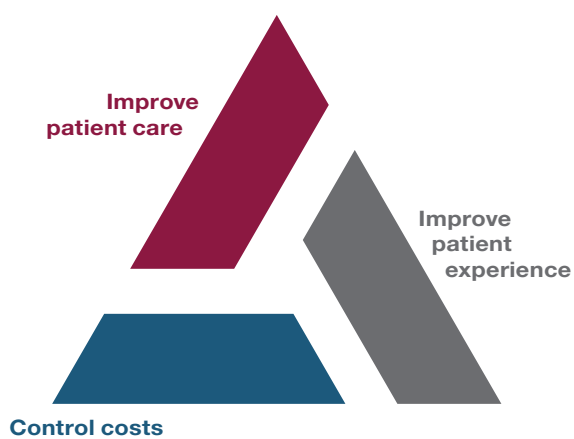


# Clinical and Economic Impact of ROTEM-Guided Patient Blood Management

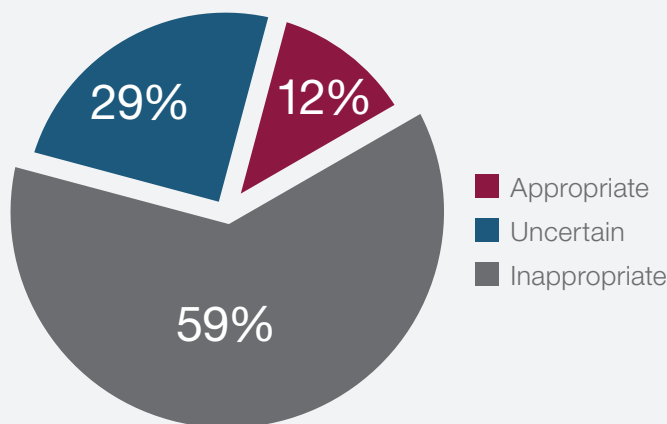


# The problem: **Inappropriate transfusions**

When facing anemia and/or blood loss in patients, many clinicians across different specialties still consider allogeneic blood transfusion the first-line treatment.<sup>1</sup> However, many transfusions are inappropriate, leading to unnecessary costs and complications.

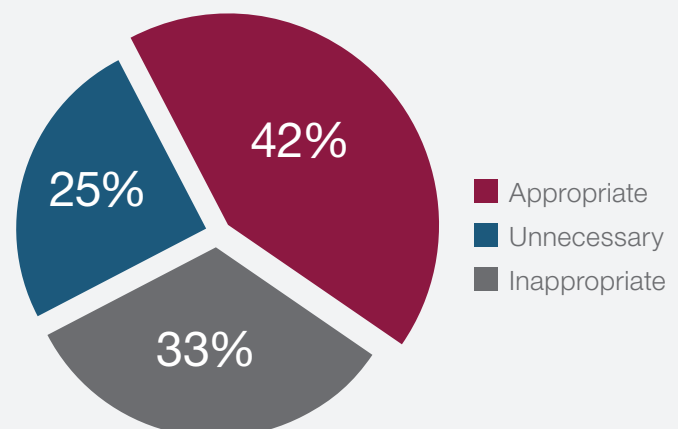
## Red blood cell (RBC) transfusion<sup>2</sup>

- ~60% of allogeneic RBC transfusions are inappropriate and should be avoided<sup>2</sup>
- RBC transfusion is not a hemostatic treatment
  - Bleeding management for coagulopathy requires plasma, specific coagulation factor concentrates, and/or platelet transfusion



## Plasma utilization<sup>3</sup>

- Analyzing plasma utilization demonstrates up to 58% of transfusions are avoidable<sup>3</sup>
- 25% of those are unnecessary, having no beneficial effect on hemostasis<sup>3</sup>



## Transfusions have a negative effect on<sup>4</sup>:

Morbidity and mortality



Hospital length of stay (LOS)



Avoidable complications



Cost



## Why?

### Due to initial clinical decisions often based on:




- Standard laboratory tests offering limited clinical value because of long turnaround time for results
- Generalized clinical experience—which does not allow for a tailored approach

# The solution: **Patient Blood Management (PBM)**

PBM is a multidisciplinary, evidence-based program that optimizes a patient’s own blood volume to reduce inappropriate transfusions.<sup>5</sup> This patient-focused approach enables individual and goal-directed therapy.<sup>6</sup>

