

CHALLENGES OF BLOOD MANAGEMENT IN COMMUNITY HOSPITALS

Lance A. Williams, III. MD

Associate Professor

UAB Department of Pathology

Division of Laboratory Medicine

NO DISCLOSURES RELEVANT TO
THIS LECTURE

LEARNING OBJECTIVES

- Understand the core principles of blood management
- Learn the unique challenges of blood management in community hospitals
- Learn strategies for success and keys for monitoring progress

OUTLINE

- Introduction / historical perspective of blood transfusion
- Blood management basics
- Blood management challenges
- Success strategies
- Final thoughts

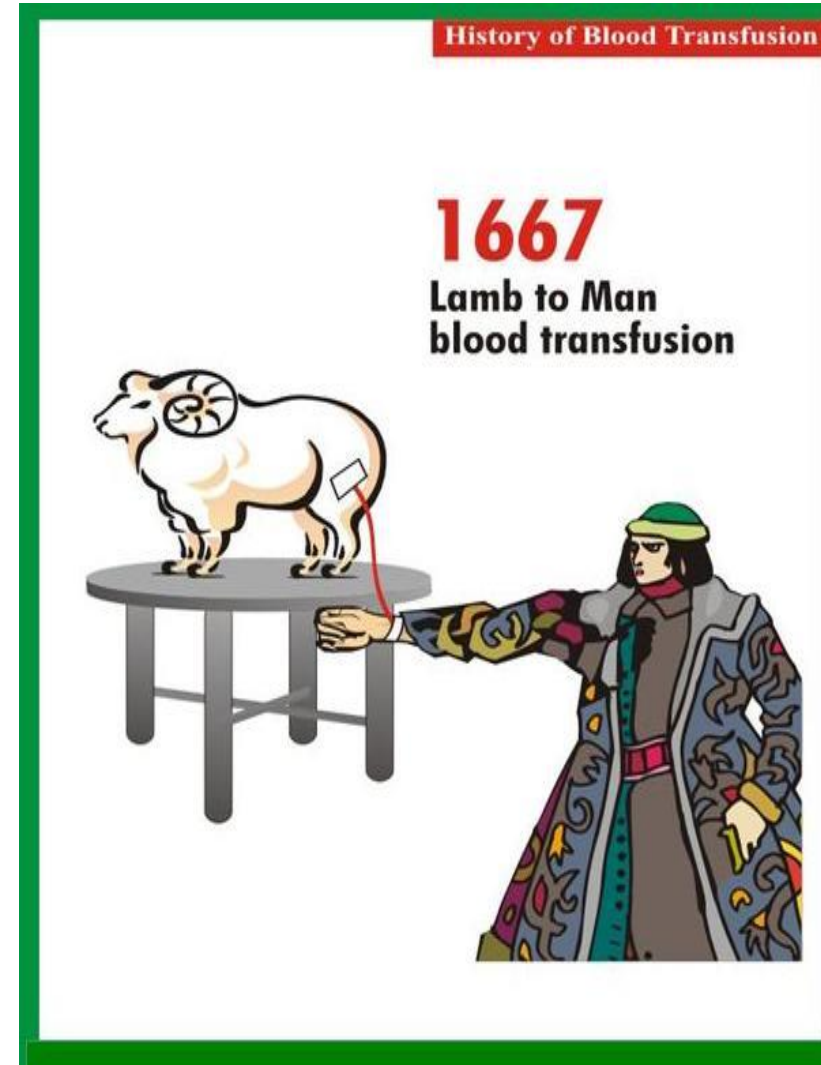
BLOOD MANAGEMENT

- TRICC Trial (1999)
- Programs increasing over the past 15-18 years
- A benchmark for regulatory agencies
- Becoming a required skill for TM directors
- Involves changing physician practice and perceptions = TOUGH!!!



