

Implementation Patient Blood Management Program Thomas Jefferson University Hospital

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Introduction

- **Patient blood management (PBM),**
 - **“the application of evidence-based medical and surgical concepts to maintain hemoglobin concentration, optimize hemostasis, and minimize blood loss in an effort to improve patient outcome.”**
- **PBM decreases morbidity and mortality, lowers transfusion rates and perioperative blood loss, and decreases length of stay and costs.**
- **PBM endorsed WHO, The Joint Commission, US Department of Health and Human Services, American Association of Blood Banks (AABB).**
- **Thomas Jefferson University Hospital (TJUH) with Specialty Care + Haemonetics integrated PBM as a daily, embedded quality improvement strategy.**

Goals

- **Development Hospital-Wide PBM program/team with interdisciplinary service lines and executive engagement responsible for decisions related to data driven patient centered improved outcomes**
 - **Length of stay**
 - **Known transfusion-related complications [C. Difficile, venous thromboembolism (VTE), sepsis, pneumonia, and disseminated intravascular coagulation (DIC)]**
- **Crossmatch to transfusion ratio (C/T) which aligns with national standards of < 2**
- **Decreased wastage of blood products**
- **Development and revision of policies for consent and refusal of blood products**
- **Massive Blood Loss management, protocol ensuring the proper ratio of products with timely and accurate delivery**

Timeline

- **Key stakeholders identified for Steering committee membership - first meeting Feb. 2015**
- **Examined and validated data, comparing sources (Haemonetics, Blood bank, and University Health Systems)**
- **General education of administrators, ICU directors, Blood Bank, Quality, Risk Management**
- **Identified service lines for first change**
 - **Voluntary (Spine, Neurosurgery)**
 - **High users (ECMO, Hematological Oncology, Cardiac ICU)**
- **High priority problems identified**
 - **Wastage**
 - **MSBOS**
 - **Consents**
 - **Order sets**
 - **Add-on crossmatches**
 - **Policy revisions**

MSBOS= Maximum Surgical Blood Ordering Schedule

Methods

- **Education**
 - **A Grand Rounds speaker for physicians addressed patient blood management (Surgery, Anesthesia)**
 - **In-services provided to Nursing, Medical staff, Residents, Grand rounds in-house**
 - **The annual nursing education was updated to reflect new guidelines and standards**
- **Electronic Medical Record (EPIC) indications were built into the EPIC ordering system**
 - **Aligned with national guidelines and included supporting resources.**
 - **Mandatory stops for indications that don't meet specified criteria.**
 - **Outliers are audited and reported monthly (Measurable, actionable metrics).**

Methods

- **The policy for hematologic malignancies was updated to include current industry best transfusion practices**
- **Transfusion guidelines for specific areas incorporated in to practice, including indications for Intensive Care Units (ICUs) and platelets**
- **Physician champions were identified to promote the importance of PBM in multiple service lines, including but not limited to Cardiac Surgery, Spine, Neurosurgery and Critical Care**
- **PBM director attends section meetings and reports real-time metrics to high use areas**

