IHI Expedition

Expedition: Appropriate Use of Blood Products
Session 2: Transfusion Safety Program Infrastructure: Implementing Transfusion Guidelines

September 2, 2014
Begins at 3:00 PM EST
These presenters have nothing to disclose

Timothy Hannon, MD, MBA
Irwin Gross, MD
Diane Jacobson, MPH, CPHQ
Today’s Host

**Terina Keller**, Project Office Assistant, Institute for Healthcare Improvement (IHI), assists in programming activities for expeditions, maintaining Passport memberships, as well as other projects and collaboratives throughout IHI. Terina is currently in the Co-Operative Education Program at Northeastern University in Boston, MA, where she majors in Sociology with a minor in Health Science. Terina plans to earn her MPH once finished with undergrad and work on issues dealing with social determinants of health around the country and abroad.
Audio Broadcast

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WebEx Quick Reference

- Welcome to today’s session!
- Please use chat to “All Participants” for questions
- For technology issues only, please chat to “Host”
- WebEx Technical Support: 866-569-3239
- Dial-in Info: Communicate / Join Teleconference (in menu)
When Chatting…

Please send your message to All Participants
Where are you joining from?
Diane Jacobsen, MPH, CPHQ, Director, Institute for Healthcare Improvement (IHI) is currently directing the CDC/IHI Antibiotic Stewardship Initiative, NSLIJ/IHI Reducing Sepsis Mortality Collaborative. Ms. Jacobsen served as IHI content lead and improvement advisor for the California Healthcare-Associated Infection Prevention Initiative (CHAIP) and directed Expeditions on Antibiotic Stewardship, Preventing CA-UTIs, Reducing C. difficile Infections, Sepsis, Stroke Care and Patient Flow. She served as faculty for IHI’s 100,000 Lives and 5 Million Lives Campaign and directed improvement collaboratives on Sepsis Mortality, Patient Flow, Surgical Complications, Reducing Hospital Mortality Rates (HSMR) and co-directed IHI’s Spread Initiative. She is an epidemiologist with experience in quality improvement, risk management, and infection control in specialty, academic, and community hospitals. A graduate of the University of Wisconsin, she earned her master’s degree in Public Health- Epidemiology.
Today’s Agenda

- Ground Rules & Introductions
- Debrief: Session 1 Assignment
- Transfusion Safety Program Infrastructure: *Implementing Transfusion Guidelines*
- Action Period Assignment
Ground Rules

- We learn from one another – “All teach, all learn”
- Why reinvent the wheel? – Steal shamelessly
- This is a transparent learning environment – Share openly
- All ideas/feedback are welcome and encouraged!
Expedition Objectives

At the end of this Expedition, participants will be able to:

- List the quality, economic, and risk management issues driving the need for safer blood use.
- Discuss the pathway required for successful implementation of evidence-based transfusion guidelines.
- Develop three to five key performance indicators for effective Transfusion Safety Committee oversight.
- Identify the essential elements of a sustainable Transfusion Safety Program.
- Describe issues of transfusion safety at the bedside and strategies to improve transfusion administration safety.
Schedule of Calls

Session 1 – Update on Transfusion Safety
Date: Tuesday, August 19, 3:00-4:30 PM ET

Session 2 – Transfusion Safety Program Infrastructure: Implementing Transfusion Guidelines
Date: Tuesday, September 2, 3:00-4:00 PM ET

Session 3 – Transfusion Safety Program Infrastructure: Measures of Clinical Effectiveness
Date: Tuesday, September 16, 3:00-4:00 PM ET

Session 4 – Transfusion Safety Program Infrastructure: Critical Role of Leadership
Date: Tuesday, September 30, 3:00-4:00 PM ET

Session 5 – Nursing at the Bedside: Transfusion Administration Safety
Date: Tuesday, October 14, 3:00-4:00 PM ET

Session 6 – Best Practices: Communication and Awareness Strategies
Date: Tuesday, October 28, 3:00-4:00 PM ET

Session 7 – Putting it All Together: Building a Sustainable Program
Date: Tuesday, November 11, 3:00-4:00 PM ET
Action Period Assignment Debrief

- Read “Blood Management: A Primer for Clinicians”

