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Driving Success in Blood Utilization: Unlock the Power of Data

**Jo Ann Hegarty, Director Blood Bank
MedAssets Advisory Solutions**

What is Blood Management?

- **An evidence based, multi-disciplinary process designed to:**
 - Promote optimal use of blood products
 - Ensure the safe and efficient use of all the resources involved in blood component therapy

Why a Blood Management Program?

- **Economic**

- Supports business environment of health care reform policies, current and projected healthcare economics, and stewardship of scarce resources

- **Clinical**

- Addresses risk/safety of transfusion practices
 - Iron overload
 - Infectious diseases
 - Immunosuppression
 - Questionable clinical outcomes, e.g. TRALI, TACO, TX reactions
 - Increased LOS

- **Regulatory/Standards**

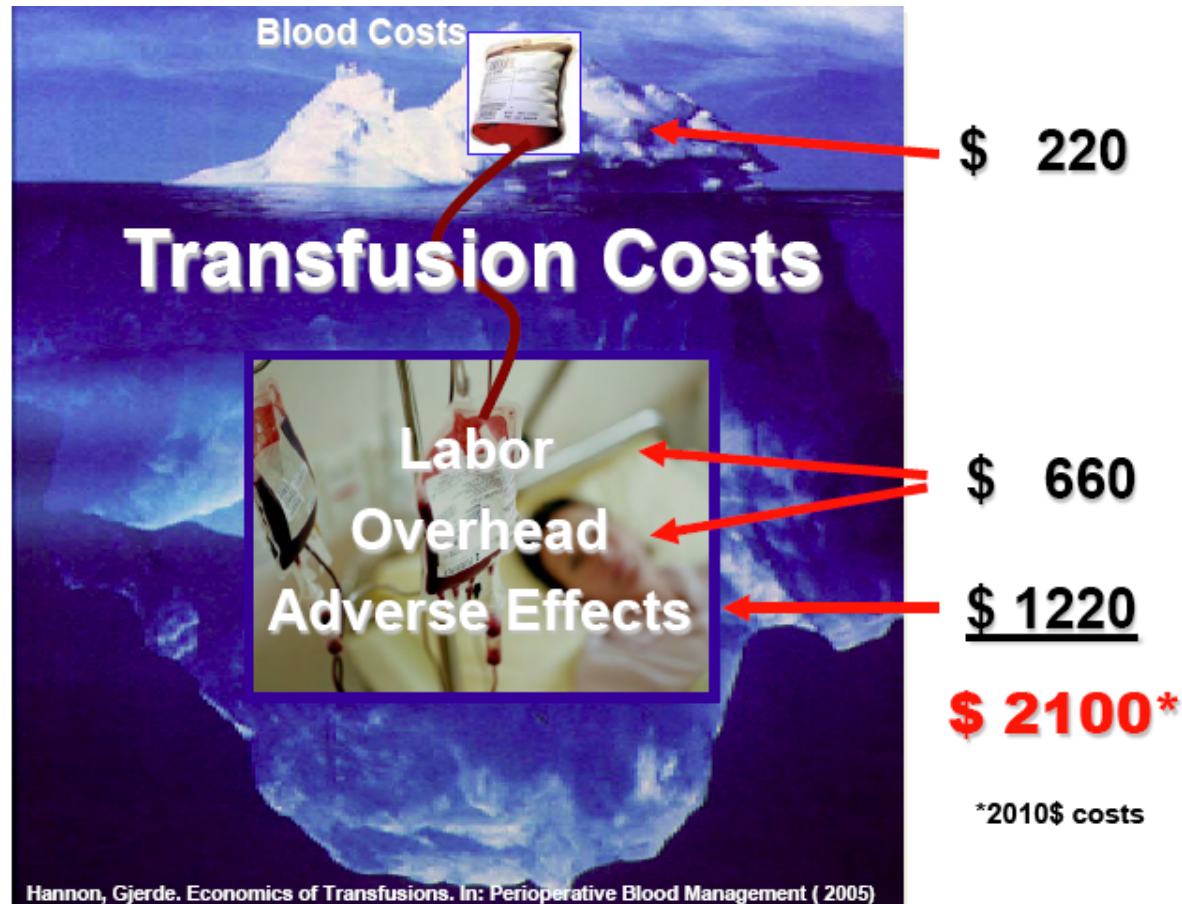
- TJC requirements
- CAP, AABB, SABM guidelines

Blood Management: A Collaborative Effort

- Physician Practice
 - Anemia reduction strategies and programs
 - Pre-intra-post operative strategies
 - Targeted use of blood and blood products
 - Blood conservation programs
- Nursing Care
 - Product issue and administration
 - Nursing management and oversight
- Laboratory Processes
 - Blood product ordering practices
 - Inventory management
 - Patient testing and donor testing
- Quality Programs
 - Transfusion committee utilization and review processes
 - Quality program and metrics tracking



Blood Management is a Critical Need



A Reminder: True Cost of Blood

- RBC-unit costs fully loaded between \$522 and \$1183
- Direct / Indirect
 - Laboratory processing
 - Nursing blood administration
 - Hospital cost/day (LOS)
- Adverse reaction
 - Treatment
 - Lost reimbursement
 - Legal expenses

TRANSFUSION PRACTICE

Activity-based costs of blood transfusions in surgical patients at four hospitals

Aryeh Shander, Axel Hofmann, Sherri Ozawa, Oliver M. Theusinger, Hans Gombotz, and Donat R. Spahn from the Society for the Advancement of Blood Management (SABM) and the Medical Society for Blood Management (MSBM)

BACKGROUND: Blood utilization has long been suspected to consume more health care resources than previously reported. Incomplete accounting for blood costs has the potential to misdirect programmatic decision making by health care systems. Determining the cost of supplying patients with blood transfusions requires an in-depth examination of the complex array of activities surrounding the decision to transfuse.

STUDY DESIGN AND METHODS: To accurately determine the cost of blood in a surgical population from a health system perspective, an activity-based costing (ABC) model was constructed. Tasks and resource consumption (materials, labor, third-party services, capital) related to blood administration were identified prospectively at two US and two European hospitals. Process frequency (i.e., usage) data were captured retrospectively from each hospital and used to populate the ABC model.

RESULTS: All major process steps, staff, and consumables to provide red blood cell (RBC) transfusions to surgical patients, including usage frequencies, and direct and indirect overhead costs contributed to per-RBC-unit costs between \$522 and \$1183 (mean, \$761 \pm \$294). These exceed previously reported estimates and were 3.2- to 4.8-fold higher than blood product acquisition costs. Annual expenditures on blood and transfusion-related activities, limited to surgical patients, ranged from \$1.62 to \$6.03 million per hospital and were largely related to the transfusion rate.

CONCLUSION: Applicable to various hospital practices, the ABC model confirms that blood costs have been underestimated and that they are geographically variable and identifies opportunities for cost containment. Studies to determine whether more stringent control of blood utilization improves health care utilization and quality, and further reduces costs, are warranted.