Methods

Blinded Physician Scorecards

HMS FOR 8/4/2017-9/13/2017

MD	A	B	C	D	E	F	G	Totals
Total PT DAYS	67	110	117	31	84	118	67	594

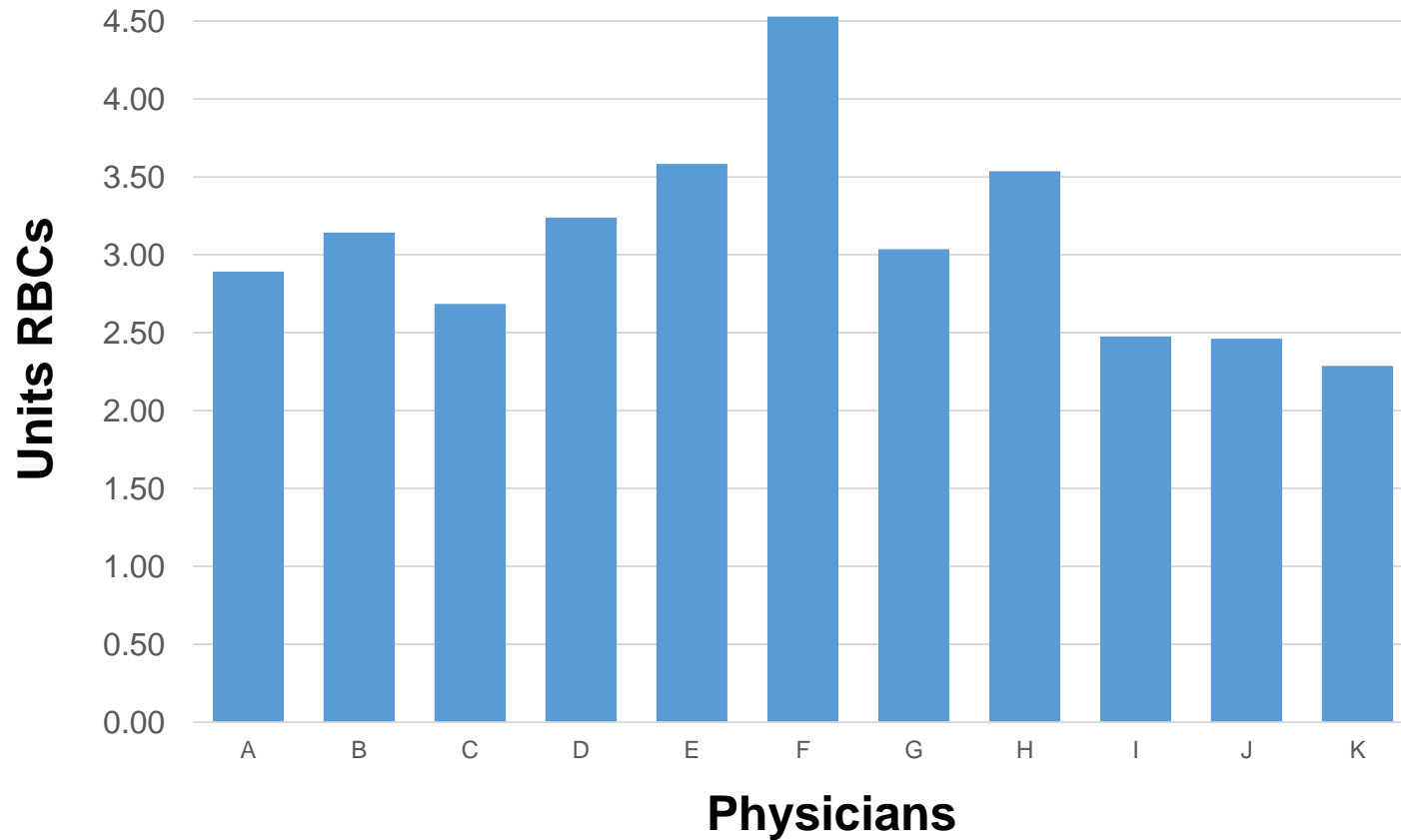
RED BLOOD CELLS

RBC TE	15	35	37	9	21	24	15	156
RBC UNITS USED	20	42	42	9	24	32	18	187
% TX EVENTS per PT DAY	22%	32%	32%	29%	25%	20%	22%	26%
RBC 1 UNIT TE	11	30	32	9	18	17	14	131
% RBC 1 UNIT TE	55%	71%	76%	100%	75%	53%	78%	70%
RBC 2 UNIT TE	3	3	5	0	3	6	0	20
% RBC 2 UNIT TE	15%	7%	12%	0%	13%	19%	0%	11%
3 OR > UNITS TE	1	2	0	0	0	1	1	5
TE's W HGB < 8	14	34	36	9	19	23	14	149
TE's W HGB = 8 -8.9	1	0	1	0	2	1	1	6
TE's W HGB ≥ 9	0	1	0	0	0	0	0	1