- Construct a three year trend chart for your facility noting percentage change for:
  - Blood utilization by product (RBC, platelets, plasma, cryoprecipitate) and annual blood purchase costs
  - Randomly ask clinical staff if they are familiar with your hospital transfusion guidelines and if they can list the three leading risks of blood products

What did you learn?
Regina, Saskatchewan Hospitals
Blood utilization by product

![Bar chart showing blood utilization by product for Regina, Saskatchewan Hospitals in 2011/12, 2012/13, and 2013/14. The chart includes data for RBC Transfused, Platelets Transfused, Plasma Equivalent, and Cryoprecipitate Transfused.](image-url)
National data in Australia
Leading risks of Blood Products

- Blood transfusion reaction
  1. Allergic reaction
  2. Febrile reaction
- Acute immune hemolytic reaction
- Graft-versus-host disease
- Transfusion-related acute lung injury

Aga khan University Hospital
Faculty

Timothy Hannon, MD, MBA, is a board certified anesthesiologist with over 20 years experience leading large-scale healthcare change initiatives to improve the safety, quality and efficiency of patient care across the nation. As the visionary founder and CEO of Strategic Healthcare Group, a consulting and informatics company focusing on Blood Management and Transfusion Safety, Dr. Hannon partnered with major healthcare systems to rapidly and sustainably improve transfusion practices, resulting in almost 400,000 blood products saved and total healthcare cost savings approaching $600,000,000. More importantly, by reducing unnecessary transfusions through evidence-based practices and bleeding edge clinical pathways, Dr. Hannon and his team were able to help hospitals avoid 12,700 complications, reduce 476,000 inpatient days, repurpose 700,000 nursing hours, and save 2900 lives.
Irwin Gross, MD, is a graduate of the University of Michigan Medical School (1981). He did his internship and residency in pathology at the University of Vermont and is board certified in anatomic and clinical pathology. He served as Chief of Pathology and Medical Director of Laboratories at Eastern Maine Medical Center from 1994 through 2006. He currently serves as Medical director of Transfusion Services and Patient Blood Management for Eastern Maine Medical Center, a 400 bed tertiary care hospital in Bangor, Maine. Dr. Gross began the EMMC Patient Blood Management Program in January, 2007. Since that time EMMC has reduced transfusions by 60% with improved patient outcomes. As part of the Society for Patient Blood Management Board (SABM), he chairs the Standards Committee that published the first Administrative and Clinical Standards for Patient Blood Management in 2011, a second edition in September, 2013 and an accompanying Clinical Guide to Patient Blood Management Standards. He currently serves as a member of the AABB/SABM Joint Patient Blood Management Advisory Group and as a member of the Laboratory Medicine Best Practices (LMBP™) 2013-2014 Expert Panel on Blood Utilization for the U.S. Centers for Disease Control and Prevention (CDC). The EMMC program is known both in the United States and internationally. EMMC has hosted teams from Medstar Hospital System, as well as Freemantle Hospital in Western Australia and University of Zurich Hospital. These teams came to EMMC to learn more about patient blood management program development and implementation. Dr. Gross has lectured extensively in the area of Patient Blood management at national meetings including the College of American Pathology, the AABB, Society for Advancement of Blood Management and the Mayo Clinic sponsored annual Transfusion meeting. He has been an invited speaker at a number of hospitals and health systems including Kaiser Permanente, Georgetown University, Indiana University Health Systems, Palmetto Baptist Hospital, Englewood Hospital and Medical Center and others.

As part of his responsibilities at EMMC, Dr. Gross has worked with the Cerner Corporation to develop clinical decision support tools to assist physicians in transfusion decisions as part of computer provider order entry for transfusion and tools to aid in identifying and managing patients with anemia.
Transfusion Safety Program Infrastructure:

Implementing Transfusion Guidelines

Tim Hannon, MD, MBA
Irwin Gross, MD

September, 2014
Disclosures

Dr. Hannon
No disclosures

Dr. Gross
No disclosures

No financial arrangement of any kind with Cerner Corporation
Appropriate Blood Use and Patient Safety

• Blood transfusions are:
  – High volume
  – High risk
  – High cost
  – Poorly utilized

• Unnecessary transfusions cause avoidable harm

• The Medical Decision to Transfuse is a patient safety issue!
From Blood Safety to Transfusion Safety

