

DOPORUČENÍ PRO PBM

JAN BLÁHA

KLINIKA ANESTEZIOLOGIE, RESUSCITACE
A INTENZIVNÍ MEDICÍNY



XXXI.

kongres České společnosti
anesteziologie, resuscitace
a intenzivní medicíny
**9.-11. ŘÍJNA 2025
PRAHA**



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FAKULTA
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Nemám konflikt zájmů



O NIKEZ ▾

Postupy a doporučení ▾

Hodnocení kvality ▾

Referenční statistiky ▾

Centra specializované péče ▾

Publikace

Akce a konference ▾

Doporučené postupy a operativní doporučení

Zde naleznete existující doporučené postupy a operativní doporučení (včetně těch vytvořených v rámci projektu [Klinické doporučené postupy](#), CZ.03.2.63/0.0/0.0/15_039/0008221). Pro zaevidování a vytvoření nového postupu přejděte na stránku [Centrální evidence](#). Stránka je ve vývoji, připravuje se interaktivní portál s doporučeními.

Seznam zaregistrovaných DP/OD

Typ	Název	Garant	Datum dokončení	Stav
OD	12 operativních doporučení na téma: Podpora kojení v porodnicích a na novorozeneckých odděleních	Dokoupilová M.	15.10.2025	Rozpracovaný
OD	3 operativní doporučení na téma: Nová a přicházející poškození zdraví z práce formou nemoci z povolání	Klusáčková P.	30.4.2025	Rozpracovaný
OD	3 operativní doporučení na téma: Vhodné ortopedické výkony pro jednodenní medicínu	Novotný T.	30.4.2025	Rozpracovaný
OD	4 operativní doporučení na téma: Optimalizace perioperační anemie, podávání transfuzních přípravků a krevních derivátů v perioperační medicíně	Bláha J.	30.4.2026	Rozpracovaný



O NIKEZ ▾

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Centra specializované péče ▾

Publikace

Akce a konference ▾

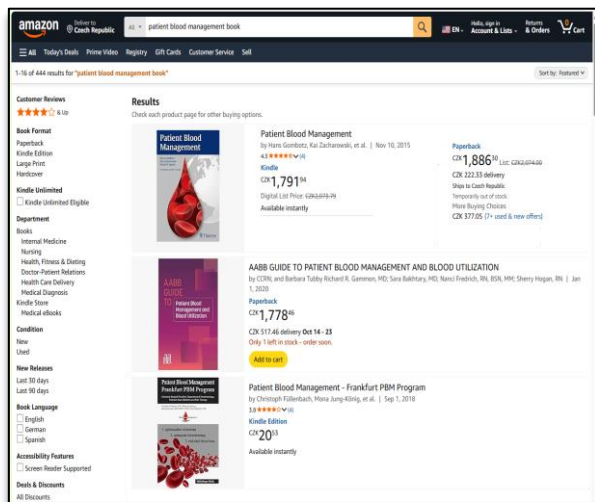
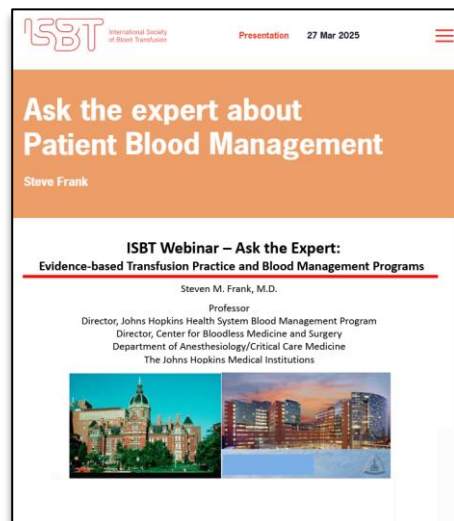
Doporučené postupy a operativní doporučení

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Seznam za

Typ	Název	Context	Population	Datum ukončení	Stav	
OD	12 operativních	Chirurgický výkon s rizikem krevní ztráty >500 ml	Dospělí pacienti podstupující chirurgický výkon	5.10.2025	Rozpracovaný	
OD	3 operativní doporučení na téma: Nová a přicházející poškození zdraví z práce formou nemoci z povolání			Klusáčková P.	30.4.2025	Rozpracovaný
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Je dnes někdo, kdo neví, co je to PBM ...?



Proč PBM ?



Protože transfuze, ač v řadě a především kritických situacích nemá alternativu, nese i značná rizika včetně zvýšené morbidity a mortality.

Efficacy of red blood cell transfusion in the critically ill: A systematic review of the literature*

Paul E. Marik, MD, FACP, FCCM, FCCP; Howard L. Corwin, MD, FACP, FCCM, FCCP

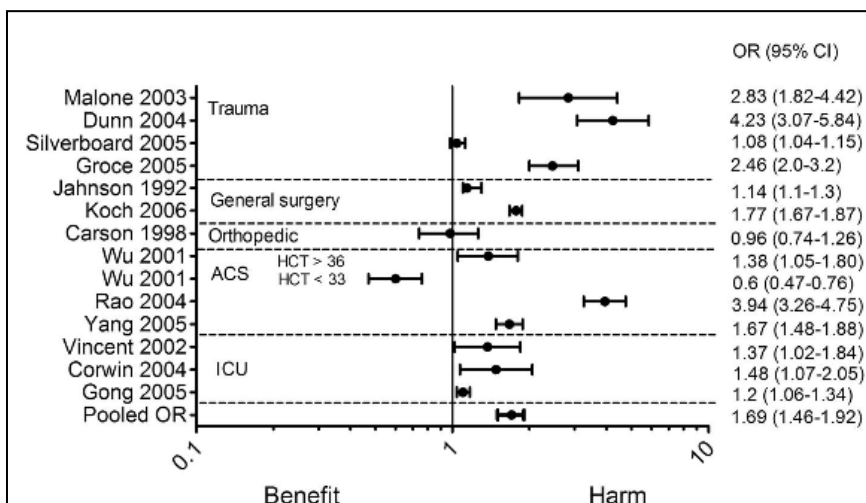


Figure 2. Association between blood transfusion and the risk of death (odds ratio [OR] and 95% confidence interval [CI]). ACS, abdominal compartment syndrome; ICU, intensive care unit.

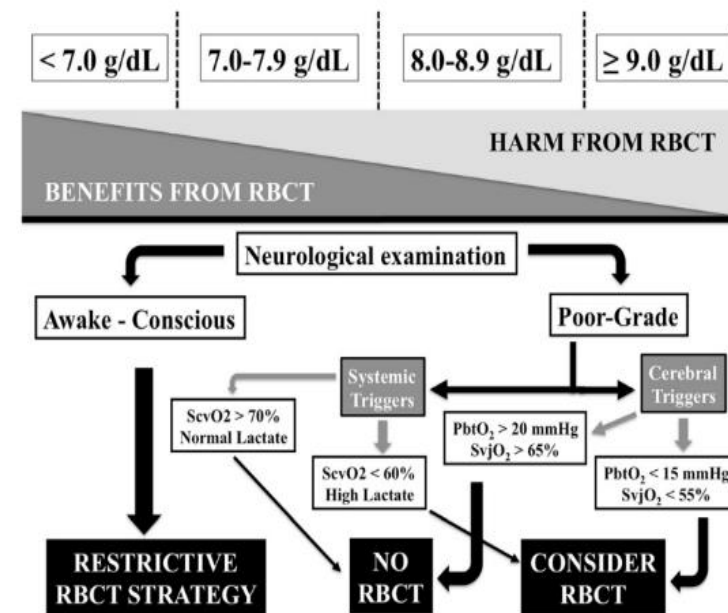


Fig. 3 The decision to administer red blood cell transfusions (RBCT) should take into consideration the potential benefits and harms of this intervention, according to different haemoglobin (Hb) levels at which RBCT is initiated. In brain-injured patients, the RBCT strategy should be "restrictive" (if Hb is less than 7.0 g/dl) in awake and conscious patients. For poor-grade comatose patients, systemic (superior vena cava oxygen saturation (ScvO₂) or high lactate levels) or cerebral triggers (jugular vein oxygen saturation (SvjO₂) or brain tissue oxygen pressure (PbtO₂)) could be used to guide RBC administration

