

TACO = Too much vOlume → *HYPER*-tension, JVD, crackles, treat with Lasix

L

TRALI = Lungs Leak → *HYPO*-tension, bilateral pulmonary edema, treat with O₂/vent — Lasix WON'T help



Quick-Recall Numbers

15 minutes — stay with patient at start • **2 mL/min** — initial rate • **30 minutes** — must start within (from blood bank) • **4 hours** — max infusion time per unit • **2 RNs** — bedside verification • **18-gauge** — minimum IV size • **0.9% NS** — only compatible fluid • **1:1:1** — MTP ratio • **≥1°C** — fever criterion for febrile reaction • **50 mL** — most fatal reactions occur within first 50 mL infused