



Blood Transfusion

Thresholds and products · Restrictive beats liberal, and one unit at a time beats two

Hb < 7 g/dL
most stable inpatients

RED CELLS — THE THRESHOLD *a lower trigger is not a compromise, it is the better outcome*

THE DEFAULT

Transfuse at a hemoglobin below 7 g/dL in the hemodynamically stable hospitalized adult, including in critical care. **Restrictive strategies match or beat liberal ones** across a wide range of populations while using far less blood, and every avoided unit avoids its risks.

ONE UNIT, THEN REASSESS

One unit raises the hemoglobin by roughly 1 g/dL. Prescribe a **single unit and recheck** rather than reflexively ordering two — the second unit is frequently unnecessary. **Transfuse for symptoms and physiology, not to reach a round number.**

WHEN NOT TO TRANSFUSE

Chronic deficiency anemia is not a transfusion indication in a stable patient. Iron, B12 or folate deficiency is corrected with replacement, and the patient has usually compensated. **Transfusing instead delays the diagnosis and exposes them to risk for no benefit.**

THE EXCEPTIONS TO 7 *a few groups have a higher trigger*

Population	Threshold and rationale
Stable inpatients, including critical care	7 g/dL. The evidence base is broad and consistent, and includes septic shock and gastrointestinal bleeding.
Cardiac surgery	7.5 g/dL. A specific, slightly higher trigger — not the same as the 8 used for the groups below, which is a distinction routinely blurred at the bedside.
Orthopedic surgery, or pre-existing cardiovascular disease	8 g/dL. Reduced capacity to compensate for anemia justifies the higher trigger.
Acute myocardial infarction	Genuinely unsettled. Trial evidence has not shown a clear benefit for a liberal strategy, but the point estimates have favored it, and many now accept a higher trigger around 8 to 10 g/dL in active ischemia. Discuss with cardiology rather than applying 7 reflexively.
Active major hemorrhage	Thresholds do not apply. Activate the major hemorrhage protocol and give balanced ratios of red cells, plasma and platelets while achieving surgical or radiological source control. The hemoglobin lags badly during acute bleeding and must not be used to decide.

THE OTHER PRODUCTS *each has a distinct indication, and each is over-used*

Product	When it is indicated
Platelets	Prophylactically at 10 ×10⁹/L or below in hypoproliferative thrombocytopenia, and below 50 for major elective non-neuraxial surgery. Higher targets are used by convention for neurosurgery, ocular surgery and neuraxial procedures . Routine prophylaxis is not indicated in non-thrombocytopenic patients having cardiac surgery.
When platelets harm	Avoid in TTP, HIT and hemolytic uremic syndrome unless there is life-threatening bleeding — adding platelets fuels the thrombotic process. Look at the film before you transfuse platelets: schistocytes change the answer completely.
Modified products	Irradiated components for Hodgkin lymphoma, after stem cell transplant, and on purine analogues, to prevent transfusion-associated graft-versus-host disease. Anti-D is required for RhD-negative women of childbearing potential exposed to RhD-positive components.

HOW MUCH, AND WHAT IT SHOULD DO *know the expected increment, because a failed one is a finding*

Product	Dose	Expected effect
Red cells	1 unit , then reassess	Raises Hb by about 1 g/dL (hematocrit ~3%) in a 70 kg adult who is not bleeding. A smaller rise than expected means ongoing loss or hemolysis , not an inadequate dose.
Platelets	1 apheresis unit (equivalent to a pool of 4-6 whole-blood units)	Raises the count 30-50 ×10⁹/L . A flat post-transfusion count suggests refractoriness from consumption, splenomegaly, sepsis or HLA alloimmunization.
Fresh frozen plasma	10-15 mL/kg , roughly 3-4 units in an adult	Small doses achieve nothing. For warfarin reversal, 4-factor PCC is faster, smaller in volume and preferred ; plasma is for multi-factor deficiency with bleeding.
Cryoprecipitate	1 pool (about 5 units)	Raises fibrinogen by roughly 50-100 mg/dL . Recheck the fibrinogen rather than assuming.

GIVING IT SAFELY *the fatal errors happen at the bedside, not in the laboratory*

- Consent and document the indication.** Record why, what and how much, and tell the patient what to report. **An unexplained transfusion on a drug chart is a governance failure and a clinical one.**
- Positive patient identification at the bedside, at sampling and at administration.** **Wrong blood in tube is the leading route to an ABO-incompatible transfusion**, and it is a bedside identification error, not a laboratory one. **Label the sample at the patient, never in advance and never at the desk.**
- Observations before starting, at 15 minutes, and at completion**, with the patient **in view during the first 15 minutes**, when severe reactions declare themselves. **Complete each unit within 4 hours** of leaving controlled storage.
- If a reaction occurs, stop the transfusion first** and keep the line open with saline. Then assess, recheck identity against the unit, and inform the laboratory. **Do not restart the same unit.**
- Distinguish overload from lung injury.** **TACO** gives hypertension, a raised JVP and a raised natriuretic peptide, and **responds to diuresis** — it is the commonest cause of transfusion-related death and is preventable by slowing the rate and reviewing the volume. **TRALI** gives hypoxemia with bilateral infiltrates **within 6 hours**, normal filling pressures, and **does not respond to diuretics**.

PEARLS & PITFALLS

- Prescribe one unit and reassess.** The reflex two-unit order is the single commonest over-transfusion.
- Cardiac surgery is 7.5, not 8.** Orthopedic surgery and pre-existing cardiovascular disease are the 8 g/dL groups.
- Iron deficiency needs iron, not blood**, in a stable patient — and blood obscures the workup for weeks.
- Label the sample at the bedside.** Wrong blood in tube is how ABO-incompatible transfusions actually happen.
- Do not give platelets in TTP or HIT** unless the bleeding is life-threatening. Check the film first.
- Think TACO before TRALI.** Circulatory overload is far commoner, is the leading transfusion death, and is largely preventable.