Doporučené

í doporučení

Souhrn důkazů: Optimalizace perioperační anémie, podávání transfuzních přípravků a krevních derivátů v perioperační medicíně

Analýza aktuálních vědeckých důkazů na úrovni doporučených postupů

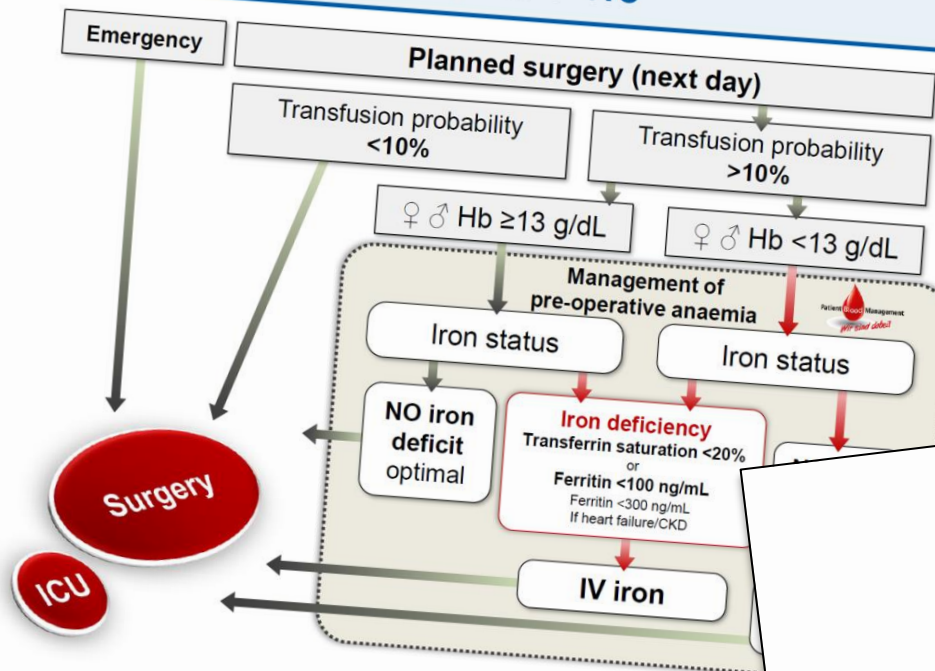
Zhotovitel:	Metodické centrum NIKEZ, Česká centra Cochrane, JBI, GRADE
Autoři:	Bláha J., Černý V., Klugar M., Pavlovská I., Kopečný P.
Segment péče:	Akutní lůžková péče
Cílová skupina:	Neurologové, neurochirurgové
Hlavní metoda tvorby:	Adolopment
Datum zhotovení:	13. 6. 2025
Klíčová slova:	Sideropenická anémie; předoperační příprava; krevní ztráta; riziko podání transfuze



Souhrn důkazů - PBM

NIKEZ NÁRODNÍ INSTITUT
KVALITY A EXCELENCE
ZDRAVOTNICTVÍ

Pre-operative algorithm V4.0



Kai Zacharowski

Can J Anesth/J Can Anesth (2019) 66:716–731 <https://doi.org/10.1007/s12630-019-01351-6>

Efficacy and safety of erythropoietin and iron therapy to reduce red blood cell transfusion in surgical patients: a systematic review and meta-analysis

Tiffanie Kai, MHS^a, Nikhil Mistry, MSc^a, Gerard Curley, MR, MSc, PhD^a, Katerina Pavenski, MD^a, Nadine Shehata, MD^a, Rosa Maria Tamin, BSc (Pharm)^a, Marie-France Gauthier, PharmD, ACP^a, Kevin Thorpe, MMath^a, Tom A. Schweizer, PhD^a, Sarah Ward, MD^a, C. David Mazer, MD^a, Gregory M. T. Hare, MD, PhD^a

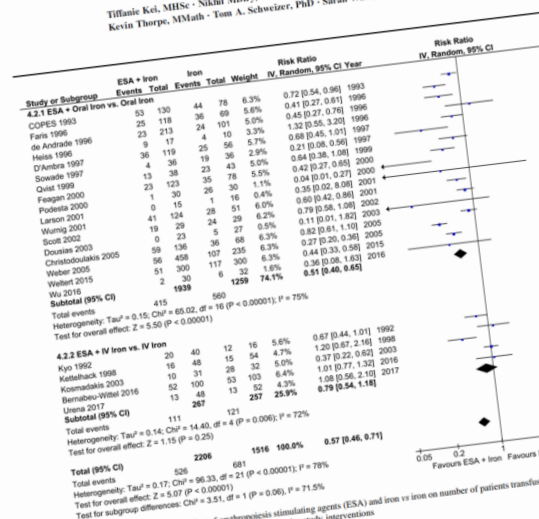


Fig. 2 Forest plot showing the effect of erythropoietin stimulating agents (ESA) and iron vs iron on number of patients transfused with red blood cells (RBCs) (primary outcome), stratified by type of surgery

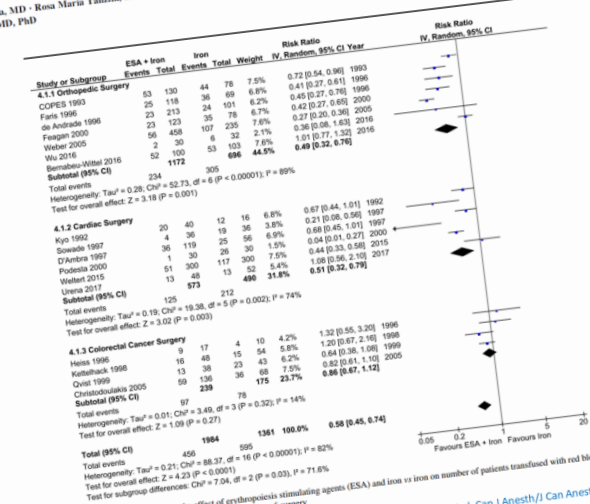


Fig. 4 Forest plot showing the effect of erythropoietin and iron therapy to reduce red blood cell transfusion in surgical patients (RBCs) (primary outcome), stratified by type of surgery

Kei et al. Can J Anesth/J Can Anesth (2019) 66:716–731

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Liberal Versus Restrictive Transfusion Strategy in Critically Ill Oncologic Patients: The Transfusion Requirements in Critically Ill Oncologic Patients Randomized Controlled Trial*

Fabricio S. Bergamin, MD¹; Juliana P. Almeida, MD, PhD²; Giovanni Landoni, MD³; Filomena R. B. G. Galas, MD, PhD⁴; Julia T. Fukushima, MSc⁵; Evgeny Fominskiy, MD, PhD⁶; Clarice H. L. Park, MD⁷; Eduardo A. Osawa, MD, PhD⁸; Maria P. E. Díz, MD, PhD⁹; Gisele Q. Oliveira, MD¹⁰; Rafael A. Franco, MD¹¹; Rosana E. Nakamura, MD¹²; Elisângela M. Almeida, MD¹³; Edson Abdala, MD, PhD¹⁴; Maristela P. Freire, MD, PhD¹⁵; Roberto K. Filho, MD, PhD¹⁶; Jose Otavio C. Auler Jr, MD, PhD¹⁷; Ludhmila A. Hajjar, MD, PhD¹⁸

Objective: To assess whether a restrictive strategy of RBC transfusion reduces 28-day mortality when compared with a liberal strategy in cancer patients with septic shock.