The Cost of Blood Consensus Conference (COBCON), initiated by investigators and convened in 2003, set out to devise a comprehensive, standardized, and generalizable method to estimate the cost of blood that would be useful for payers,

ABBREVIATIONS: ABC = activity-based costing; AKH = General Hospital Linz; CHUV = Centre Hospitalier Universitaire Vaudois; COBCON = Cost of Blood Consensus Conference; EHMC = Englewood Hospital Medical Center; RIH = Rhode Island Hospital.

From The Institute for Patient Blood Management and Bloodless Medicine at Englewood Hospital and Medical Center, Englewood, New Jersey; the Medical Society for Blood Management, Laxenburg, Austria; the Department of Anesthesiology, University Hospital Lausanne, Lausanne, Switzerland; the Institute of Anesthesiology, University Hospital Zurich, Zurich, Switzerland; and the Department of Anesthesiology and Intensive Care, General Hospital, Linz, Austria.

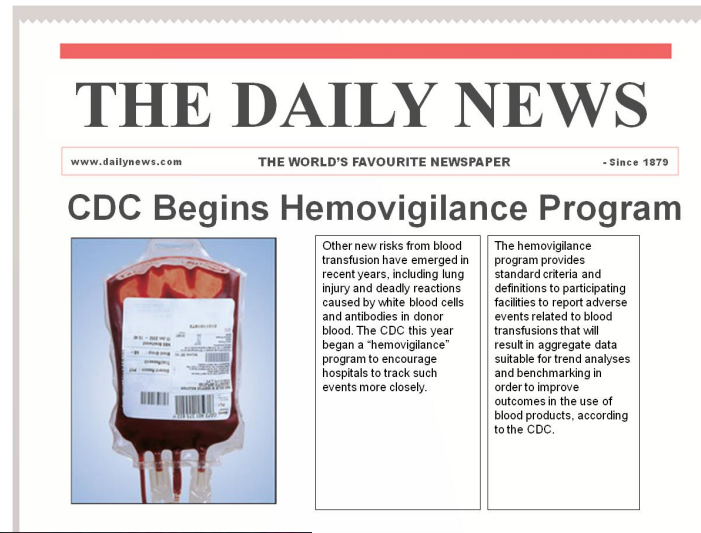
Address reprint requests to: Aryeh Shander, MD, FCCP, FCCM, Chief, Department of Anesthesiology and Critical Care and Hyperbaric Medicine, Medical Director, Institute for Patient Blood Management and Bloodless Medicine and Surgery, Englewood Hospital and Medical Center, 350 Engle Street, Englewood, NJ 07631; e-mail: aryeh.shander@ehmc.com.

A preliminary, partial report of this work was presented at the American Society of Hematology Meeting, San Francisco, CA, December 2008; Shander A, Hofmann A, Ozawa S, Javidrooz M. The true cost of red blood cell transfusion in surgical patients. Blood 2008;112: Abstract 3045.

Funding to support this research, including ABC software development and manuscript preparation, was provided by the Society for the Advancement of Blood Management (SABM), made possible by a grant from Centocor Ortho Biotech Services, LLC. Janssen-Cilag AG and Janssen-Cilag GmbH also contributed funding for research conducted in Europe.

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TRANSFUSION 2010;50:753-765.

Hospitals seeking solutions to drive safety and efficiency.



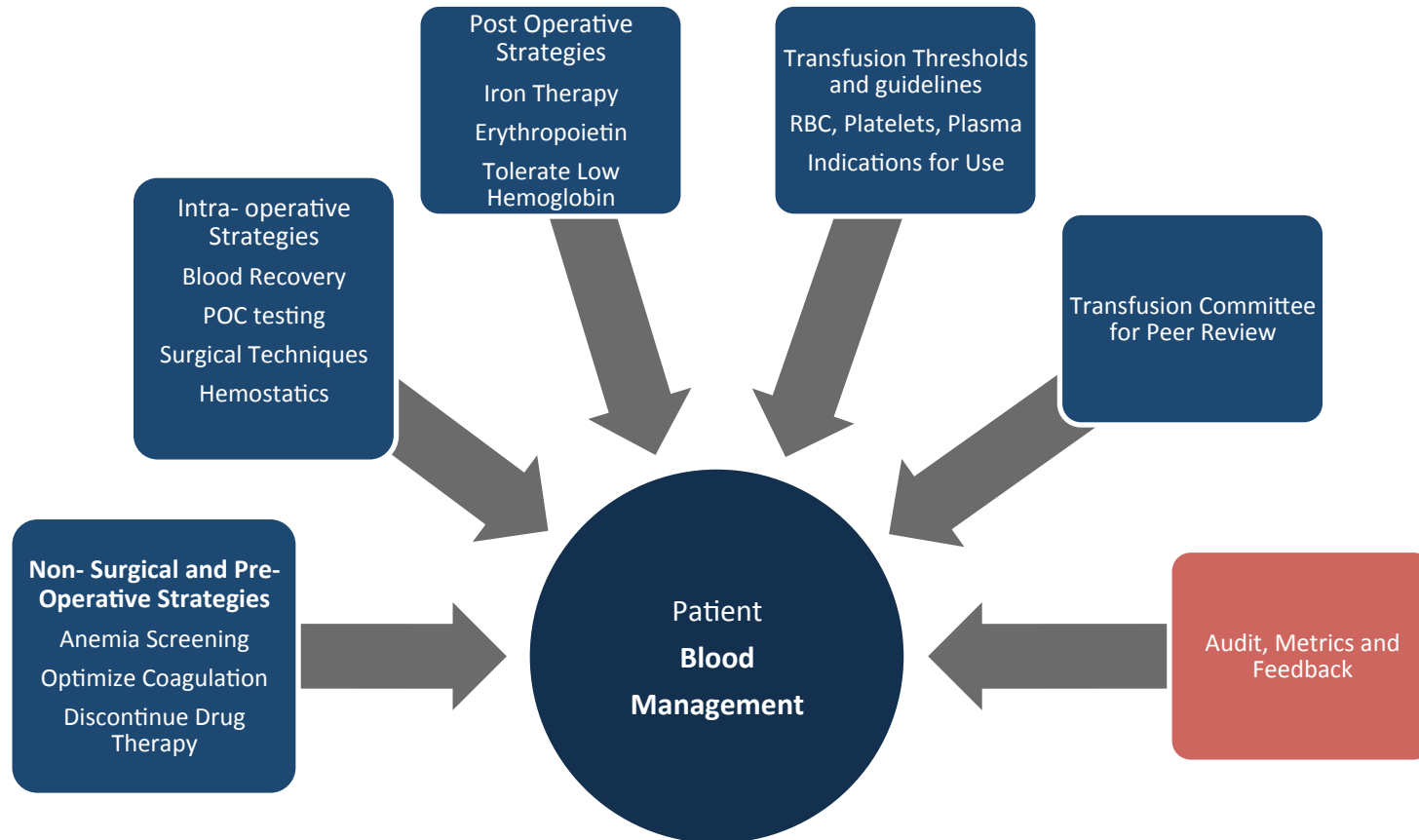
Sources:

- Transfusion March 2010
- AABB News August 2010
- Modern Healthcare August 2010

- [www.transfusion.org](#)
- [www.aabb.org](#)
- [www.modernhealthcare.com](#)

Current thinking is that blood may not be as safe as previously believed.