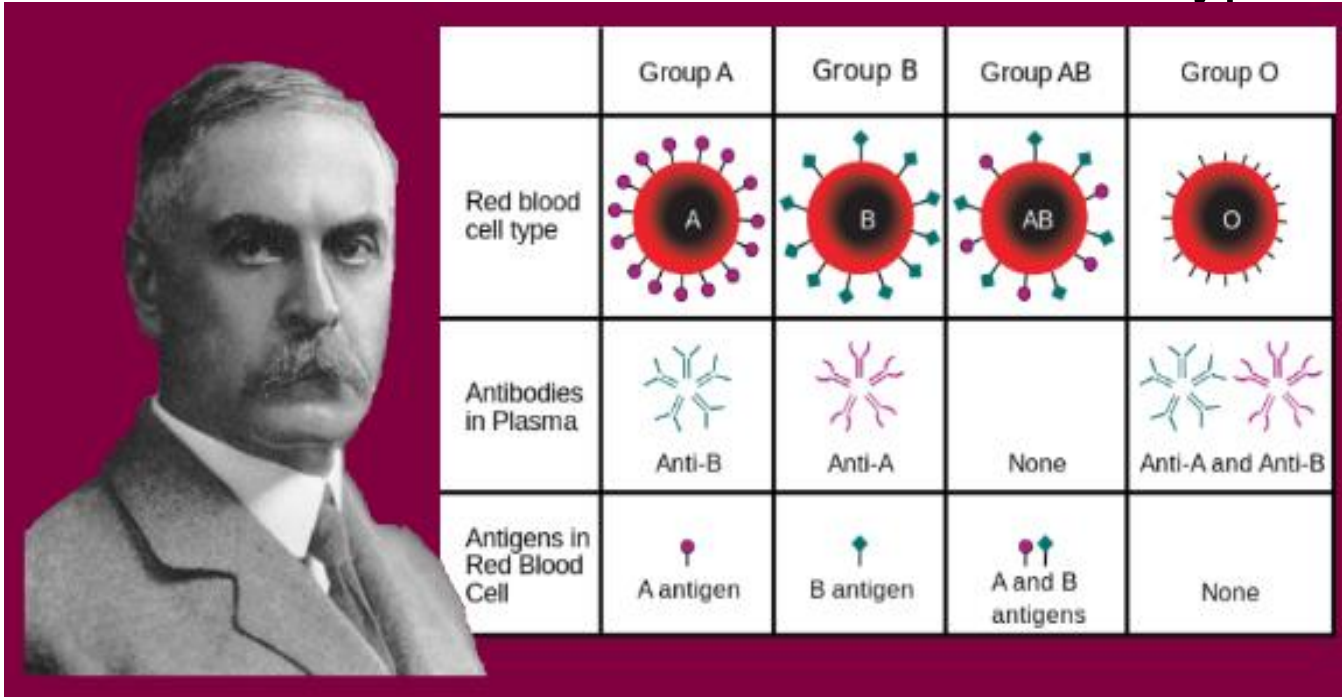
HISTORICAL PERSPECTIVE ON TRANSFUSIONS

- **1628** – William Harvey discovers blood circulation
- **From 1628**, transfusions from humans and animals were attempted with the first successful human to human transfusion report coming from a British OB doctor (James Blundell)
- **From 1937-1987**, per Dr. John Lundy, transfuse at $\text{hgb} < 10\text{g/dL}$
- Physicians thought “the closer to normal, the better”



BLOOD SAFETY

- 1900 – Karl Landsteiner discovers ABO types



- 1914-1916 – Both anticoagulants and blood preservatives are identified

BLOOD SAFETY

- 1932 – First blood bank is established in Linengrad
- 1940 – U.S. and Britain establish donation initiatives and collect 13M units by the end of WWII
- 1947 – AABB chartered
- 1971 – Infectious disease testing for Hepatitis B begins



WHY BOTHER WITH BLOOD MANAGEMENT?



FDA FATALITY DATA

Table 3: Transfusion-Associated Fatalities by Complication, FY2013 – FY2017

| Complication | FY13 No. | FY13 % | FY14 No. | FY14 % | FY15 No. | FY15 % | FY16 No. | FY16 % | FY17 No. | FY17 % | Total No. | Total % |
|----------------------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|--------------|------------|
| Anaphylaxis | - | 0% | 2 | 7% | 2 | 5% | 5 | 12% | 3 | 8% | 12 | 6% |
| Contamination | 5 | 13% | 1 | 3% | 5 | 14% | 5 | 12% | 7 | 19% | 23 | 12% |
| HTR (ABO) | 1 | 3% | 4 | 13% | 2 | 5% | 4 | 9% | 1 | 3% | 12 | 7% |
| HTR (non-ABO) | 5 | 13% | 4 | 13% | 4 | 11% | 1 | 2% | 6 | 16% | 20 | 11% |
| Hypotensive Reaction | - | 0% | 1 | 3% | 1 | 3% | 1 | 2% | 0 | 0% | 3 | 2% |
| TACO | 13 | 34% | 5 | 17% | 11 | 30% | 19 | 44% | 11 | 30% | 59 | 32% |
| TRALI* | 14 | 37% | 13 | 43% | 12 | 32% | 8 | 19% | 9 | 24% | 56 | 30% |

Note: FY2015-FY2017 only includes cases with an imputability of *Definite/Certain*, *Probable/Likely*, or *Possible*, and FY2013-FY2014 only include cases classified as transfusion-related.

*FY2013-FY2017 numbers combine both *TRALI* and *Possible TRALI* cases^{22,23}

HIV INFECTION FROM TRANSFUSION

Table 1. Persons with Hemophilia Who Developed HIV Infection from Transfusion of Contaminated Blood Products in Selected Countries*

| Country | Persons with Hemophilia Who Became Infected, <i>n</i> (%) |
|----------------|---|
| United Kingdom | 1700 (32) |
| Japan | 1800 (45) |
| France | 2000 (50) |
| United States | 10 000 (50) |
| Canada | 800 (55)† |
| Denmark | 210 (64)‡§ |

* Except where otherwise noted, data in the table were obtained from Starr (8).

† Data obtained from Kondro (9).

‡ Data obtained from Feldman and Bayer (10).

§ Approximate number.

BLOOD TRANSFUSIONS ASSOCIATION WITH INFECTIONS

- **1. 20 peer-reviewed studies, 1986-2000**
- N = 13,152 (Tx 5215, No-Tx 7937)
- **Association of Blood Tx to Infection**
 - **Common OR 3.45** (range 1.43-15.15)
 - 17 of 20 studies with $p < 0.05$
- **2. Study of patients with total knee or hip arthroplasty**
 - Transfused patients had statistically significant increases in infections (joint, URI, etc.)