Design: Single center, randomized, double-blind controlled trial.

Setting: Teaching hospital.

Patients: Adult cancer patients with septic shock in the first 6 hours of ICU admission.

Interventions: Patients were randomized to the liberal (hemoglobin threshold, < 9 g/dL) or to the restrictive strategy (hemoglobin threshold, < 7 g/dL) of RBC transfusion during ICU stay.

Measurements and Main Results: Patients were randomized to the liberal ($n = 149$) or to the restrictive transfusion strategy ($n = 151$) group. Patients in the liberal group received more RBC units than patients in the restrictive group (1 [0–3] vs 0 [–2] unit; $p < 0.001$).

At 28 days after randomization, mortality rate in the liberal group (primary endpoint of the study) was 45% (67 patients) versus 56% (84 patients) in the restrictive group (hazard ratio, 0.74; 95% CI, 0.53–1.04; $p = 0.08$) with no differences in ICU and hospital length of stay. At 90 days after randomization, mortality rate in the liberal group was lower (59% vs 70%) than in the restrictive group (hazard ratio, 0.72; 95% CI, 0.53–0.97; $p = 0.03$).

Conclusions: We observed a survival trend favoring a liberal transfusion strategy in patients with septic shock when compared with the restrictive strategy. These results went in the opposite direction of the a priori hypothesis and of other trials in the field and need to be confirmed.

(Crit Care Med 2017; 45:766–773)

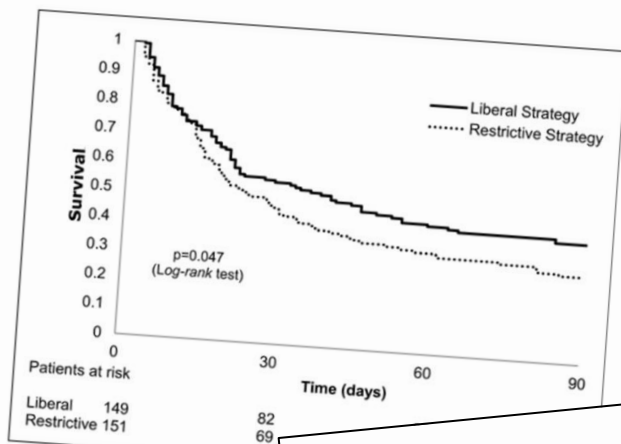


Figure 2. Unadjusted Kaplan-Meier 90-d survival in patients randomized to liberal or restrictive RBC transfusion. The p value was 0.047 (Log-rank test).

Efficacy of red blood cell transfusion in the critically ill: A systematic review of the literature*

Indications for red blood cell transfusion in cardiac surgery: a systematic review and meta-analysis

Liberal Versus Restrictive Transfusion Strategy in Critically Ill Oncologic Patients: The Transfusion Requirements in Critically Ill Oncologic Patients Randomized Controlled Trial*

Red blood cell transfusion in obstetrics and its implication for patient blood management: a retrospective analysis in Switzerland from 1998 to 2016



Proč PBM ?



Protože transfuze, ač v řadě a především kritických situacích nemá alternativu, nese i značná rizika včetně zvýšené morbidity a mortality.

Náklady na odběr, distribuci a zpracování/skladování krve jsou vysoké. PBM pomáhá snižovat poptávku po transfuzních přípravcích, což vede k úspoře celkových nákladů ve zdravotnictví.



Vysoká poptávka po transfuzních přípravcích současně vyvíjí značný tlak na omezenou základnu dárců.

Se stárnoucí populací lze očekávat, že tyto problémy ve všech svých parametrech dále porostou.



SIXTY-THIRD WORLD HEALTH ASSEMBLY

WHA63.12

Agenda item 11.17

21 May 2010

Availability, safety and quality of blood products

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);

- Eighth plenary meeting, 21 May 2010 A63/VR/8; https://apps.who.int/gb/ebwha/pdf_files/wha63/a63_r12-en.pdf

Consensus Statement

International consensus statement on the peri-operative management of anaemia and iron deficiency

M. Muñoz,¹ A. G. Acheson,² M. Auerbach,³ M. Besser,⁴ O. Habler,⁵ H. Kehlet,⁶ G. M. Liumbruno,⁷ S. Lasocki,⁸ P. Meybohm,⁹ R. Rao Baikady,¹⁰ T. Richards,¹¹ A. Shander,¹² C. So-Osman,¹³ D. R. Spahn¹⁴ and A. A. Klein¹⁵

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² Associate Professor, Department of Colorectal Surgery, Nottingham Digestive Diseases Centre, National Institute for Health Research Biomedical Research Unit, Nottingham University Hospitals, Nottingham, UK

³ Clinical Professor, School of Medicine, Georgetown University, Washington, District of Columbia, USA

⁴ Associate Lecturer and Consultant Haematologist, Department of Haematology, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

⁵ Professor, Clinic of Anaesthesiology, Surgical Intensive Care Medicine and Pain Management, Krankenhaus Nordwest, Frankfurt, Germany

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⁷ Director, Italian National Blood Centre, National Institute of Health, Rome, Italy

⁸ Professor, Département Anesthésie Réanimation, CHU Angers, LUNAM Université d'Angers, Angers, France

⁹ Professor, Department of Anaesthesiology, Intensive Care Medicine and Pain Therapy, University Hospital Frankfurt, Frankfurt, Germany

¹⁰ Consultant, Department of Anaesthesia, The Royal Marsden NHS Foundation Trust, London, UK

¹¹ Professor, Division of Surgery and Interventional Science, University College London, London, UK

¹² Professor, Anaesthesiology, Critical Care and Hyperbaric Medicine, Englewood Hospital and Medical Centre and Director, TeamHealth Research Institute, Englewood, New Jersey, USA

¹³ Consultant, Department of Transfusion Medicine, Sanquin Blood Bank, Amsterdam and Department of Internal Medicine, Groene Hart Hospital, Gouda, The Netherlands

¹⁴ Professor and Chairman, Institute of Anaesthesiology, and Head of Anaesthesiology, Intensive Care Medicine and Operating Room Management, University Hospital of Zurich, Zurich, Switzerland

¹⁵ Consultant, Department of Anaesthesia and Intensive Care, Papworth Hospital, Cambridge, UK

Summary

Despite current recommendations on the management of pre-operative anaemia, there is no pragmatic guidance for the diagnosis and management of anaemia and iron deficiency in surgical patients. A number of experienced researchers and clinicians took part in an expert workshop and developed the following consensus statement. After presentation of our own research data and local policies and procedures, appropriate relevant literature was reviewed and discussed. We developed a series of best-practice and evidence-based statements to advise on patient care with respect to anaemia and iron deficiency in the peri-operative period. These statements include: a diagnostic approach for anaemia and iron deficiency in surgical patients; identification of patients appropriate for treatment; and advice on practical management and follow-up. We urge anaesthetists and peri-operative physicians to embrace these recommendations, and hospital administrators to enable implementation of these concepts by allocating adequate resources.

