Transfusion Safety and Blood Management Specialists: New Roles for a New Medical Paradigm

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What do we hope to accomplish here today?

• Discuss the new paradigm and define how it challenges transfusion medicine

• Describe new roles to meet the challenges

• Define the responsibilities of the TSO

• Explain how a TSO can improve both quality patient care while improving the bottom line
Quality Patient Care

Cost Savings

Management of Precious Resources
Challenge 1: Costs of Transfusion
Acquisition Costs are only $\frac{1}{4}$ (or less) of the total costs of transfusion.
Costs of Surgical RBC Transfusion
Acquisition Costs are only ~¼ of total costs

- Austria: $154 (RBC acquisition cost), $522 (Activity-based cost)
- Switzerland: $194 (RBC acquisition cost), $611 (Activity-based cost)
- Rhode Island: $203 (RBC acquisition cost), $726 (Activity-based cost)
- New Jersey: $248 (RBC acquisition cost), $1,183 (Activity-based cost)

Shander et al. Transfusion. 2010.
By approaching blood management systematically, you can reduce activity-based costs of blood by optimizing your internal steps.
It will take a systems approach to tackle activity-based costs

- Every step in the process costs money
  - Have variable, fixed, direct, and indirect costs
  - Some hospitals will have difficulty seeing this as “real” costs

Figure 1. Process flow of outpatient RBC transfusion administration. This flow chart is part of a larger process, comprising a limited portion of cost elements (i.e., Steps 7 & 8 in Figure 2). (Reprinted from Cantor, et al31 with permission from the American Society of Clinical Oncology.)
Challenge 2: Quality Patient Care

Policies and Processes Hospital-wide impact overall risks of transfusion and blood banks have little control over them.
Transfusion-associated errors

**FACTS:**

- 1/12,000 units are given to the wrong patient
- 1/38,000 transfusions are ABO incompatible,
- 1/2 result in an hemolytic transfusion reaction,
- but are obscured by a low fatality rate (1/600K to 1/1800K)

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**TABLE 3. Sources of transfusion-associated errors in New York State, 1990 through 1999**

<table>
<thead>
<tr>
<th>Nature of error</th>
<th>Number (%)</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-blood bank error alone</td>
<td></td>
<td>259 (56)</td>
</tr>
<tr>
<td>Identification error</td>
<td>171 (37)</td>
<td></td>
</tr>
<tr>
<td>Phlebotomy error</td>
<td>62 (13)</td>
<td></td>
</tr>
<tr>
<td>Incorrect order sent</td>
<td>22 (5)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>4 (1)</td>
<td></td>
</tr>
<tr>
<td>Blood bank error alone</td>
<td></td>
<td>135 (29)</td>
</tr>
<tr>
<td>Tested wrong sample</td>
<td>39 (8)</td>
<td></td>
</tr>
<tr>
<td>Testing error, technical</td>
<td>34 (7)</td>
<td></td>
</tr>
<tr>
<td>Wrong unit issued</td>
<td>17 (4)</td>
<td></td>
</tr>
<tr>
<td>Testing error, clerical/transcription</td>
<td>16 (3)</td>
<td></td>
</tr>
<tr>
<td>Wrong unit tagged</td>
<td>14 (3)</td>
<td></td>
</tr>
<tr>
<td>Clerical error, recorded on wrong slip</td>
<td>11 (2)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>4 (1)</td>
<td></td>
</tr>
<tr>
<td>Compound error</td>
<td></td>
<td>67 (15)</td>
</tr>
<tr>
<td>Wrong unit issued, identification error</td>
<td>48 (10)</td>
<td></td>
</tr>
<tr>
<td>Wrong unit tagged, not detected</td>
<td>6 (1)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>13 (3)</td>
<td></td>
</tr>
<tr>
<td>Could not be determined*</td>
<td>1 (0.2)</td>
<td>1 (0.2)</td>
</tr>
<tr>
<td>Total</td>
<td>462 (100)</td>
<td></td>
</tr>
</tbody>
</table>

* Change in blood type. Could not be determined whether blood bank or phlebotomy error.