BLOOD MANAGEMENT BEGINNINGS

TRICC (Transfusion Requirements In Critical Care) Trial

- To determine if there was a difference between restrictive (hemoglobin trigger of <7.0 g/dL) and liberal (hemoglobin trigger of <10.0 g/dL) transfusion strategies in terms of mortality and organ dysfunction
- 838 patients enrolled

TRICC TRIAL RESULTS

- In-hospital mortality
 - 22% (restrictive) vs. 28% (liberal) $p < 0.05$
- Number of units transfused
 - Restrictive protocol
 - 2.6 ± 4.1 units of RBC/patient
 - Liberal protocol
 - 5.6 ± 5.3 units of RBC/patient

- Launched April 2012
- National physician groups to develop evidence-based lists of five tests/procedures that may be overused in their field
- Close to 60 societies so far...
 - More than 220 tests and procedures potentially harmful
- “The *Choosing Wisely* campaign calls on physicians to be the very best doctors they can be for their patients.”

Richard J. Baron, MD, president and CEO - ABIM Foundation

TOP CHOOSING WISELY RECOMMENDATIONS

Don't administer packed red blood cells (PRBCs) in a young healthy patient without ongoing blood loss and hemoglobin of ≥ 6 g/dL unless symptomatic or hemodynamically unstable.

Avoid transfusions of red blood cells for arbitrary hemoglobin or hematocrit thresholds and in the absence of symptoms of active coronary disease, heart failure or stroke.

Don't transfuse red blood cells in hemodynamically stable, non-bleeding ICU patients with a hemoglobin concentration greater than 7 g/dL.

Don't transfuse more than the minimum number of red blood cell (RBC) units necessary to relieve symptoms of anemia or to return a patient to a safe hemoglobin range (7 to 8 g/dL in stable, non-cardiac in-patients).

Blood Management Success

DOCTOR'S ORDERS

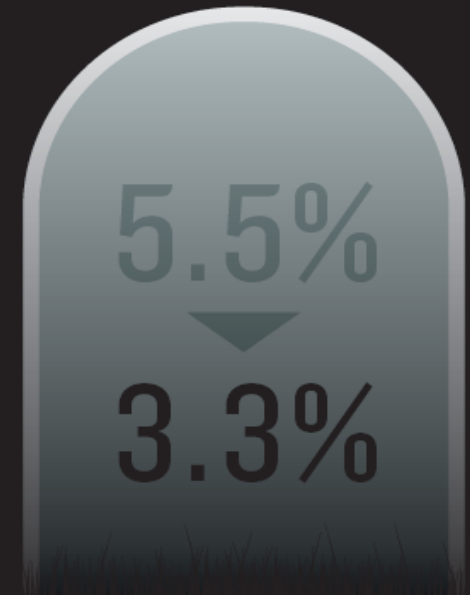
By simply reminding doctors of the current guidelines when they order blood, a California hospital was able to save money and lives.



Reducing the blood used for transfusions by nearly one-quarter saved the hospital US \$1.6 million per year.



The average length of stay for patients who received transfusions went from 10.1 days to 6.2.



Mortality among people who had transfusions fell from 5.5% to 3.3%.

Getting Started With Blood Management



BLOOD MANAGEMENT BASICS

- **Evaluate the current criteria / transfusion thresholds**

- Match with evidence-based guidelines?
- Up to individual provider?
- Any oversight?

- **Evaluate current use**

- What is the practice setting?
- What trigger are being used (practically)?
- What is your total use of products?
- What is your usage per patient discharge?

BLOOD MANAGEMENT BASICS

- **Beginning your program**
 - Develop evidence-based guidelines with a **multi-disciplinary** committee
 - Establish “win” conditions from key stakeholders



“I have some specific, unknown objectives for you to achieve.”

BLOOD MANAGEMENT BASICS

• Beginning your program

- Establish the audit process
 - One physician reviewer or a panel?
 - Blood Bank Techs?
 - How often?
 - Prospective?
 - Retrospective?
 - How many units will you audit per day, week, or month?
 - What determines if a physician gets a call or a letter?
 - How is delivery of the audit letter confirmed?



BLOOD MANAGEMENT BASICS

• **Beginning your program continued...**

- Present your plan to major committees for feedback
 - BUT, don't let them establish their own guidelines without good reason!
- Present your plan to key stakeholders as a final check
- Present your final plan to medical executive committee and get “green light” to proceed



BLOOD MANAGEMENT BASICS

• **Beginning your program continued...**

- Educate clinicians and nurses on the coming changes and what to expect as far as the audit process
- Create pocket guides with guidelines
- Create posters / fliers to put in locker rooms, bathrooms, scrub rooms, nurses stations, etc.