Patient Blood Management Recommendations From the 2018 Frankfurt Consensus Conference

Markus M. Mueller, MD; Hans Van Remoortel, PhD; Patrick Meybohm, MD, PhD; Kari Aranko, MD, PhD; Céline Aubron, MD, PhD; Reinhard Burger, PhD; Jeffrey L. Carson, MD, PhD; Klaus Cichutek, PhD; Emmy De Buck, PhD; Dana Devine, PhD; Dean Fergusson, PhD; Gilles Folléa, MD, PhD; Craig French, MB, BS; Kathrine P. Frey, MD; Richard Gammon, MD; Jerrold H. Levy, MD; Michael F. Murphy, MD, MBBS; Yves Ozier, MD; Katerina Pavenski, MD; Cynthia So-Osman, MD, PhD; Pierre Tiberghien, MD, PhD; Jimmy Volmink, DPhil; Jonathan H. Waters, MD; Erica M. Wood, MB, BS; Erhard Seifried, MD, PhD; for the ICC PBM Frankfurt 2018 Group

IMPORTANCE Blood transfusion is one of the most frequently used therapies worldwide and is associated with benefits, risks, and costs.

OBJECTIVE To develop a set of evidence-based recommendations for patient blood management (PBM) and for research.

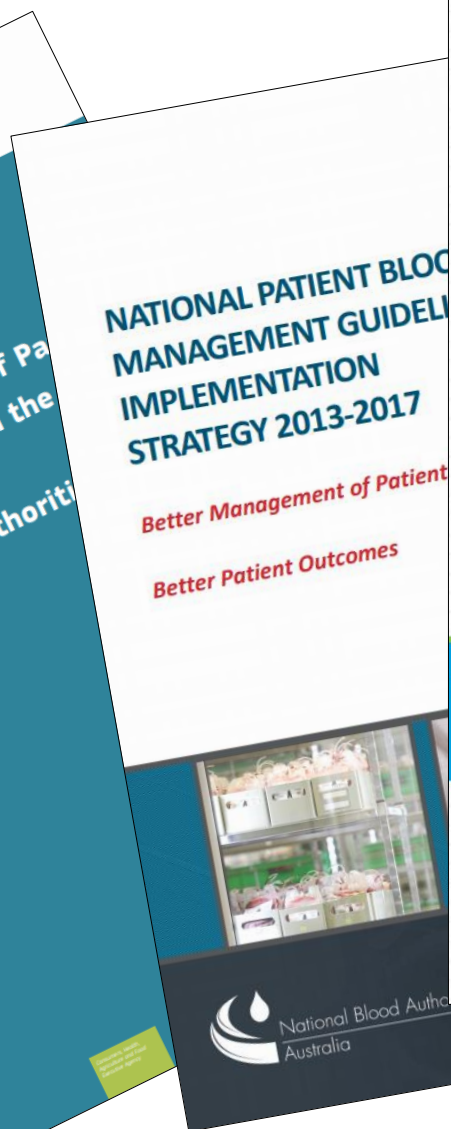
EVIDENCE REVIEW The scientific committee developed 17 Population/Intervention/Comparison/Outcome (PICO) questions for red blood cell (RBC) transfusion in adult patients in 3 areas: preoperative anemia (3 questions), RBC transfusion thresholds (11 questions), and implementation of PBM programs (3 questions). These questions guided the literature search in 4 biomedical databases (MEDLINE, EMBASE, Cochrane Library, Transfusion Evidence Library), searched from inception to January 2018. Meta-analyses were conducted with the GRADE (Grading of Recommendations, Assessment, Development, and Evaluation) methodology and the Evidence-to-Decision framework by 3 panels including clinical and scientific experts, nurses, patient representatives, and methodologists, to develop clinical recommendations during a consensus conference in Frankfurt/Main, Germany, in April 2018.

FINDINGS From 17 607 literature citations associated with the 17 PICO questions, 145 studies, including 63 randomized clinical trials with 23 143 patients and 82 observational studies with more than 4 million patients, were analyzed. For preoperative anemia, 4 clinical and 3 research recommendations were developed, including the strong recommendation to detect and manage anemia sufficiently early before major elective surgery. For RBC transfusion thresholds, 4 clinical and 6 research recommendations were developed, including 2 strong clinical recommendations for critically ill but clinically stable intensive care patients with or without septic shock (recommended threshold for RBC transfusion, hemoglobin concentration <7 g/dL) as well as for patients undergoing cardiac surgery (recommended threshold for RBC transfusion, hemoglobin concentration <7.5 g/dL). For implementation of PBM programs, 2 clinical and 3 research recommendations were developed, including recommendations to implement comprehensive PBM programs and to use electronic decision support systems (both conditional recommendations) to improve appropriate RBC utilization.

CONCLUSIONS AND RELEVANCE The 2018 PBM International Consensus Conference defined the current status of the PBM evidence base for practice and research purposes and established 10 clinical recommendations and 12 research recommendations for preoperative anemia, RBC transfusion thresholds for adults, and implementation of PBM programs. The relative paucity of strong evidence to answer many of the PICO questions supports the need for additional research and an international consensus for accepted definitions and hemoglobin thresholds, as well as clinically meaningful end points for multicenter trials.

Munoz M, et al. *Anaesthesia* 2017;72:233–47;

Mueller M, et al. *JAMA* 2019;321:983–97.



Patient Blood Management: a revolutionary approach to transfusion medicine

Massimo Franchini^{1,2}, Giuseppe Marano¹, Eva Veropalumbo¹, Francesca Masiello¹, Ilaria Pati¹, Fabio Candura¹, Samantha Profili¹, Liviana Catalano¹, Vanessa Piccinini¹, Simonetta Pupella¹, Stefania Vaglio^{1,3}, M. Liumbruno¹

¹*Italian National Blood Centre, National Institute of Health, Rome;* ²*Department of Haematology and Transfusion Medicine, "Carlo Poma" Hospital, Mantua;* ³*Department of Clinical and Molecular Medicine, "Sapienza" University of Rome, Rome, Italy*

Proč aplikace PBM selhává ...?

PROČ TO TEDY NEFUNGUJE?

Protože... problémem není princip, ale implementace !

