

# The State of Play of Patient Blood Management: Globally and in Selected European Countries

COLLOQUE PBM, Paris, Oct. 18, 2023



THE UNIVERSITY OF  
**WESTERN  
AUSTRALIA**

International Foundation for  
Patient Blood Management



Dr. Axel Hofmann, ME

Professor | Faculty of Health and Medical Sciences | Division of Surgery | University of Western Australia

Chair | World Health Organization External Steering Committee on the Implementation of Patient Blood Management

Board Member IFPBM | Basel | Switzerland

## Disclaimer

Dr Hofmann has received fees, honoraria or travel for consulting or lecturing from the following companies and legal entities:

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- European Commission/Austrian Institute of Technology, Austria
- Hong Kong Health Authority, China
- Nova Scotia Health Authority, Canada
- Ospedale Lugano, Switzerland
- Royal Brisbane Women's Hospital Foundation, Queensland, Australia
- United States Department of Health and Human Services, Washington, USA
- University Hospital Zurich, Switzerland
- Western Australia Department of Health, Australia

### BLOOD SERVICES

- Australian Red Cross Blood Service, Australia
- National Blood Authority, Australia
- Saudi Society of Blood Transfusion Medicine & Services
- South African National Blood Service, South Africa

### PROFESSIONAL SOCIETIES & NGOs

- Brazilian Society of Anesthesiology (SBA)
- Colombian Society of Anesthesiology
- International Foundation for Patient Blood Management (IFPBM), Switzerland
- Korean Society of Anesthesiology
- Korean Surgical Society
- Mexican College of Internal Medicine
- Network for the Advancement of PBM, Haemostasis and Thrombosis (NATA), France
- Society for the Advancement of Blood Management (SABM), USA
- Società Scientifica dei Medici Legali delle Aziende Sanitarie del Servizio Sanitario Nazionale, Italy
- World Heart Federation, Geneva, Switzerland

### INDUSTRY

- Amgen, Switzerland
- Austrian Institute of Technology
- BBraun Melsungen AG, Germany
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- Celgene/Bristol Myers Squibb, Belgium
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- Fresenius Kabi, Germany
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- Janssen Cilag, Belgium
- Novo Nordisk, Denmark
- Ortho Biotech, USA
- PBMe Solutions, Switzerland
- Plasma Protein Therapeutics Association (PPTA), USA
- Swiss Medical Network, Switzerland
- Takeda, South Africa
- UCB Pharma, China
- Vifor Fresenius Medical Care Renal Pharma, Switzerland
- Vifor International, Switzerland

2010

# WHO ENDORSEMENT of PATIENT BLOOD MANAGEMENT



## Sixty-third World Health Assembly

**Date:** 17-21 May 2010

**Location:** Geneva, Switzerland

### WHA63.12 adopted by resolution May 21, 2010:

“Bearing in mind that patient blood management means that before surgery every reasonable measure should be taken to optimize the patient’s own blood volume, to minimize the patient’s blood loss and to harness and optimize the patient-specific physiological tolerance of anaemia following WHO’s guide for optimal clinical use (three pillars of patient blood management)”

#### Pillar 1:

Optimizing the patient’s own blood volume

#### Pillar 2:

Minimizing the patient’s blood loss

#### Pillar 3:

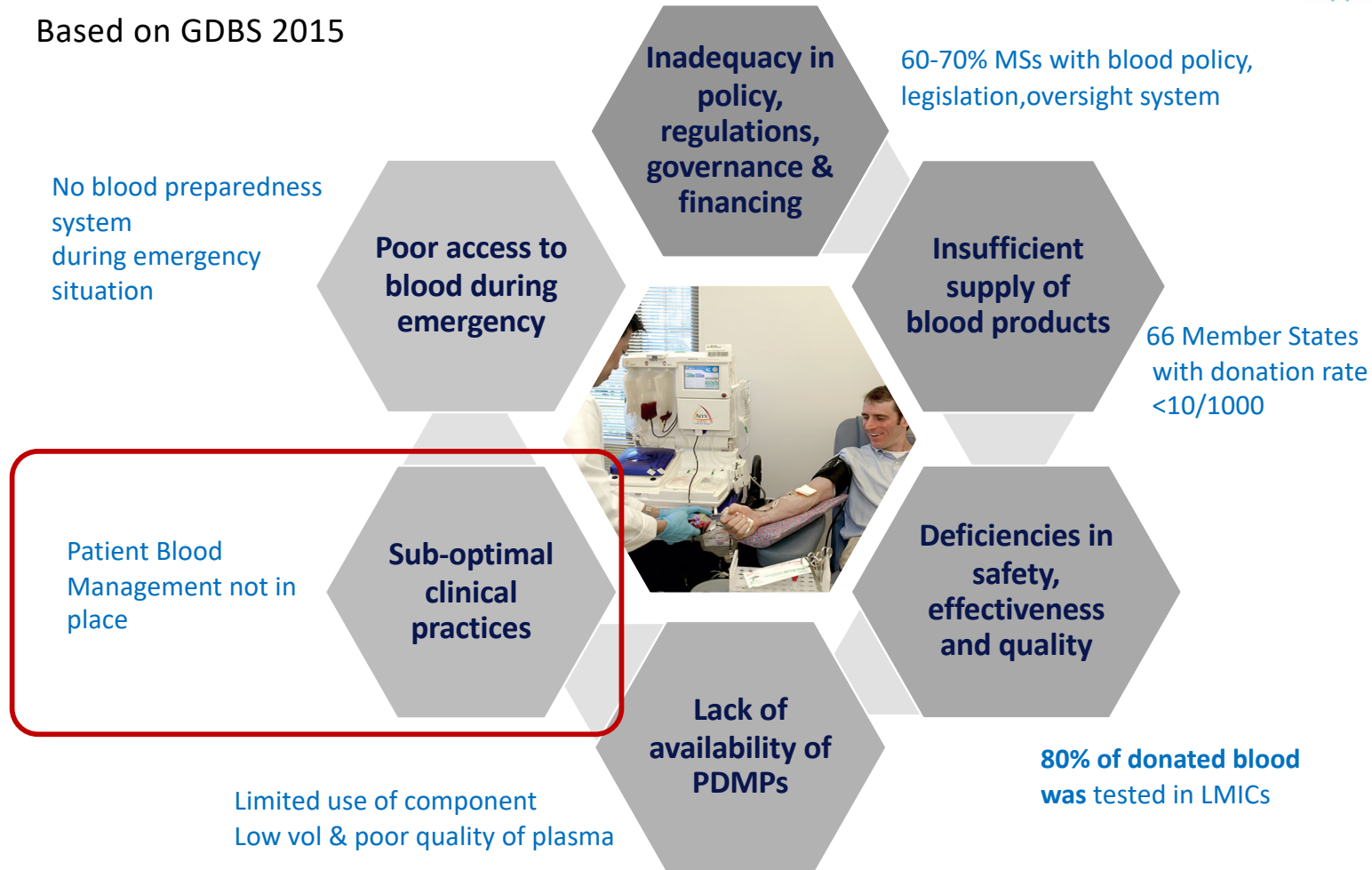
Optimizing the patient-specific physiological tolerance of anaemia

2015

# CHALLENGES IN BLOOD SERVICES



Based on GDBS 2015



Slide: Courtesy of Dr. Yuyun Maryuningsih  
Team Lead Blood and other Products of Human Origin, WHO

2020

## WHO's EXTERNAL STEERING COMMITTEE for PATIENT BLOOD MANAGEMENT IMPLEMENTATION



Prof. Neil Blumberg



Dr. Irwin Gross  
Co-Chair



Prof. Jeff Hamdorf



Prof. Axel Hofmann  
Chair



Prof. James Isbister



Prof. Aryeh  
Shander

Tasked with the development of

- Patient Blood Management Policy Brief
  - Patient Blood Management Implementation Guidance,
- supported by 70+ international PBM experts



Action framework to advance universal access to safe, effective and quality-assured blood products

2020–2023

The six strategic objectives are:

- 1 an appropriately structured national blood system;
- 2 an appropriate national standards and quality assessment programmes;
- 3 functioning and efficient national blood systems;
- 4 effective implementation of national blood systems;
- 5 effective surveillance, accurate data collection and analysis;
- 6 partnerships, collaboration and joint action to address challenges and emerging threats at global, regional and national levels.