1 Dzik, Transfusion 2003;43
Transfusion Safety Error Rates

Blood Safety

Transfusion Safety

Recruit
Donor screening
Collect & prepare
Infectious disease tests

Pre-transfusion testing
Medical decision to transfuse

Issue/transport
Bedside ID/administration

Monitor & evaluate

1:3,000-1:2,000,000
1-2%
30-70%
1:14,000
60-90%

1%

Dzik, Transfusion 2003;43
Maskens, Transfusion 2014;54(1)
Transfusion Safety Program Elements

• The core of a comprehensive Transfusion Safety Program is an effective Transfusion Safety Committee (TSC)
• The effective TSC is multidisciplinary and representative of the transfusing departments
• The effective TSC is empowered and enabled with administrative support and resources
• The effective TSC is evidence based, patient centered, data driven and systems oriented
Transfusion Safety Committee Roles

• The primary role of the TSC is to ensure appropriate blood use in all patients:
  **Right Patient, Right Product, Right Dose, Right Rate**

• The secondary role of the TSC is to identify, prioritize and support process improvement activities in high risk patients that reduce the need for blood products
Transfusion Safety Committee Tools

• The effective Transfusion Safety Committee uses a variety of tools to achieve and maintain improvements, including:
  – Ongoing provider education
  – Change management strategies
  – Process improvement tools
  – Transfusion practice analytics

• Each of the tools in the toolkit are necessary but not sufficient
Implementing Transfusion Guidelines
Implementation of Clinical Practice Guidelines

• Development should be based on scientific evidence, and their application must be meaningful in clinical practice (i.e., they must be worth the effort)
• Key local physicians should help to formulate the guidelines (ownership/buy-in)
• Guidelines should be disseminated to all affected healthcare professionals for critique (consensus building, not consensus)
• Guidelines should have readily discernible benchmarks or targets for good practice

Implementation of Clinical Practice Guidelines

• Active educational efforts should accompany guideline roll-out (20/80 rule)
• There should be a patient-specific reminder at the time of interventions
• Implementation should include direct feedback on performance to physicians or general feedback on system performance
• There should be accountability for performance according to the guidelines
  – Peer pressure
  – Administrative reward or sanction
  – Financial implications

Unsuccessful Methods of Guideline Implementation

• Reliance on general dissemination of information (“stuffing mailboxes”)
• Lack of communication and implementation strategies
• Lack of a patient-specific implementation plan
• No accountability for adherence
• Single methods of dissemination are not as effective as multiple methods

Stages of “Meaningful Use” of Transfusion Guidelines

• Stage I
  – Development and approval of evidence based guidelines by TSC up to and including the MEC

• Stage II
  – Transfusion guidelines are available and in use at the point of decision; order sets or embedded in CPOE

• Stage III
  – Continuous audit, feedback, education and improvement of evidence based guidelines
  – Transfusion practice and overall compliance with transfusion guidelines should be monitored as Ongoing Professional Practice Evaluation (OPPE) and ultimately be tied to the re-credentialing process
Questions?

Raise your hand

Use the Chat
Computerized Physician Order Entry (CPOE)

Effective Implementation of Transfusion Guidelines

Irwin Gross, M.D.
Eastern Maine Medical Center
September, 2014
Disclosures

No disclosures

_No financial arrangement of any kind_ with Cerner Corporation
Computerized Physician Order Entry

- Facilitate clinical practice consistent with guidelines
- Reduce inter-provider variation
- Provide clinical decision support
  - Facilitates evidence-based decisions
- Place barriers to inappropriate practices
- Real time transfusion review
- Accurate data collection

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Why Transfusion Guidelines?

- With clinical decision support (CDS) and **effective** implementation of **transfusion guidelines**:
  - Fewer patients transfused
  - Fewer units per patient
  - Decreased transfusion AE’s
  - Reduced practice variation
  - **Improved clinical outcomes**
Do We follow Our Guidelines: Variations in Blood Transfusion Rates

RBC Transfusion rate range: **1.5% to 77.8%**

FFP Transfusion rate range: **0% to 11.4%**

Transfusion medicine in American undergraduate medical education

TRANFUSION 2011;51:2470-2479.