# OF TE WITH HGB < 8 AND 1 UNIT	10	29	31	9	16	16	13	124
% OF TE WITH HGB < 8 AND 1 UNIT	67%	83%	84%	100%	76%	67%	87%	79%

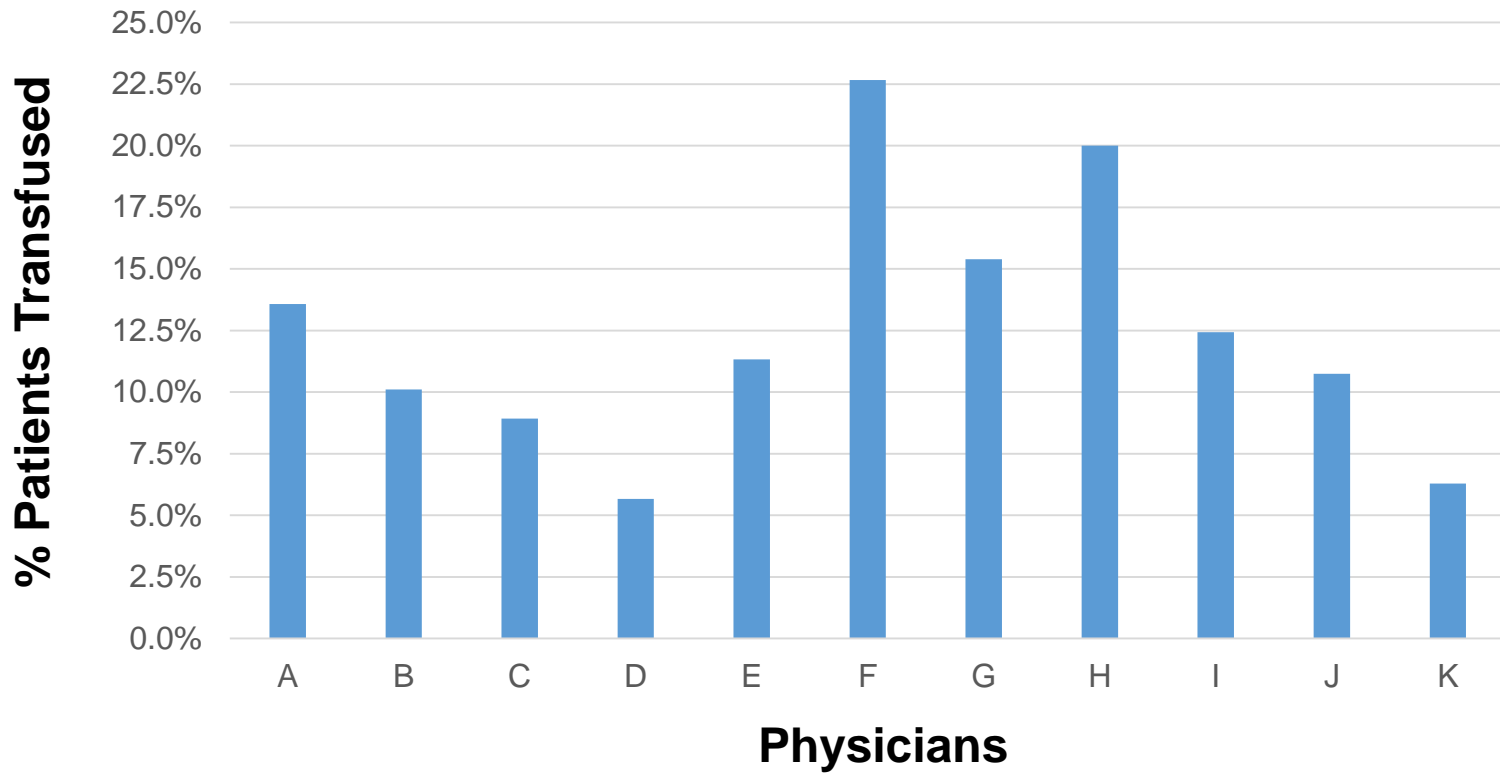
Methods

AVG RBC Units per Transfused Patient



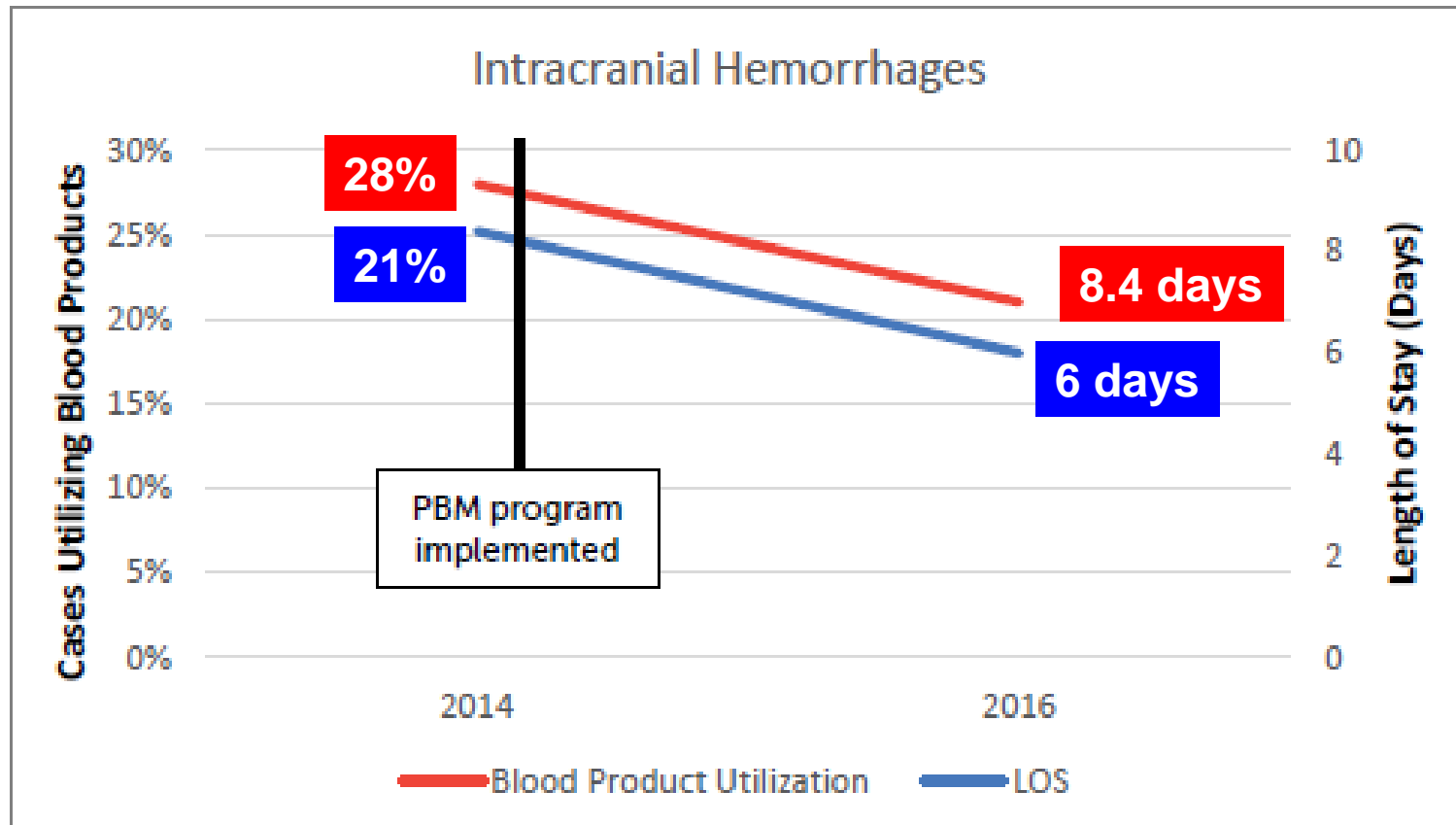
Methods

% Patients Transfused



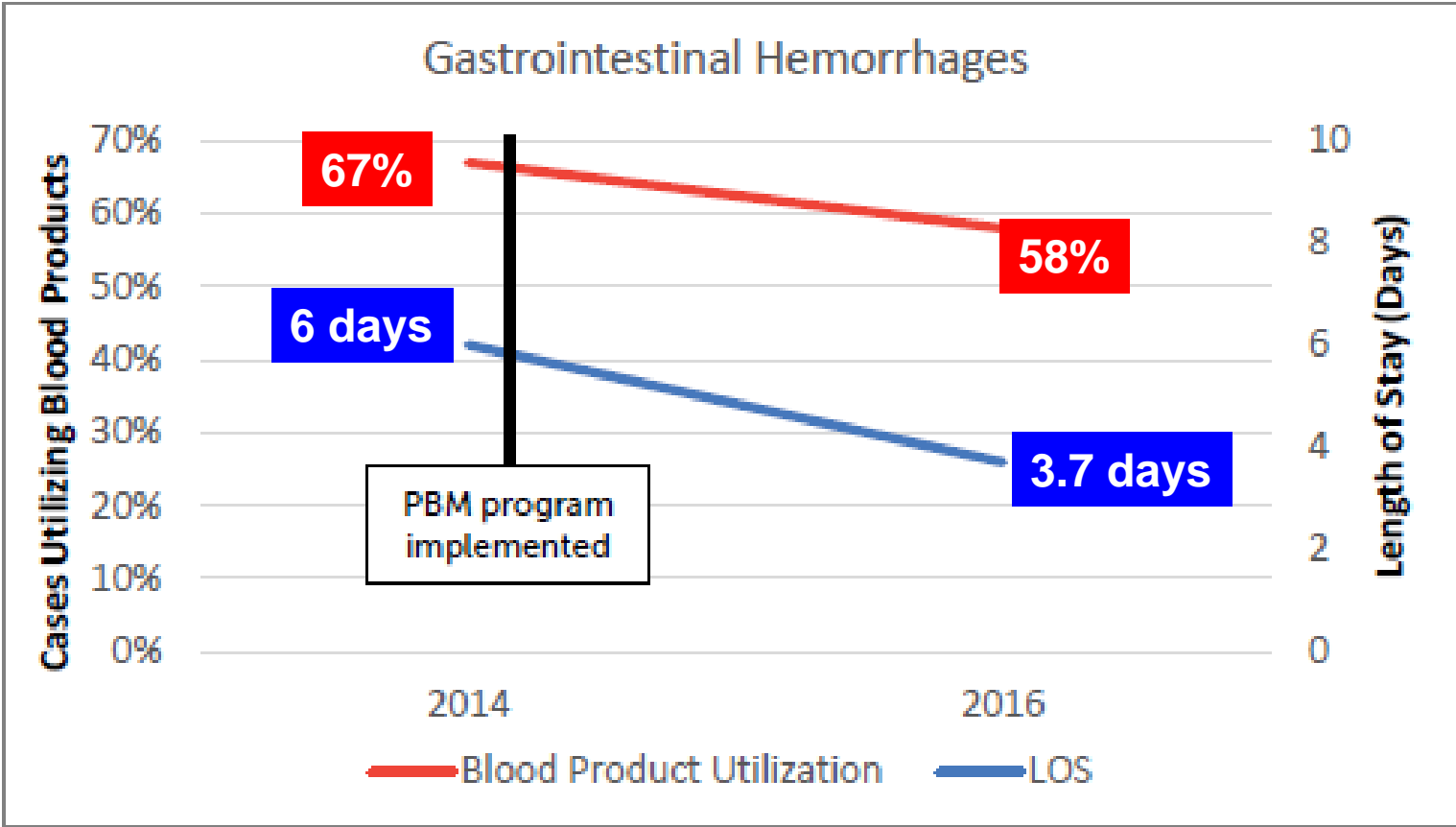
	Mean – BPU*	Mean – LOS**		Mean – BPU*	Mean – LOS**
Traumatic Stupor & Coma: DRG-085			Red Blood Cell Disorders: DRG-811		
Pre-PBM Program (2014)	56% (24/43)	11.3	Pre-PBM Program (2014)	74% (50/68)	7.1
Post-PBM Program (2016)	45% (15/33)	8.2	Post-PBM Program (2016)	68% (39/57)	4.7
Cirrhosis of the Liver: DRG-432			Craniotomy: DRG-025		
Pre-PBM Program	57% (39/68)	9.8	Pre-PBM Program	32% (102/322)	9.7
Post-PBM Program	53% (25/47)	5.8	Post-PBM Program	26% (74/285)	7
Liver Disorders (excluding cancer, cirrhosis, and alcoholism): DRG-442			Wound Debridement & Skin Graft: DRG-464		
Pre-PBM Program	22% (26/119)	8.4	Pre-PBM Program	61% (34/56)	10.9
Post-PBM Program	14% (10/72)	3.9	Post-PBM Program	50% (31/62)	7.5
Renal Failure: DRG-682			Revision of Hip/Knee Replacement: DRG-468		
Pre-PBM Program	30% (49/161)	10.6	Pre-PBM Program (2014)	16% (33/210)	6.1
Post-PBM Program	26% (31/119)	5.6	Post-PBM Program (2016)	11% (20/182)	3.8