Optimal Blood Use

national blood system;  
standards and quality assessment

*patient outcomes*  
~~real practice of transfusion;~~

ed by comprehensive and

orities and jointly address

PBM

The six strategic objectives are:

- 1 an appropriately structured, well coordinated and sustainably resourced national blood system;
- 2 an appropriate national framework of regulatory controls, national standards and quality assessment programmes;
- 3 functioning and efficiently managed blood services;
- 4 effective implementation of patient blood management to optimize *patient outcomes* ~~clinical practice of transfusion~~;
- 5 effective surveillance, haemovigilance and pharmacovigilance, supported by comprehensive and accurate data collection systems;
- 6 partnerships, collaboration and information exchange to achieve key priorities and jointly address challenges and emerging threats at global, regional and national levels.

**PBM**

# Why is this distinction important?

	PREOP	INTRAOP	POSTOP
PREOP	<ul style="list-style-type: none"> <li>• Detect anemia</li> <li>• Identify underlying disorders causing anemia</li> <li>• Monitor bleeding</li> <li>• Treat underlying iron deficiency</li> <li>• Assess transfusion requirements</li> <li>• Assess for coagulopathy</li> <li>• Assess for other hemostatic abnormalities</li> <li>• Plan transfusion by a transfusionist for elective surgery</li> </ul>	<ul style="list-style-type: none"> <li>• Identify and manage bleeding risk</li> <li>• Minimize iatrogenic blood loss</li> <li>• Prevent platelet and relevant factor depletion</li> </ul>	<ul style="list-style-type: none"> <li>• Assess/optimize patient's physiological reserve and risk factors</li> <li>• Complete extended blood loss with patient-specific transfusion blood loss</li> <li>• Formulate patient-specific management plan using appropriate blood conservation modalities to minimize blood loss, optimize red cell mass and manage anemia</li> </ul>
INTRAOP	<ul style="list-style-type: none"> <li>• Fine-tune surgery with hemostatic optimization</li> </ul>	<ul style="list-style-type: none"> <li>• Multicenter hemostatic and surgical techniques</li> <li>• Blood-sparing surgical devices</li> <li>• Assessable blood conservation strategies</li> <li>• Autologous blood salvage</li> <li>• Platelet transfusions</li> <li>• Pharmacologic hemostatic agents</li> </ul>	<ul style="list-style-type: none"> <li>• Optimize cardiac output</li> <li>• Optimize ventilation and oxygenation</li> </ul>
POSTOP	<ul style="list-style-type: none"> <li>• Optimize erythropoiesis</li> <li>• In areas of drug interactions that can increase anemia</li> </ul>	<ul style="list-style-type: none"> <li>• Vigilant monitoring and management of post-operative bleeding</li> <li>• Avoid secondary hemostasis</li> <li>• Fluid-sparing / fluidless transfusion (active hypothermia specifically indicated)</li> <li>• Autologous blood salvage</li> <li>• Minimize iatrogenic blood loss</li> <li>• Hemostatic optimization management</li> <li>• Prophylaxis of upper GI hemorrhage</li> <li>• Avoid/reduce sedation</li> <li>• Be aware of adverse effects of medication</li> </ul>	<ul style="list-style-type: none"> <li>• Optimize anemia rescore</li> <li>• Minimize organ delivery</li> <li>• Minimize oxygen consumption</li> <li>• Avoid/reduce sedation</li> <li>• Restorative transfusion thresholds</li> </ul>

Perioperative multidisciplinary multimodal patient-specific team approach

Aiming for **FIXED LAB-VALUES** (hb, INR, plt count) through administration of **allogeneic blood components**

Optimal Blood Use

Aiming for **BLOOD HEALTH** through etiology-specific treatment of anemia, blood loss and coagulopathy

**PBM**



**PATIENT FOCUS**





# Why is this distinction important?

	PREOP	INTRAOP	POSTOP
PREOP	<ul style="list-style-type: none"> <li>• Detect anemia</li> <li>• Identify underlying disorders causing anemia</li> <li>• Assess for further evaluation if necessary</li> <li>• Treat underlying iron deficiency</li> <li>• Assess for coagulopathy</li> <li>• Assess for transfusion requirements</li> <li>• Plan transfusion in a coordinated fashion</li> </ul>	<ul style="list-style-type: none"> <li>• Identify and manage bleeding risk</li> <li>• Minimize iatrogenic blood loss</li> <li>• Prevent platelet and relevant factor dysfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Assess/optimize patient's physiological reserve and risk factors</li> <li>• Correct coagulopathy</li> <li>• Formulate patient-specific management plan using appropriate blood conservation modalities to minimize blood loss, optimize red cell mass and manage anemia</li> </ul>
INTRAOP	<ul style="list-style-type: none"> <li>• Fine-tune surgery with hemostatic techniques</li> </ul>	<ul style="list-style-type: none"> <li>• Multicenter hemostatic and surgical techniques</li> <li>• Blood-sparing surgical devices</li> <li>• Anesthetics blood conserving strategies</li> <li>• Autologous blood salvage</li> <li>• Platelet transfusions</li> <li>• Pharmacologic hemostatic agents</li> </ul>	<ul style="list-style-type: none"> <li>• Optimize cardiac output</li> <li>• Optimize ventilation and oxygenation</li> </ul>
POSTOP	<ul style="list-style-type: none"> <li>• Optimize erythropoiesis</li> <li>• In areas of drug interactions that can increase anemia</li> </ul>	<ul style="list-style-type: none"> <li>• Vigilant monitoring and management of post-operative bleeding</li> <li>• Avoid secondary hemostatic defects</li> <li>• Fluid-sparing / fluidless transfusion (active hypothermia specifically indicated)</li> <li>• Autologous blood salvage</li> <li>• Minimize iatrogenic blood loss</li> <li>• Hemostatic/anticoagulation management</li> <li>• Prophylaxis of upper GI bleeding/bleeds</li> <li>• Avoid/limit sedation/analgesia</li> <li>• Be aware of adverse effects of medications</li> </ul>	<ul style="list-style-type: none"> <li>• Optimize anemia response</li> <li>• Minimize oxygen delivery</li> <li>• Minimize oxygen consumption</li> <li>• Avoid/limit sedation/analgesia</li> <li>• Restorative transfusion thresholds</li> </ul>

Perioperative multidisciplinary multimodal patient-specific team approach

Aiming for **FIXED LAB-VALUES** (hb, INR, plt count) through administration of **allogeneic blood components**

Optimal Blood Use

Aiming for **BLOOD HEALTH** through etiology-specific treatment of anemia, blood loss and coagulopathy

**PBM**



Bundle of care: diagnosis, therapy and follow-up



# Global State of Play?



[I]nappropriate rates of RBC transfusion of 22-57% in a variety of clinical settings, including **hospitalised inpatients, operative units,** and emergency departments

*Mehta N. et al. Reducing unnecessary red blood cell transfusion in hospitalised patients. BMJ. Apr 6 2021;373:n830.*

[P]latelet usage does **not** appear to be **concordant with ... guidelines**

*Goel R. et al. Platelet transfusion practices in immune thrombocytopenia related hospitalizations. Transfusion. Jan 2019;59(1):169-176.*

Critically ill patients ... **more likely to receive blood** for major bleeding at **night**

*Aubron C. et al. Day or overnight transfusion in critically ill patients: does it matter? Vox Sang. Apr 2018;113(3):275-282*

[W]ide variations in blood product transfusion practices .... **in patients with AL**

*Pine A.B. et al. Wide variations in blood product transfusion practices among providers who care for patients with acute leukemia in the United States. Transfusion. Feb 2017;57(2):289-295.*

[D]iscernible **variability** in the current practice of blood utilization for a given procedure ..., with no changes in practice patterns for the last decade of **paediatric cardiac surgery.**

*Karimi M. et al. National trends and variability in blood utilization in paediatric cardiac surgery. Interact Cardiovasc Thorac Surg. Jun 1 2017;24(6):938-943.*

**16.8-fold difference in adjusted blood transfusion rates across surgeons** and a **13.2-fold difference [] across hospitals.**

*Aquina C.T. et al. Large Variation in Blood Transfusion Use After Colorectal Resection: A Call to Action. Dis Colon Rectum 2016;59(5):411-418*

The **median lowest Hb level** on days with an **RBC transfusion [during ICU stays]** ranged from **5.2 g/dL to 13.1 g/dL across centers,** from **5.3 g/dL to 9.1 g/dL across countries,** and from **7.2 g/dL to 8.7 g/dL across continents.**