## ROTEM testing and the pillars of PBM

ROTEM testing is an integral part of the second pillar of PBM—to minimize blood loss. ROTEM testing allows for the rapid evaluation of coagulopathies, enabling goal-directed therapy that can help stop bleeding and reduce transfusions.<sup>7</sup>

	Pillar 1 Treating anemia 	Pillar 2 Minimizing blood loss 	Pillar 3 Avoiding inappropriate transfusions 
<b>Risk factor</b>	Anemia/iron deficiency	Blood loss and bleeding	Transfusion
<b>Solution</b>	Optimize red cell mass	Minimize blood loss and bleeding	Harness and optimize physiological reserve of anemia
<b>Pre-operative</b>	Identify and treat anemia	Standardize bleeding questionnaire and pre-operative evaluation of coagulation status	Patient-specific management plan for blood conservation
<b>Intra-operative</b>	Time surgeries individually	Point of care (POC)-guided bleeding management with ROTEM in Operating Room and/or Emergency Department	Optimize hemodynamics and oxygenation
<b>Post-operative</b>	Stimulate erythropoiesis	POC-guided bleeding management with ROTEM in Intensive Care Unit	Restrictive transfusion thresholds

Modified from reference 4.

## PBM leads to improved patient outcomes<sup>4</sup>

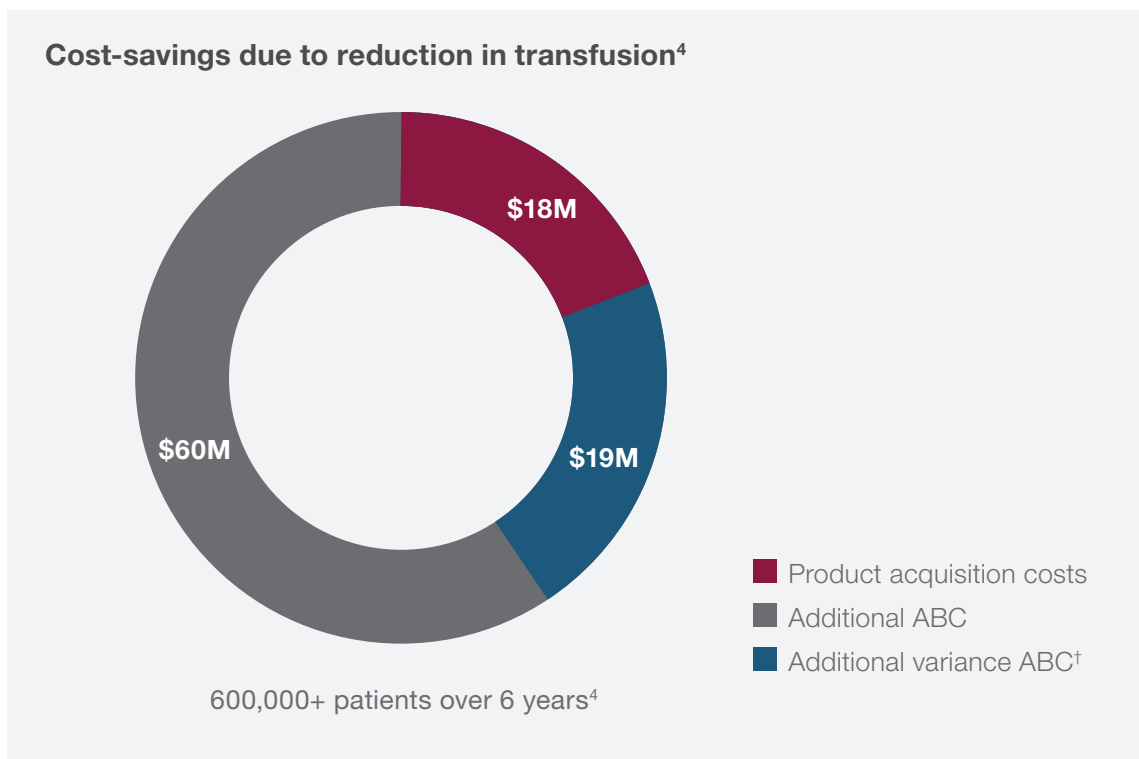
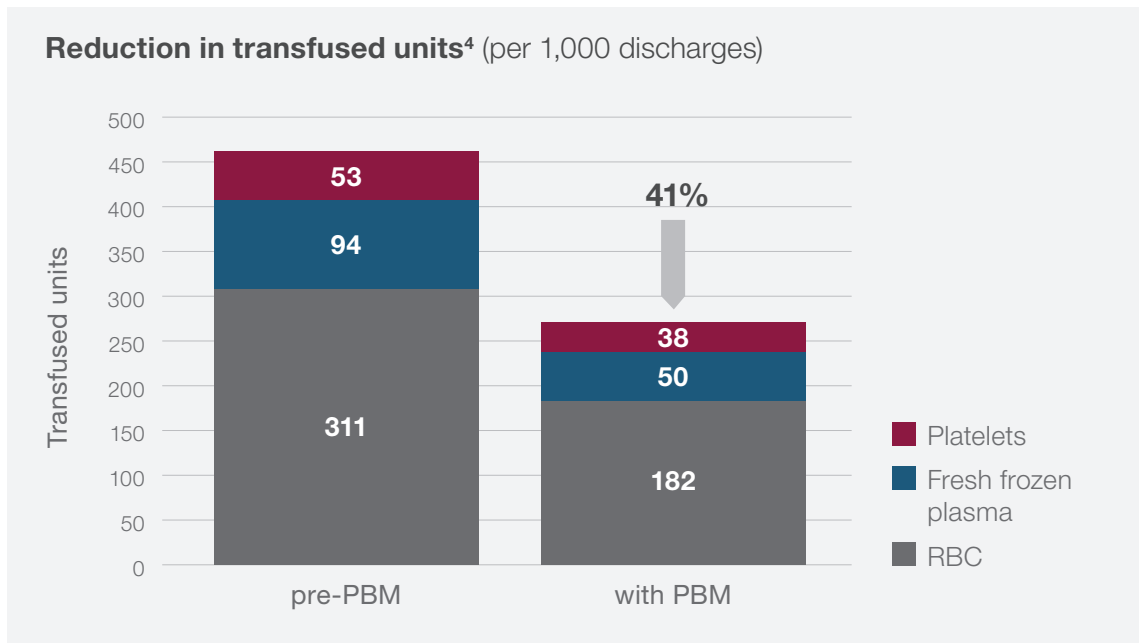