Intracranial Hemorrhages



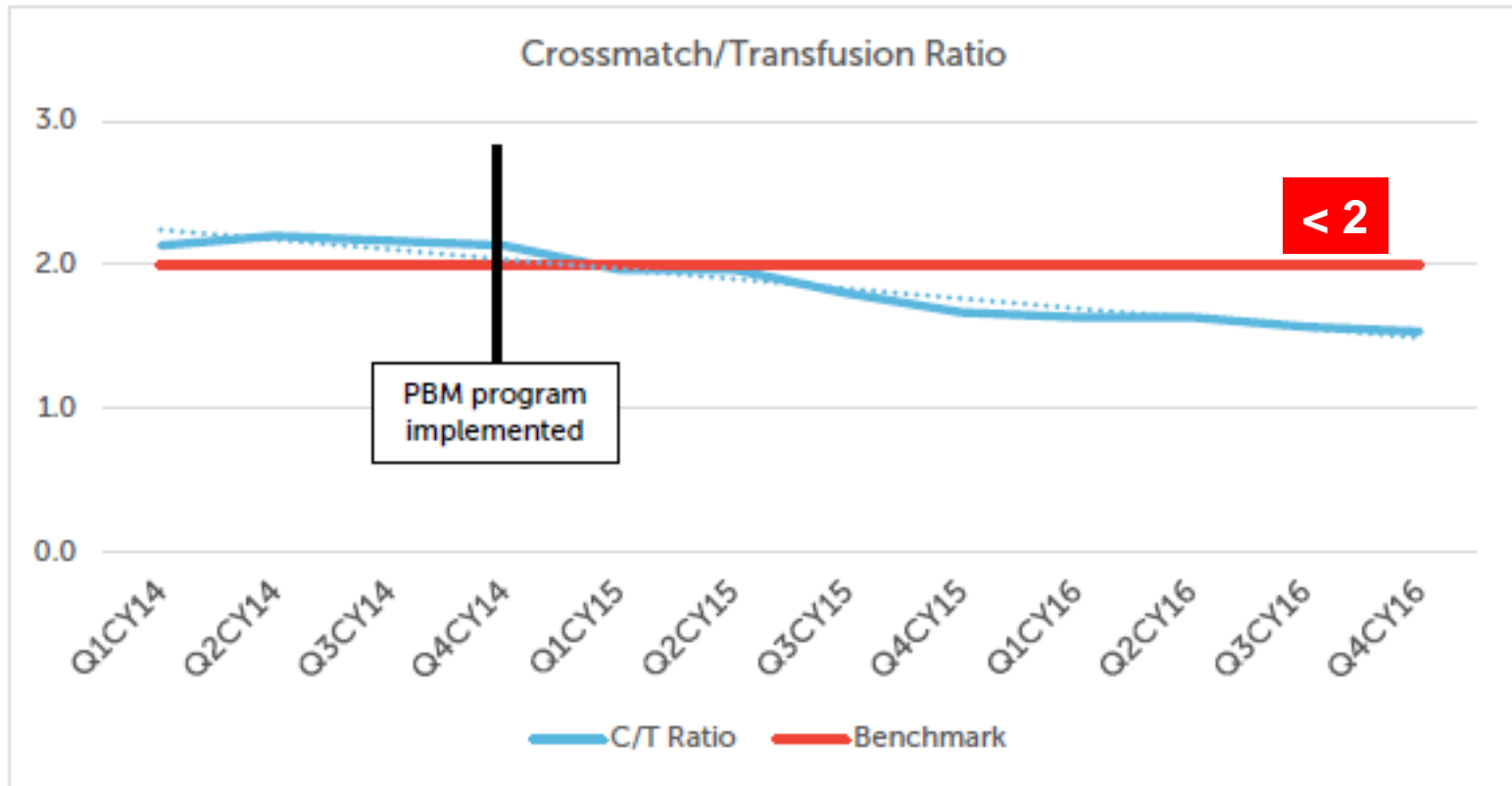
This figure depicts changes in blood product utilization and length of stay pre- and post-implementation of the PBM for patients with a principal diagnosis of DRG-064.