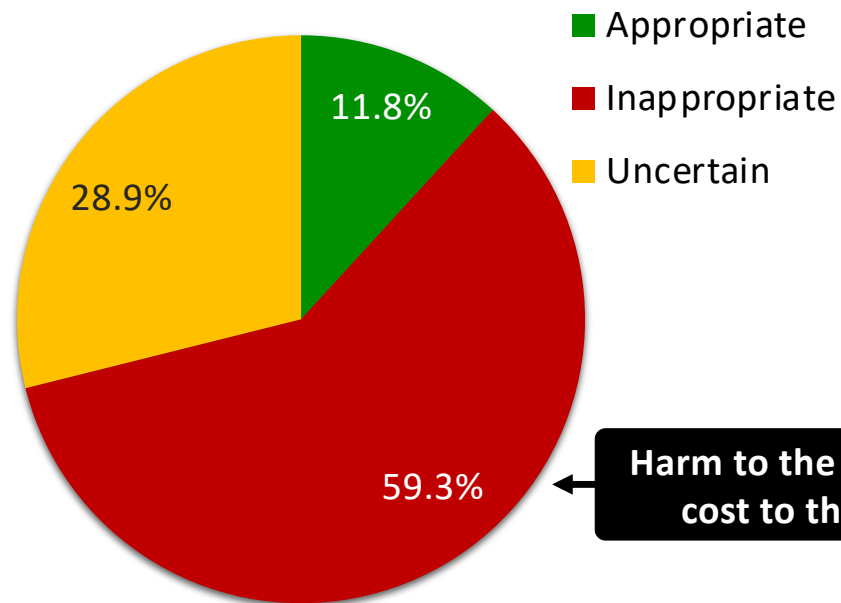
*Raasveld S.J. et al. Red Blood Cell Transfusion in the Intensive Care Unit. JAMA. Oct 12, 2023*

# Global State of Play?

*Transfusion Medicine Reviews*, Vol 25, No 3 (July), 2011: pp 232-246.e53

## Appropriateness of Allogeneic Red Blood Cell Transfusion: The International Consensus Conference on Transfusion Outcomes

Aryeh Shander, Arlene Fink, Mazyar Javidroozi, Jochen Erhard, Shannon L. Farmer, Howard Corwin, Lawrence Tim Goodnough, Axel Hofmann, James Isbister, Sherri Ozawa, and Donat R. Spahn, for the International Consensus Conference on Transfusion Outcomes Group



Optimal  
Blood Use

~50\*  
MILLION  
patients  
transfused

*\*Estimate based based on Roberts N et al. Lancet Haematol. 2019;6(12):e606-e615; Kim et al., Annals of Laboratory Medicine, 2013; Borkent-Raven et al., Vox Sang 2010; PROTON Study Denmark, Sweden, Edgren et al. Transfusion 2015*

Harm to the patient and  
cost to the system

# Global State of Play? ←

EDITORIAL

## Precision in Transfusion Medicine

Matthew D. Neal, MD; Beverley J. Hunt, MD

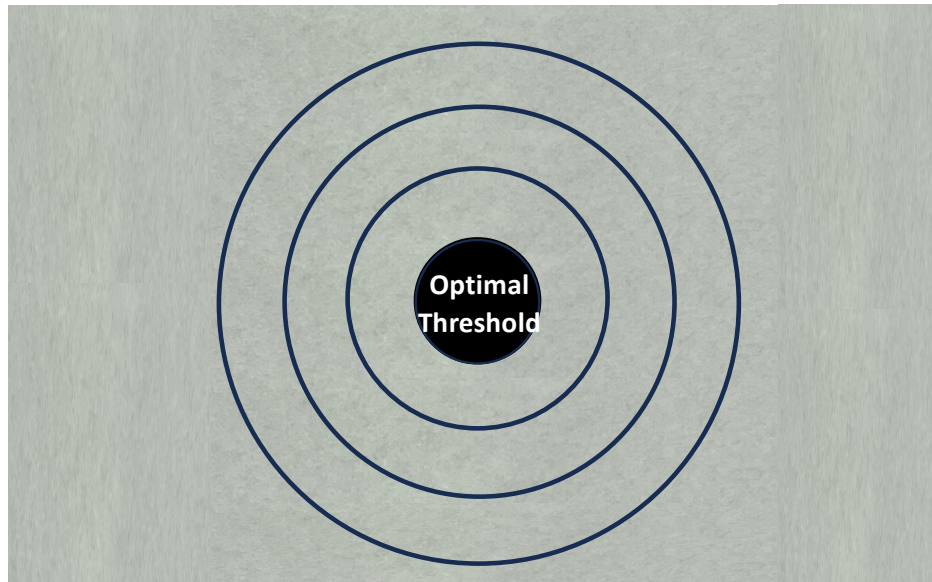
JAMA. Oct 12, 2023

Optimal  
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Good  
Luck!



# Global State of Play? ←

**Bloody,  
Dangerous  
Culture!**

**Optimal  
Blood Use**

**~50\***  
MILLION  
patients  
transfused

*\*Estimate based based on Roberts N et al. Lancet Haematol. 2019;6(12):e606-e615; Kim et al., Annals of Laboratory Medicine, 2013; Borkent-Raven et al., Vox Sang 2010; PROTON Study Denmark, Sweden, Edgren et al. Transfusion 2015*

July 25, 1990

## **Influence of Clinical Knowledge, Organizational Context, and Practice Style on Transfusion Decision Making**

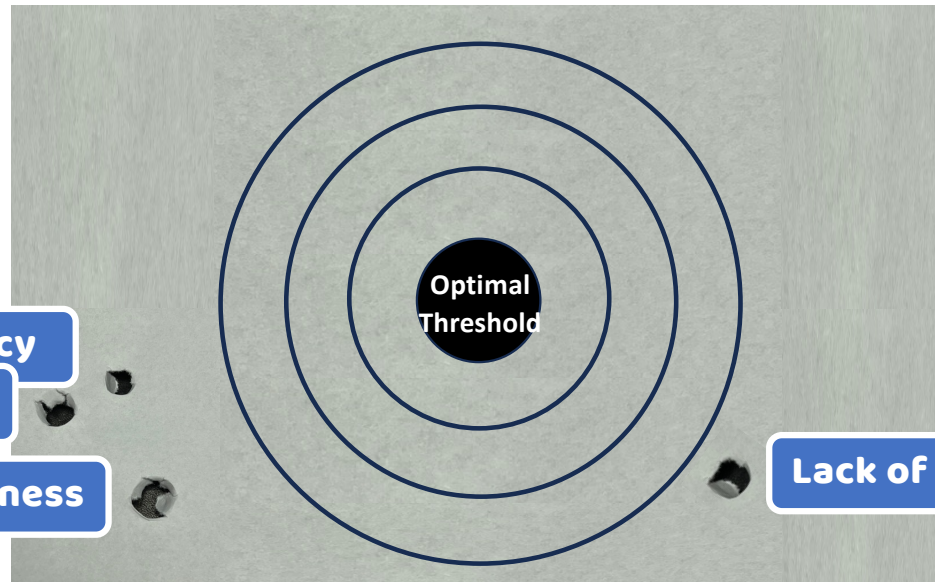
Implications for Practice Change Strategies

Susanne R. Salem-Schatz, ScD; Jerry Avorn, MD; Stephen B. Soumerai, ScD

JAMA. 1990;264(4):476-483. doi:10.1001/jama.1990.03450040072034

**“Amount of transfused products was inversely proportional to physician knowledge of transfusion medicine”**

JAMA. Jul 25, 1990



**Complacency**

**Ignorance**

**Lack of Awareness**

**Lack of Knowledge**

# Global State of Play?

**2.9+** BILLION

individuals with anaemia (2-4, 195)  
and/or micronutrient deficiencies (4-7)

**600+** MILLION

individuals with chronic or acute  
blood loss and/or bleeding disorders (32-44)

**PBM**

- Iron deficiency and
- Pre-operative anaemia in sur
- Anaemia following surgical in
- Anaemia in patients with common diseases
- Anaemia in patients with oncological an malignancies
- Anaemia in patients with infectious disea (including viral and parasitic infections)
- Hospital-acquired anaemia in patients without haemorrhage or surgery

**Lack of Awareness**

**Lack of Knowledge**

**Complacency**

**Ignorance**

**Negligence**

- Gastrointestinal bleeding
- Haemoglobinopathies
- Coagulopathies
- Phlebotomy/venipunctures
- Trauma

