Appropriateness Benchmarks for Red Blood Cell Transfusions

Using Blood Wisely.

An initiative of:
Choosing Wisely Canada
Canadian Blood Services
Héma-Québec

Benchmarking is a core element of the Using Blood Wisely program. In order to achieve and maintain their status as a Using Blood Wisely Hospital, participating organizations must regularly audit a sample of their red blood cell transfusions to ensure that they're performing at or above benchmark levels:

- At least 65% of red blood cell transfusion episodes are single unit transfusions
- At least 80% of inpatient red blood cell transfusions have a pre-transfusion Hb 80 g/L or less

Why were these indicators chosen?

The two benchmark indicators are based on current Choosing Wisely Canada recommendations related to red blood cell transfusions.

Current Recommendations:	
Don't transfuse more than one red cell unit at a time when transfusion is required in stable, non-bleeding patients.	Canadian Society for Transfusion Medicine Choosing Wisely Canada recommendation #2
Don't transfuse patients based solely on an arbitrary hemoglobin threshold.	Canadian Hematology Society Choosing Wisely Canada recommendation #5
Don't transfuse red blood cells for arbitrary hemoglobin or hematocrit thresholds in the absence of symptoms, active coronary disease, heart failure or stroke.	Canadian Society of Internal Medicine Choosing Wisely Canada recommendation #3
Don't routinely transfuse red blood cells in hemodynamically stable ICU patients with a hemoglobin concentration greater than 70 g/l (a threshold of 80 g/L may be considered for patients undergoing cardiac or orthopedic surgery and those with active cardiovascular disease).	Canadian Critical Care Society Canadian Association of Critical Care Nurses Canadian Society of Respiratory Therapists Choosing Wisely Canada recommendation #5
Don't transfuse red blood cells for arbitrary hemoglobin or hematocrit thresholds in the absence of symptoms, or if no benefit was perceived from previous transfusions.	Canadian Society of Palliative Care Physicians Choosing Wisely Canada recommendation #5

These indicators were identified by the Using Blood Wisely Measurement Working Group as they have been recognized to be surrogate measures of appropriate red blood cell transfusion practice. They have been used in quality improvement and audit initiatives undertaken in hospitals across Ontario as part of the Ontario Transfusion Quality Improvement Program (OTQIP) as well as the multi-province quality improvement project, the START Study.

Data for single unit transfusions and pre-transfusion Hb are collected in most hospital data systems. Although manual chart audits are the gold standard, they are resource intensive and limited due to their retrospective nature, whereas the above mentioned metrics are relatively easy to obtain on a regular basis.

How were these indicators chosen?

These benchmarks were established based on audit data submitted by 21 participating hospitals in the OTQIP where the 75th percentile for single unit transfusions was 67%. Similarly, the 75th percentile for inpatient pre-transfusion hemoglobin 80 g/L or less was 88%. Participating sites included a combination of 2 teaching and 19 community hospitals of various sizes.

The START study, which involved 13 hospitals (3 academic and 10 community sites) across 3 provinces, was also able to achieve a post-intervention result of 68% single unit transfusions and 85% pre-transfusion hemoglobin 80 g/L or less.

In establishing the benchmarks, a validation exercise was conducted at a medium-sized community hospital and a large academic hospital to ensure the feasibility of collecting the data for these benchmarks.

Final indicators and benchmark levels were approved by the Using Blood Wisely Steering Committee.

References

Berger MD, Gerber B, Arn K, Senn O, Schanz U, Stussi G. Significant reduction of red blood cell transfusion requirements by changing from a double-unit to a single-unit transfusion policy in patients receiving intensive chemotherapy or stem cell transplantation. 2012. Haematologica. 97(1):116-22.

Borgert M, Binnekade J, Paulus F, Vroom M, Vlaar A, Goossens A, Dongelmans D. Implementation of a transfusion bundle reduces inappropriate red blood cell transfusions in intensive care – a before and after study. 2016. Transfusion Medicine. 26(6): 432-439.

Boral LI, Bernard A, Hjorth T, Davenport D, Zhang D, MacIvor DC. How do I implement a more restrictive transfusion trigger of hemoglobin level of 7 g/dL at my hospital? 2015. Transfusion. 55(5):937-45.

Larson EA, Thompson PA, Anderson ZK, Anderson KA, Lupu RA, Tigner V, Hoffman WW. Decreasing the critical value of hemoglobin required for physician notification reduces the rate of blood transfusions. 2016. Int J Gen Med 3(9):133-6.

Leahy MF, Hofmann A, Simon T, Trentino KM, Burrows SA, Swain SG, Hamdorf J, Gallagher T, Koay A, Geelhoed GC, Farmer SL. Improved outcomes and reduced costs associated with a health-system-wide patient blood management program: a retrospective observational study in four major adult tertiary-care hospitals. 2017. Transfusion. 57(6):1347-1358.

Leahy MF, Trentino KM, May C, Swain SG, Chuah H, Farmer, SL. lood use in patients receiving intensive chemotherapy for acute leukemia or hematopoietic stem cell transplantation: the impact of a health system-wide patient blood management program. 2017. Transfusion. 57(9):2189-2196.

Lee TC, Murray J, McDonald EG. An online educational module on transfusion safety and appropriateness for resident physicians: a controlled before–after quality-improvement study. 2019. CMAJO 7(3): E492-E496.

Michetti CP, Prentice HA, Lita E, Wright J, Ng E, Newcomb AB. Reducing transfusions in critically injured patients using a restricted-criteria order set. 2016. J Trauma Acute Care Surg. 81(5):889-896.

Warner MA, Schaefer KK, Madde N, Burt JM, Higgins AA, Kor DJ. Improvements in red blood cell transfusion utilization following implementation of a single-unit default for electronic ordering. 2019. Transfusion. 59(7): 2218-2222.

Yerrabothala S, Desrosiers KP, Szczepiorkowski ZM, Dunbar NM. Significant reduction in red blood cell transfusions in a general hospital after successful implementation of a restrictive transfusion policy supported by prospective computerized order auditing. 2014. Transfusion. 54(10): 2640-2645.

Last updated: September 2020