Adverse Risks of per unit transfusions in US compared to other risk

- **Syphilis**: No cases reported since 1969
- **HTLV**: 11 cases since 2003
- **T cruzi**: 1 in 100 million
- **WNV**: 1 in 10 million
- **HTLV**: 1 in 1 million
- **HBV**: 1 in 100,000
- **Bacteria**: 1 in 1000
- **Life-threatening reaction**: 1 in 100
- **Fatal hemolysis**: 1 in 10
- **TACO**: 1 in 1

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Transfusion Reactions

**ACUTE**
- Acute Hemolytic
- Allergic
- Anaphylactic
- Circulatory Overload
- Febrile Non-hemolytic
- Hypothermia, hypocalcemia, hypotension with ACE inhibitors etc
- Transfusion Associated Sepsis
- Transfusion Related Acute Lung Injury (TRALI)
- Non-immune hemolysis

**DELAYED**
- Alloimmunization - new RBC antibody or against HLA antigens
- Delayed hemolytic
- Immunomodulation
- Iron overload
- Post Transfusion Purpura
- Transfusion associated GvHD
- Viral infections

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**References**

By reducing unnecessary blood transfusions, risks of potentially lethal transfusion reactions, a frequently forgotten cost of transfusion, can be reduced.
Challenge 3: Management of Precious Resources

Blood Management
Patient Blood Management

- The right **product** to the right **patient** in the right **dose** at the right **time** for the right **reason**.
- The timely application of evidence-based medical and surgical concepts designed to maintain hemoglobin concentration, optimize hemostasis and minimize blood loss in an effort to improve patient outcomes.

**Patient Blood Management**

Anemia management

Optimize hemostasis

Minimize blood loss
What is Blood Management?

• It is not
  – Just about the

• It is
  – The timely use of evidence-based medical and surgical concepts to optimize patient outcomes.
Why Are Hospitals Focusing on Blood Management

• Blood is a (relatively) rare resource.
  – Usage usually outpaces collections across the USA, especially for platelets, AB plasma, and O neg RBCs.

• Although the US blood supply is the safest in the world, there are still risks associated with receiving a blood donation.
  – In many cases, less may be more.

• Hospital-wide budgetary constraints have focused on cost saving initiatives.
  – Our payers and accreditors expect us to cut costs while improving outcomes.
Why is Blood Management important

• Doctors spend on average <30 minutes in medical school learning about appropriate transfusion triggers.
• Across the world, ~ 60% FFP, 30% RBCs, and 25% platelets are unnecessary.
  – This can translate into substantial savings
• Like all pharmaceuticals, unnecessary or inappropriate blood components can adversely impact morbidity and mortality.
• There are a broad range of policies throughout a hospital that impact overall blood usage.
• Optimally, a hospital will want to utilize multiple blood management strategies tailored to their patient mix and local expertise
Optimal Care of Patients involves

• Success depends upon
• Focusing on patients and evidence-based best practices and not history or personal wishes
• Taking a long-term, systems approach and developing final common pathways
• Willingness to (eventually) approach sacred cows
• Tying successes into Hospital Risk or Quality Initiatives

Taken from SABM website, Dec 2011
Topics that can be eventually addressed in a comprehensive blood management program

- Activity-based and Acquisition costs of blood
- Adult and Pediatric Transfusion Guidelines
- Anemia Management
- Anesthesia Techniques
- Autologous and Directed donations
- Blood Inventory and Age
- Blood Product Wastage
- Blood Substitutes
- Bloodless surgical techniques
- Blood Utilization committee
- Blood Utilization Metrics
- Cardiology and Cardiac Surgery
- Coagulation
- Continuous Process Improvement
- Collaboration between lab and clinical staff
- Critical Care policies
- Evidence Based Transfusion Guidelines
- Financial Reimbursement
- GI Bleed
- Transplant blood usage
- Hemostatics (DDAVP, rFactor VIIa, Topical Agents)
- Hemovigilance
- Informed Consent
- Iatrogenic Blood Loss
- Lean Principles/Six Sigma
- Massive Transfusion Protocol
- Patient – Community Education
- Perioperative management
- Pharmaceutical alternatives
- Specialized Blood Components
- Storage Lesions
- Transfusion Documentation
- Transfusion Ordering Practices
- Transfusion Reactions
- Transfusion Risk v Benefits
- Transfusion Safety Strategies
- Transfusion Transmitted Pathogens
Fundamentals of Blood Management