Blood Management Program Elements



Blood Management

- **Analyze** laboratory data, C/T Ratios, transfusion data by procedure
- **Identify** opportunities in cost, process, utilization, variation between physicians
- **Develop** teams to address opportunities to improve quality and reduce cost
- **Implement** changes in process and/or practice in target populations
- **Monitor** with metrics; provide feedback to stakeholders

The Approach

- Focus on guidelines for service lines
- Use the evidence, education, and engagement to drive change
- Develop metrics and monitoring for feedback

TRANSFUSION

Activity-based costs of blood transfusion

*Aryeh Shander, Axel Hofmann, Shmuel
Donat R. Spahn from the Society for
Medical Societies*

BACKGROUND: Blood utilization has long been expected to consume more health care resources than previously reported. Incomplete accounting for blood costs has the potential to misdirect programmatic decision making by health care systems. Determining the cost of supplying patients with blood transfusions requires an in-depth examination of the complex of activities surrounding the decision to transfuse. **STUDY DESIGN AND METHODS:** To accurately mine the cost of blood in a surgical population from a health system perspective, an activity-based cost (ABC) model was constructed. Tasks and resource consumption (materials, labor, third-party services, capital) related to blood administration were identified prospectively at two US and two European hospitals. Process frequency (i.e., usage) data were captured retrospectively from each hospital and used to populate the ABC model.

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Annals of Internal Medicine

CLINICAL GUIDELINE

Red Blood Cell Transfusion: A Clinical Practice Guideline From the AABB*

Jeffrey L. Carson, MD; Brenda J. Grossman, MD, MPH; Steven Kleinman, MD; Alan T. Tinmouth, MD; Marisa B. Marques, MD; Mark K. Fung, MD, PhD; John B. Holcomb, MD; Orijei Illoh, MD; Lewis J. Kaplan, MD; Louis M. Katz, MD; Sunil V. Rao, MD; John D. Roback, MD, PhD; Aryeh Shander, MD; Aaron A.R. Tobian, MD, PhD; Robert Weinstein, MD; Lisa Grace Swinton McLaughlin, MD; and Benjamin Djulbegovic, MD, PhD, for the Clinical Transfusion Medicine Committee of the AABB

Description: Although approximately 85 million units of red blood cells (RBCs) are transfused annually worldwide, transfusion practices vary widely. The AABB (formerly, the American Association of Blood Banks) developed this guideline to provide clinical recommendations about hemoglobin concentration thresholds and other clinical variables that trigger RBC transfusions in hemodynamically stable adults and children.

Recommendation 2: The AABB suggests adhering to a restrictive strategy in hospitalized patients with preexisting cardiovascular disease and considering transfusion for patients with symptoms or hemoglobin level of 8 g/dL or less (Grade: weak recommendation, moderate-quality evidence).

Recommendation 3: The AABB cannot recommend for or against a liberal or restrictive transfusion threshold for hospitalized patients.

less Medicine at Englewood Hospital and Medical Center, Englewood, New Jersey; the Medical Society for Blood Management, Laxenburg, Austria; the Department of Anesthesiology, University Hospital Lausanne, Lausanne, Switzerland; the Institute of Anesthesiology, University Hospital Zurich, Zurich, Switzerland; and the Department of Anesthesiology and Intensive Care, General Hospital, Linz, Austria.

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The Process

- Establish “best-practices” evidence-based transfusion guidelines
- Enhance existing transfusion committee efforts with education
- Establish multi-disciplinary modalities and methods that promote the optimal use of blood products
- Create current utilization and outcome metrics to provide feedback for performance improvement

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DATA

Data? What Data?

- Where do I get data??

Laboratory

- C/T ratio by service line by physician
- Monthly usage data by product by cost
- Wastage data by product by cost
- Emergency release
- Hemoglobin, Platelet count, INR for transfused product

Data? What Data?

Blood Utilization Data

- Where are the products used? Transfused?
- What and how much does each service line use?
- What and how much does each physician use?
- How do we do peer review?
- Is there a scorecard?
- Is it a priority?
- Who can help?

Evaluating the Impact of Peer Review

Outcome measures preferred over process measures

Measures the result of a goal - directed activity, function or process (processes you implemented to change transfusion practice)

Collect data to provide clinicians with meaningful feedback

Examples:

- Average pre-transfusion hemoglobin overall and by provider
- Average number of units transfused per patient by DRG
- Percentage of inpatients transfused
- Number of transfusions with post-transfusion hemoglobin above 10 g/dl

A Reminder for Engaging Physicians

- **Collect data to provide clinicians with meaningful feedback**
 - Utilization
 - Characterize Context (Indication, H&H, INR, base deficit, Temp, BP, etc.)
 - Facilitate identifying practice pattern variation
- **Facilitate evidence-based practice and development of clinical guidelines**
- **Establish/revitalize transfusion utilization committee**
 - Peer based accountability
 - Medical staff's responsibility
- **Laboratory operational performance matters**
 - Turn around times for results
 - Timeliness of blood availability

Reporting the Data

Types of reports

- Service specific reports
- Provider specific reports
 - Provider “report cards”
- Diagnosis / procedure specific reports
 - Can report by provider
- Global reports and trending data
 - Program “report cards”

Transfusion “Report Cards”

