Session 2
Preserving Red Cell Mass
• Do the guidelines help?

• What story does the data tell?
2 Guidelines:

1. The Society of Thoracic Surgeons and the Society of Cardiovascular Anesthesiologists Blood Conservation Clinical Practice Guidelines

2. Quality guide to the Administrative & Clinical Standards for Patient Blood Management Programs
Goals: 2 Questions

1. How does a perfusionist use these guidelines to improve practice?

2. Do these guidelines meet our needs?
Plan of Action

• Part 1: Review of 1\textsuperscript{st} guideline
  answer question 1 & 2

• Part 2: Review of 2\textsuperscript{nd} guideline
  answer question 1 & 2

• Part 3: What story does data tell?
The Society of Thoracic Surgeons and the Society of Cardiovascular Anesthesiologists Blood Conservation Clinical Practice Guidelines
2011 Update to The Society of Thoracic Surgeons and the Society of Cardiovascular Anesthesiologists Blood Conservation Clinical Practice Guidelines

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5. Evidence Supporting Guideline Recommendations
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“Significant revisions of the blood conservation guidelines aim at reducing hemodilution and conserving preoperative patient red cell volume”
1. How does a perfusionist use these guidelines to improve practice?
d. Blood Salvage interventions
f. Perfusion interventions
   microplegia
   blood conservation in ECMO
   mini circuits/VAVD
   biocompatible CPB circuits
   ultrafiltration
h. management of blood resources
   blood management teams
- preoperative use of erythropoietin
- minimized CPB circuits
- normovolemic hemodilution
- salvage of CPB circuit
- MUF
- Microplegia

- Consistent transfusion algorithm
  (including massive transfusion)
1. How does a perfusionist use these guidelines to improve practice?
Does the STS/ACA/ICEBP Clinical Practice Guideline document have what we need to create a consistent transfusion algorithm?
2. Does the STS/SCA/ICEBP Clinical Practice Guidelines meet our needs?
Transfusion triggers

• Given that the risk of transmission of known viral diseases with blood transfusion is currently rare, fears of viral disease transmission should not limit administration of INDICATED blood products. (This recommendation only applies to countries/blood banks where careful blood screening exists.) (Level of evidence C)

• Transfusion is unlikely to improve oxygen transport when the hemoglobin concentration is greater than 10 g/dL and is not recommended. (Level of evidence C)

• With hemoglobin levels below 6 g/dL, red blood cell transfusion is reasonable since this can be life-saving. Transfusion is reasonable in most postoperative patients whose hemoglobin is less than 7 g/dL but no high level evidence supports this recommendation. (Level of evidence C)

• It is reasonable to transfuse non red-cell hemostatic blood products based on clinical evidence of bleeding and preferably guided by point-of-care tests that assess hemostatic function in a timely and accurate manner. (Level of evidence C)

• During cardiopulmonary bypass (CPB) with moderate hypothermia, transfusion of red cells for hemoglobin 6 g/dL is reasonable except in patients at risk for decreased cerebral oxygen delivery (ie, history of cerebrovascular attack, diabetes, cerebrovascular disease, carotid stenosis) where higher hemoglobin levels may be justified. (Level of evidence C)

• In the setting of hemoglobin values exceeding 6 g/dL while on CPB, it is reasonable to transfuse red cells based on the patient’s clinical situation, and this should be considered as the most important component of the decision making process. Indications for transfusion in this setting are multifactorial and should be guided by patient-related factors (ie, age, severity of illness, cardiac function, or risk for critical end-organ ischemia), the clinical setting (massive or active blood loss), laboratory or clinical parameters (eg, hematocrit, SVO2, electrocardiogram, or echocardiographic evidence of myocardial ischemia etc.). (Level of evidence C)

• It is reasonable to transfuse nonred-cell hemostatic blood products based on clinical evidence of bleeding and preferably guided by specific point-of-care tests that assess hemostatic function in a timely and accurate manner. (Level of evidence C)

• It may be reasonable to transfuse red cells in certain patients with critical noncardiac end-organ ischemia (eg, central nervous system and gut) whose hemoglobin levels are as high as 10 g/dL but more evidence to support this recommendation is required. (Level of evidence C)

• In patients on CPB with risk for critical end-organ ischemia/injury, transfusion to keep the hemoglobin 7 g/dL may be considered. (Level of evidence C)
Microlegia?
“When compared with 4:1 conventional blood cardioplegia, microplegia does not significantly impact RBC exposure.”
- preoperative use of erythropoietin
- minimized CPB circuits
- normovolemic hemodilution
- salvage of CPB circuit
- MUF
- Microplegia

- Consistent transfusion algorithm
  (including massive transfusion)
Microplegia is...

• "Intuitively advantageous " and "more data is needed to assess whether microplegia has an effect."