• Patient-centered care
  – Support optimal patient outcomes/safety
• Continuously distill & bridge available evidence & apply to clinical environment
• Multidisciplinary and inter-organizational cooperation to promote best-use practices
• Achieve best possible balance between cost and effectiveness
Success depends on all key stakeholders having a voice

- Administration
- Nursing
- Surgical Services
- Performance Improvement
- Blood Bank
- Pharmacy
- Risk Management
- Information Technology
- Admissions
- Emergency Room
- Department of Medicine
- Hematology
- Critical Care/ICU
- Anesthesiology
- Finance

Ideally, you establish a Medical Director and a Coordinator of Blood Management.

SO.....do you feel a little bit like this?
Transfusion therapy is a set of processes, not just a product

Blood Product safety

Entire process: Transfusion safety

After S. Dzik, MD  Blood Transfusion Service, MGH, Boston
Check the sample status and/or prepare to draw
Identify the recipient
Ensure the test request and recipient ID match
Draw and identify the recipient sample
Transport sample to laboratory for testing
Accept the sample
Type screen the sample
Select the donor unit and compete cross-match
Properly label donor units
Request for blood
Issue blood
Receive donor units and bring to bedside
Identify the recipient
Match donor unit(s), request for blood and recipient ID

Transfusion Process Map

Recipient Identification
Sample Identification
Blood Bank Component
Blood Issue
Recipient Verification
Pre-transfusion testing → Medical Decision to Transfuse → Dispense the correct product from the Blood Bank → Safe Administration at the bedside
OR.....do you feel a little bit like this?
The Transfusion Safety Officer (TSO) Blood Management Specialist (BMS)

The Transfusion Safety Officer/Blood Management Specialist (TSO/BMS) is a medical professional who has the specialized training to be responsible for patient safety and quality initiatives, reporting, processes and procedures, regulatory compliance, education and support related to blood transfusions.

What’s in a name?
That which we call a rose,
By any other name...
• The TSO is the resource that “bridges the gaps”
Origins of the TSO

- History
    - National Blood Service, formally Blood Transfusion Service, became a nationally organized service (www.blood.co.uk)
    - Transfusion Safety Officers are employed at the hospital level
  - Australia (1996):
    - Australian Red Cross Blood Service becomes a centralized, national entity (www.donateblood.com.au)
    - Transfusion Nurses are employed at the hospital level
Origins of the TSO

Canada (1998):
- Canadian Blood Services is the successor to the Canadian Red Cross and Canadian Blood Agency. National Blood Safety Council advises the federal government on blood safety (www.blood.ca)
- Transfusion Safety Officers are employed at the hospital level

United States (present)
- No centralized blood service exists. Red Cross, America’s Blood Centers, and Blood Systems Inc. are examples
- Every hospital employs a different solution to transfusion safety oversight (i.e. Transfusion Team, Transfusion Services Department, Quality Department)
TSO Job Responsibilities

- Education
- Blood Utilization
- Patient
- Hemovigilance

- Medical Information Services
- Laboratory Services
- Administration
- Medical Staff
- Quality
- Transfusion Committee

- Risk Management
- Pharmacy
- Community
- Nursing Services
- Blood Collection Center
- Marketing
The Role of a TSO

• Patient education
• Consultative resource to clinicians
• Clinical education
• Incident investigation
• Transfusion-related reaction reporting and analysis
• Transfusion policy and procedure development and enforcement
• Cost containment
• Regulatory compliance
• Transfusion Review Committee participation
Benefits of a TSO

• Increased patient safety and quality
• In-house expertise in transfusion administration and protocols
• Dedicated educator for patients and clinicians
• Development of transfusion policies and procedures
• Consistent tracking and analysis of transfusion-related data
• Gains in transfusion-related process efficiencies
• Improved communication between blood bank and clinicians
• Compliance with regulatory requirements
Duties and Responsibilities