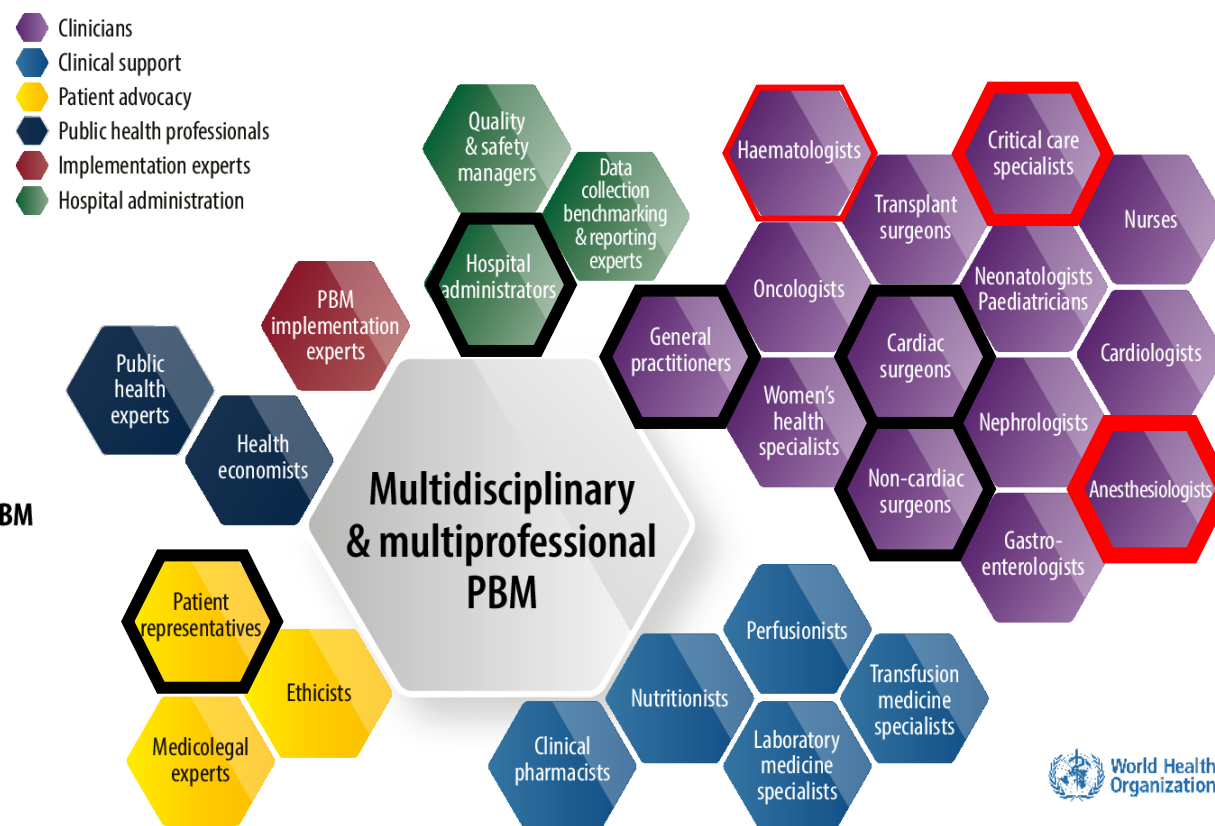
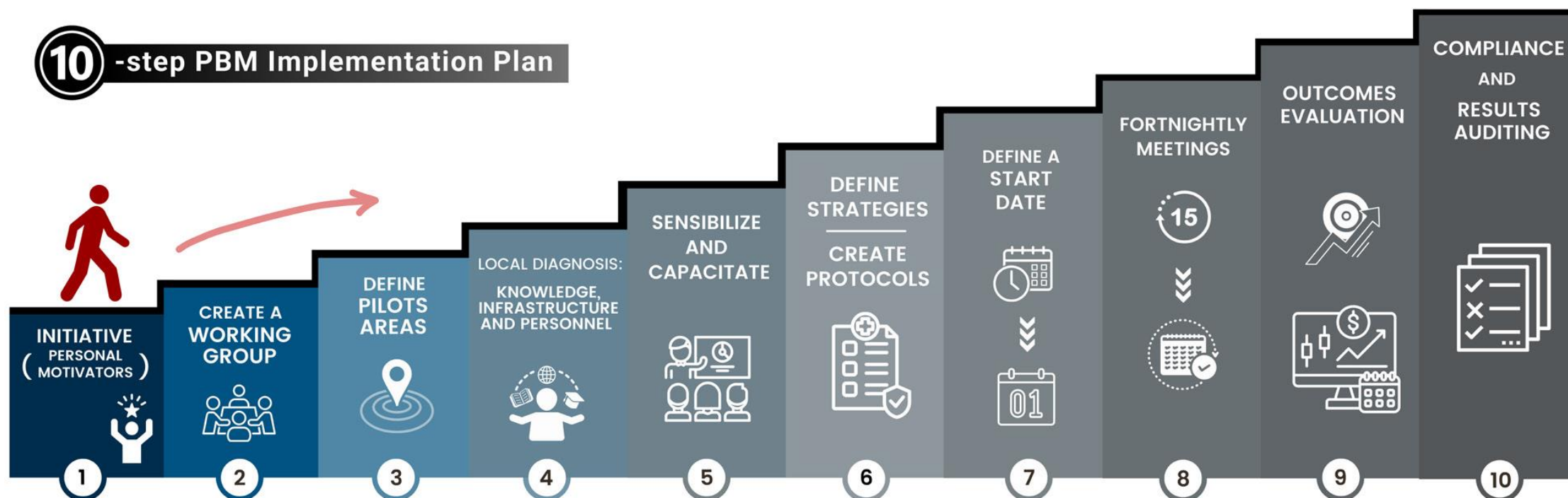


Fig. 4. Stakeholders in multidisciplinary and multiprofessional PBM

PROČ TO TEDY NEFUNGUJE?

Protože... problémem není princip, ale implementace !



Céspedes et al. Braz. J. Cardiovasc. Surg. 39 (5) • 2024

NA CO REAGUJEME

Hofmann et al. *BMC Health Services Research* (2021) 21:634
<https://doi.org/10.1186/s12913-021-06484-3>

RESEARCH ARTICLE

Open Access

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

Axel Hofmann^{1,2†}, Donat R. Spahn^{1†}, Anke-Peggy Holtorf^{3,4*†}  and PBM Implementation Group

Abstract

Background: Patient blood management (PBM) describes a set of evidence-based practices to optimize medical and surgical patient outcomes by clinically managing and preserving a patient's own blood. This concept aims to detect and treat anemia, minimize the risk for blood loss and the need for blood replacement for each patient through a coordinated multidisciplinary care process. In combination with blood loss, anemia is the main driver for transfusion and all three are independent risk factors for adverse outcomes including morbidity and mortality. Evidence demonstrates that PBM significantly improves outcomes and safety while reducing cost by macroeconomic magnitudes. Despite its huge potential to improve healthcare systems, PBM is not yet adopted broadly. The aim of this study is to analyze the collective experiences of a diverse group of PBM implementors across countries reflecting different healthcare contexts and to use these experiences to develop a guidance for initiating and orchestrating PBM implementation for stakeholders from diverse professional backgrounds.

Methods: Semi-structured interviews were conducted with 1–4 PBM implementors from 12 countries in Asia, Latin America, Australia, Central and Eastern Europe, the Middle East, and Africa. Responses reflecting the drivers, barriers, measures, and stakeholders regarding the implementation of PBM were summarized per country and underwent qualitative content analysis. Clustering the resulting implementation measures by levels of intervention for PBM implementation informed a PBM implementation framework.

Results: A set of PBM implementation measures were extracted from the interviews with the implementors. Most of these measures relate to one of six levels of implementation including government, healthcare providers, funding, research, training/education, and patients/public. Essential cross-level measures are multi-stakeholder communication and collaboration.