• “But, microplegia use may be considered as part of a multimodality blood management program."
2. Does the STS/SCA/ICEBP Clinical Practice Guidelines meet our needs?
What do we want?

• How?
• What equipment will I need?
• Expectations?
• Normals?
• Quick
• Specific
• Evidence Based
Quality Guide to the Administrative & Clinical Standards for Patient Blood Management Programs
Administrative and Clinical Standards
For Patient Blood Management Programs

Foreword
Transfusion of allogeneic blood and its components has been an integral part of clinical management strategies in health care for decades, yet evidence-based criteria for transfusion are limited. Practitioners often transfuse patients without sufficient evidence of benefit to the recipient. As awareness of the risks associated with blood transfusion (including disease transmission, hemolytic transfusion reactions, bacterial contamination, acute lung injury, volume overload, allergic reactions, transfusion-related immunomodulation to name but a few) has increased and data supporting restrictive transfusion practices have emerged, a shift in transfusion threshold is appearing in the published medical literature. However, this may not be part of established daily practice in many hospitals. A growing number of publications strongly suggest that not only are blood transfusions associated with significant risk, but that they may not provide the desired therapeutic outcome. A fresh look into this medical intervention is required.

When is blood transfused? The answer often depends on who the ordering physician is, their hospital location, and culture, and their knowledge of transfusion medicine. With the exception of patients who are transfusion dependent due to abnormal hemoglobin production (for example, patients with thalassemia or sickle cell disease) or marrow failure (for example, patients with myelodysplasia), red cell transfusion in non-hemorrhaging patients may reflect a missed clinical opportunity for early diagnosis, treatment and correction of anemia. Transfusion of plasma may reflect a missed clinical opportunity for the timely correction of warfarin-associated coagulation defects with vitamin K. It is likely that many transfusions occur because of these missed clinical opportunities. When should blood be transfused is more difficult to answer and should always involve clinical assessment of the patient and continuing evaluation of non-transfusion treatment modalities. The Institute of Medicine (IOM), in its study of health care in the United States, described the great variability of transfusion practices and the frequency of transfusion. Demonstrated variation in transfusion practices suggests that at least some transfusions in many hospitals are not appropriate.

The Society for the Advancement of Blood Management® (SABM®) is a not-for-profit professional organization with a goal of educating health care providers about improving patient outcomes through the three principles of patient blood management: prospective evaluation and management of each patient, especially related to diagnosis and early management of pre-existing anemia; minimizing procedural and surgical blood loss, and where appropriate, reducing and/or avoiding patient exposure to allogeneic blood by optimizing the patient’s physiologic compensation for anemia. Although an evolving concept, SABM defines patient blood management as “the appropriate provision and use of blood, its components and derivatives, and strategies to reduce or avoid the need for a blood transfusion.” Distinct from management of the blood supply inventory, SABM is focused on “patient blood management;” that is, a multi-disciplinary and multi-modal clinical management of the patient to ensure better patient outcome by preventive measures addressed above.

Identifying an unmet medical need, SABM has developed this document, Administrative and Clinical Standards for Patient Blood Management. These standards span all activities related to patient blood management and are intended to optimize clinical outcomes and improve patient safety. These standards are not intended to provide strict indications, contraindications or other criteria for the practice of clinical medicine and surgery. Clinical decisions are the sole responsibility of the health care provider and may vary from patient to patient, subject to individual health care practitioner clinical judgment. As such, these standards should not be used as the only basis for making case-specific decisions regarding patient recommendations or diagnostic testing.
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"this document is intended to optimize clinical outcomes and improve patient safety."
1. How does a perfusionist use these guidelines to improve practice?
Quality Guide to the Administrative & Clinical Standards for Patient Blood Management Programs
2. Do these resources meet your needs?
"these standards are not intended to provide strict indications, contraindications, or other criteria for the practice of clinical medicine and surgery."
Do such standards exist?
What story does the data tell?
An evidence-based review of the practice of CPB in adults

A focus on neurological injury, glycemic control, hemodilution, and the inflammatory response
Figure 6: Glucose levels in the operating room.
Why does practice **NOT** change?

- Plethora of information
- Lack of clarity of ownership of case
- “Old school”
- Money
Let’s Do This!!!

1. DATA!!! DATA!!! Registry!!!
2. EVALUATE YOURSELF
3. REMOVE the gaps.
Why does practice **NOT** change?

- Plethora of information
  - *NO specific clinical guidelines*
- Lack of clarity of ownership of case
- “Old school”
- Money
WE NEED MORE!!

- How?
- What will I need?
- Expectations?
- Normals?
- Quick
- Specific
- Evidence Based

We, as a society, do not have the evidence-based Guidelines to achieve success!