• Blood Management
  – Development
  – Implementation
  – Reporting
  – Education

• Transfusion Adverse Event Monitoring
  – Identify opportunities for improvement and education
  – Maintain database of information to track all suspected transfusion reactions

• Policy and Procedure review
  – Identify changes in accreditation agencies to amend policies and procedures
  – Identify areas of improvement in transfusion procedure
  – Develop strategies to educate on transfusion policies and procedures

• Informed consent review
  – Review and revise informed consent to reflect the current identified risks of transfusion

• Compliance review
  – Perform in-person audits on transfusion policy compliance with nursing staff
Duties and Responsibilities

- **Patient education**
  - Provide education to patients and family members on safety measures practiced in your facility and by your blood collection center
  - Provide education on transfusion-related risks

- **Nurse education**
  - Provide education to nursing staff on transfusion-related risks, transfusion reaction identification, and safe transfusion practices

- **Adverse reaction contact**
  - Act as a resource to nurses and physicians in the identification and treatment of adverse events (i.e. TRALI, TACO)

- **Transfusion Guidelines**
  - Development of evidence-based transfusion guidelines
  - Literature review to keep guidelines current

- **Transfusion review**
  - Review transfusion orders to identify miscommunications, clerical errors, or lab errors
  - Review transfusion notes for vitals and times
Duties and Responsibilities

• Transfusion order review
  – Evaluate physician orders for transfusion for adherence to guidelines and appropriate documentation
  – Initiate opportunities with medical staff to educate on current blood management techniques

• Transfusion Team
  – Organize meetings
  – Report findings
  – Manage tasks

• Blood Management Reports
  – Demonstrate the progress of the blood management program to further conservative use of blood products

• Public Relations and Marketing
  – Address patient concerns with transfusion
  – Balance the community’s perception of the hospital’s approach to transfusion with blood supplier’s approach to donation
Which Healthcare Professional for position?

Registered Nurse:

- Understands blood administration and patient monitoring
- Familiar with a variety of clinical conditions that may require transfusion
- Familiar with hospital structure and organization
- Minimal knowledge about BB or its specific accreditation standards
Which Healthcare Professional for position?

Medical Technologist:

- Understands BB and its functionality
- Analytical interpretation of BB sample test results
- Management of blood inventory and protocols
- Minimal knowledge about blood administration and the clinical aspects of patient care
Which Healthcare Professional for position?

**Physician Assistant/APN:**
- Master’s degree
  - Able to prescribe or order blood
  - Knowledgeable about anemia and its management
- Often have skills related to in-depth data analysis

**Perfusionist:**
- Known for their solid background in surgery, especially CV surgery
- Technical skills with specialty equipment
- May lack understanding of other areas of hospital, all types of accreditation standards
Other Characteristics to Consider...

• Ability to build and lead teams
• Project Management skills
• Innovative thinking
• Ability to function in a new role with minimal direction
• Goals of the blood center and the hospital
TSO Training Program Curriculum

Course may include lectures, dry labs, tours, case studies, roundtable discussions and reference abstracts.

• Course Topics
  – General
    • Role of TSO
    • Regulatory agency oversight
  – Blood Center Essentials
    • Donor recruitment, eligibility & collection
    • Donor testing
    • Component preparation, storage & delivery
    • Quality programs
  – Hospital Essentials
    • Ordering
    • Hospital blood bank—tasks and testing
  • Administration of blood components
  • Transfusion reactions
  • Specialty products and transfusions

– Blood Management Essentials
  • Rationale
  • Components of a successful blood management program
  • Education and outreach
  • Transfusion/blood utilization committee
  • Data management and reporting basics
Patient Safety and Blood Management

Current State
- Unsafe practices
- Inappropriate use of blood
- Wastage of precious Resources
- Unnecessary exposure to risks of transfusion

Ideal State
- Appropriate transfusion
- Enhanced patient safety
- Reduced wastage with cost savings
- Reduced transfusion adverse events

- Implementation of Blood Management Program
- Well Trained and effective Transfusion Safety Officer
- Involved Blood Safety and Utilization Committee
- Education of nurses, medical staff, administration, patients

From Kevin Land, MD
Who wants to be a TSO?