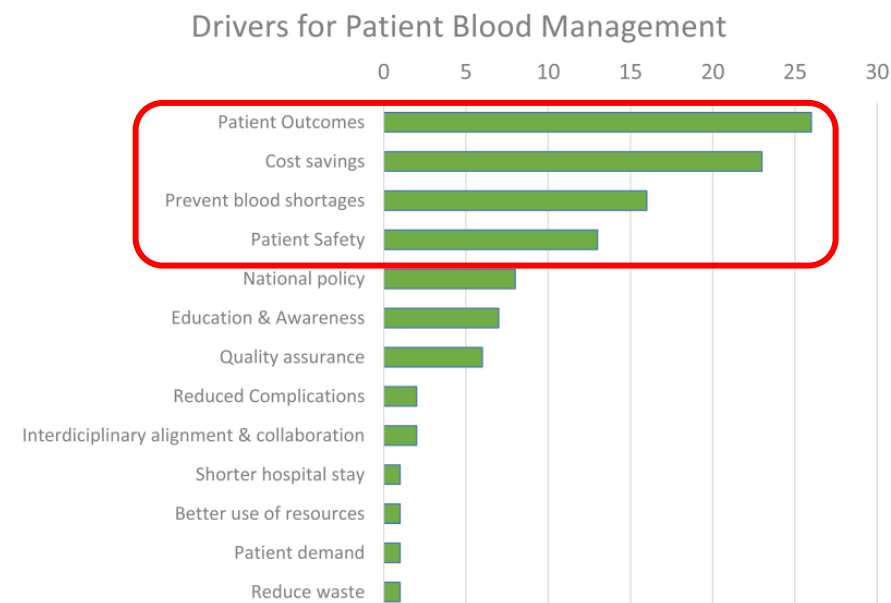


Fig. 1 Drivers for Patient Blood Management. Quantitative evaluation of all drivers mentioned by the interviewees when asked the question "What could be the main drivers for Patient Blood Management – Why is Patient Blood Management needed?". The responses were spontaneous and unprompted. (N = 46) The driving factors were sorted by the total number of mentions (top to bottom decreasing). Note: The number of mentions is not a measure for the strength of a specific driver. Education & Awareness is abbreviated for 'education and awareness relating to the risks of transfusion and the benefits of Patient Blood Management'

KOHO TO ZAJÍMÁ

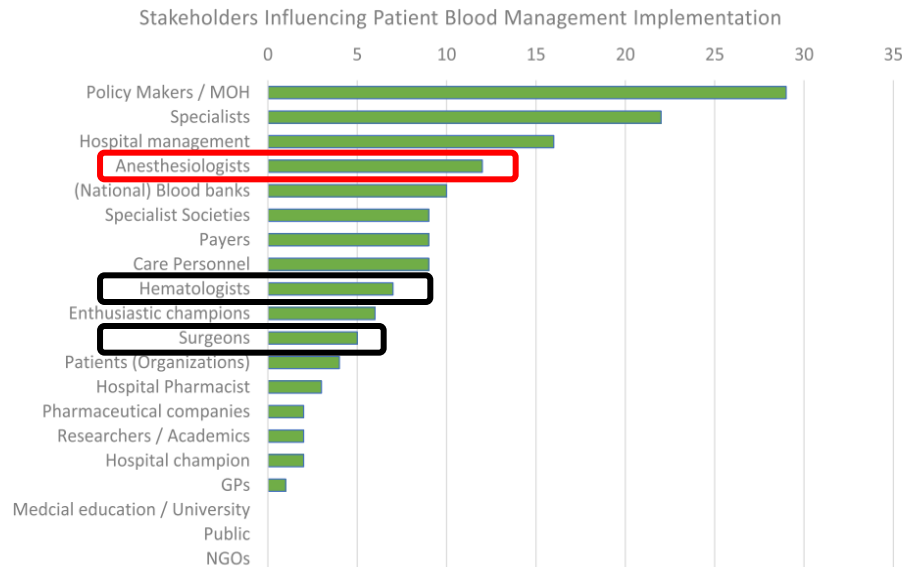


Fig. 3 Stakeholders Influencing Patient Blood Management Implementation. Quantitative evaluation of categories mentioned by the interviewees to the question "Who in your opinion will be the essential stakeholders who will have to be involved / convinced?". The responses were spontaneous and unprompted. (N = 46) The stakeholder types were sorted by the total number of mentions (top to bottom decreasing). Note: The number of mentions is not a measure for the importance of a specific stakeholder. Medical education, Non-governmental organization (NGO) and the Public were not mentioned as important stakeholders specifically, but they were mentioned in other parts of the interview as important groups and therefore were added for completeness

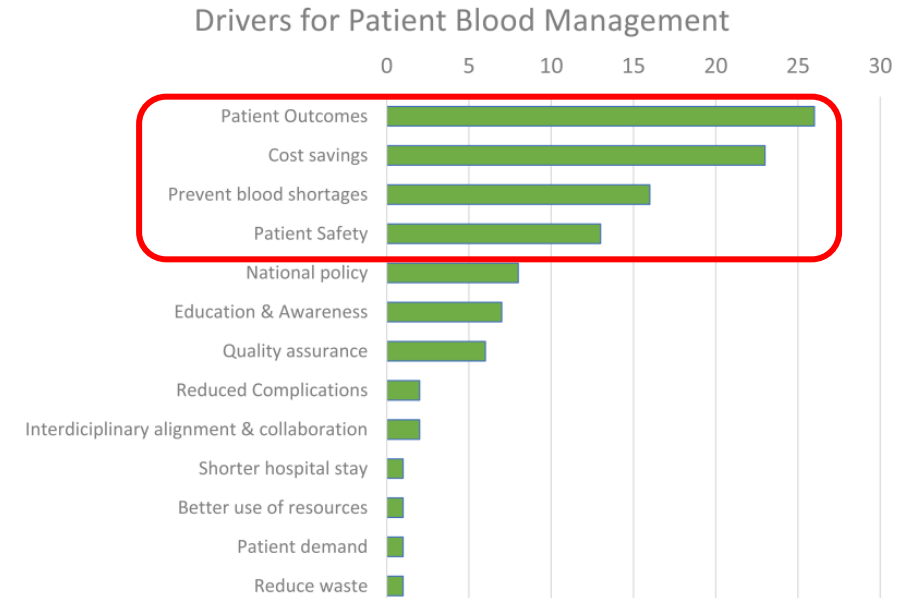
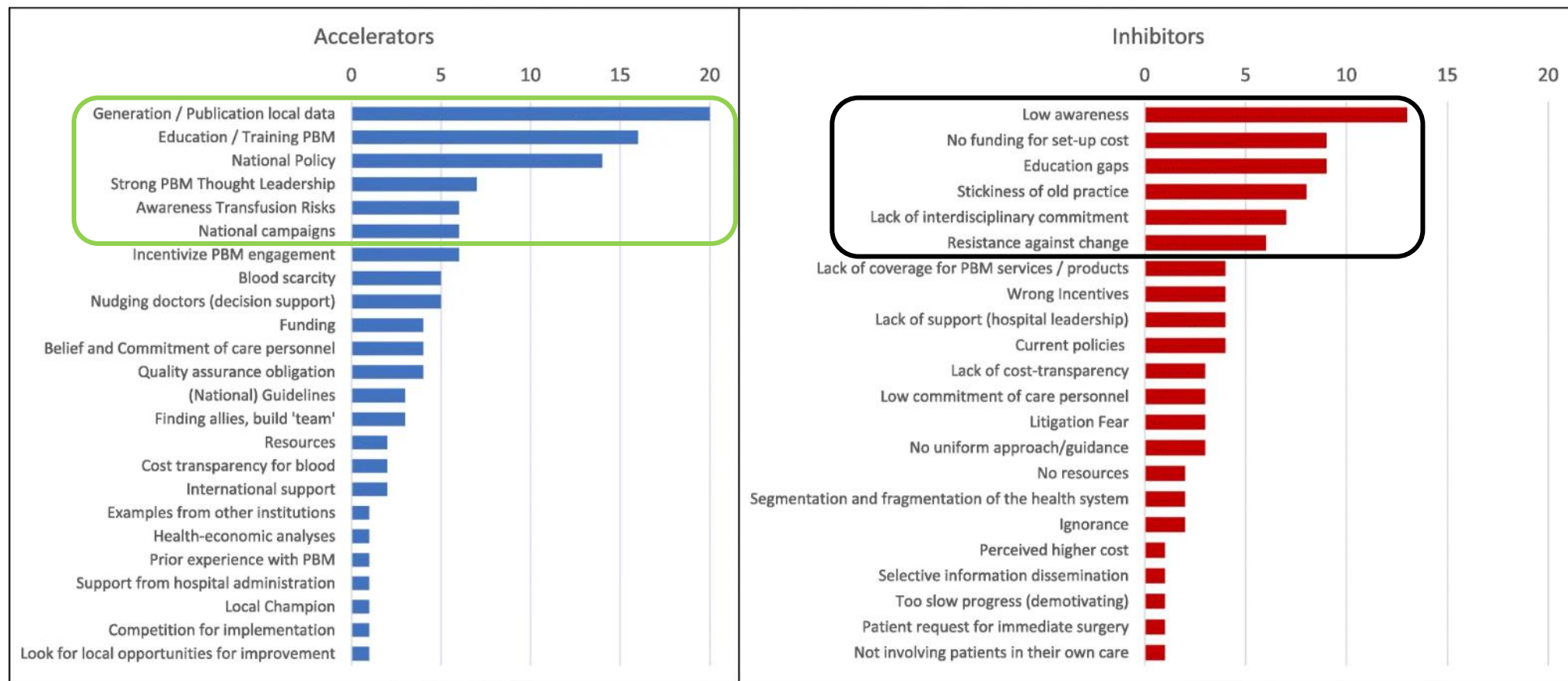


