

# PBM

PatientBloodManagement



**NEW!**  
**40%**  
less blood



**SARSTEDT**

## Patient Blood Management – Issues & Solutions!

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Patient Blood Management (PBM) is a multi-faceted and interdisciplinary treatment concept for improving patient care. The aim is to handle the patient's blood with the greatest possible care, so that the patient's exposure to allogeneic blood or allogeneic blood products in the event of anemia is kept as low as possible. In this way, the development of hospital-acquired anemia should be reduced to a minimum or completely prevented.<sup>1,2,3</sup>

### The PBM concept is based on three key elements:

1. Diagnosis and therapy of pre-operative anemia
2. Reduction of laboratory diagnostic and interventional blood loss
3. Controlled use of erythrocyte concentration and full utilization of individual anemia tolerance

## Laboratory diagnostic blood loss and clinical relevance

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Hospital-acquired anemia has a negative effect on the healing process.

Blood loss is especially high in cardio-surgical patients, patients with coagulation disorders, and in cases of long-term ventilation, e.g. due to the high frequency of blood collections from these patients. Children, the elderly, and patients with a low body weight are particularly affected.

The clinical relevance of diagnostic blood loss is still often underestimated. Related research shows that:

- Critically ill patients lose an average of 40-70 ml of blood a day<sup>4,5</sup> and an average of 300-500 ml<sup>6,7</sup> during a seven-day hospital stay
- > 50% of all intensive care patients are transfused with allogeneic blood products<sup>8,9</sup>
- Diagnostic blood loss correlates with the frequency and severity of hospital-acquired anemia<sup>6,10</sup>

## How can laboratory diagnostic blood loss be reduced?

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Laboratory diagnostic blood loss<sup>3,7</sup> can be reduced by decreasing the sample volume of a blood collection tube to a minimum. Today, smallest amounts in the µl range are required to measure laboratory parameters.

## S-Monovette® PBM - Specially designed for reduced sample volumes

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With the newly designed and innovative S-Monovette® 1.8 ml, Sarstedt offers a blood collection tube with more than 40% less blood volume than traditional tubes. In spite of the reduced volume, the outer tube dimensions conform to the standard dimensions so that this S-Monovette® can be easily adapted to a range of analysers.

1. *Journal Klinikarzt Medizin im Krankenhaus* 44. Jahrgang 3/2015: Patient Blood Management, Georg Thieme Verlag

2. *KVH aktuell* Jahrg. 20, Nr. 3 | September 2015: Kapitel ANÄMIE-SPECIAL Prof. Dr. med. P. Meybohm *Transfusionsmedizin: Richtig handeln bei präoperativer Anämie I-XII*

3. *Patient Blood Management Braun-Scharm und Kollegen, Kapitel 4 Gombotz, Thieme Verlag 1. Auflage 2013*

4. Corwin, et al. *The CRIT study: anemia and blood transfusion in the critically ill: current clinical practice in the United States. Crit Care Med* 32:39-52, 2004.

5. Vincent et al. *Anemia and blood transfusion in critically ill patients. JAMA* 2002, 288: 1499-1507.

6. Salisbury, et al. *Diagnostic blood loss from phlebotomy and hospital-acquired anemia during acute myocardial infarction. Arch Intern Med. Vol 171 (no. 18), Oct 10, 2011.*

7. Steiner et al *Anämie auf einer Intensivstation. Blutentnahmen und Hämoglobinverlauf. Gemeinsame Jahrestagung der Schweizerischen Gesellschaften für Kardiologie, für Pneumologie, für Thoraxchirurgie, und Intensivmedizin Juni 2006*

8. Corwin, et al. *RBC transfusion in the ICU: is there a reason? Chest* 108:767-771, 1995.

9. Rao, et al. *Blood component use in critically ill patients. Anesthesia* 57:530-551, 2002.

10. Becquet, et al. *Respective effects of phlebotomy losses and erythropoietin treatment on the need for blood transfusion in very premature infants. BMC Pediatrics* 13:176-182, 2013.

## S-Monovette® with reduced volume - advantages for the patient

- Significantly reduced laboratory diagnostic blood loss
- Reduced hospital-acquired anemia
- Improved patient outcome

Citrate

Citrate PBM

Standard

Reduced



3.0 ml

1.8 ml

Blood Gas

Serum-Gel

EDTA

Standard

Reduced

Standard

Reduced

Standard

Reduced



2.0 ml

1.0 ml



7.5 ml

4.0 ml



2.7 ml

1.6 ml

## Typical intensive care patient



		Current Sample Volumes		Reduced Sample Volumes	
Hospitalization		1 day	14 days	1 day	14 days
Preparation	Serum/Plasma	1 x 7.5 ml	14 x 7.5 ml = 105 ml	4 ml	14 x 4 ml = 56 ml
	EDTA	1 x 2.7 ml	14 x 2.7 ml = 37.8 ml	1.6 ml	14 x 1.6 ml = 22.4 ml
	Citrate	1 x 3 ml	14 x 3 ml = 42 ml	1.8 ml	14 x 1.8 ml = 25.2 ml
	Blood Gas	6 x 2 ml	14 x 12 ml = 168 ml	6 ml (6 x 1 ml)	14 x 6 ml = 84 ml
<b>Total</b>		<b>25.2 ml</b>	<b>352.8 ml</b>	<b>13.4 ml</b>	<b>187.6 ml</b>

## Example of a typical University Clinic in Germany

Number of samples/year	Preparation	Typical sample volume	Reduced sample volume	Saved blood volume/tube	Saved blood volume/year	Saved blood in %
380,000	Serum	7.5 ml	4.0 ml	3.5 ml	1,330,000 ml	47 %
400,000	EDTA	2.7 ml	1.6 ml	1.1 ml	440,000 ml	41 %
250,000	Citrate	3.0 ml	1.8 ml	1.2 ml	300,000 ml	40 %
360,000	Blood Gas	2.0 ml	1.0 ml	1.0 ml	360,000 ml	50 %
<b>Total</b>		<b>5,400,000 ml</b>	<b>2,970,000 ml</b>	<b>6.8 ml</b>	<b>2,430,000 ml</b> <b>= 2,430 liters</b>	<b>Ø = 45 %</b>

In one year, about 2,430 L blood can be saved and patients' lives can be protected.

## Ordering information

Preparation	Volume	Length/Ø	Order No. based on BS 4851 (EU-Code)	Order No. based on ISO 6710 (US-Code)
Citrate 9NC 3.2%	1.8 ml	75 x 13 mm	04.1955.001 	04.1955.100 
EDTA K <sub>3</sub> E	1.6 ml	66 x 11 mm	05.1081.001 	05.1081.100 
Serum-Gel	4.0 ml	75 x 13 mm	04.1925/04.1925.001 	
Blood Gas	1.0 ml	66 x 11 mm	05.1146/05.1146.020*	

\* ind. wrapped, sterile

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