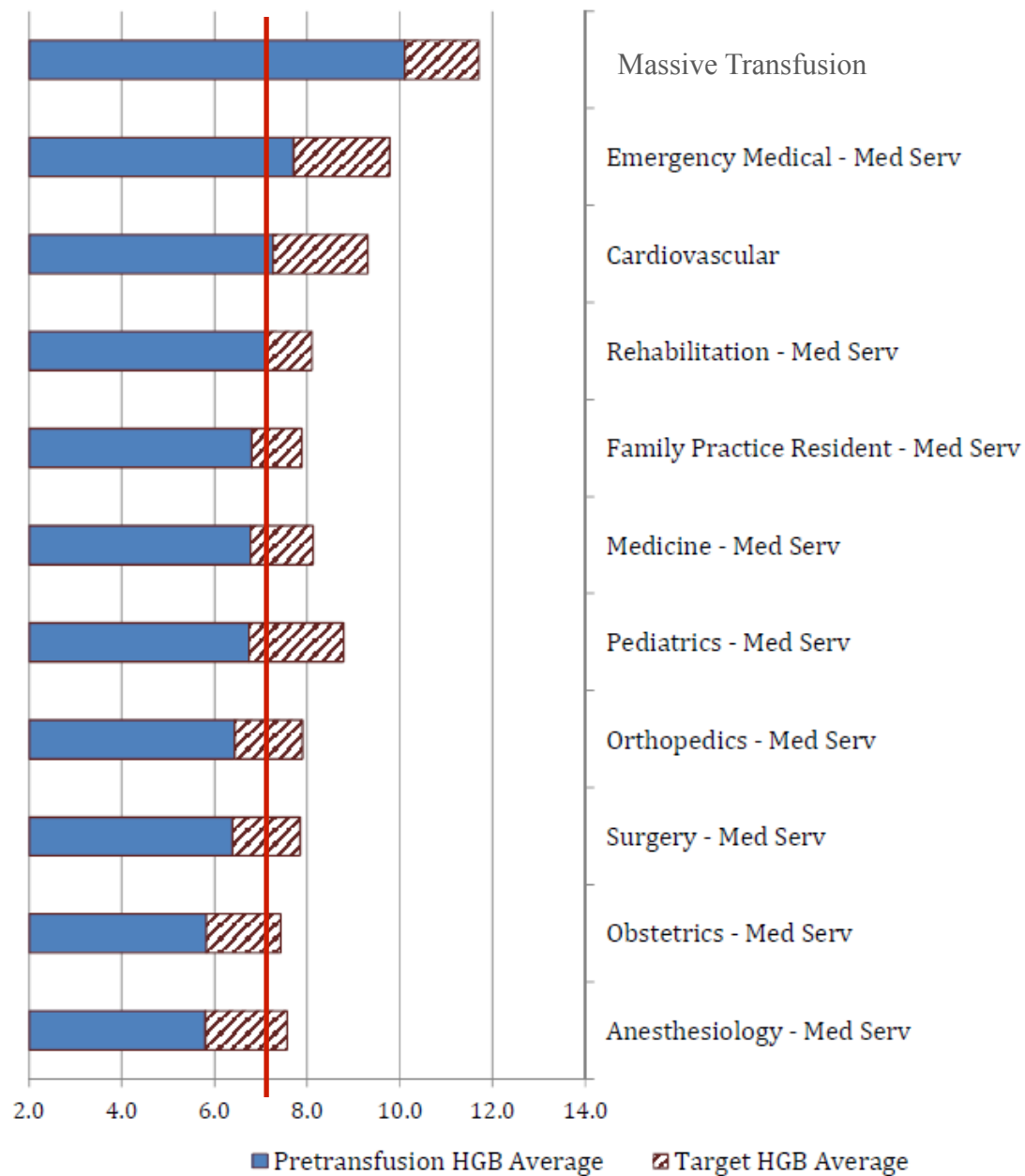
Exception Reporting

Percent Transfusion > 8 HGB	Pretransfusion HGB Average	PreTransfusion HCT Average	Posttransfusion HGB Average	Posttransfusion HCT Average	Average # of Units Transfused	Total Units Transfused	# of Transfusion Episodes	# of Single Unit Transfusions	Percent Single Unit Transfusion	Percent SUT w/ 2nd Unit w/i 24 Hours
	6.7	21.9	7.6	24.0	1.0	1	1	1		
	7.1	22.9	8.4	26.7	1.0	1	1	1		
	6.7	20.7	8.3	24.1	1.0	1	1	1		
0.0%	6.8	21.8	8.1	24.9	1.0	3	3	3	100.0%	0.0%