Gastrointestinal Hemorrhages



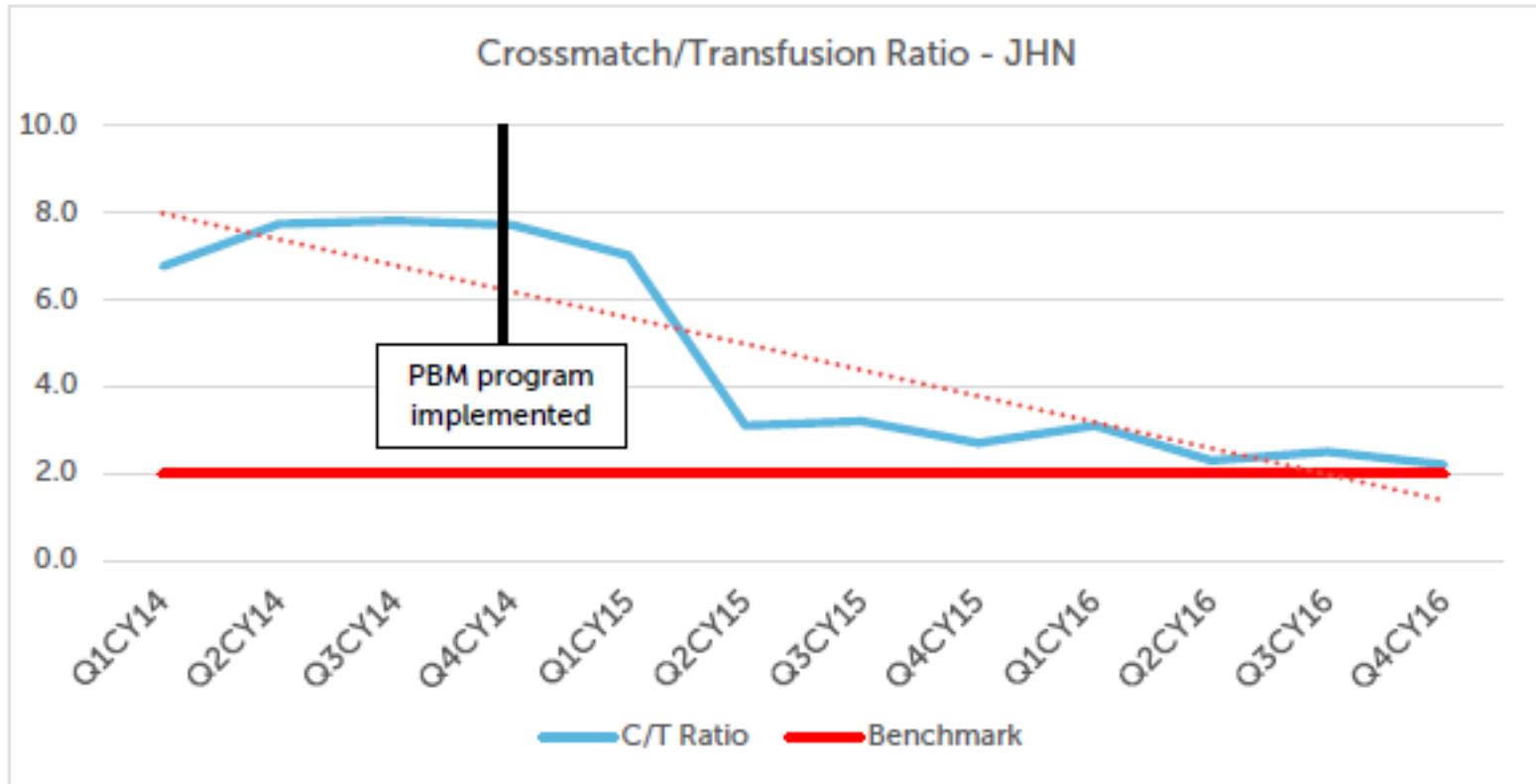
This figure depicts changes in blood product utilization and length of stay pre- & post-implementation of the PBM for patients with a principal diagnosis of DRG-378.

