



SABM[®]
SOCIETY FOR THE ADVANCEMENT
OF BLOOD MANAGEMENT

TRANSFUSION OVERUSE

EXPOSING AN
INTERNATIONAL PROBLEM
AND PATIENT SAFETY ISSUE

“Over-transfusion should be viewed as a serious adverse event much like a serious adverse drug reaction or administration of the wrong drug or wrong dose and evaluated as part of a hospital’s overall quality review process.”

- Aryeh Shander MD, Clinical Professor of Anesthesiology, Medicine and Surgery, Icahn School of Medicine at Mt Sinai, New York.

WHY THE PROBLEM?

FREQUENCY: MORE THAN REALIZED

Blood transfusion is one of the most common procedures performed in US hospitals.¹

- Every year, approximately 12 million units of packed red blood cells are used.²
- One in ten hospitalized patients who undergoes an invasive procedure is transfused.³

RISKS: HIGHER THAN MOST BELIEVE

Many studies have shown that transfusions are associated with negative outcomes⁴:

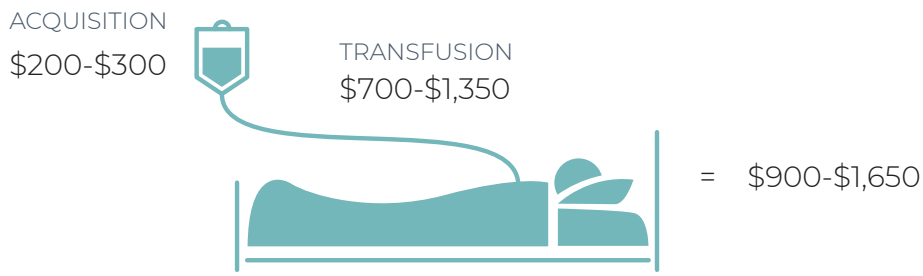
- Increased mortality.
- Increased complications.
- Increased length of stay.
- Increased infection rates.

The implementation of donor selection and screening has dramatically lowered the risk of transfusion transmitted-infection. However, hemolytic transfusion reactions, transfusion-related acute lung injury (TRALI), transfusion-associated circulatory overload (TACO) and anaphylactic reactions remain major sources of transfusion-related morbidity and mortality due to un-informed and widespread poor transfusion practices.

COST: HIGH AND INCREASING⁵

In the United States, hospitals purchase blood from a variety of profit and non-profit blood centers.

- Acquisition cost for 1 unit of red cells is estimated at \$200 - \$300.
- Transfusion cost is actually 3 ½ to 4 ½ times the cost of purchasing blood, excluding the cost of complications.
 - The cost of transfusing one unit of red cells is almost \$1200.
 - Each additional unit is associated with \$1480 in increased hospital costs.⁶



“Far too often transfusions are given with little or no reason to believe they will actually benefit the patient. Without that we give our patients only unnecessary risk at great cost. This is unethical.”

**— SHERRI OZAWA RN,
CLINICAL DIRECTOR ,
INSTITUTE FOR PATIENT
BLOOD MANAGEMENT,
ENGLEWOOD HOSPITAL
AND MEDICAL CENTER,
ENGLEWOOD , NJ**

BEHAVIOR : NON-EVIDENCE BASED

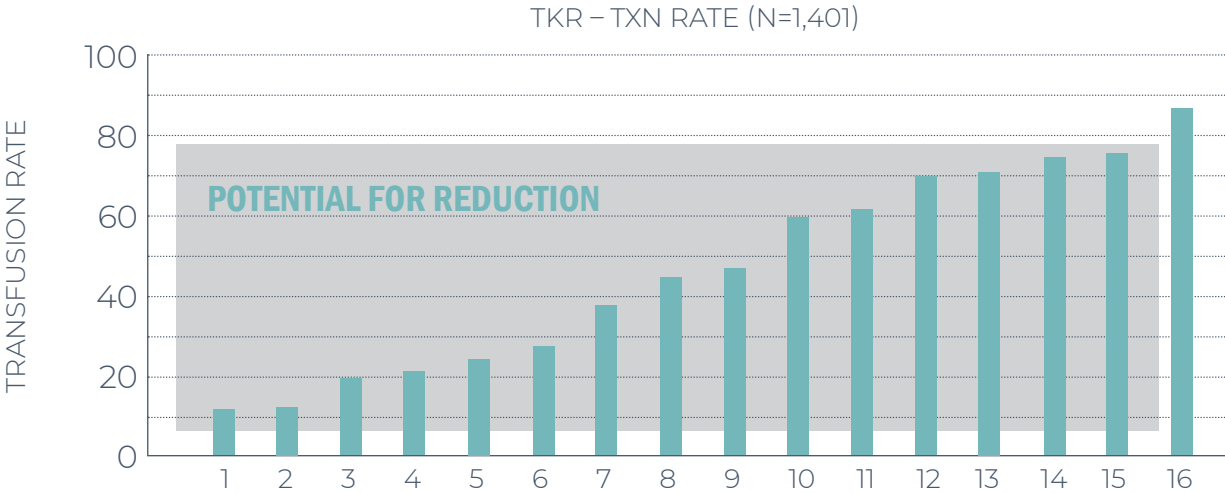
1. Variability in transfusion practice ^{9,10}

Despite the availability of clinical practice guidelines, there remains significant variability in clinical practice.