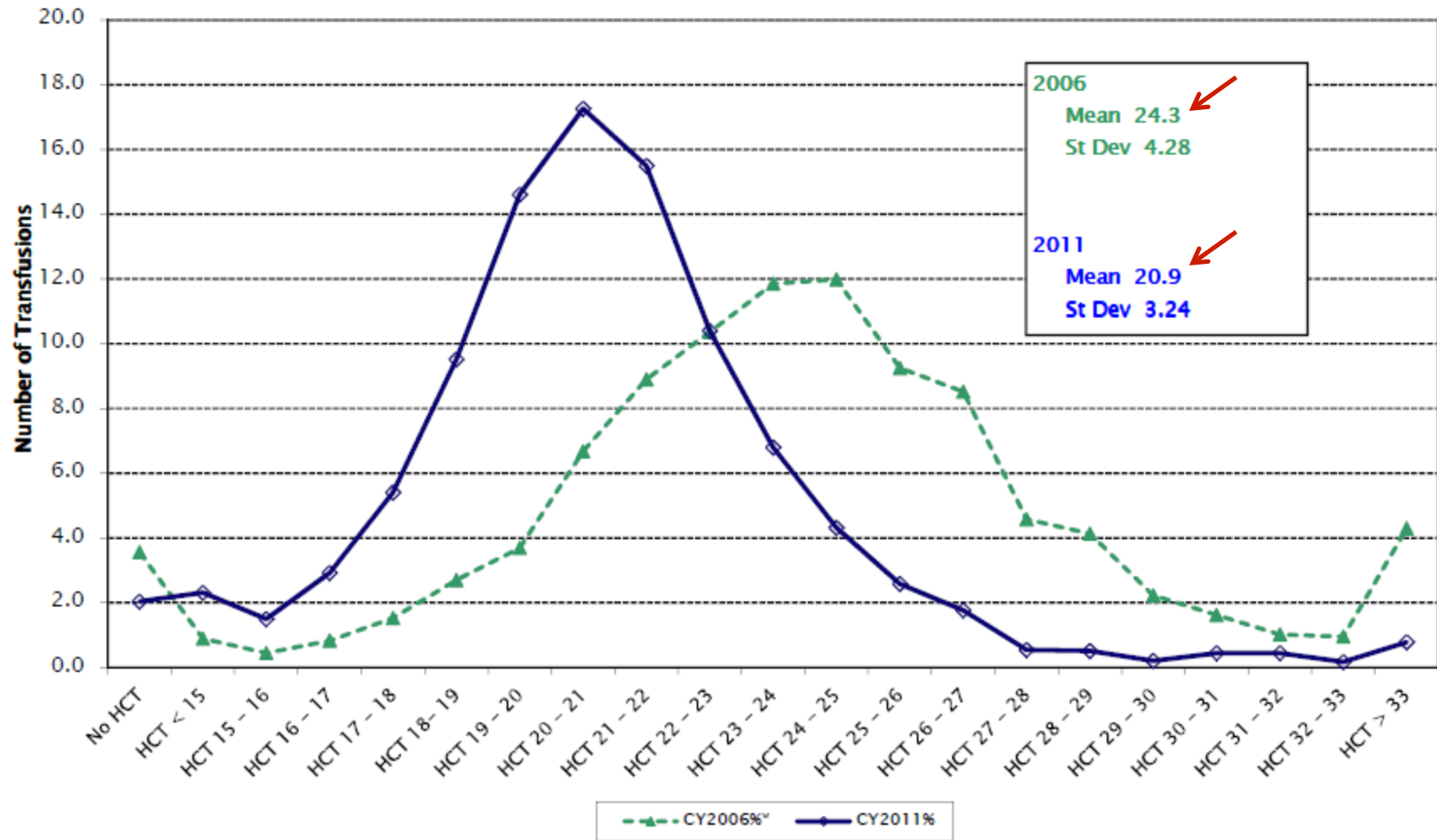
Pre-transfusion Hgb

KM48811		11.2	33.0
KT54571			
4LJ05911			
KH64383		7.0	21.3

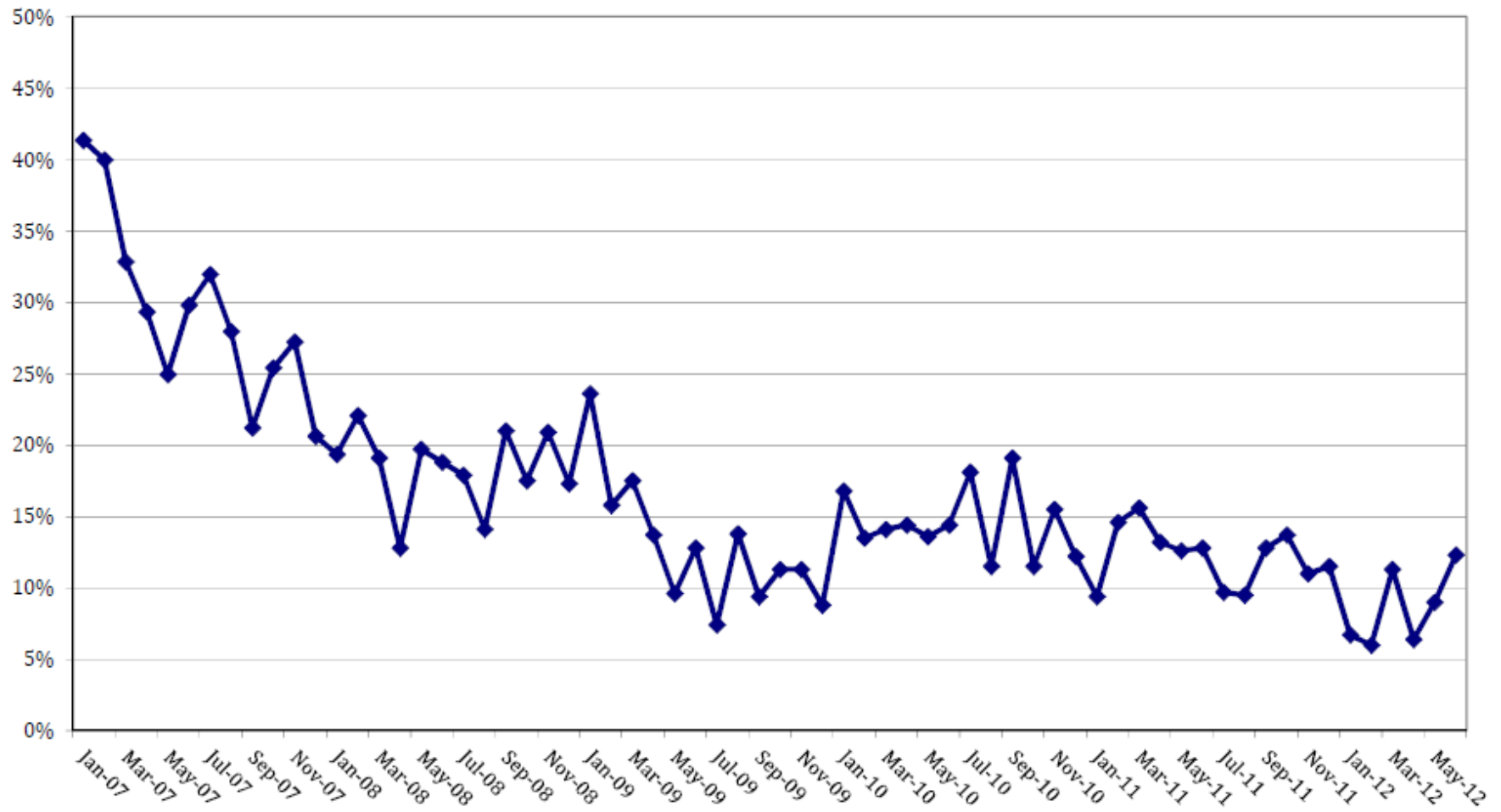
Trigger/Target HGB



Distribution of Pretransfusion Hematocrits

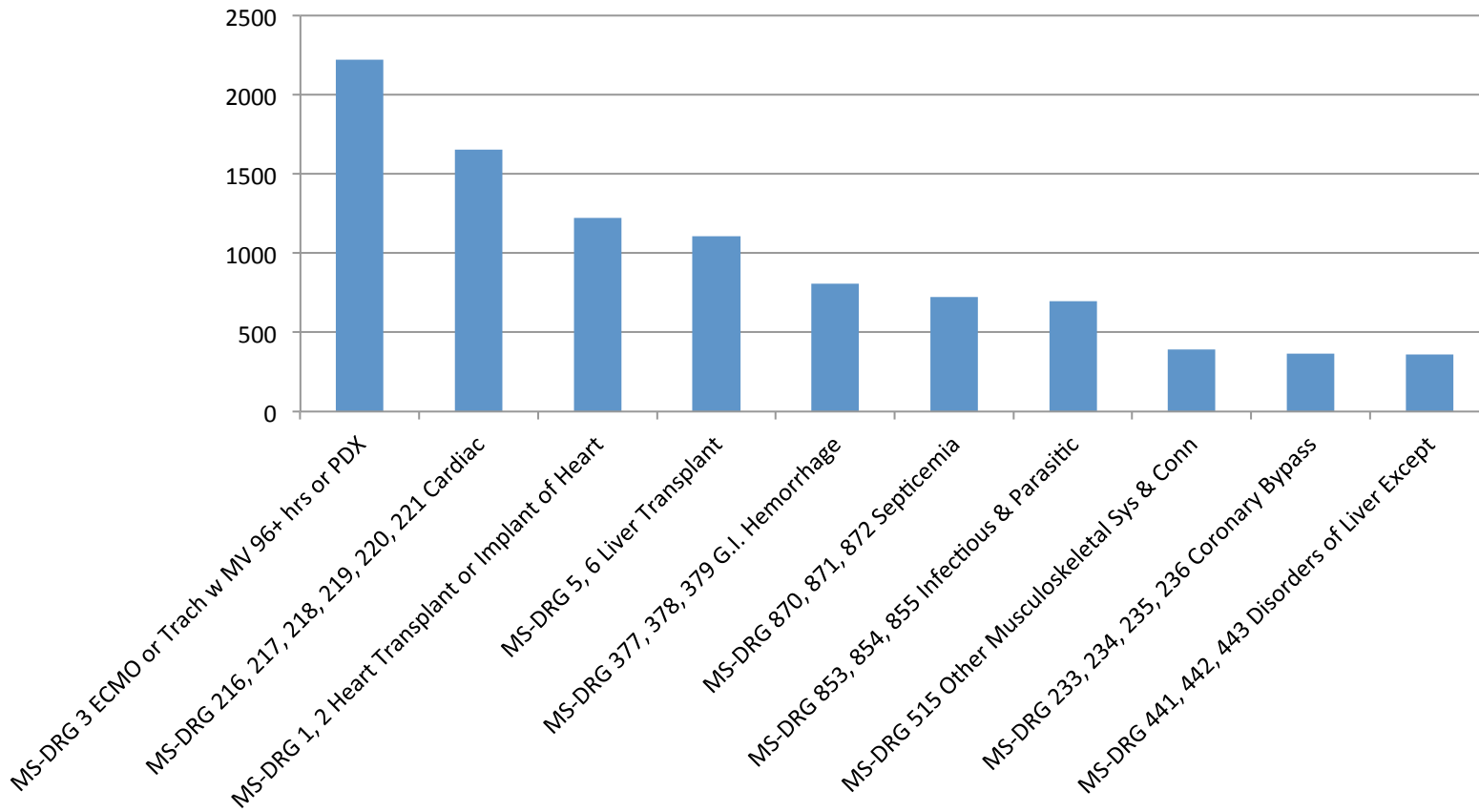


Percent of Transfusions @ > 24% HCT



Total Blood Volume by Top 10 MS DRG

Total



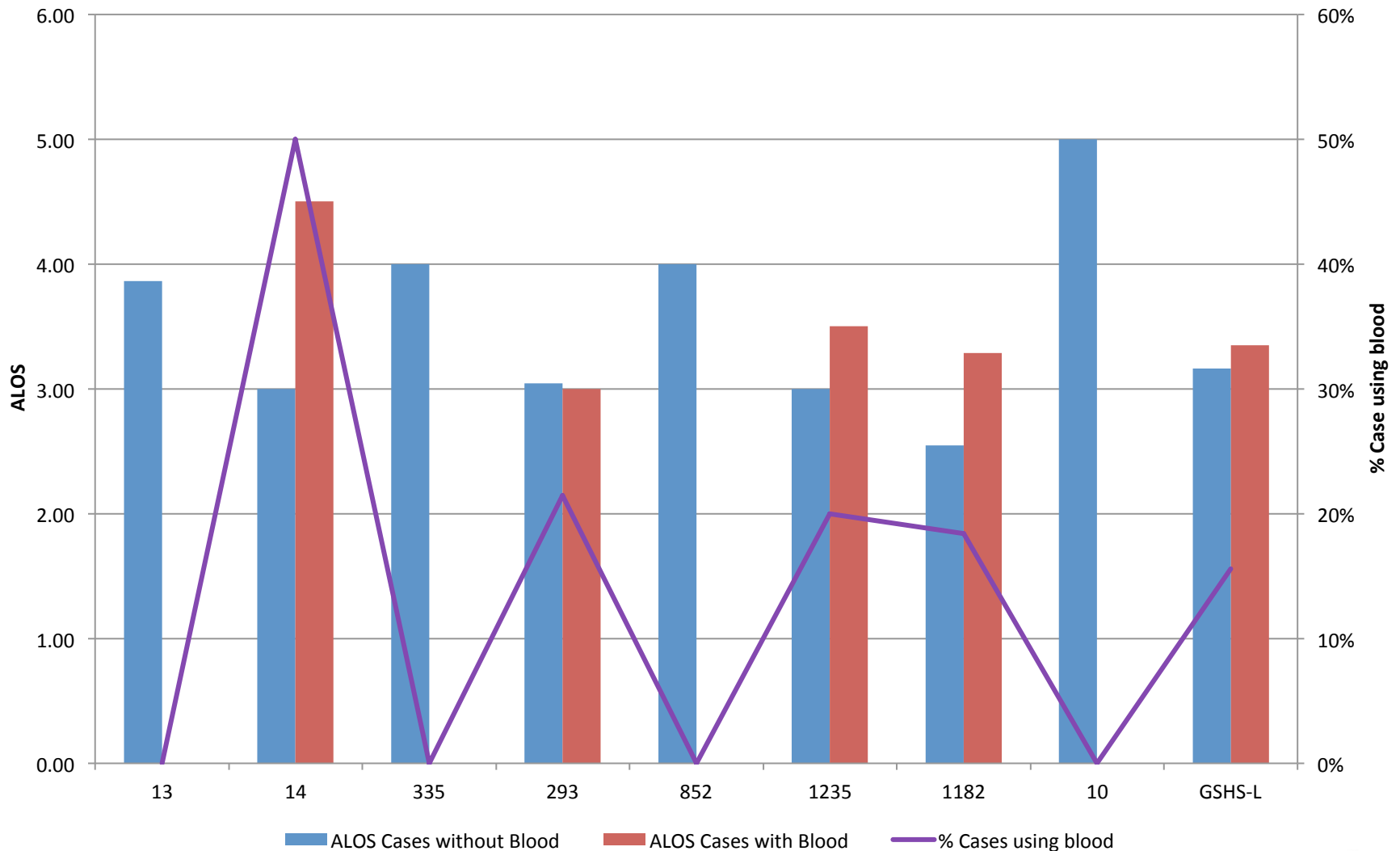
470 Total Hip

- **Total Hip Volume**

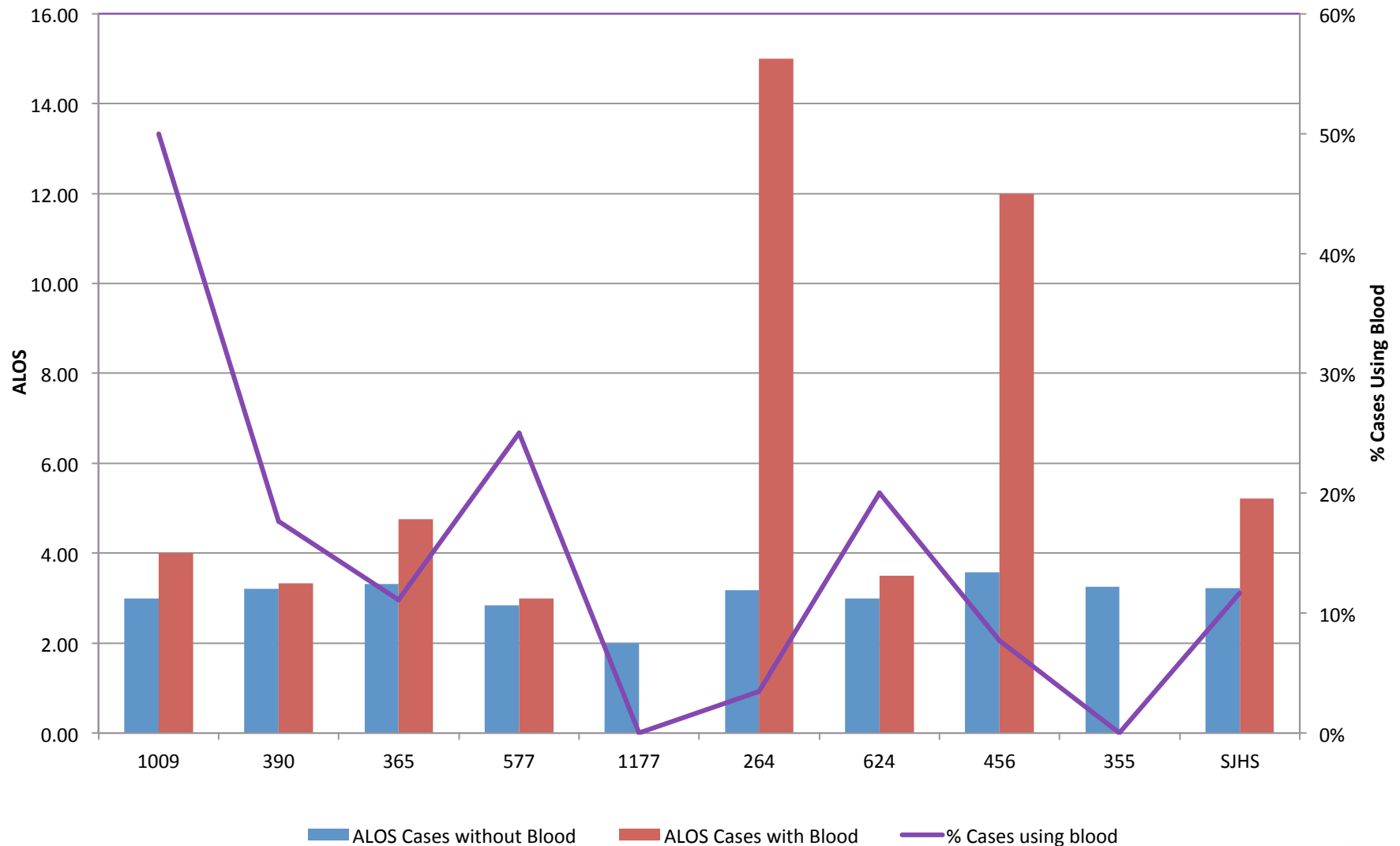
- Annual case volume: 820
- Annual case volume that used blood: 163
- % cases with Blood: 20%

Facilities	Total Volume	Volume- Case without blood	Volume - Case with blood	% cases with blood
Hospital A	109	92	17	16%
Hospital B	24	22	2	8%
Medical Center C	100	69	31	31%
Hospital D	22	17	5	23%
Medical Center E	76	66	10	13%
Medical Center F	57	37	20	35%