TRANSFUSION GUIDELINES

RED BLOOD CELLS

Every indication for the use of blood products cannot be anticipated and clinical judgment should be utilized

Guidelines for transfusion of PRBCs

- **Transfuse 1 unit** and reassess unless patient has ongoing blood loss or hemodynamic instability
- **Hgb < 7 g/dL in most patients**
- Hgb should increase by ~1g/dL with each unit transfused

RBC TRANSFUSION INDICATIONS

ACTIVELY BLEEDING PATIENTS

- With ongoing massive bleeding
- With severe symptomatic anemia (unresponsive to fluids) and / or hypoxia

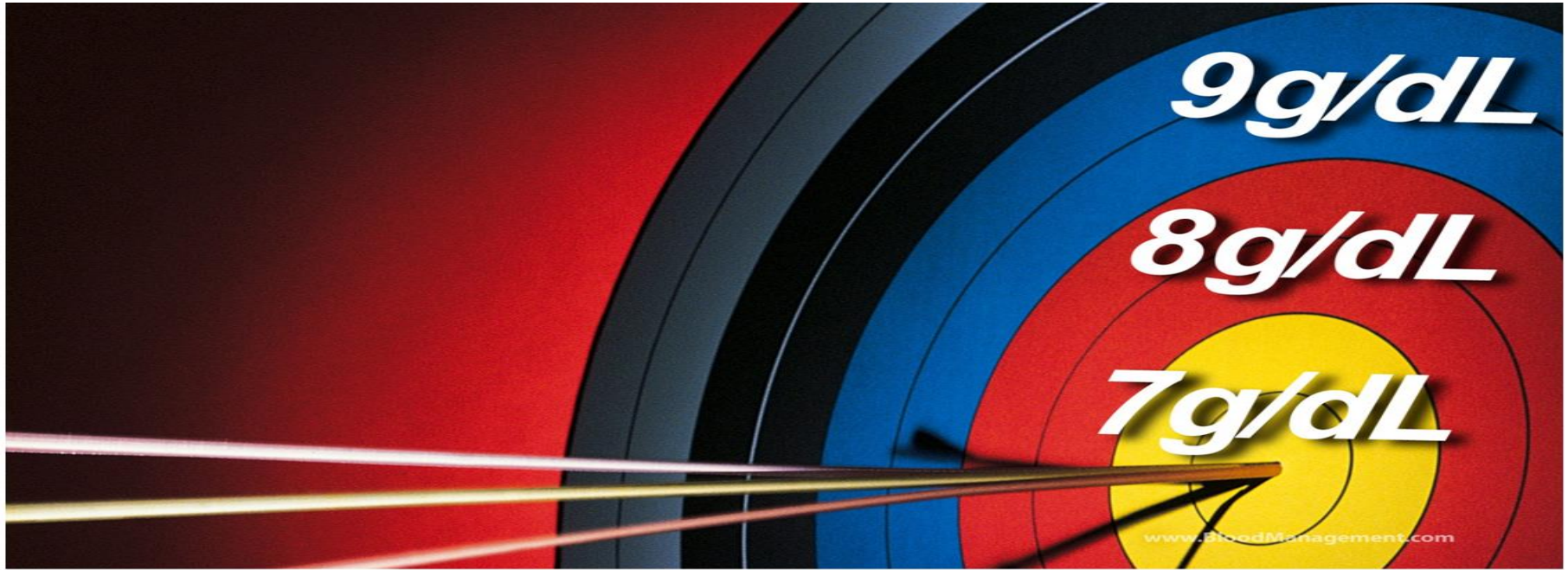
NON-BLEEDING PATIENTS

- H/H <7/21 in a stable patient
- H/H <8/24 with current myocardial ischemia / unstable angina
- H/H <8/24 with severe symptomatic anemia (unresponsive to fluids) and / or hypoxia
- Symptomatic anemia with chemotherapy, radiation, dialysis
- Symptomatic anemia with diseases requiring chronic transfusion therapy (e.g. sickle cell disease, thalassemia, myelodysplasia, etc.)

PRE-, INTRA-, and POST-OPERATIVE PATIENTS

- Pre-Operative anemia
- Intra-operative or immediately post-operative anemia
- Ongoing massive bleeding
- Post-operative with severe symptomatic anemia (unresponsive to fluids) and / or hypoxia

PROMOTIONAL POSTERS / REMINDERS



Aim for the evidence-based transfusion target

Based on Hebert et al. A multicenter, randomized, controlled clinical trial of transfusion requirements in critical care. *NEJM* 1999; 40:409

PROMOTIONAL POSTERS / REMINDERS



LESS
— *is* —
MORE

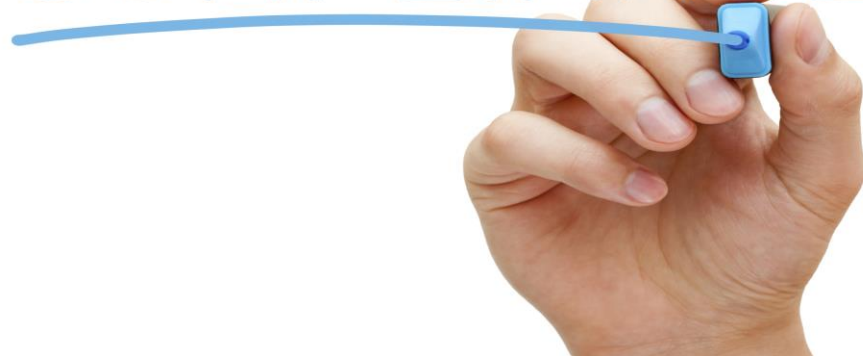


BLOOD MANAGEMENT BASICS

- **Beginning your program continued...**

- Set rollout date for the expected usage of the new criteria
- Begin aggressive review and audit process!!!
- Expect LOW compliance and complaints at first

COMPLIANCE



ADVANCED STRATEGIES

- Real-time clinical decision support



TRANSFUSION ALERT

The most recent hemoglobin value performed December 05, 2014 14:40:00 CST is 15.0 g/dl, which exceeds the 7 g/dL threshold for PRBC transfusion under UAB Medicine's Transfusion Guidelines. Do you wish to continue with this order?