**Again,  
Dangerous  
Culture!**

# Estimated Global Major Surgeries: 300+ Million

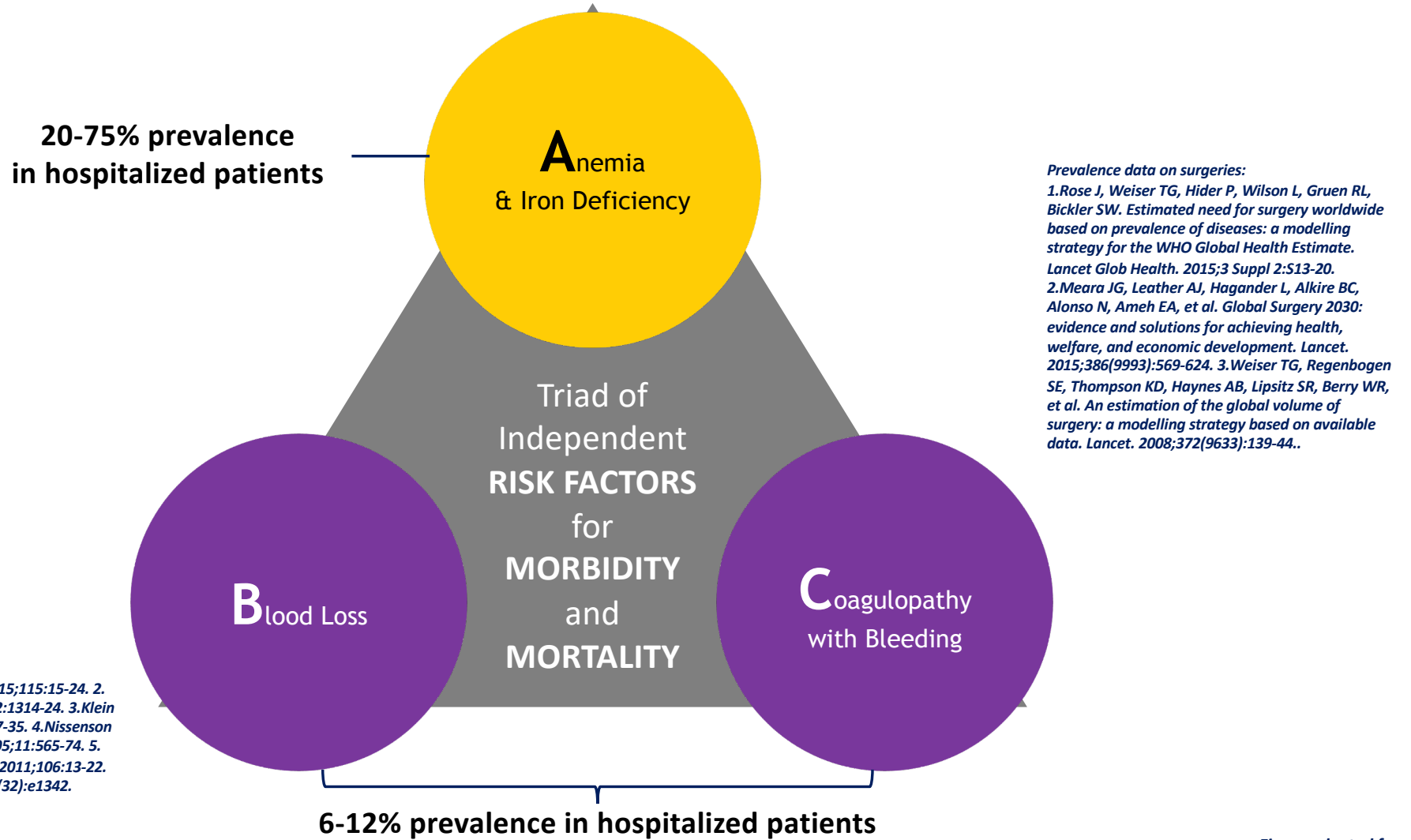


Figure adapted from Hofmann A, Aapro M, Fedorova et al. *Journal of Cancer Policy*, 31 (2022)

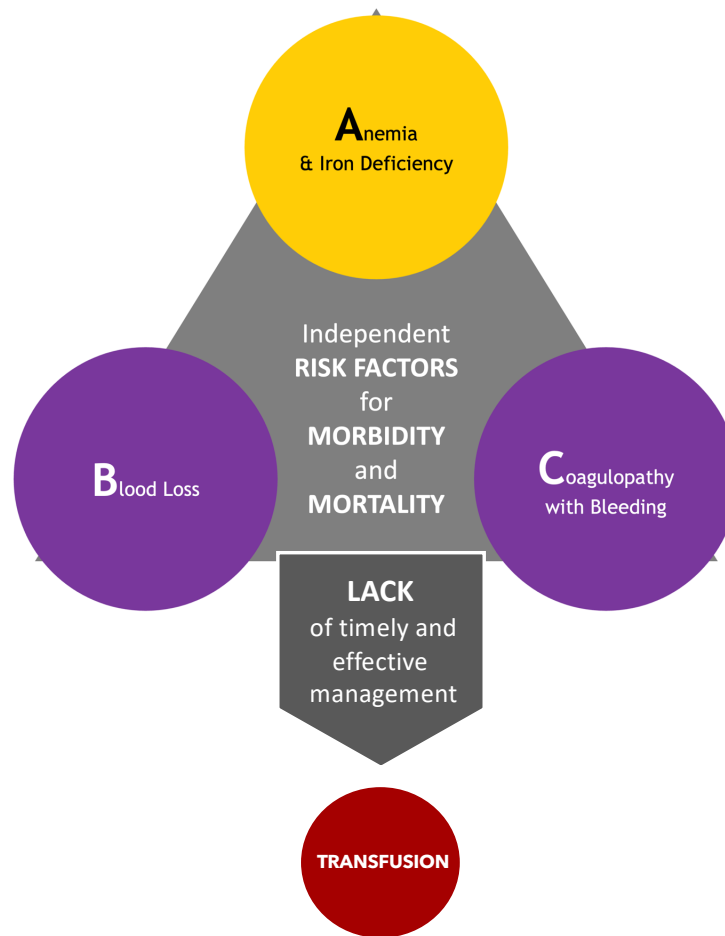


Figure adapted from  
Hofmann A, Aapro M, Fedorova et al. *Journal of Cancer Policy*, 31 (2022)



