



TRAN-01 Review - May 20, 2024

Review Measure Specification by selecting this [link](#)

Feedback from Measure Reviewer:

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Review of new literature (Published: 09/2015, Last Review: 05/2021)

Between 2021 and now there have been no new recommendations for transfusion triggers. Published literature reaffirmed what has been already established about restrictive and liberal triggers. Restrictive transfusion strategies, typically with a threshold of 7 g/dL for both adult and pediatric patients are still recommended. However, it has been recognized that in certain clinical scenarios triggers may need to be modified to slightly higher value.

Published guidelines recognize additional considerations that influence the decisions about the transfusion: signs and symptoms of end organ ischemia, comorbid conditions, hemodynamic status, rate of blood loss, type of the surgical procedure. In general, an individualized approach to red cell transfusion is recommended, but there is little evidence of which objective physiologic parameters beyond hemoglobin level should guide the decision. There is no data in the literature suggesting that liberal transfusion triggers (Hgb 9 to 10 g/dL) offer improvement in outcomes.

AABB (Carson et al.) published robust review of 45 RCTs following GRADE methodology and can be used as reference in red cell transfusion decision making. The panel made following recommendation applicable to the perioperative setting:

1. for hospitalized adult patients who are hemodynamically stable, a restrictive transfusion strategy considering transfusion when the hemoglobin concentration is less than **7 g/dL** (strong recommendation, moderate certainty evidence).
2. In accordance with the restrictive strategy threshold used in most trials, clinicians may choose a threshold of **7.5 g/dL for patients undergoing cardiac surgery and 8 g/dL for those undergoing orthopedic surgery or those with preexisting cardiovascular disease.**

CONCLUSIONS AND RELEVANCE It is good practice to consider overall clinical context and alternative therapies to transfusion when making transfusion decisions about an individual patient.

Carson JL, Stanworth SJ, Guyatt G, Valentine S, Dennis J, Bakhtary S, et al. Red blood cell transfusion: 2023 AABB international guidelines. JAMA. 2023;330: 1892–902.

Consensus Statement (Lenet et al.) provided an expert opinion on intraoperative Hgb measurement and restrictive transfusion strategies, which can be summarized as follows:

1. Hemoglobin should be routinely measured before every intraoperative transfusion **if the situation permits.**
2. Hemoglobin should be measured between successive intraoperative transfusions in cases where multiple units are being transfused, **situation permitting.**
3. There is uncertainty surrounding **the benefits of restrictive transfusion protocols in the operating room.**
4. There is uncertainty surrounding **the risks of restrictive transfusion protocols in the operating room.**
5. **Restrictive transfusion strategies should be adopted for intraoperative transfusions, which would include a restrictive hemoglobin transfusion threshold or trigger.**
6. **70 g/L (7 g/dL) is an acceptable restrictive hemoglobin trigger** to use in the operating room for patients without major cardiac comorbidities.

Intraoperative Blood Management Strategies for Patients Undergoing Noncardiac Surgery: The Ottawa Intraoperative Transfusion Consensus.

Lenet T, McIsaac DI, Hallet JH, Jerath A, Lalu MM, Nicholls SG, Presseau J, Tinmouth A, Verret M, Wherrett CG, Fergusson DA, Martel G; Ottawa Consensus on Intraoperative Patient Blood Management. JAMA Netw Open. 2023 Dec 1;6(12):e2349559

Other literature:

Transfusion thresholds for guiding red blood cell transfusion.

Carson JL, Stanworth SJ, Dennis JA, Trivella M, Roubinian N, Fergusson DA, Triulzi D, Dorée C, Hébert PC. Cochrane Database Syst Rev. 2021 Dec 21;12(12):CD002042. doi: 10.1002/14651858.CD002042.pub5.PMID: 34932836

A total of 48 trials, involving data from 21,433 participants

Conclusion: Transfusion at a restrictive haemoglobin concentration decreased the proportion of people exposed to RBC transfusion by 41% across a broad range of clinical contexts. Across all trials, no evidence suggests that a restrictive transfusion strategy impacted 30-day mortality, mortality at other time points, or morbidity (i.e. cardiac events, myocardial infarction, stroke, pneumonia, thromboembolism, infection) compared with a liberal transfusion strategy. Despite including 17 more randomised trials (and 8846 participants), data remain insufficient to inform the safety of transfusion policies in important and selected clinical contexts, such as myocardial infarction, chronic cardiovascular disease, neurological injury or traumatic brain injury, stroke, thrombocytopenia, and cancer or haematological malignancies, including chronic bone marrow failure. Further work is needed to improve our understanding of outcomes other than mortality. **Overall findings provide good evidence that transfusions with allogeneic RBCs can be avoided in most patients with haemoglobin thresholds between the range of 7.0 g/dL and 8.0 g/dL.**

Health-related quality of life after restrictive versus liberal RBC transfusion for cardiac surgery: Sub-study from a randomized clinical trial.