Alert Action

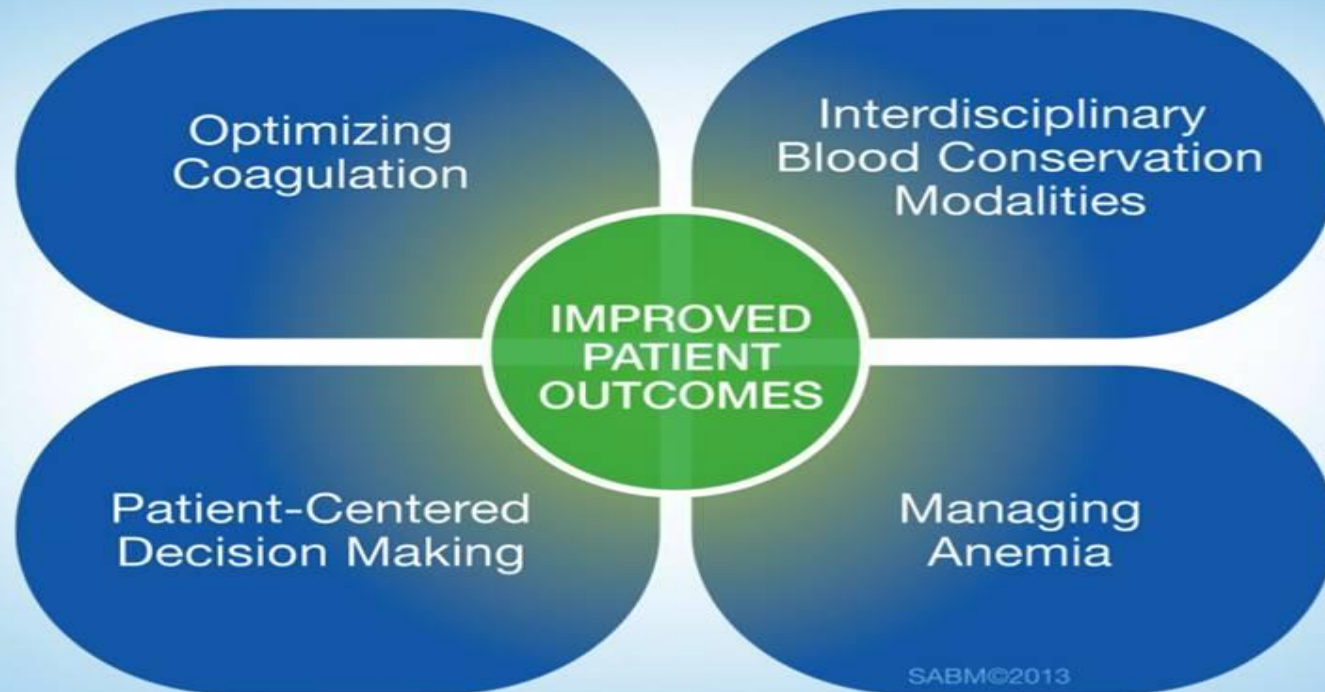
- ☐ CANCEL Transfusion
- ☐ Patient requires Hgb > 7 g/dL; continue with order

History

OK

ADVANCED STRATEGIES CON'T

Patient Blood Management



Community Hospital Blood Management



CHALLENGES IN COMMUNITY HOSPITALS

- Can be a mixture of clinician types
 - Some models are University / community clinicians
 - Some models are purely community minded clinicians
- There are often no department chairs / section chiefs
- There may be widely varying practice patterns
- Decreasing usage may have no direct benefit to the clinicians

