

**Appendix 2 (as supplied by the authors): Pros and cons of various measures of blood transfusion utilization and evaluation of proportion of transfusions with hemoglobin below 80g/L as a metric**

| Measure   | Pros  | Cons  |
|---|---|---|
| Overall number of units   | <ul style="list-style-type: none"> <li>Easiest to obtain</li> </ul>   | <ul style="list-style-type: none"> <li>Sensitive to the population being measured</li> <li>Not comparable between institutions with different populations</li> <li>Does not assess appropriateness of the transfusion</li> </ul>  |
| Transfusions per 1000 patient days                                      | <ul style="list-style-type: none"> <li>Allows standardization and comparison within a unit or institution</li> </ul>  | <ul style="list-style-type: none"> <li>Sensitive to the population being measured</li> <li>Not comparable between institutions with different populations</li> <li>Does not assess appropriateness of the transfusion</li> <li>May underestimate overuse in units with low acuity patients and long lengths of stay</li> </ul>  |
| Transfusions per 100 admissions   | <ul style="list-style-type: none"> <li>Allows standardization</li> <li>For many services, newly admitted patients are, in general, much more likely to be transfused than long-term patients</li> </ul>   | <ul style="list-style-type: none"> <li>Sensitive to the population being measured</li> <li>Not comparable between institutions with different populations</li> <li>Does not assess appropriateness of the transfusion</li> </ul>  |
| Number of single unit transfusions                                      | <ul style="list-style-type: none"> <li>Addresses appropriateness and supports campaigns such as Choosing Wisely Canada’s “why use two when one will do?”</li> <li>Eliminating routine orders to transfuse two units will reduce overuse</li> </ul>  | <ul style="list-style-type: none"> <li>Does not address the appropriateness of the first transfusion given or of single unit transfusions</li> <li>Not always straightforward to electronically collect this type of data particularly when the transfused units occur on two calendar days (i.e. pre/post-midnight)</li> </ul> |
| Proportion of transfusions with hemoglobin below 80g/L (or other value) | <ul style="list-style-type: none"> <li>Allows for internal and external comparisons which are independent of case mix</li> <li>Addresses appropriateness and can be used in goal setting for an institution e.g. “80% below 80”</li> <li>Sensitivity and specificity of potential overuse can be adjusted by changing the hemoglobin cut-off</li> </ul> | <ul style="list-style-type: none"> <li>More difficult to obtain in some centers because it requires both transfusion and laboratory data</li> <li>Can be confused with stating that 80g/L is the clinical threshold for transfusions</li> </ul>   |
| Proportion of appropriate transfusions                                  | <ul style="list-style-type: none"> <li>Allows for internal and external comparisons which are independent of case mix</li> <li>Addresses appropriateness</li> </ul>   | <ul style="list-style-type: none"> <li>Requires expert adjudication</li> <li>Time consuming and impossible to automate</li> <li>Comparisons highly dependent on inter-observer reliability</li> </ul>   |

Reference: [https://choosingwiselycanada.org/wp-content/uploads/2017/07/CWC\\_Transfusion\\_Toolkit\\_v1.2\\_2017-07-12.pdf](https://choosingwiselycanada.org/wp-content/uploads/2017/07/CWC_Transfusion_Toolkit_v1.2_2017-07-12.pdf)

The table was created based discussions occurring during the 2015 meeting of the Canadian Society of Internal Medicine’s Choosing Wisely and Quality Improvement Subcommittee of whom TCL and EGM were the members tasked with working on transfusion appropriateness.

*Evaluation of Proportion of transfusions with hemoglobin below 80g/L as a metric*

To evaluate how well this outcome served as a surrogate for potentially inappropriate transfusions, two authors (TCL and EGM, both staff general internists) blinded to transfusion date and location, reviewed a convenience sample of 75 charts of patients who were transfused with hemoglobin values above 80g/L. Transfusions above 80g/L were judged as inappropriate in non-bleeding, hemodynamically stable patients, and in the absence of active cardiac ischemia documented in the medical record. Consensus was reached through discussion in cases of disagreement. The proportion of inappropriate transfusions occurring above 80g/L was estimated at 78.7% (kappa 0.80 for inter-observer agreement), indicating that the majority of transfusions that occurred above this threshold might have been unnecessary and could have been avoided.