Hu RT, Royse AG, Royse C, Scott DA, Bowyer A, Boggett S, Summers P, Mazer CD. Transfusion. 2022 Oct;62(10):1973-1983. doi: 10.1111/trf.17084. Epub 2022 Sep 6. PMID: 36066319

617 patients randomized to restrictive vs liberal transfusion trigger.

Conclusion: The non-inferiority of a restrictive compared to a liberal transfusion strategy was not established for long-term (24 months post op) HRQOL in this dataset.

Restrictive blood transfusion and 1-year mortality in patients undergoing open abdominal surgery: A retrospective propensity score-matched cohort study.

Kikura M, Uraoka M, Nishino J. Transfus Clin Biol. 2023 Feb;30(1):75-81. doi: 10.1016/j.traccli.2022.08.003. Epub 2022 Aug 5. PMID: 35934225

Retrospective analysis of 452 consecutive patients who underwent open abdominal surgery before (liberal group: 233 patients) and after (restrictive group: 219 patients) implementing intraoperative restrictive transfusion of red blood cell. The trigger levels of hemoglobin were less than 9-10 g/dL in the liberal group and less than 7-8 g/dL in the restrictive group.

Conclusion: **Intraoperative restrictive blood transfusion reduces 1-year mortality and the transfusion rate of allogeneic blood products.**

A Systematic Review and Meta-analysis of Randomized Controlled Trials Comparing Intraoperative Red Blood Cell Transfusion Strategies.

Lenet T, Baker L, Park L, Vered M, Zahrai A, Shorr R, Davis A, McIsaac DI, Tinmouth A, Fergusson DA, Martel G. Ann Surg. 2022 Mar 1;275(3):456-466. doi: 10.1097/SLA.0000000000004931.PMID: 34319671

14 trials (8641 patients) were included.

Conclusions: Intraoperative restrictive transfusion strategies decreased perioperative transfusions without added postoperative morbidity and mortality in 12/14 trials. **Two trials reported worse outcomes.** Given trial design and generalizability limitations, uncertainty remains regarding the safety of broad application of restrictive transfusion triggers in the operating room. **Trials specifically designed to address intraoperative transfusions are urgently needed.**

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Some limitations and gaps in knowledge:

1. In clinical practice decision to transfuse is based not only on the absolute value of the hemoglobin/hematocrit but overall clinical scenario including patient's comorbidities, hemodynamic instability, signs and symptoms of end organ ischemia and anticipated blood loss. Bleeding during surgery is often acute, unpredictable, and may be challenging to control while maintaining hemodynamic stability. Application of restrictive transfusion triggers in actively bleeding surgical patients, based on intermittently measured hemoglobin values, may not be entirely safe.
2. Trials specifically designed to address intraoperative transfusions are needed.
3. A patient-centered and individualized red cell transfusion approach is recommended, but there is little evidence of which objective physiologic parameters should guide the decision intraoperatively.

Appropriateness of rationale

TRAN 01 is a process measure, and it represents the best practice of evaluating one of many aspects of the decision-making process to transfuse red blood cells. Having said that it must be kept in mind that the decision to transfuse, in most of the intraoperative scenarios, is based on multiple factors not captured nor adjusted for in calculation of TRAN 01 success rate.

Nevertheless, the measure promotes a responsible approach to red cells transfusion.

Evaluation of inclusion/ exclusion criteria

1. Inclusion and exclusion criteria are appropriate, however complete exclusion of cardiac cases should be reconsidered if capturing complete data is feasible (Hgb/Hct recorded by perfusionist, EBL, etc.).

2. Consider:

- Change the requirements to recheck Hgb/Hct in between the units if $\text{Hgb/Hct} \leq 7/21$

Adding (if possible) hemodynamic or vasopressor requirements to metric exclusion

Evaluation of definition of success or flagged cases

Definition of success is appropriate. If feasible, cases with unstable hemodynamics should be excluded in calculation of the measure of success.

Evaluation of provider attribution logic

It is appropriate to attribute the measure to the providers signed into the case at the time of transfusion.

Other feedback

Decision to transfuse red cells considers multiple factors including laboratory value, comorbidities, clinical scenario, and hemodynamic variables. As the ability of MPOG to capture these parameters evolves, contextualizing intraoperative transfusion would help to provide more meaningful feedback.

Inclusion of cardiac cases should be considered IF all necessary data elements can be captured to calculate success.

MPOG Coordinating Center Comments

- Consider: If the last hemoglobin or hematocrit drawn before the first transfusion is $\leq 6/18$ (rather than 5/16), a second unit could be administered without rechecking hemoglobin/hematocrit.
- Cardiac Subcommittee Agenda item to consider including cardiac cases

Recommendation for TRAN-01

	Recommendation
Keep as is: no changes at all	☐
Modify: changes to measure specifications (see below)	☒
Retire: eliminate entirely from dashboard and emails	☐



**Current TRAN-01 Performance
All MPOG Institutions
April 2023 - March 2024**