SUCCESS STRATEGIES IN A COMMUNITY SETTING

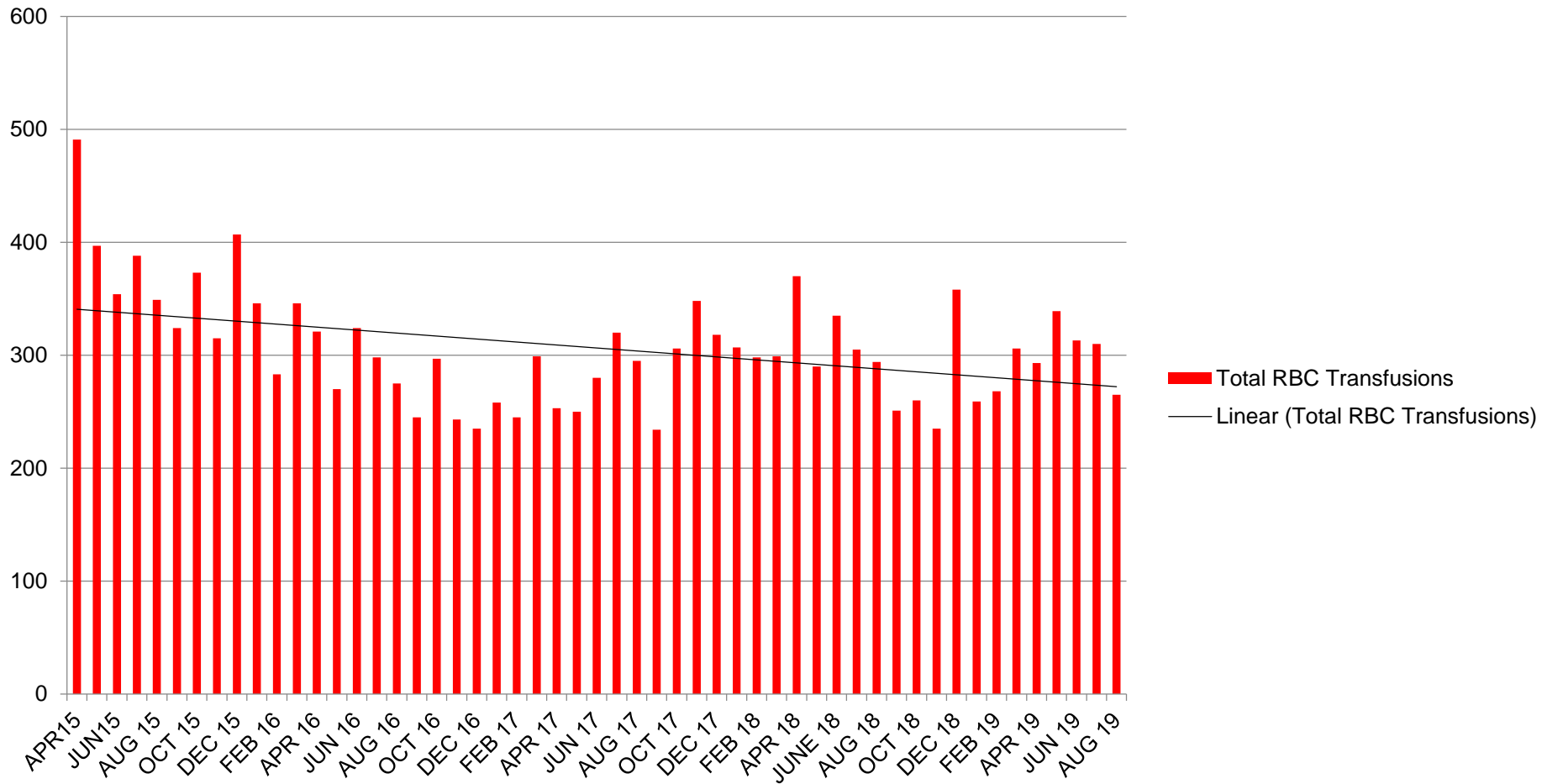
- MUST have a champion in administration
- MUST know the key stakeholders
- Retrospective data from 1-5 years before starting the program
- Identify the chronic over-users quickly (the bigger they are...)
- Contact the chronic over-users quickly (within 3-4 days) to get their attention
- Befriend and get the support of the CMO and CIO

SUCCESS STRATEGIES IN A COMMUNITY SETTING CON'T

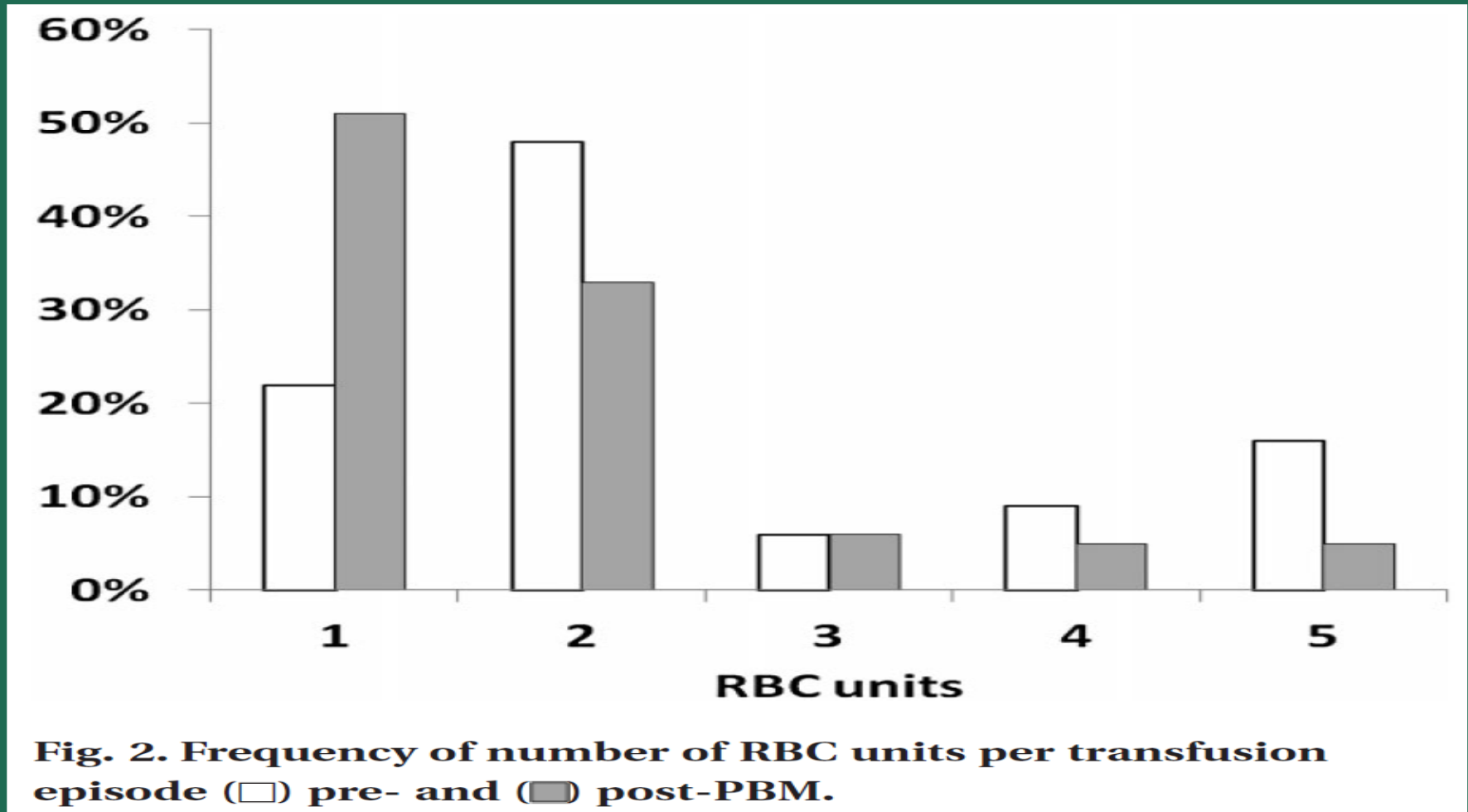
- Carefully analyze transfusion triggers and number of units ordered
- Befriend and get the support of the CMO and CIO
- “Soft-stop” at the blood bank for orders outside of criteria
 - First call is to nurse
 - Next call to Pathologist on-call
 - Often a release 1 unit and re-evaluate strategy
- Update your MEC and BUC regularly on progress for blood usage, transfusion reactions, and cost savings