Fig. 1. If offered, how many total hours are devoted to lectures specific to transfusion medicine during undergraduate medical education? (n = 66).
Reinforcing Guidelines with Clinical Decision Support

Delivering:
• Right information
• Right time
• Right person – the physician!
• Right communication channel
• Right intervention format

➢ Providers will resist any interruption in workflow
➢ Optimize usability
Clinical Decision Support
The CPOE Toolkit - Alerts

Passive alert
From (CRIT) Collaborative:
CPOE Reducing Inappropriate Transfusions
Impact of CPOE Decision Support on Transfusions in the PICU

![Bar chart showing the average pre-transfusion Hgb mg/dl between Control and Post-intervention periods.](chart.png)
Impact of Clinical Decision Support on Implementation of Transfusion Guidelines

This is another iteration of the alert used by the CRIT Collaborative providing more physiologic data.

Allows physiologic data to be incorporated into transfusion guidelines and tied to CDS.

Option to discontinue order or continue with possible prospective review.

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“Adaptive” alerts
- Whether alert fires (or not) based on some action by the provider while in the ordering conversation
  - Responding to a question about clinical condition, e.g. presence or absence of significant bleeding
  - Selection of specific clinical context for transfusion
    - If bleeding prophylaxis was chosen as reason for platelet transfusion, alert will fire for platelet count of 19,000 (guideline is < 10,000)
    - If a procedure or bleeding was chosen as reason for platelet transfusion, no alert for platelet count of 19,000 (guideline is platelet count < 30,000)
Clinical Decision Support: Plasma Order Alert

“Hard-Stop” Plasma Alert

- Alert fires if INR is increased and patient on warfarin
- Cancels plasma order
- Redirects physician to order Vitamin K and prothrombin complex concentrate
- Fits into workflow – no need to leave order conversation
Clinical Decision Support
The CPOE Toolkit

• **Link to specific content to support decision**
  - Links to treatment algorithms, protocols, checklists, guidelines
  - **Clinically relevant** reference material
  - Works best if it is **integrated into workflow**

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Irradiation Indications

Irradiation is recommended for the following indications:

- Malignancy and treatment for malignancy:
  - Hodgkin’s Disease
  - Hematologic malignancy, other than Hodgkin’s, treated with chemotherapy
  - Ongoing treatment with high dose chemotherapy, radiation therapy
  - Transfusions from blood relative or donor matched for HLA

- Marrow/stem cell recipient or donor:
  - Allogeneic or autologous marrow/stem cell recipient
  - Donor of allogeneic marrow/stem cells

- Medications other than cytotoxic chemotherapy:
  - Ongoing treatment with fludarabine or other purine analogue
  - Ongoing treatment with antithymocyte globulin
  - Ongoing treatment with Alemtuzumab

- Neonates:
  - Neonate born to family with history of congenital immune deficiency
  - Neonate under 1,200 grams
  - Exchange transfusion in a neonate who received intrauterine transfusion

- Other:
  - Congenital cellular immune deficiency

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CPOE: Structural Design

• Design should **encourage preferred decision, discourage less preferred decision** and should be structured with the end-user in mind

• **User “friendliness” and clinical relevance** is the key to:
  – Acceptance
  – Improved patient care
Success with CPOE and Changing Transfusion Practice

• Revised hospital policy: recommend **single unit for non-bleeding patients** when hgb is not more than **7 g/dl**
  – CPOE reconfigured to remove single-click option for ordering two unit RBC transfusions
  – If hgb > **7 g/dl** or no hgb in previous 24 hours, best practice **alert (BPA) triggered**: provider must select justification or cancel order

Yerrabothala et al Transfusion 2014
Success with CPOE and Changing Transfusion Practice

• **Two (2) unit transfusions** declined from **47% to 15%**

• Average pre-transfusion hgb decreased from **7.5 g/dl** to **6.9 g/dl** for single unit orders and from **7.3 g/dl** to **6.8 g/dl** for 2-unit orders

• Post-implementation: **Total units transfused decreased 27%**

Yerrabothala et al Transfusion 2014
Improved Blood Utilization Using Real-time Clinical Decision Support

• Suggested **transfusion threshold of 7.0 g/dl or 8.0 g/dl for coronary syndromes**
• “Interruptive” alert triggered by last recorded Hgb, excluding patients with CT surgery, hemorrhage, or hemodynamic instability based on diagnosis codes and problem list
• Alert included
  – Reminder that single units preferred
  – List of the last three Hgb concentrations for that patient
  – “Acknowledgement reason” drop-down query requiring physician to identify reason to transfuse

Goodnough et al Transfusion 2014;54:1358-65
Improved Blood Utilization Using Real-time Clinical Decision Support

Strong evidence suggests that in hemodynamically stable, non-bleeding patients a hemoglobin threshold of 7 gm/dl (or 8 gm/dl in acute coronary syndromes/post cardiac surgery) can decrease...