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PODPORA A PŘEKÁŽKY ZAVEDENÍ

Accelerators and Inhibitors for Patient Blood Management



Hofmann A, et al. *BMC Health Services Res* 2021;21:634.

Úspěšné kampaně ale existují...

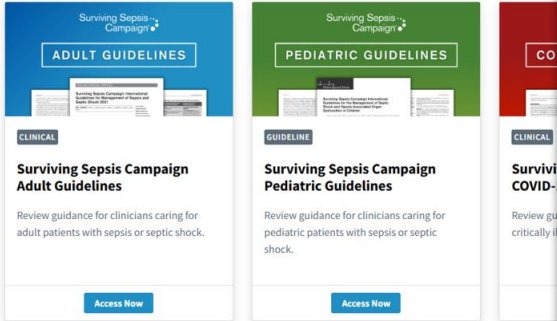
Surviving Sepsis Campaign

Protokoly masivní transfuze (MTP) při traumatu

Peripartální krvácení (PPH)

About Surviving Sepsis Campaign

The international Surviving Sepsis Campaign (SSC) is a joint initiative of the **Society of Critical Care Medicine** (SCCM) and the **European Society of Intensive Care Medicine** (ESICM), led by multidisciplinary international experts who are committed to reducing mortality and morbidity from sepsis and septic shock, which are leading causes of death worldwide.



Outcomes of the Surviving Sepsis Campaign in intensive care units in the USA and Europe: a prospective cohort study

Mitchell M Levy, Antonio Artigas, Gary S Phillips, Andrew Rhodes, Richard Beale, Tiffany Osborn, Jean-Louis Vincent, Sean Townsend, Stanley Lemeshow, R Phillip Dellinger

	USA	Europe	p value*
Count	18 766 (74.0%)	6609 (26.0%)	
Hospital mortality	5313 (28.3%)	2719 (41.1%)	<0.0001
Hospital mortality if origin is emergency department	3008 (24.6%)	736 (34.1%)	<0.0001
Hospital mortality if origin is ward	1661 (34.9%)	1481 (43.5%)	<0.0001
Hospital mortality if origin is ICU	644 (36.1%)	502 (48.0%)	<0.0001

	USA (N=18 766)	Europe (N=6609)	p value
Compliance with all applicable elements of sepsis resuscitation bundle	21.6%	18.4%	<0.0001
Broad-spectrum antibiotic given within 3 h of admission to emergency department or 1 h of non-emergency department admission	70.8%	63.9%	<0.0001
For hypotension or lactate concentration >4 mmol/L, 20 mg/kg crystalloid fluid bolus delivered followed by vasopressors if needed to maintain MAP ≥65 mm Hg	70.0%	72.6%	0.0001

Levy MM, et al. *Lancet Infect Dis* 2012;12:919–24.

Crit Care Med 2010 Vol. 38, No. 4

Impact of the Surviving Sepsis Campaign protocols on hospital length of stay and mortality in septic shock patients: Results of a three-year follow-up quasi-experimental study*

Álvaro Castellanos-Ortega, MD, PhD; Borja Suberviola, MD; Luis A. García-Astudillo, MD; María S. Holanda, MD; Fernando Ortiz, MD; Javier Llorca, MD, PhD; Miguel Delgado-Rodríguez, MD, MPH, PhD

Table 2. Comparison between the historical and the intervention groups

	Historical Group n = 96 (20%)	Intervention Group n = 384 (80%)	p
Outcome measurements			
Hospital mortality, n (%)	55 (57.3)	144 (37.5)	.001
Standardized mortality ratio	1.05 ± 0.18	0.75 ± 0.13	.139
ICU mortality, n (%)	51 (53.1)	117 (30.5)	<.001
Hospital LOS for all patients, days	26.5 ± 23.9	30.6 ± 33.2	.435
ICU LOS for all patients, days	9.9 ± 9.3	9.1 ± 10.4	.235
Hospital LOS for survivors, days	41.0 ± 26.3	36.2 ± 34.8	.043
ICU LOS for survivors, days	11.0 ± 9.5	8.4 ± 9.8	.004

Results are mean ± so unless indicated otherwise. ICU, intensive care unit; LOS, length of stay.

Castellanos-Ortega A, et al. *Crit Care Med* 2010;38:1036–43.

Protocol
Key differences

Protocol
for emergency department
to ensure

low flow
narrow
enable
can be

	Historical Group n = 96 (20%)	Intervention Group n = 384 (80%)	p
Time from severe sepsis presentation to ICU admission, hr	11.7 ± 13.5	9.2 ± 14.4	<.001
Compliance with 6-hr resuscitation bundle, n (%)			
Serum lactate measured	15 (15.6)	288 (75.0)	<.001
Blood cultures before antibiotics	36 (37.5)	210 (56.7)	.003
Early broad-spectrum antibiotics	47 (49.0)	220 (57.3)	.168
Intravenous fluids delivered	57 (59.4)	322 (83.9)	.037
Mean arterial pressure ≥65 mm Hg achieved	71 (74.0)	257 (66.9)	.187
Central venous pressure ≥8 mm Hg achieved	68 (70.8)	288 (75.0)	.435

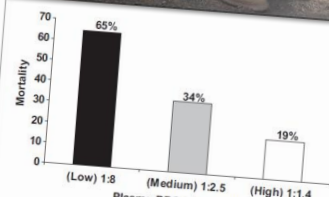
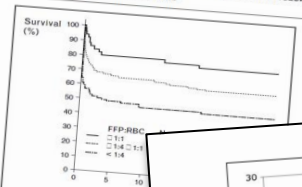


Fig. 1. Percentage mortality associated with low, medium, and high plasma to RBC ratios transfused at admission. Ratios are median ratios per group and include units of fresh whole blood counted both as plasma and RBCs.