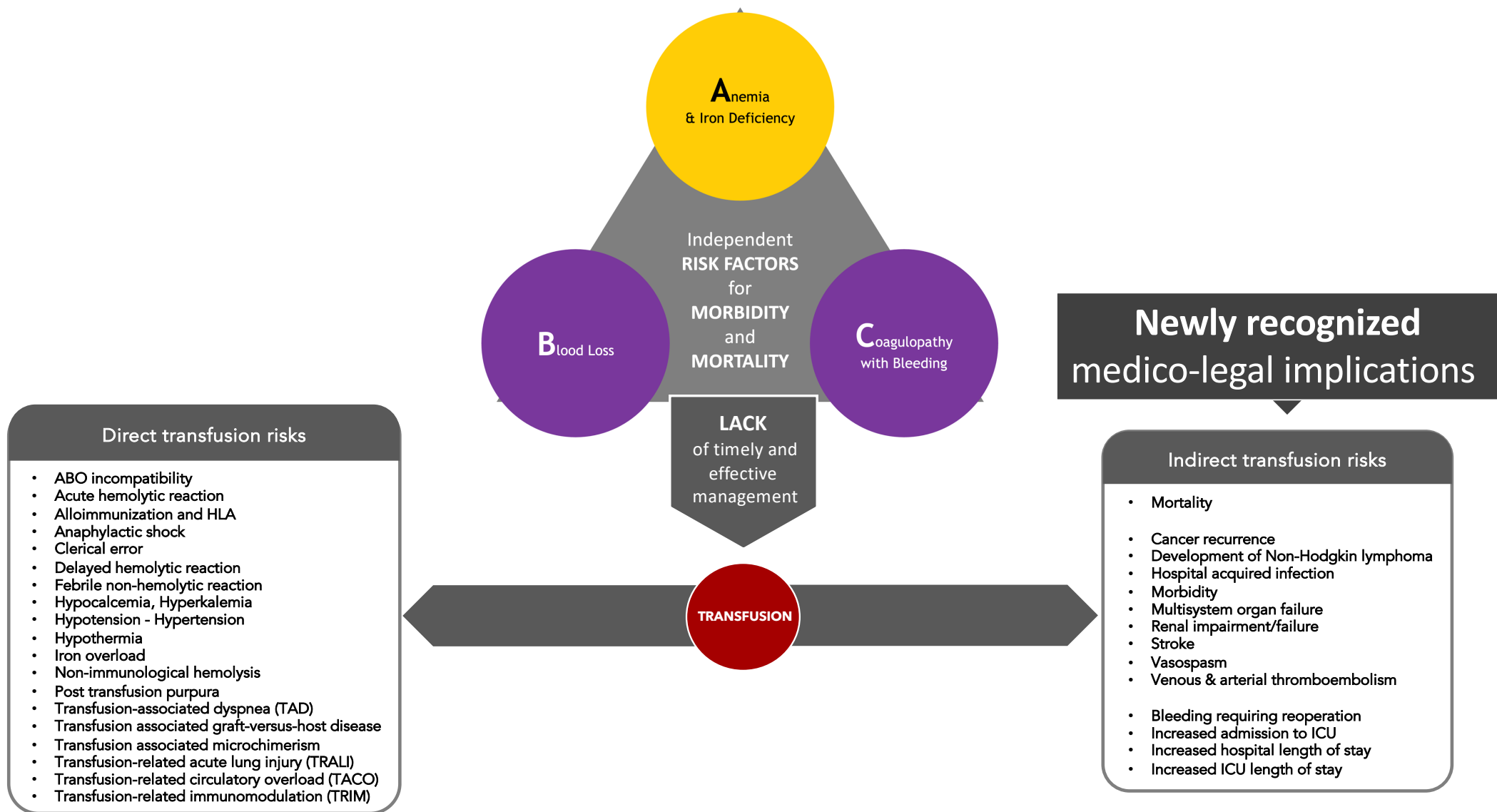
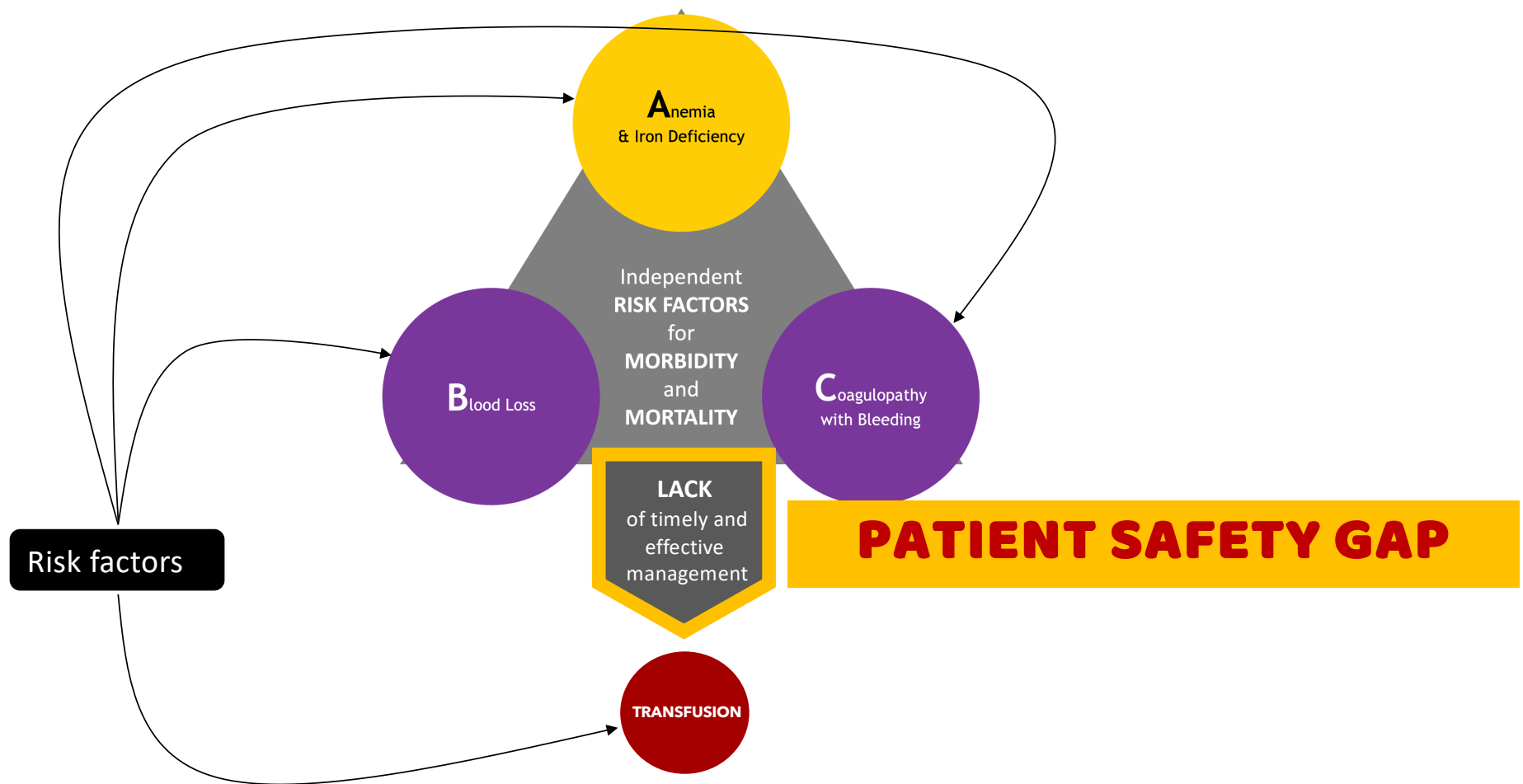
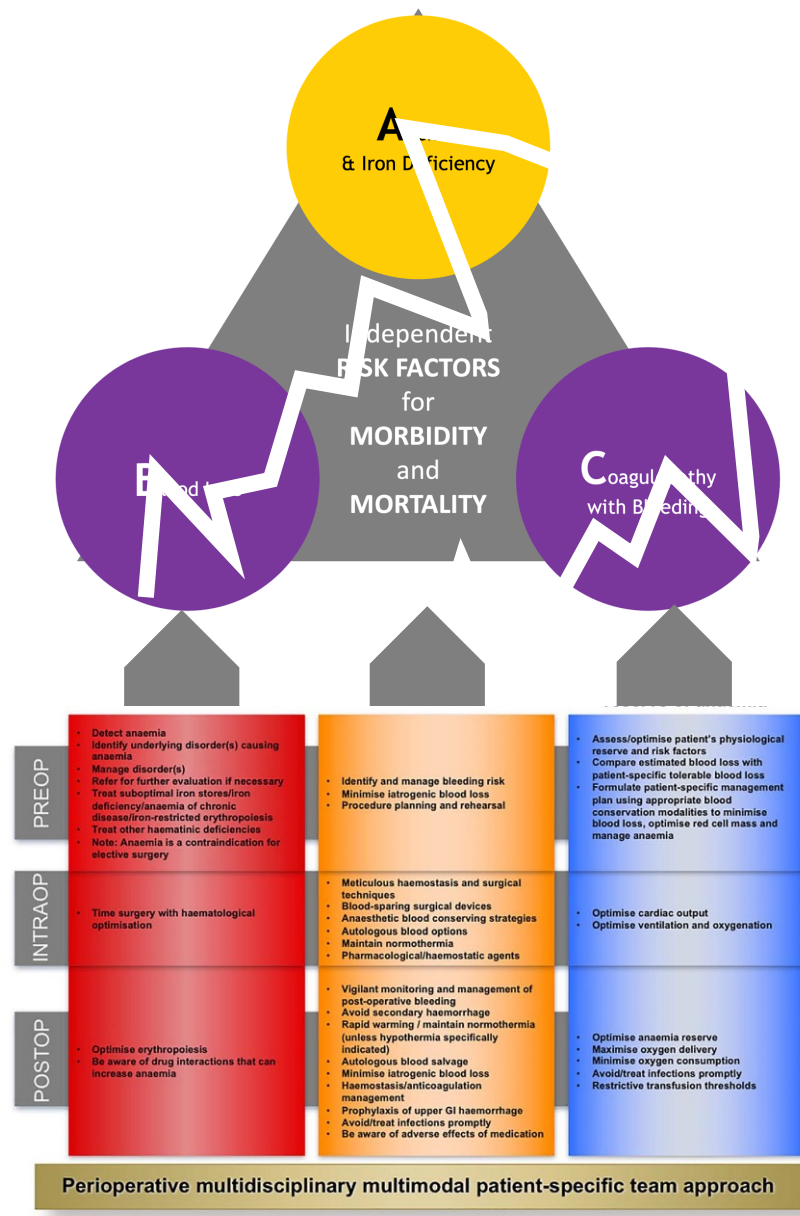