Crossmatch/Transfusion Ratio

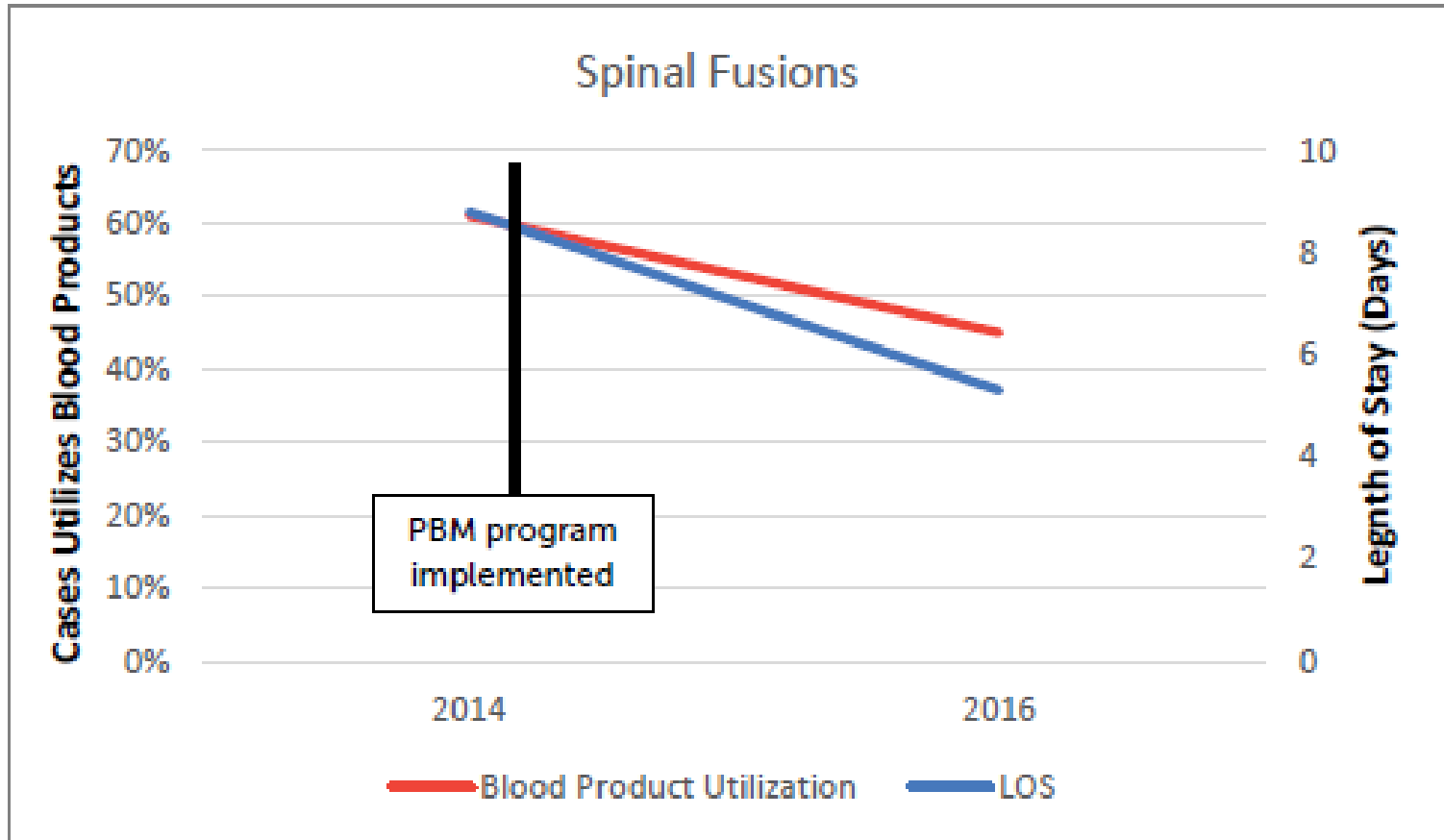


Crossmatch/Transfusion Ratio

Jefferson Hospital Neurosciences

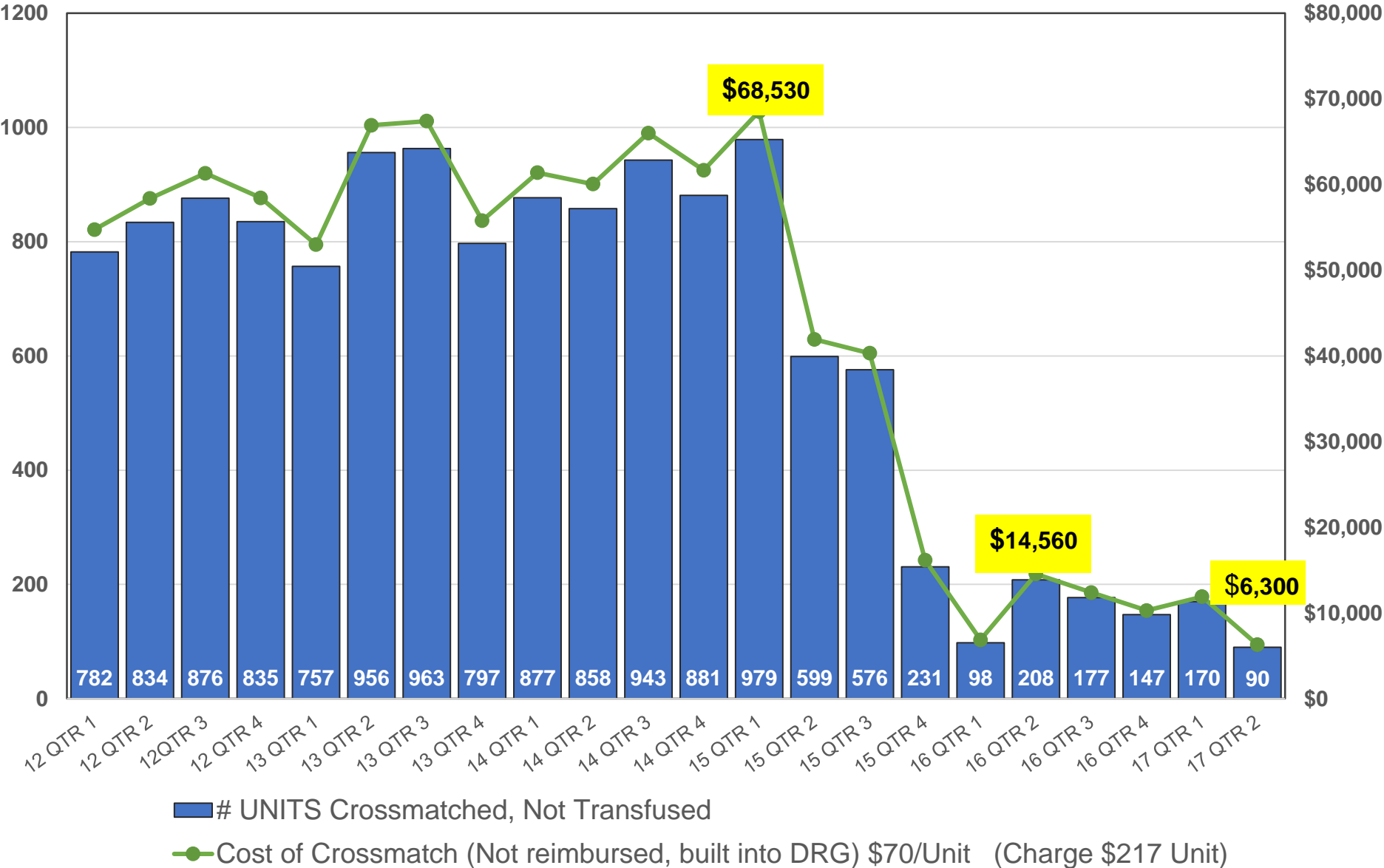


Spinal Fusions



This figure depicts changes in blood product utilization and length of stay pre- and post-implementation of the PBM for patients with a principal diagnosis of DRG-457.

Crossmatch Reduction Cost Savings at Jefferson Neuroscience Hosp and Gibbon Spine Surgeries



Conclusions

Patient Blood Management

- Benefits realized are far greater than shown in these graphs
- Is a recognized specialty with Joint Commission certification
- Has been in existence since the late 90's
- Is inclusive in satisfying cultural and personal beliefs about transfusions
- Functions best as a liaison between clinical areas and the blood bank
- Success is improved with a committed executive sponsorship and dedicated Physician champions/leaders
- Prepares health systems for upcoming “pay for performance” and clarity reporting (CMS, STS, Leapfrog, Crimson, UHC ...) – Fiscally responsible
- Has an easy segue to passive recidivism, no one thinks they're transfusing inappropriately
- Is quite possibly the only Quality Initiative which results in improved outcomes that are beneficial to the Patient, Nurse, MD and Hospital.

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Extra Slides

Table 4. Prevalence of Sepsis in Patients Receiving ABP as Compared to Those Who Did Not

	Sepsis Rates (2016)	95% Con. Interval	P-val.
Patients Receiving ABP	19% (951/5,004)	(13.42%, 15.65%)	0.00
Patients Not Receiving ABP	4.5% (1,417/31,698)		

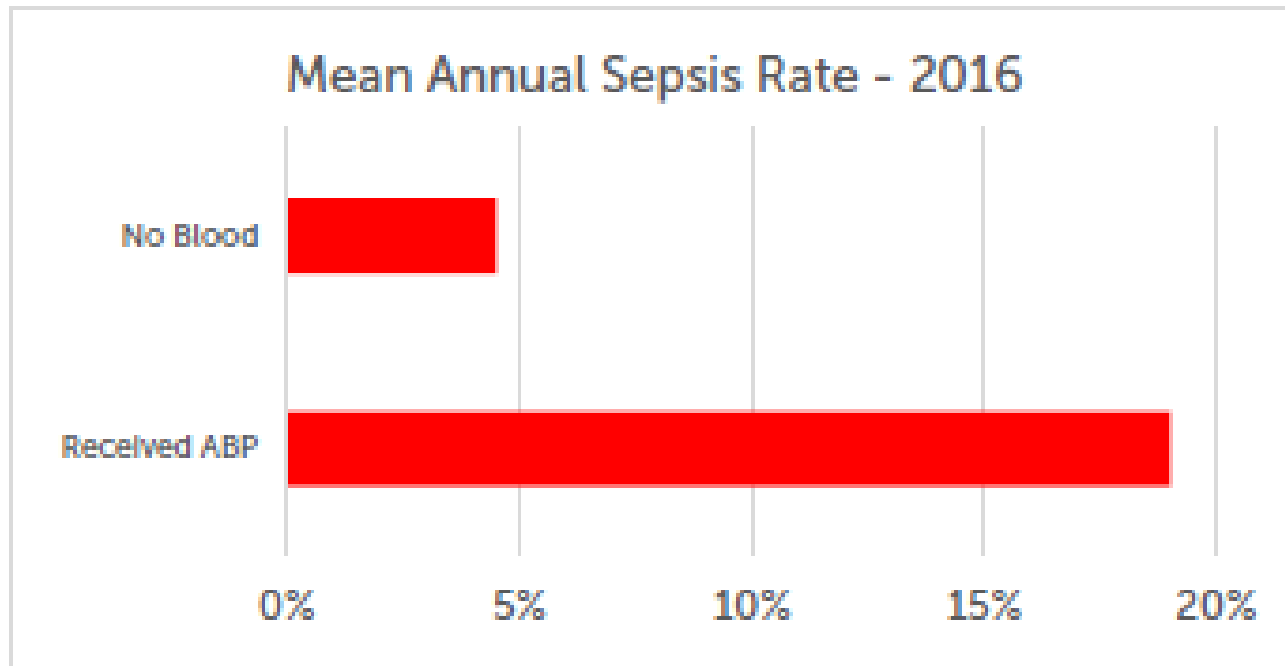
Table 4 and Figure 4A compare the mean sepsis rates in 2016 between patients who received Any Blood Product (ABP) versus those who did not. The data reflects all 2016 inpatients at our Center City, Methodist, and Jefferson Hospital for Neuroscience (JHN) campuses and not a randomized sample.