- Variability in transfusion practice is found between one hospital and another as well as among individual practitioners.
- Variability consistently points to the fact that the decision to transfuse is based on behavior, rather than scientific data, guidelines or evidence based risk versus benefit analysis.

VARIABILITY OF TRANSFUSION RATES FOR MATCHED PATIENTS

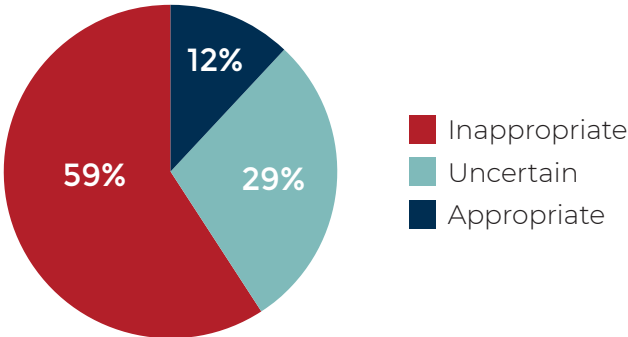
GOMBOTZ H., REHAK P., SHANDER A., HOFMANN A.; TRANSFUSION 2007



2. Perceived Benefit

Published studies show that between 40% to 60% of transfusions are inappropriate, suggesting no benefit or worse–harm to patients.⁷

A study evaluated 494 publications using an expert panel to systematically assess transfusion appropriateness, defined as the likelihood of improving health outcomes.⁶ The panel concluded that only 12% of transfusions were considered to be appropriate to improve outcomes; 88% either resulted in harm or showed no benefit.



TRANSFUSION OVERUSE*

The American Medical Association and The Joint Commission recently identified red blood cell transfusion as one of the five overused procedures in medicine at the National Summit on Overuse (September 24, 2012). The five included:

1. Elective Percutaneous Coronary Intervention.
2. Myringotomy and Tubes.
3. Early Cesarean Section.
4. Antimicrobials in Upper Respiratory Infections.
- 5. Blood Transfusion.**

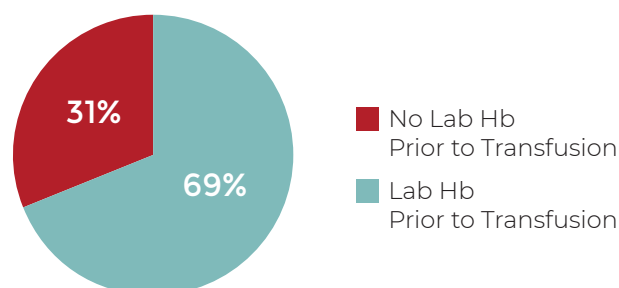
*The Joint Commission and the Institute of Medicine define overuse as “the use of health services where, in circumstances where the likelihood of benefit is negligible and therefore the patient faces only the risk of harm.”

MODIFIABLE KNOWN RISKS THAT CONTRIBUTE TO TRANSFUSION OVERUSE

- Presence of correctable anemia.
- Excessive surgical blood loss.
- Excessive blood loss due to unnecessary testing.
- Un-informed and poor transfusion practice.

ONE-THIRD OF TRANSFUSIONS IN THE OPERATING ROOM ARE GIVEN WITHOUT A LAB HEMOGLOBIN MEASUREMENT¹¹

- Hemoglobin levels play a large role in the decision to transfuse, establishing a hemoglobin threshold for transfusion and/or as a surrogate indicator for transfusion benefit. However, blood should not be ordered based on hemoglobin value alone; rather physiologic indicators as well as signs and symptoms should be evaluated. Oxygenation and hemodynamics should always be evaluated and optimized before transfusion is considered.
- Data from almost 3,000 surgical patients showed that 31% of transfusions did not have a documented hemoglobin level prior to transfusion. Researchers noted that this is often due to the long turnaround time for laboratory testing while decisions must be made in real-time.



WHAT IS THE SOLUTION?

A RESTRICTIVE BLOOD TRANSFUSION APPROACH IS BEST PRACTICE!

When hospitals reduce the variation in transfusion practice among their providers, there is an overall reduction in transfusion and an improvement in clinical outcomes. The goal is a safe hemoglobin range that is adequate to prevent end-organ ischemia after optimizing oxygenation and hemodynamics.