The goal of a PBM program is to **ensure a disease process free of complications** through optimal management of a patient’s own blood volume and avoidance of inappropriate transfusions.

# Reducing inappropriate transfusions can **reduce costs**

## Implementing a PBM program can result in significant blood- and cost-savings.<sup>4</sup>

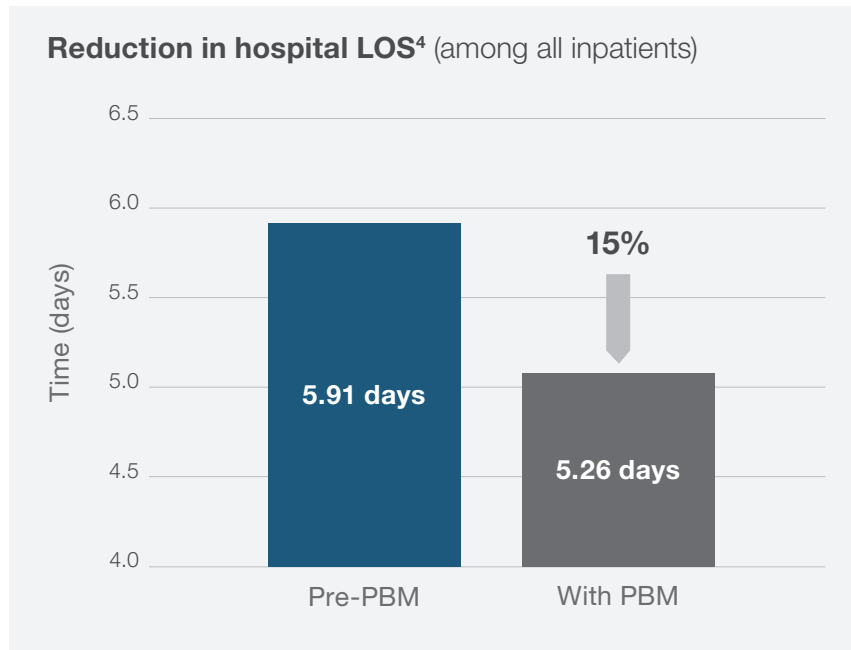
- Reduced transfused units, including all allogeneic blood products
- Cost-savings due to reduction in transfusions, including activity-based costs (ABC) related to products, services, logistics, storage, and personnel



<sup>\*</sup>US dollars.