Table 3. Complication and Infection Rates in Patients Receiving Red Blood Cells (RBC) as Compared to Those Who Did Not

	Infections & Complications* (2016)	95% Con. Interval	P-val.
Patients Receiving RBC	2.5% (79/3,172)	(1.4%, 2.4%)	0.00
Patients Not Receiving RBC	0.6% (187/31,698)		

This table looks at the mean transfusion-associated complication rates in 2016 between patients who received red blood cells versus those who received a different blood product or no blood product at all. The data reflects all 2016 inpatients at our Center City, Methodist, and Jefferson Hospital for Neuroscience (JHN) campuses and not a randomized sample. *Infections and complications include - venous thromboembolism (VTE), C. difficile, disseminated intravascular coagulation (DIC), sepsis, and pneumonia

2016 Sepsis Rates ABP vs None



ABP= Any Blood Product

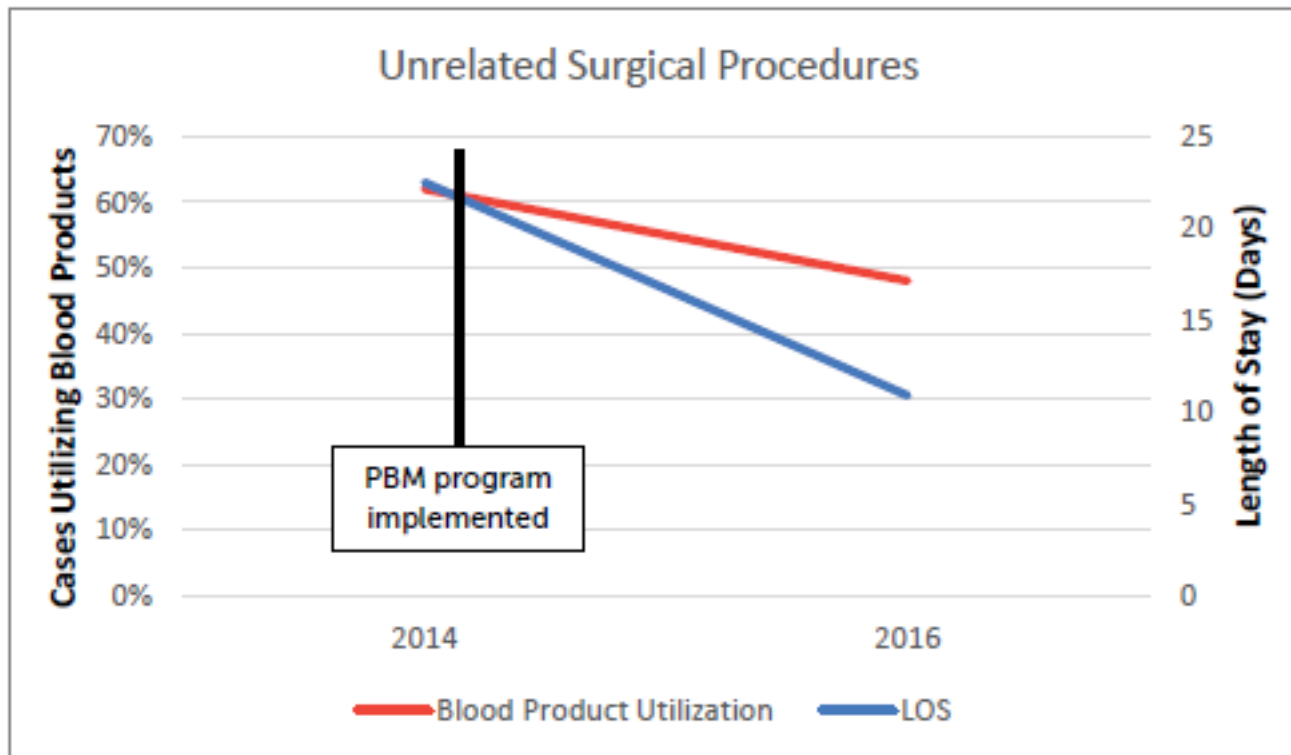
Results

	Mean – BPU*	Mean – LOS**
Traumatic Stupor & Coma: DRG-085		
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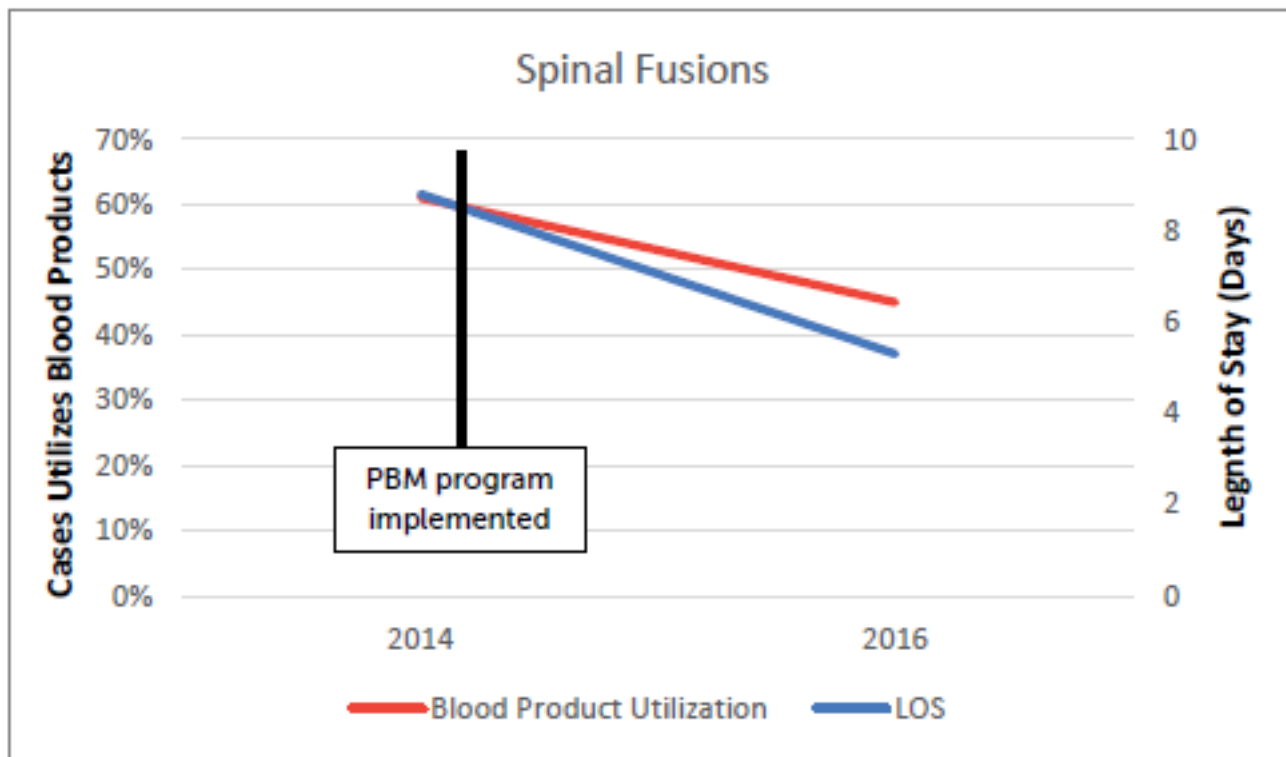
Results