RESULTS FROM OUR COMMUNITY PROGRAMS

Total RBC Transfusions

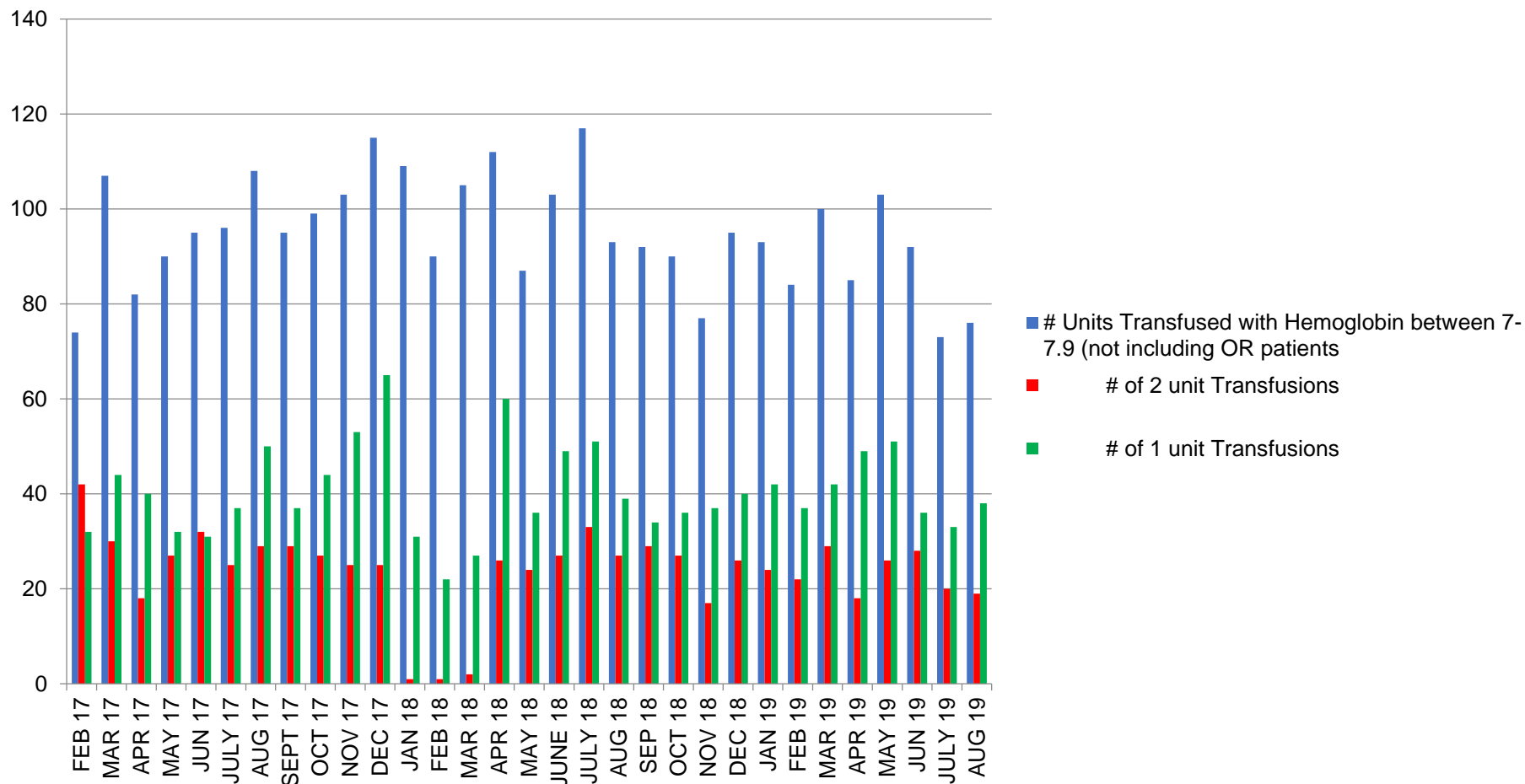


How many units ordered?