Hospital G	120	106	14	12%
Medical Center H	248	200	48	19%
Hospital Y	64	48	16	25%
TPC	820	657	163	20%

Total Hip by Physician- Medical Center H



Total Hip by Physician Hospital D



Physician Variation

St Elsewhere			Severity scores are in the 3.5-3.7 range for all surgeons (1 as low, 4 as high)														
MSDRG 219 Cardiac Valve & CV Proc wo Cath w MCC																	
Blood Products: Charge Detail by MD																	
2012																	
Revenue Code Group	Charge Code	Unit Variable Cost	Avg All Cases			Bunson, W			Drake, D			Gregg, T			Kester, J		
			Volume	Avg Units per Patient	Avg Variable Cost per Patient	Volume	Avg Units per Patient	Avg Variable Cost per Patient	Volume	Avg Units per Patient	Avg Variable Cost per Patient	Volume	Avg Units per Patient	Avg Variable Cost per Patient	Volume	Avg Units per Patient	Avg Variable Cost per Patient
	Average LOS			12.7			12.7			15.5			13.7			11	
	Average Age			66			62			58			65			69	
Blood Products			180	7.59	1,728.00	36	10.83	2,439.00	13	6.00	1,290.00	53	9.21	2,008.00	68	4.79	1,171.00
	702580831 RBC LEUKO REDU (A1) PROCESS	\$231.00		3.58	\$827		4.22	\$975		3.62	\$836		4.62	\$1,067		2.44	\$564
	702584193 PLATELET PHERESIS LR PROCESS	\$529.00		1.03	\$545		1.64	\$868		0.62	\$328		0.96	\$508		0.78	\$413
	717389713 CRYO POOLED (5) PROCESS	\$318.00		0.79	\$251		1.33	\$422		0.15	\$48		0.96	\$305		0.44	\$140
	702581153 FFP PROCESS	\$48.00		2.18	\$105		3.64	\$174		1.62	\$78		2.66	\$128		1.13	\$54

Make or Buy?

Make

- What is your current system?
- What resources will you need?
- Is there anything available?
- How much will this effort cost in time and resources?