	Mean – BPU*	Mean – LOS**
Red Blood Cell Disorders: DRG-811		
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	Mean – BPU*	95% CI - BPU	P-val. - BPU	Mean – LOS**	95% CI - LOS	P-val. - LOS
GI Hemorrhages: DRG-378						
Pre-PBM Program (2014)	67% (157/234)	(0.25%, 17.62%)	0.045	6	(1.4, 3.4)	0.00
Post-PBM Program (2016)	58% (139/239)			3.7		
Intracranial Hemorrhages: DRG-064						
Pre-PBM Program	28% (110/393)	(01.106%, 12.892%)	0.002	8.4	(0.7, 4.0)	0.01
Post-PBM Program	21% (89/424)			6		
Ext. Unrelated Surgeries: DRG-981						
Pre-PBM Program	62% (49/79)	(-0.813%, 27.224%)	0.04	22.5	(5.0, 18.3)	0.00
Post-PBM Program	48% (58/120)			10.9		
Spinal Fusions: DRG-457						
Pre-PBM Program	61% (39/64)	(-0.306%, 31.705%)	0.042	8.8	(1.2, 5.7)	0.03
Post-PBM Program	45% (38/84)			5.3		

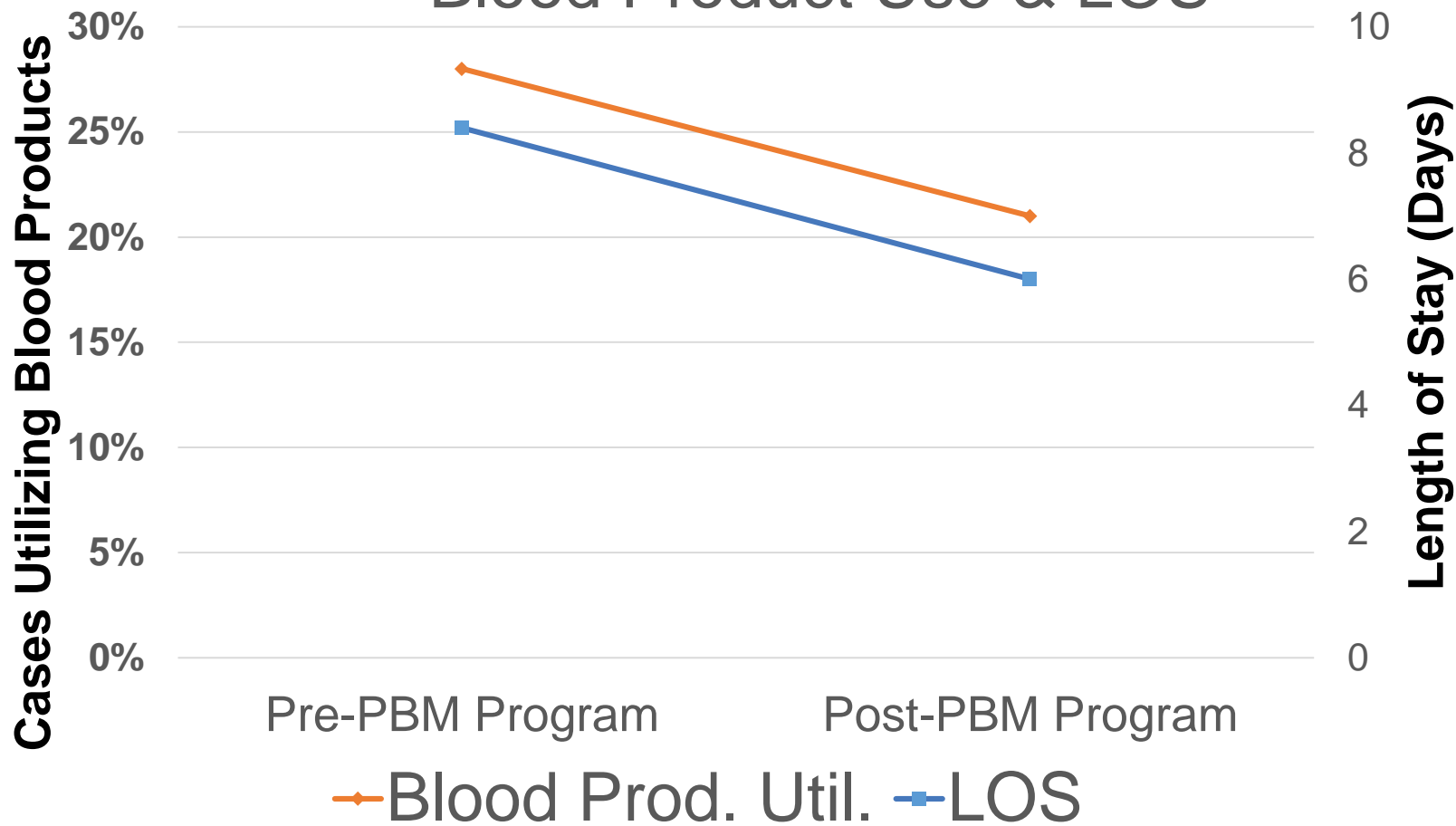


This figure depicts changes in blood product utilization and length of stay pre- and post-implementation of the PBM for patients with a principal diagnosis of DRG-981.



This figure depicts changes in blood product utilization and length of stay pre- and post-implementation of the PBM for patients with a principal diagnosis of DRG-457.

Intracranial Hemorrhages - Decreased Blood Product Use & LOS



Spine Surgery Transfusion and Complications