Most guidelines recommend transfusion triggers at hemoglobin of 6–7 g/dl for the majority of patients, with a possibly higher threshold at hemoglobin of 7–10 g/dl for patients considered to be high-risk.¹²

The American Board of Internal Medicine’s Choosing Wisely® campaign had every professional organization submit five “do not’s”. Number three (#3) states: “Avoid transfusions of red blood cells for arbitrary hemoglobin or hematocrit thresholds in the absence of symptoms of active coronary disease, heart failure or stroke.”

Implementation of these restrictive transfusion practices has led to reductions in transfusions:

- 12-83% reduction in red cell transfusion.¹³
- More than 85% reduction in use of fresh frozen plasma.¹⁴

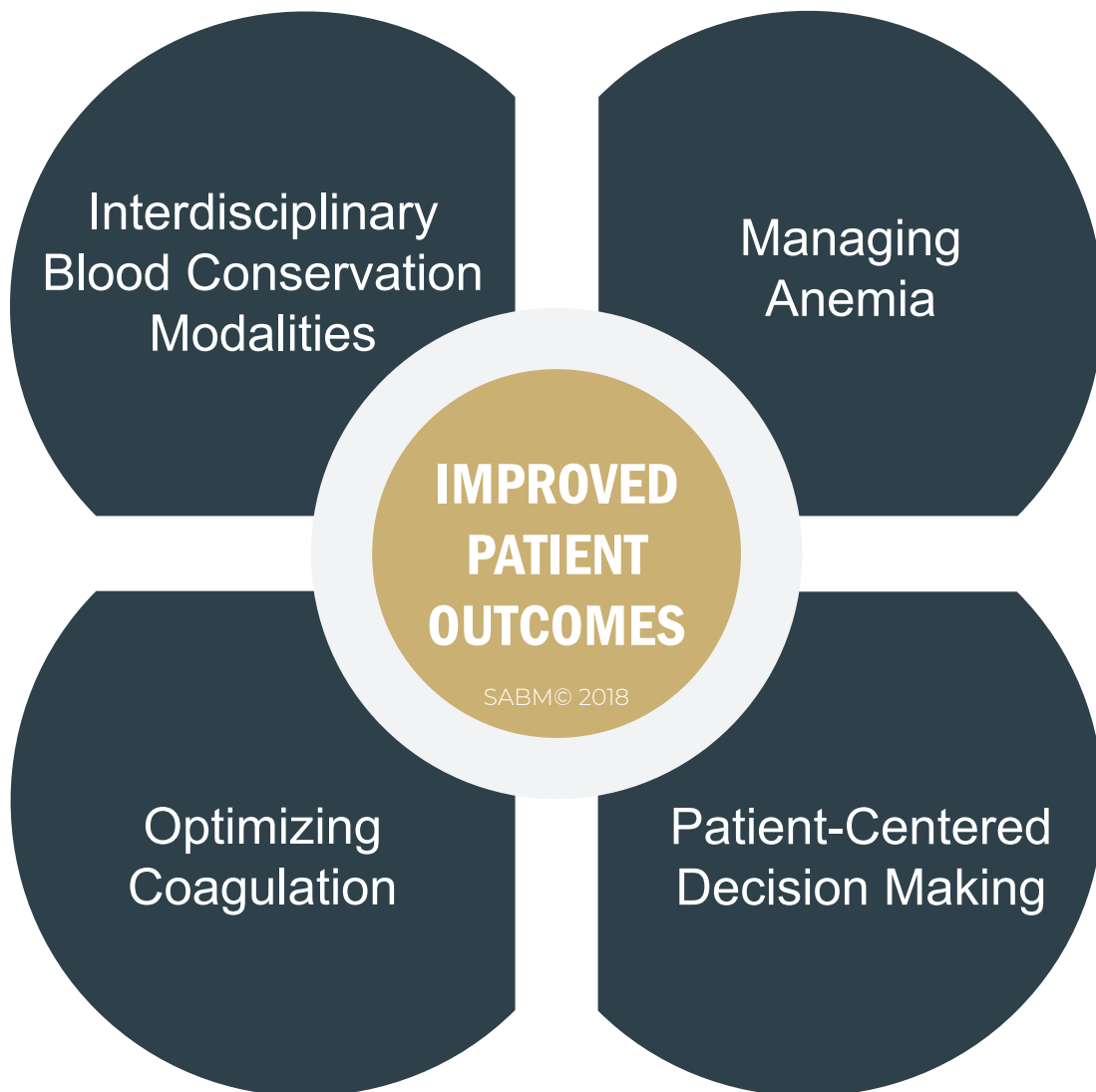
BRIDGING THE KNOWLEDGE AND PRACTICE GAP

Apply best practice guidelines for transfusion use

- Implement an evidence-based approach to the ordering of blood components using a restrictive transfusion strategy.
- Refrain from ordering red blood cells based on hemoglobin values alone.
- Consider red blood cell transfusion only when defined physiological indicators—including signs and symptoms—are not correctable by other modalities.
 - Re-evaluate the patient and measure hemoglobin between EACH unit of blood.
 - Monitor the change in hemoglobin as well as the absolute hemoglobin level.