Figure adapted from Hofmann A, Aapro M, Fedorova et al. *Journal of Cancer Policy*, 31 (2022); Bolcato M, Russo M, Trentino K, et al. *Patient blood management: The best approach to transfusion medicine risk management. Transfus Apher Sci* 2020;102779; Oehlschläger M. *Patient blood management as a medical standard – in the light of legislation and jurisdiction. Anästh Intensivmed* 2019;60:572–476



1. Bolcato M, Russo M, Trentino K, et al. Patient blood management: The best approach to transfusion medicine risk management. *Transfus Apher Sci* 2020;102779
2. Oehlschläger M. Patient blood management as a medical standard – in the light of legislation and jurisdiction. *Anästh Intensivmed* 2019;60:572–476



*Reformatted from Hofmann A, Friedman D, Farmer S. Western Australia Patient Blood Management Project 2008-2012: Analysis, Strategy, Implementation and Financial Projections. Perth, Western Australia: Medicine and Economics; 2007:1-215 in: Leahy MF, Hofmann A, Towler S, Trentino KM, Burrows SA, Swain SG et al. Improved outcomes and reduced costs associated with a health-system-wide patient blood management program: a retrospective observational study in four major adult tertiary care hospitals. Transfusion. 2017;57:1347-58.*



World Health  
Organization

**POLICY BRIEF**

# THE URGENT NEED TO IMPLEMENT PATIENT BLOOD MANAGEMENT

**The unmet need to manage and preserve the patients' own blood**

*World Health Organization. The urgent need to implement patient blood management: policy brief. ISBN 978-92-4-003574-4 (electronic version), 2021*

# Global State of Play:

**2.9+** BILLION

individuals with anaemia (2-4, 195)  
and/or micronutrient deficiencies (4-7)

- Iron deficiency and other micronutrient deficiencies
- Pre-operative anaemia in surgical patients (IDA, AI)
- Anaemia following surgical interventions
- Anaemia in patients with common noncommunicable diseases
  - Anaemia in patients with oncological and haematological malignancies
  - Anaemia in patients with infectious diseases (including viral and parasitic infections)
  - Hospital-acquired anaemia in patients without haemorrhage or surgery

**600+** MILLION

individuals with chronic or acute  
blood loss and/or bleeding disorders (32-44)

- Major surgery
- Medical and surgical ICU
- Obstetric/peripartum bleeding
- Heavy menstrual bleeding
- Gastrointestinal bleeding
- Haemoglobinopathies
- Coagulopathies
- Phlebotomy/venipunctures
- Trauma

## POLICY BRIEF

# THE URGENT NEED TO IMPLEMENT PATIENT BLOOD MANAGEMENT



Taken together, they represent one of the world's biggest, largely preventable, yet greatly underestimated public health and health-economic burdens.

## Global State of Play:

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Medicine's  
Biggest  
Safety and  
Quality  
Problem?

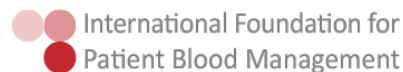


## A Global Definition of Patient Blood Management

Aryeh Shander, MD,\*† Jean-Francois Hardy, MD,‡§ Sherri Ozawa, RN,†|| Shannon L. Farmer, DHSc,¶##\*\*†† Axel Hofmann, Dr.rer.medic,¶\*\*‡‡ Steven M. Frank, MD,§§ Daryl J. Kor, MD,|||¶¶ David Faraoni, MD,§## and John Freedman, MD,\*\*††† Collaborators

Patient Blood Management is a patient-centered, systematic, evidence-based approach to improve patient outcomes by managing and preserving a patient's own blood, while promoting patient safety and empowerment.

*Shander A, Hardy JF, Ozawa S, et al. A Global Definition of Patient Blood Management. Anesth Analg. Feb 10 2022*



[www.ifpbm.org](http://www.ifpbm.org)



[www.sabm.org](http://www.sabm.org)



[www.nataonline.com](http://www.nataonline.com)

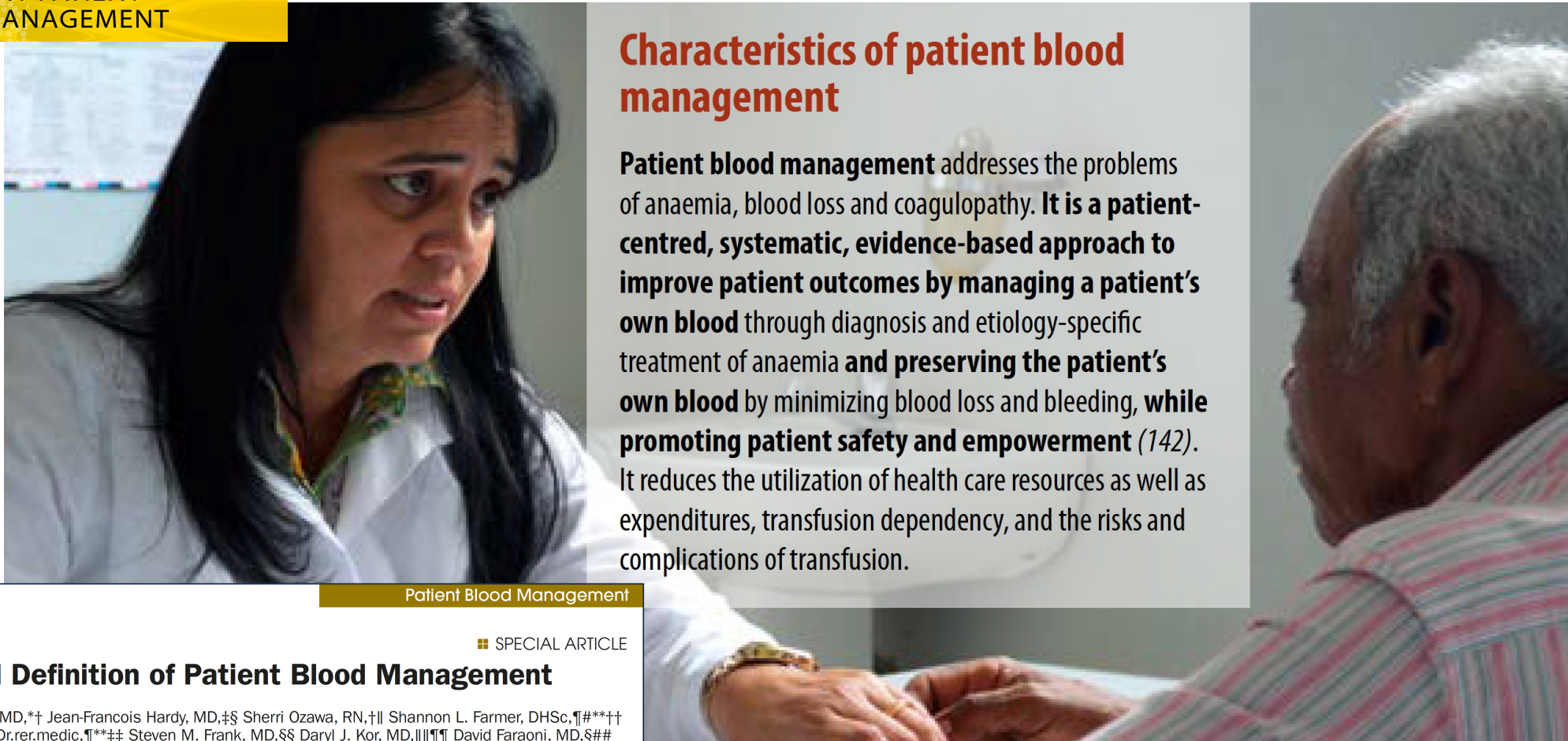


### Definition endorsed by

American Society of Anesthesiologists (ASA)  
American Society of Extracorporeal Technology (AmSECT)  
Anemia Working Group Espana (AWGE)  
Asia-Pacific Society for Patient Blood Management (ASPBM)  
Chinese Society for Patient Blood Management (CSPBM)  
Korean Society for Patient Blood Management (KPBM)  
Korean Society of Anesthesiologists (KSA)

Malaysian Society of Haematology (MSH)  
National Association of Specialists in Patient Blood Management (NASPBm)  
Ontario Nurse Transfusion Coordinators Program, Canada (ONTRraC)  
Sociedad IberoAmericano de Patient Blood Management (SIAPBM)  
Society of Cardiovascular Anesthesiologists (SCA)  
South African National Blood Service (SANBS)  
**World Health Organization (WHO)**

## THE URGENT NEED TO IMPLEMENT PATIENT BLOOD MANAGEMENT



### Characteristics of patient blood management

**Patient blood management** addresses the problems of anaemia, blood loss and coagulopathy. **It is a patient-centred, systematic, evidence-based approach to improve patient outcomes by managing a patient's own blood** through diagnosis and etiology-specific treatment of anaemia **and preserving the patient's own blood** by minimizing blood loss and bleeding, **while promoting patient safety and empowerment** (142). It reduces the utilization of health care resources as well as expenditures, transfusion dependency, and the risks and complications of transfusion.