-Acute Bleeding
-Hgb less than or equal to 8 and acute coronary syndrome
-Hgb less than or equal to 8 and postoperative cardiothoracic patient
-Other (Click Note icon to enter comment)
Improved Blood Utilization Using Real-time Clinical Decision Support

Goodnough et al Transfusion 2014;54:1358-65

<table>
<thead>
<tr>
<th>Title</th>
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<tbody>
<tr>
<td>1. Platelet count (\leq 10,000/\mu L)</td>
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<tr>
<td>2. Platelet count (\leq 20,000/\mu L) and signs of hemorrhagic diathesis</td>
</tr>
<tr>
<td>3. Platelet count (\leq 50,000/\mu L) and active hemorrhage</td>
</tr>
<tr>
<td>4. Platelet count (\leq 50,000/\mu L) with invasive procedure (recent, in-progress, planned)</td>
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<tr>
<td>5. Platelet count (\leq 100,000/\mu L) with bleeding in a closed anatomical space (e.g. CNS, eye, etc)</td>
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<tr>
<td>6. Platelet dysfunction with active or anticipated hemorrhage</td>
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<tr>
<td>7. Other</td>
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Platelet Indication Acknowledgement Screen: required before placing an order for platelets, but no alerts
Improved Blood Utilization Using Real-time Clinical Decision Support

Goodnough et al Transfusion 2014;54:1358-65

RBC: decr. 24%
Plasma: decr. 10%
Platelets: decr. 12%
Why Providers Transfuse Blood Outside Guidelines in Spite of Integrated Electronic Best Practice Alerts

• 30% of transfusions occur outside guidelines; most common overrides:
  – Many of the overrides were subjective and not evidence based, e.g. “fatigue”
  – Many comments stated non-threshold Hgb values, e.g. 7.2 g/dl as being “close enough”
  – 25% of BPAs trigger for RN’s: should RN’s enter transfusion orders in non-critical patients?
  – 62% of overrides using “other” had no text comment: too easy to override?

Chen et al Journal of Hospital Medicine 2014
Keys to Successful CPOE Implementation

- Keep guidelines and alerts simple
- Ask for information from the provider only when it will change the output of CDS
- Involvement of physician “champions” in the design and implementation processes
- System and user performance outcome measures (e.g. physician compliance rates, rate of alert overrides)

Beware of Alert Fatigue
Linking CPOE and Guidelines to Transfusion Review: “Pre”-Transfusion Review

• Pre-transfusion review (selected cases)
  – Triggered through CPOE process
  – Rules alert blood bank tech to need for review
  – Transfusion service physician notified by tech and contacts ordering provider
    • Can be programmed as an automated text page
    • Reinforces transfusion guidelines
    • Monitors for inaccurate selection of bleeding status
    • Treated as a clinical consultation
EMMC Annual Red Cell Transfusions: 1994 - 2013

58% sustained reduction in red cell use
Questions?

Raise your hand

Use the Chat
Action Period Assignment


- Locate and review your hospital’s current transfusion guidelines

- Determine what systems you currently have in place for blood utilization review
  - explore gaps, opportunities for enhancing the process
  * identify one specific change to “test” to improve the process

- Identify key stakeholders to add to your current blood utilization/transfusion safety committee

Come prepared to share what you learned: insights/surprises
Expedition Communications

- Listserv for session communications: bloodproductsexpedition@ls.ihi.org
  - To add colleagues, email us at info@ihi.org
  - Pose questions, share resources, discuss barriers or successes
Session 3: Transfusion Safety Program Infrastructure: Measures of Clinical Effectiveness

Tuesday, September 16th, 3:00 PM – 4:00 PM ET

Faculty: Timothy Hannon, MD