Apply best practice guidelines for transfusion use

“The timely application of evidence-based medical and surgical concepts designed to manage anemia, optimize hemostasis, and minimize blood loss in order to improve patient outcomes.” - Society for the Advancement of Blood Management (SABM.org).



Employ Patient-Centered Decision Making

The healthcare professional's role in patient blood management is to:

- Align practitioners' expectation with those of the patient (Transparency and Knowledge).
- Apply evidence-based rationale and guidelines for transfusion (Patient Advocacy).
- Ensure benefit when transfusing, not just risk (Patient Safety).
- Inform patients of the risks, benefits and alternatives of treatment choices (Patient Education).
- Use the SABM Standards for Patient Blood Management Programs at sabm.org/ publications.

REFERENCES

1. Agency for Healthcare Research and Quality. Healthcare Cost Utilization Project Statistical Brief. #149. most Frequent Procedures Performed in Hospitals 2010. <http://www.hcup-us.ahrq.gov/reports/stat-briefs/sb149.pdf> - Accessed July 18, 2013.
2. 2015 NBCUS TRANSFUSION 2017;57;1588-1598.
3. Agency for Healthcare Research and Quality. HCUP Facts and Figures: Statistics on Hospital-Based Care in the United States, 2007. Available at: http://www.hcup.us.ahrq.gov/reports/factsandfigures/2007/pdfs/FF_report_2007.pdf - Accessed June 16, 2013.
4. Petrides M, AuBuchon JP. To transfuse or not to transfuse: An assessment of risks and benefits. In: Mintz PD, ed. Transfusion therapy: Clinical principles and practice. 3rd ed. Bethesda, MD: AABB Press, 2011.
5. Shander A, Hofmann A, Ozawa S, Theusinger OM, Gombotz H, Spahn DR. Activity-based costs of blood transfusions in surgical patients at four hospitals. *Transfusion*. 2010; 50(4):753-65.
6. Blumberg N, Kirkley SA, Heal JM. A cost analysis of autologous and allogeneic transfusions in hipreplacement surgery. *Am J Surg*. 1996;171(3):324-30.
7. Shander A, Fink A, Javidroozi et al International Consensus Conference on Transfusion Outcomes Group. Appropriateness of allogeneic red blood cell transfusion: the international consensus conference on transfusion outcomes. *Transfus Med Rev*. 2011; 25(3):232-246.e53.
8. Shander A, Javidroozi M, Perelman S, et al *Mt Sinai J Med*. Jan-Feb 2012.
9. Goodnough LT, Johnston MF, Toy PT. The variability of transfusion practice in coronary artery bypass surgery. Transfusion Medicine Academic Award Group. *JAMA*; 1991; 265(1): 86-90.
10. Qian F, Osler TM, Eaton MP, et al. Variation of blood transfusion in patients undergoing major noncardiac surgery. *Ann Surg*. 2013; 257(2):266-78.
11. Frank S, Savage W, Rothschild J, et al. Variability in blood and blood component utilization as assessed by an anesthesia information management system. *Anesthesiology*. 2012;117:99-106.
12. Goodnough LT, Levy JH, Murphy MF. Concepts of blood transfusion in adults. *Lancet*. 2013; 381(9880):1845-54.
13. Behavior modification interventions to optimize red blood cell transfusion practices: A systematic review and meta analysis *BMJ Open*. 2018 May 18;8(5):e019912. doi: 10.1136/bmjopen-2017-019912.
14. Tavares M, DiQuattro P, Nolette N, Conti G, Sweeney J. Reduction in plasma transfusion after enforcement of transfusion guidelines. *Transfusion*. 2011;51(4):754-61.



SABM[®]
SOCIETY FOR THE ADVANCEMENT
OF BLOOD MANAGEMENT

TRANSFUSION OVERUSE

EXPOSING AN
INTERNATIONAL PROBLEM
AND PATIENT SAFETY ISSUE

“Over-transfusion should be viewed as a serious adverse event much like a serious adverse drug reaction or administration of the wrong drug or wrong dose and evaluated as part of a hospital’s overall quality review process.”

- Aryeh Shander MD, Clinical Professor of Anesthesiology, Medicine and Surgery, Icahn School of Medicine at Mt Sinai, New York.