#### Patient Blood Management

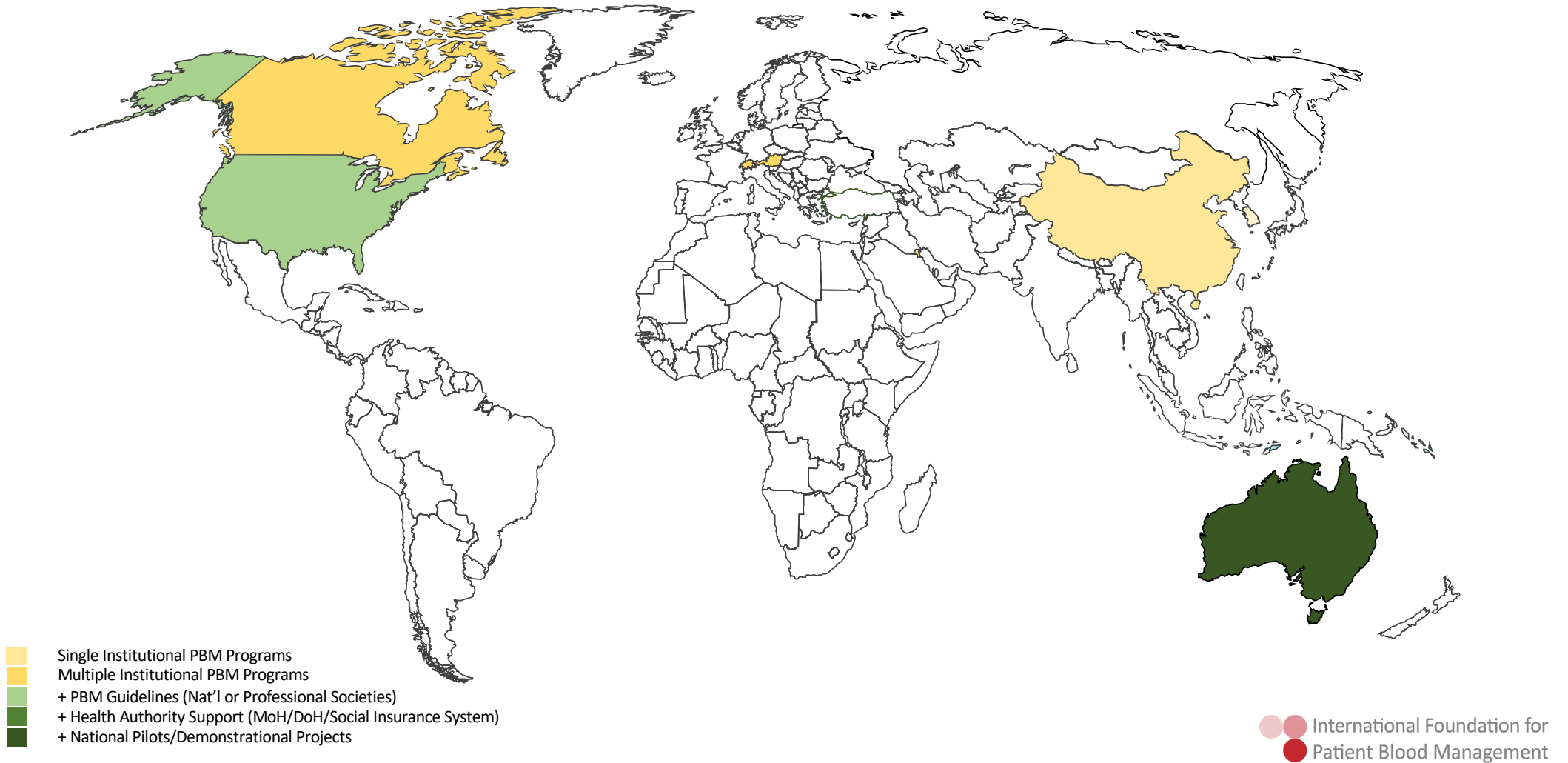
■ SPECIAL ARTICLE

### A Global Definition of Patient Blood Management

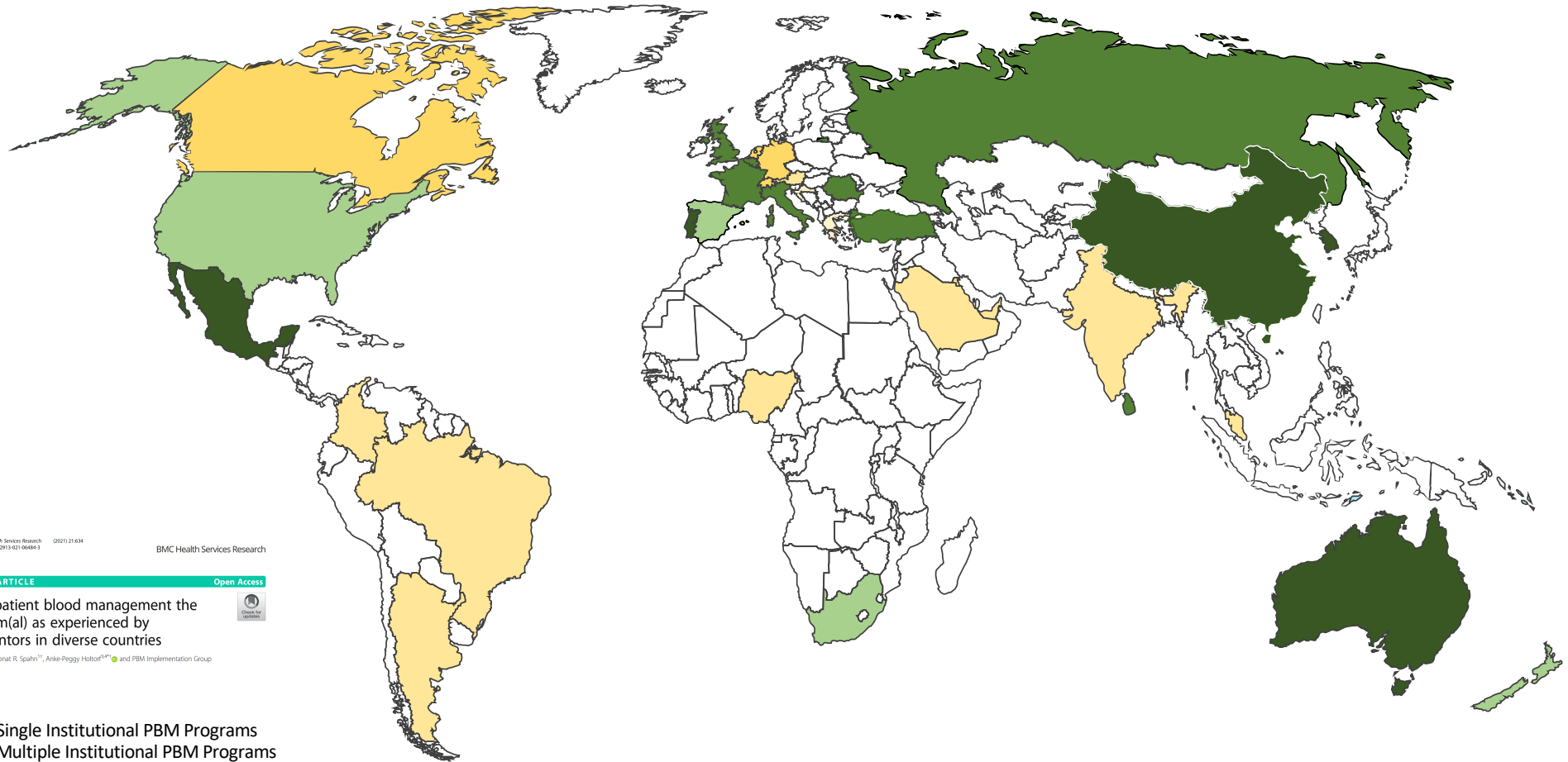
Aryeh Shander, MD,\*† Jean-Francois Hardy, MD,‡§ Sherri Ozawa, RN,†|| Shannon L. Farmer, DHSc,¶##\*\*†† Axel Hofmann, Dr.rer.med.,¶\*\*‡‡ Steven M. Frank, MD,§§ Daryl J. Kor, MD,|||¶¶ David Faraoni, MD,§## and John Freedman, MD,\*\*\*††† Collaborators



