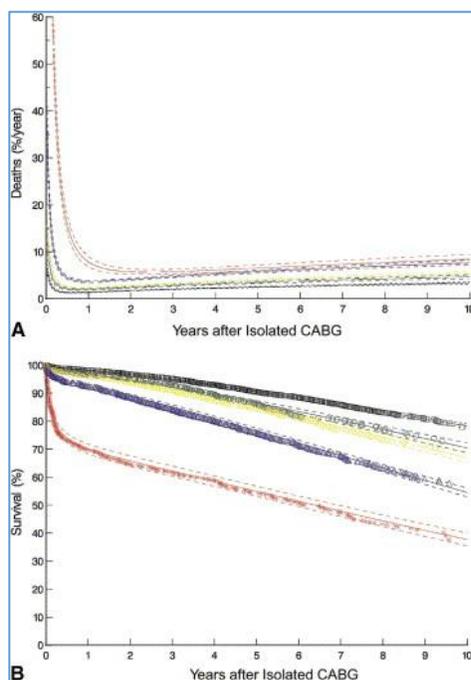


Evidence Concerning Transfusions and Clinical Outcomes
Robert C Groom, CCP, FPP
Maine Cardiothoracic and Vascular Institute
Portland, Maine

Blood is an expensive and scarce resource that has risks and benefits. Anemia during cardiac surgery is quite common. However, the threshold at which red blood cells (RBC) are transfused in cardiac surgery is controversial and over the past several decades transfusion practices for cardiac surgery patients have varied widely both across centers and across care providers¹. There is tension regarding the use of blood since numerous observational studies have shown an association between transfusions and long term survival as well as other adverse outcomes.



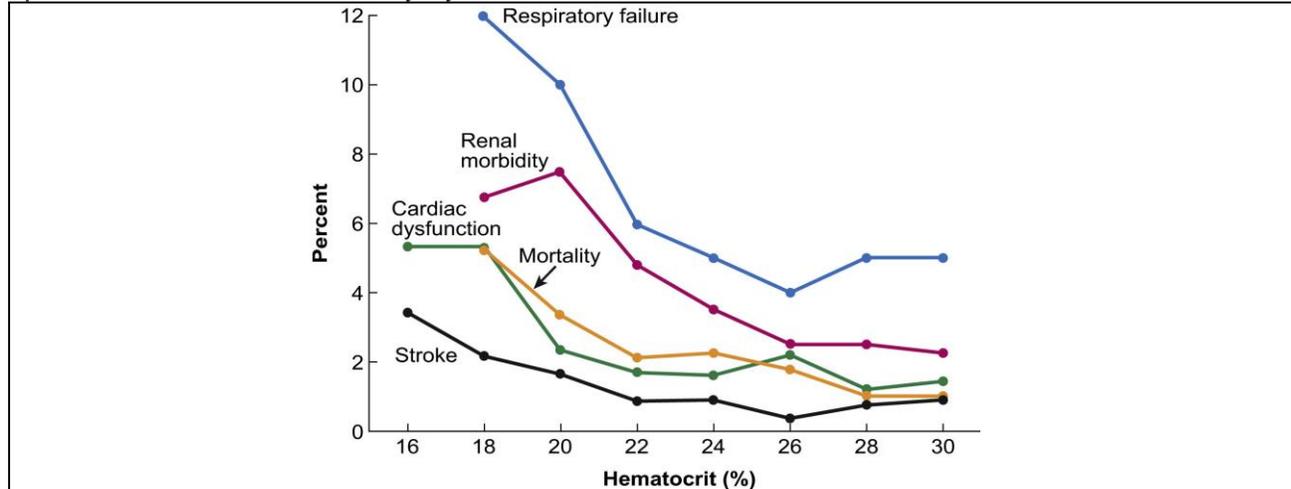
Black, no blood transfusion; green, 1 unit; yellow, 2 units; blue 3–5 units; and red 6 units of red blood cells transfused; CABG coronary artery bypass grafting; PRBC perioperative red blood cell.) *The Annals of Thoracic Surgery* 2006 81, 1650-1657DOI:

Similarly, there are a number of studies that have associated anemia during cardiac surgery with heart failure, stroke, acute kidney injury, respiratory failure, and death. It has also been shown that the association of adverse outcomes related to transfusion appear to be different for women than for men.

Most practice guidelines recommend a restrictive transfusion practice. To date more than 20 randomized controlled trials have sought to determine if there is a difference in outcomes for patients managed with a liberal or a restrictive transfusion practice. These trials have shown that a restrictive practice is effective in reducing the transfusion of RBCs, however restrictive practices do not appear to reduce the rates of adverse

¹ Bennett-Guerrero E, Zhao Y, O'Brien SM, et al. Variation in Use of Blood Transfusion in Coronary Artery Bypass Graft Surgery. *JAMA*. 2010;304(14):1568-1575. doi:10.1001/jama.2010.1406

events.² Of note, there are few studies that have compared transfusion practices in patients with acute coronary syndromes.



Loor, The Journal of Thoracic and Cardiovascular Surgery, 2012 144, 538-546DOI³

The duration of storage and filtration of donor blood also been implicated in the safety of transfused blood⁴. More recently donor characteristics such as age and sex of have been associated with recipient survival.⁵

In 2015, AmSECT's International Consortium for Evidence- Based Perfusion committee published a consensus statement on minimal criteria for reporting cardiopulmonary bypass-related contributions to red blood cell transfusions associated with adult cardiac surgery.⁶ The aim of this presentation will be to review the current literature on transfusion of RBCs in adult cardiac surgery patients as it relates to their clinical outcomes.

² Carson JL, Carless PA, and Hebert PC. Transfusion thresholds and other strategies for guiding allogeneic red blood cell transfusion Cochrane Database Syst Rev. ; 4: CD002042. doi:10.1002/14651858.CD002042.pub3.

³ Loor, Gabriel et al. Implications and management of anemia in cardiac surgery: Current state of knowledge JTCVS 2012;144: 538 – 546

⁴ Wang D, Sun J, Solomon SB, Klein HG, Natanson C. Transfusion of older stored blood and risk of death: a meta-analysis. Transfusion 2012;52:1184-1195

⁵ Chassé M, Tinmouth A, English SW, et al. Association of Blood Donor Age and Sex With Recipient Survival After Red Blood Cell Transfusion. JAMA Intern Med. Published online July 11, 2016. doi:10.1001/jamainternmed.2016.3324.

⁶ Likosky DS, Baker RA, Dickinson TA, FitzGerald DJ, De Somer ME, Groom RC, FitzGerald D, Shann KG, Poullis M, Spiess BD, Jabr K, Lucas MT, Ferguson JD, Bronson SL. Report from AmSECT's international consortium for evidence- based perfusion consensus statement: Minimal criteria for reporting cardiopulmonary bypass-related contributions to red blood cell transfusions associated with adult cardiac surgery J Extra Corpor Technol. 2015 Jun;47(2):83-9.