<sup>†</sup>The gross savings in total ABC over 6 years are estimated to be between USD \$78M and \$97M, accounting for the \$19M variance.

## Implementing a PBM program can reduce length of stay (LOS) and associated costs



**15%**  
Potential reduction in LOS

### Example: Potential hospital cost-savings due to reduction in LOS\*

Average hospital LOS per patient: 5.91 days<sup>†</sup>

#### Implementation of a PBM program

$$0.65 \text{ days reduction in hospital LOS/patient}^{\ddagger} \times \$625 \text{ average cost/bed day}^{\ddagger} = \$406 \text{ average savings/patient}$$

$$1,000 \text{ approximate inpatients/year}^{\S} \times \$406 \text{ average savings/patient} = \$406,000 \text{ potential savings/year}$$

\*US dollars.

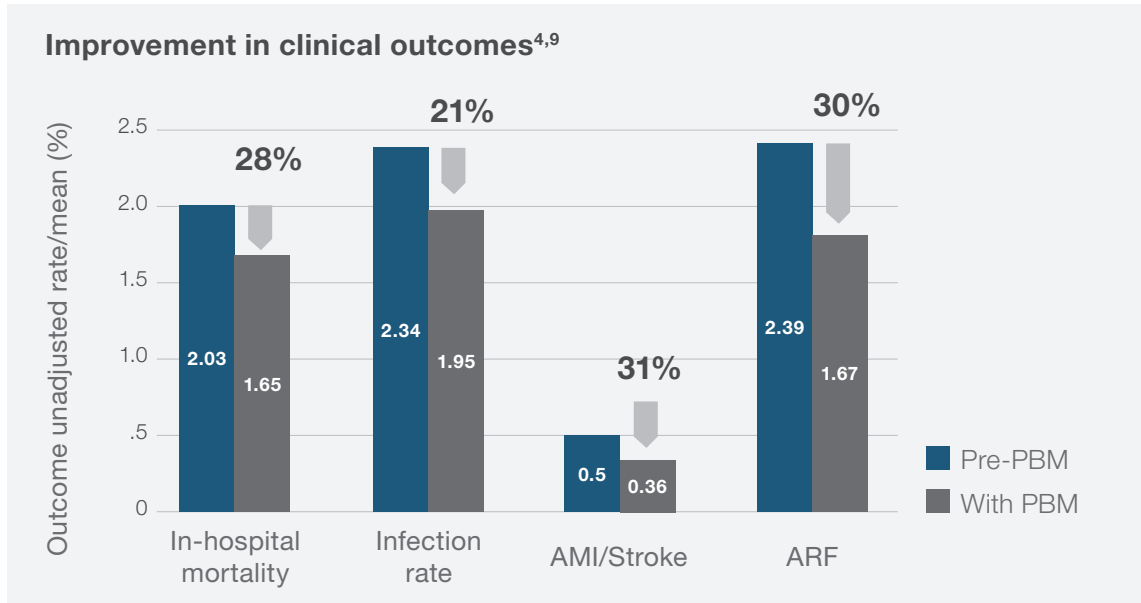
<sup>†</sup>Unadjusted mean, days.<sup>4</sup>

<sup>‡</sup>Calculated mean of all departments, excluding ICU.<sup>8</sup>

<sup>§</sup>Assumes 1,000 inpatients/year.