# PBM Penetration 2012



# PBM Penetration 2023



Hofmann et al. BMC Health Services Research (2023) 23:634  
https://doi.org/10.1186/s12913-023-06484-3

BMC Health Services Research

RESEARCH ARTICLE Open Access

Making patient blood management the new norm(al) as experienced by implementors in diverse countries

Axel Hofmann<sup>1,2\*</sup>, Dorat R. Spahn<sup>1</sup>, Anke-Peggy Holtorf<sup>1,3\*</sup> and PBM Implementation Group



- Single Institutional PBM Programs
- Multiple Institutional PBM Programs
- + PBM Guidelines (Nat'l or Professional Societies)
- + Health Authority Support (MoH/DoH/Social Insurance System)
- + National Pilots/Demonstrational Projects



## 促进实施患者血液管理的专家倡议

—— 张宗久<sup>1</sup> 胡 豫<sup>2</sup> Axel Hofmann<sup>3</sup> 刘远立<sup>4</sup> 纪宏文<sup>5\*</sup>

### Abstract

Anemia, blood loss and coagulopathy with bleeding are affecting billions of individuals every year. Each of these conditions represents an independent risk factor for adverse patient outcomes including mortality and morbidity. Patient blood management is a new medical paradigm that can significantly reduce or avoid such risks. Based on the multiple benefit results of patient blood management and relevant policy background in China, this expert initiative was launched to facilitate the implementation of patient blood management for medical institutions. It is believed that this model requires the policy promotion of the competent health authorities, the implementation of education and training, the active participation of all medical institutions and supplementation by innovative diagnosis and treatment paths, reasonable reimbursement plans of medical insurance and evaluation tools based on data.

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### Key words

Patient Blood Management; Anemia; Blood Loss; Coagulopathy; Bleeding Disorder; Blood Transfusion; Multi-disciplinary Collaboration

# Summary and the Way Forward

THE URGENT NEED TO IMPLEMENT PATIENT BLOOD MANAGEMENT

**Ethics**  
STAKEHOLDERS are OBLIGED to act

2.9+ BILLION Individuals with anemia and/or micronutrient deficiencies

0.6 BILLION Individuals with chronic or acute blood loss / bleeding disorders

PREOP	<ul style="list-style-type: none"> <li>Detect anaemia</li> <li>Identify underlying disorder(s) causing anaemia</li> <li>Manage disorder(s)</li> <li>Refer for further evaluation if necessary</li> <li>Treat suboptimal iron absorption</li> <li>Identify/assess/iron deficiency/anaemia of chronic disease/iron-restricted erythropoiesis</li> <li>Treat other haematologic deficiencies</li> <li>Note: Anaemia is a contraindication for elective surgery</li> </ul>	<ul style="list-style-type: none"> <li>Identify and manage bleeding risk</li> <li>Minimise iatrogenic blood loss</li> <li>Procedure planning and rehearsal</li> </ul>	<ul style="list-style-type: none"> <li>Assess/optimize patient's physiological reserve and risk factors</li> <li>Compare estimated blood loss with patient-specific tolerable blood loss</li> <li>Formulate patient-specific management plan using appropriate blood conservation modalities to minimize blood loss, optimize red cell mass and manage anaemia</li> </ul>
INTRAOP	<ul style="list-style-type: none"> <li>Time surgery with haematological optimization</li> </ul>	<ul style="list-style-type: none"> <li>Meticulous haemostasis and surgical techniques</li> <li>Blood-sparing surgical devices</li> <li>Anesthetic blood conserving strategies</li> <li>Autologous blood options</li> <li>Maintain normothermia</li> <li>Pharmacological/haemostatic agents</li> </ul>	<ul style="list-style-type: none"> <li>Optimize cardiac output</li> <li>Optimize ventilation and oxygenation</li> </ul>
POSTOP	<ul style="list-style-type: none"> <li>Optimize erythropoiesis</li> <li>Be aware of drug interactions that can increase anaemia</li> </ul>	<ul style="list-style-type: none"> <li>Vigilant monitoring and management of post-operative bleeding</li> <li>Avoid secondary haemorrhage</li> <li>Rapid warming / maintain normothermia (unless hypothermia specifically indicated)</li> <li>Autologous blood salvage</li> <li>Minimise iatrogenic blood loss</li> <li>Haemostasis/anticoagulation management</li> <li>Prophylaxis of upper GI haemorrhage</li> <li>Avoid/treat infections promptly</li> <li>Be aware of adverse effects of medication</li> </ul>	<ul style="list-style-type: none"> <li>Optimize anaemia reserve</li> <li>Maximize oxygen delivery</li> <li>Minimize oxygen consumption</li> <li>Avoid/treat infections promptly</li> <li>Restrictive transfusion thresholds</li> </ul>

Perioperative multidisciplinary multimodal patient-specific team approach

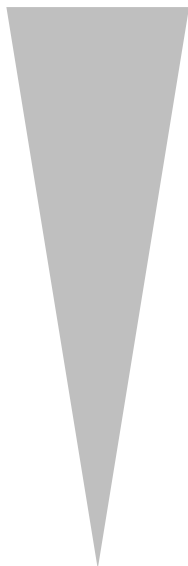
**Evidence**  
STAKEHOLDERS are ALERTED to act

**Economics**  
STAKEHOLDERS are ENABLED to act





**MoH's TOP-DOWN implementation**



### 1. Introduction

In the past four decades, increased awareness of the inherent risks of transfusion has resulted in major initiatives to mitigate those risks through improvements in blood component safety. The realization that the intense focus on product safety had not been matched with a similar focus on improving transfusion decisions at the bedside led to the concept of "optimal blood use". The practice of transfusion medicine now emphasizes the judicious use of transfusion, only when clinically indicated. The concept that "our own blood is still the best thing to have in our veins" (1) has given rise to various surgical "blood conservation" techniques (for example, minimization of blood loss, blood salvage and acute isovolaemic haemodilution). Underlying these efforts is the broader concept of "patient blood management" (PBM). This is a patient-centred approach that addresses iron deficiency, anaemia, coagulopathy and bleeding in both surgical and nonsurgical patients, as risks for adverse medical outcomes. Under PBM, anaemia and iron deficiency are recognized as serious global health issues in their own right, affecting billions of people worldwide. Yet, globally, there is still a gap in awareness and implementation of PBM as an overall framework to address the risks of iron deficiency, anaemia, blood loss and coagulopathy. This policy brief focuses on the urgent need to close that gap and the steps needed to achieve that goal.

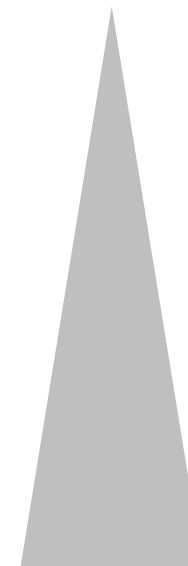
### 2. Purpose of this policy brief

This policy brief aims to:

- create awareness about the enormous, but greatly under-appreciated global disease burden of iron deficiency, anaemia, blood loss and bleeding disorders;
- create a sense of urgency for health care entities to implement PBM, a systematic, multidisciplinary, multiprofessional concept to routinely minimize these risk factors, and, in so doing, significantly and cost-effectively improve health and clinical outcomes for hundreds of millions of medical and surgical patients, pregnant women, neonates, children, adolescents, elderly people, and the population as a whole;

**● announce the upcoming World Health Organization (WHO) initiative to develop PBM Implementation Guidelines that will serve as a framework for health care leaders of all Member States;**

- foster the rapid dissemination and implementation of PBM in their jurisdiction;
- coordinate these efforts with existing initiatives pertaining to improved patient-centred care, patient safety and quality of care, including maternal, prenatal and child care, and nutritional supplementation programmes;
- act as an accelerant for change by educating the readers about what PBM is and is not, why PBM implementation is critical, and calling attention to the barriers to implementation.



**Champions' BOTTOM-UP+ implementation**



POLICY BRIEF

# THE URGENT NEED TO IMPLEMENT PATIENT BLOOD MANAGEMENT

## 12. Call to action

All Member States should act quickly through their ministry or department of health to adopt their national PBM policy, install the necessary governance, and reallocate resources to improve the population health status and individual patient outcomes while reducing overall health care expenditures.



**Thank you for your attention!**