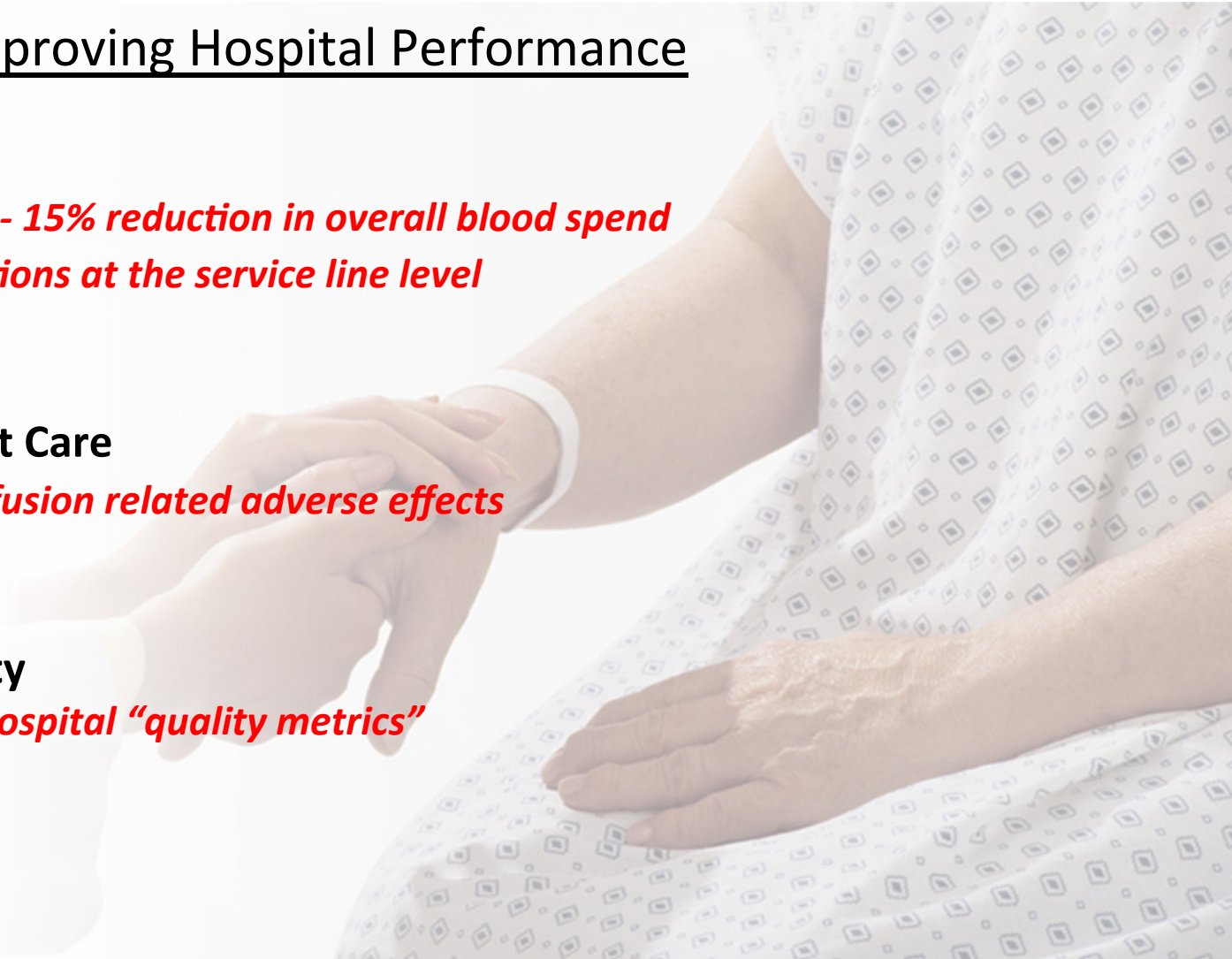
Buy

- How will the vendor get the data?
- How long does it take?
- What is the cost?
- Is this easy to use?
- What is the ROI?

Blood Management Solutions

Improving Hospital Performance

- **Reduce Cost**
 - *Goal of 10% - 15% reduction in overall blood spend*
 - *>20% reductions at the service line level*
- **Improve Patient Care**
 - *Fewer transfusion related adverse effects*
- **Improve Quality**
 - *Determine hospital “quality metrics”*





IMPACT Online Blood Management Intelligence Tool

- Web-based tool for clinicians and administrators
- Insight to blood use and clinical metrics
- Analysis to understand trends
- Measurement for program success

Measurement for program success

Comprehensive metrics specific to the advancement of blood management practices

Billing Systems

Blood Bank

Encounter Audit

Encounter ID	Event Date	Event Type	Activity	Quantity	Procedure Performed By	Lab Test Result	Admitting Doctor	Attending Doctor
4232009	Admission	Emergency Room			6812		7336	7336
4232009	Procedure	81.52 - Partial Hip Replacement						
4302009	Crossmatch	Electronic	1					
4302009	Transfusion	Allogenic	1					
542009	Crossmatch	Electronic	4					
542009	Transfusion	Allogenic	1					
5242009	Crossmatch	Electronic	2					
5242009	Transfusion	Allogenic	1					
5252009	Transfusion	Allogenic	1					
6162009	Crossmatch	Serological	2					
6202009	Crossmatch	Electronic	2					
6202009	Transfusion	Allogenic	1					
91130009	62112009	Transfusion	Allogenic	1				
7112009	Lab	Hemoglobin				9.5		
7112009	Lab	Hematocrit				30.4		
7122009	Lab	Hemoglobin				10.0		
7122009	Lab	Hematocrit				32.2		
732009	Lab	Hemoglobin				9.5		
732009	Lab	Hematocrit				30.0		
742009	Lab	Hemoglobin				9.2		
742009	Lab	Hematocrit				29.1		
752009	Lab	Hemoglobin				9.3		
752009	Lab	Hematocrit				29.9		
762009	Lab	Hemoglobin				9.3		
762009	Lab	Hematocrit				29.4		

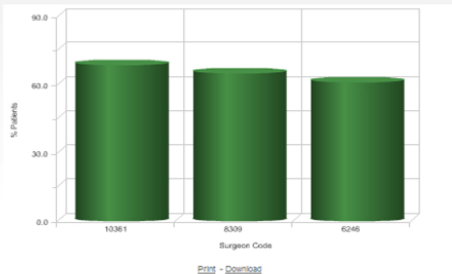
Records 1 - 25

The information displayed in this report represents the specific patient encounter activities related to blood transfusions. Actual transfusions are highlighted in yellow. Allogenic and Autologous refers to red cells.

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Cardiovascular - Blood Use

Percent Patients Transfused By Doctor



Lab Results

Hospital-wide and Department

0111 Blood Use and Clinical Outcomes 011110

Total Units Transfused By Category

Category	Total Units
Allogenic	14,851
Autologous	563
Cryoprecipitate	3,670
Fresh Frozen Plasma	5,263
Platelets	1,942

Total Patients: 35,623

0111

011110

011001

0111

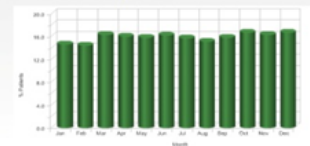
BloodTrack®

ADT System

Total Units Transfused By Month



Percent Patients Transfused By Month



Units Per Transfused Patient By Month



010111

0111

0111

0111

0111

011001

Cardiovascular – all products/procedures

4/2011 – 3/2012

Total Units Transfused by Product

Product	Total Units	Transfused Patients	Units Per All Patients
Allo RBC	1,937.0	261	4.34
PAD	3.0	2	0.01
Platelets	457.0	118	1.02
Plasma	657.0	109	1.47
Cryoprecipitate	108.0	29	0.24

Total Patients	446
Total Transfused Patients	274
Transfusion Rate	61.4%
Units per Transfused Patient	11.54
Units Per All Patients	7.09

4/2012 – 3/2013

Total Units Transfused by Product

Product	Total Units	Transfused Patients	Units Per All Patients
Allo RBC	1,199.0	205	3.32
PAD	1.0	1	0.00
Platelets	232.0	83	0.64
Plasma	451.0	82	1.25
Cryoprecipitate	49.0	16	0.14

▼ 24%

▼ 37%

▼ 15%

▼ 42%

Total Patients	361
Total Transfused Patients	215
Transfusion Rate	59.6%
Units per Transfused Patient	8.99
Units Per All Patients	5.35

▼ 22%

▼ 25%

▼ 2.55 Units/Pt

Gross Savings ~ \$298,369.00

Blood Management Program Results

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
Blood Spend*	\$6,000,000	\$4,860,000	\$4,131,000	\$3,717,900	\$3,457,647	\$22,166,547
Savings per Year	\$1,140,000	\$729,000	\$413,100	\$260,253	\$172,882	\$2,715,235
Total Savings over 5 Years	\$5,700,000	\$2,916,000	\$1,239,300	\$520,506	\$172,882	\$10,548,688
	19%	15%	10%	7%	5%	

Based on acquisition price only

Blood Management Program Goals

- **Encourage optimal and appropriate use of blood resulting in:**
 - Improvement in patient outcomes and LOS
 - Reduction of health care expenditures
 - Conservation of a precious, vital and finite resource
- **Establish metrics and ongoing measurement**
- **Drive new behaviors into the fabric of the organization**