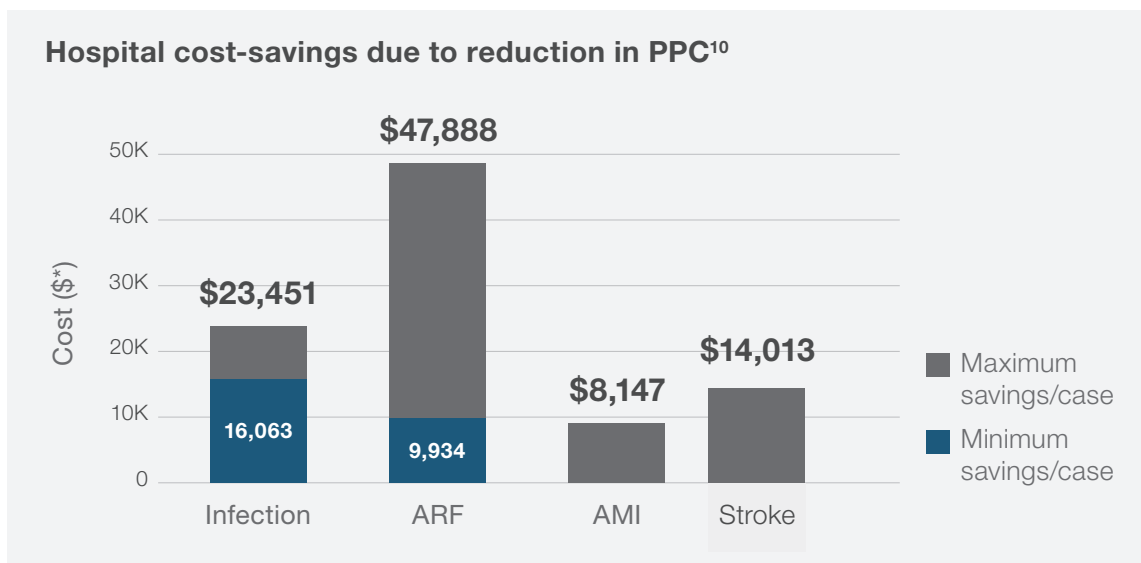
# Reducing inappropriate transfusions may **improve clinical outcomes**

Implementing a PBM program can significantly improve clinical outcomes and reduce potential preventable complications (PPC) and associated costs.\*



Potential reduction in

- In-hospital mortality **28%**
- Infection rate **21%**
- Acute myocardial infarction (AMI)/Stroke **31%**
- Acute renal failure (ARF) **30%**



Potential cost savings in\*

- Infection **\$23,451**
- ARF **\$47,888**
- AMI **\$8,147**
- Stroke **\$14,013**

### Example: Potential hospital cost savings due to infection rate reduction\*

Assumes approximately 1,000 inpatients/year

#### Implementation of a PBM program

$$\begin{array}{ccccccc}
 4 & \times & \$23,451 & = & \$93,804 \\
 \text{less inpatients with} & & \text{maximum costs for} & & \text{potential total} \\
 \text{acquired infections/year}^\dagger & & \text{infections/case}^{10} & & \text{savings/year}
 \end{array}$$

\*US dollars.

†Calculated with unadjusted rate, % data of 2009–2010 and 2013–2014, equaling 0.39% reduction in infection rate.<sup>4</sup>



## Targeted therapy stops the bleeding

ROTEM systems provide whole blood viscoelastic testing for the rapid evaluation of coagulopathies to optimize patient treatment decisions.

- Easy and safe handling
- Advanced diagnostic results
- Fast therapeutic decisions



**ROTEM *sigma***

**ROTEM *delta* with  
ROTEM *platelet***

## ROTEM-guided PBM<sup>7,11</sup>

### Improve patient care

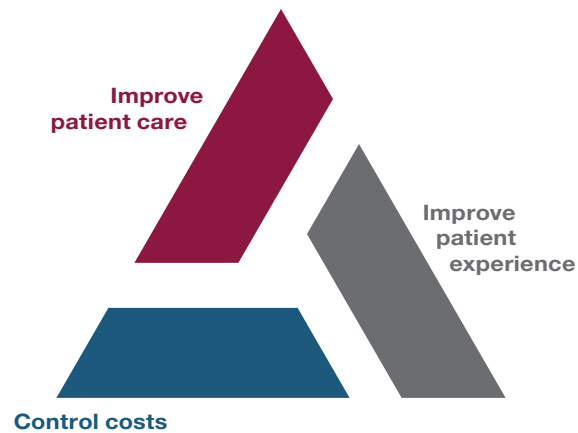
- Fewer adverse events
- Minimized bleeding complications
- Reduced inappropriate transfusions

### Improve patient experience

- Reduced mortality
- Reduced length of stay
- Fewer potential preventable complications

### Control costs

- Decreased costs for blood products
- Fewer transfusions of plasma, RBC and platelets
- Reduced length of stay



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