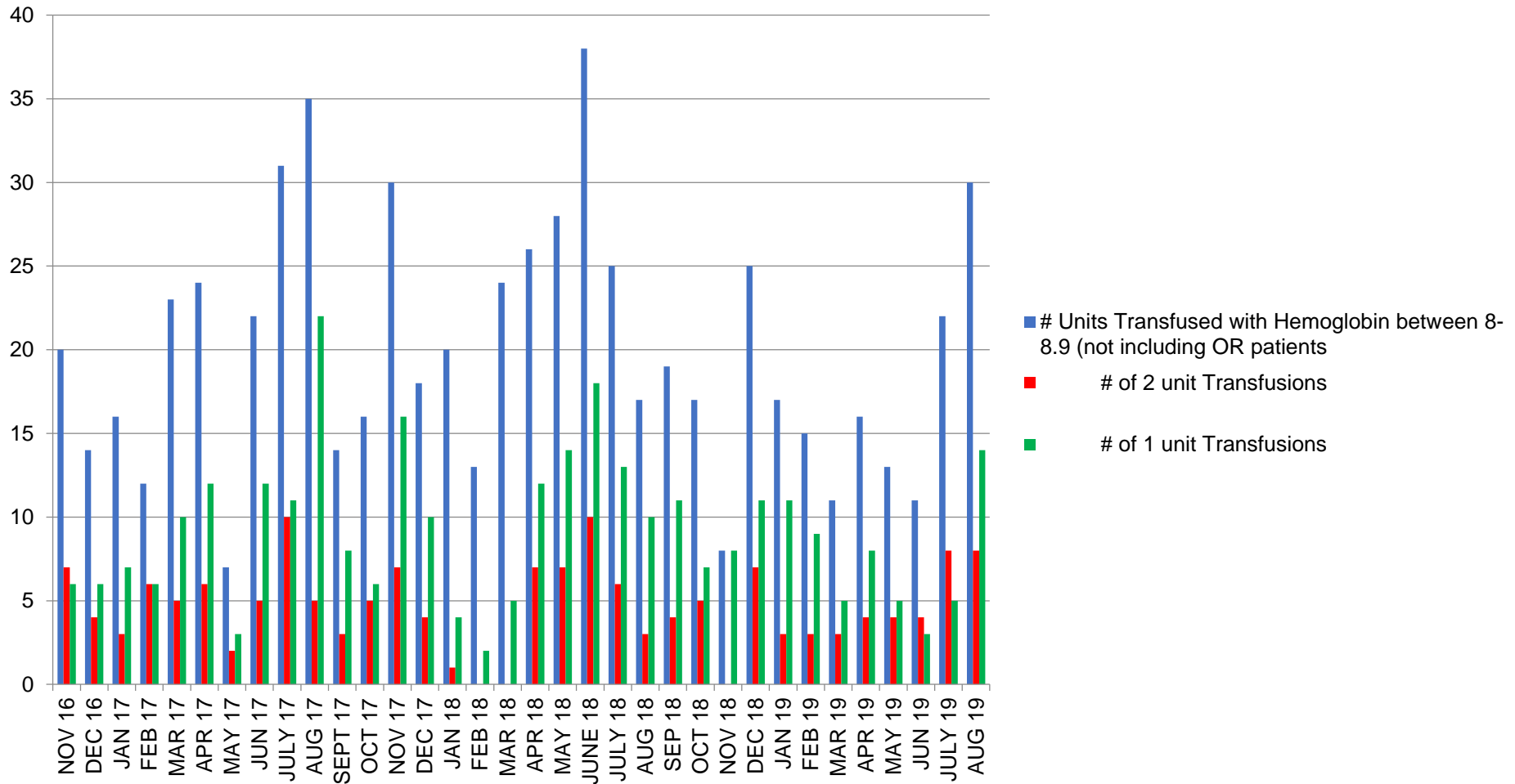
RESULTS FROM OUR COMMUNITY PROGRAMS

NUMBERS OF RBC UNITS TRANSFUSED (Hgb 7-7.9 mg/dL)



RESULTS FROM OUR COMMUNITY PROGRAMS

NUMBERS OF RBC UNITS TRANSFUSED (Hgb 8-8.9 mg/dL)



KEYS TO SUCCESS AND FINAL THOUGHTS

- Know the key **STAKEHOLDERS!**
- Identify “win” conditions for the program
- Have a **daily “shepherd”** for the program
- Have a “**champion**” in administration
- Demonstrate **benefits to all** (patients, clinicians, nurses, admin, technologists, managers, etc.)
- **Regular updates** to stakeholders, Medical Executive Committee and Blood Utilization Committee

THE END

- Questions?
- Feel free to contact me at law3@uab.edu