Figure 1 Survival curves for each category of fresh frozen plasma:packed red blood cell ratio



The lowest mortality was observed in patients who received a ratio of fresh frozen plasma (FFP:PRBCs) equal to or greater than 1:1.5. The survival curve occurred immediately.

Borgman MA, et al. *J Trauma* 2007;63:805-13;
Griffie M, et al. *Curr Opin Anaesthesiol* 2010;23:263-8.

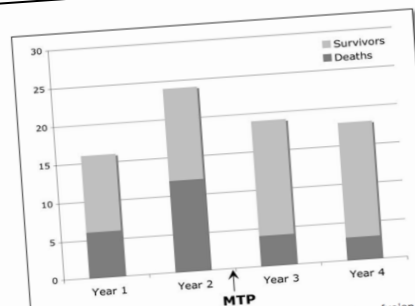


Figure 2. Patient survival by year. MTP, massive transfusion protocol.

Table 2. Mean Units and Ratios of Product Used, Pre- and Postmassive Transfusion Protocol Implementation

Product and ratio	Pre-MTP, mean (95% CI)	Post-MTP, mean (95% CI)	p Value
PRBCs	23.9 (18.7-29.1)	20.5 (15.5-25.5)	0.34
FFP	12.3 (9.6-15.0)	10.7 (7.8-13.6)	0.42
Plt	2.3 (1.7-2.9)	2.8 (1.8-3.7)	0.41
FFP:PRBCs	1:1.8 (1:1.5-1:2.2)	1:1.8 (1:1.5-1:2.1)	0.97
Plt:PRBCs	1:1.7 (1:1.4-1:2.1)	1:1.3 (1:1.1-1:1.5)	0.05*

*Statistically significant; $p \leq 0.05$.
FFP, fresh frozen plasma; MTP, massive transfusion protocol; Plt, platelets; PRBCs, packed red blood cells.

Table 3. Mean Minutes to First Transfusion of Type-Specific Blood Products Before and after Implementation of Massive Transfusion Protocol

Product	Pre-MTP, mean (95% CI)	Post-MTP, mean (95% CI)	p Value
PRBCs	115 (85-146)	71 (49-93)	0.02*
FFP	254 (185-323)	169 (130-209)	0.04*
Platelets	418 (316-519)	241 (169-311)	0.01*

*Statistically significant; $p \leq 0.05$.
FFP, fresh frozen plasma; MTP, massive transfusion protocol; PRBCs, packed red blood cells.

The Role of Massive Transfusion Protocols in Obstetrics

Luis D. Pacheco, MD^{1,2} George R. Saade, MD¹ Magd M. Costantine, MD¹ Steven L. Clark, MD¹
Gary D.V. Hankins, MD¹

¹Division of Maternal-Fetal Medicine, Department of Obstetrics and Gynecology, The University of Texas Medical Branch, Galveston, Texas
²Division of Surgical Critical Care, Department of Anesthesiology, The University of Texas Medical Branch, Galveston, Texas
³Perinatal and Neonatal Clinical Program, Hospital Corporation of America, Salt Lake City, Utah

... čas je důležitější než poměr!

The combination of early recognition and intervention may be more important than a specific administration ratio of blood products.

Riskin DJ, et al. *J Am Coll Surg* 2009;209:198-205.

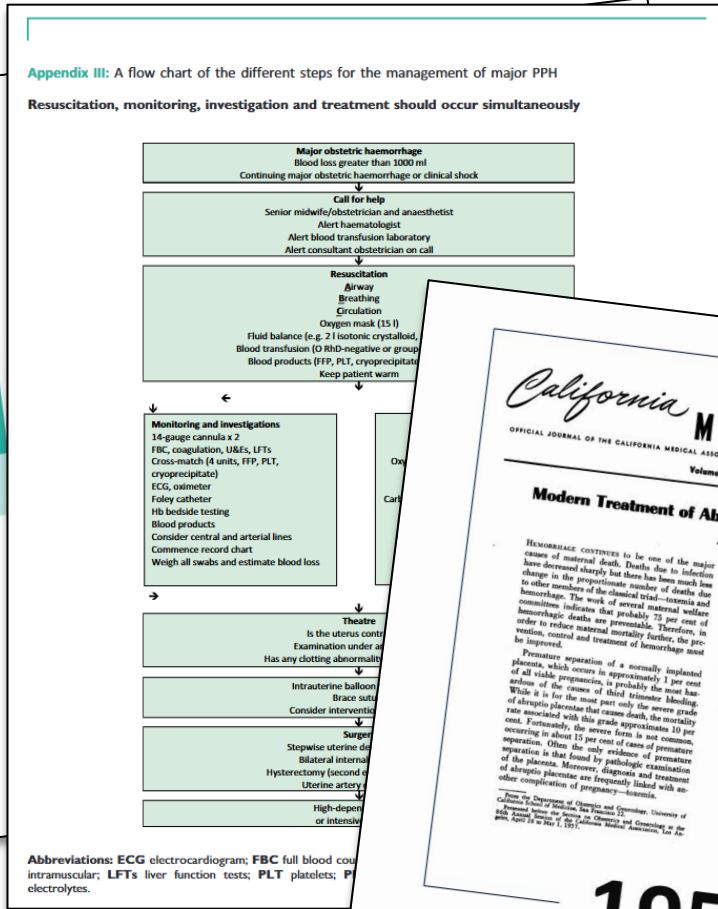
Prevention and Management of Postpartum Haemorrhage

Green-top Guideline No. 52
December 2016

Please cite this paper as: Mavrides E, Allard S, Chandraran E, Collins P, Green L, Hunt BJ, Kiris S, Thomson AJ on behalf of the Royal College of Obstetricians and Gynaecologists. Prevention and management of postpartum haemorrhage. BJOG 2016;124:e106-e149.

Mavrides E, et al. BJOG 2016;124:e106-e149.

XXXI.



Modern Treatment of Abruption Placentae

JAMES A. MERRILL, M.D., San Francisco

75 % úmrtí na krvácení lze pravděpodobně předejít

1957

XXXI.

Epidemiology and definition of PPH worldwide

Jan Blaha (Associate Professor) & Tereza Bartošová Anaesthetist

Department of Anaesthesiology and Intensive Care Medicine, First Faculty of Medicine, Charles University and General University Hospital in Prague, U Nemocnice 2, 128 08, Prague 2, Czech Republic

Available online 10 December 2022.

Zpoždění léčby až v 90 % PPH

67 % úmrtí v USA a 85 % ve Francii bylo možné předejít!!

2022

Co pro to můžeme udělat ...?

... nejdříve analyzovat situaci





- Jasná evidence o prospěchu PBM z pohledu výsledků zdravotní péče i ekonomiky financování zdravotní péče (snížení celkových nákladů na poskytovanou péči) = **NEMUSÍME PŘESVĚDČOVAT O VÝZNAMU**
- Výzva EU k implementaci PBM v jednotlivých zemích a existence národních PBM programů ve srovnatelných zemích (Rakousko, Německo) = **NEMUSÍME STAVĚT „NA ZELENÉ LOUCE“**

STRENGTHS

SILNÉ STRÁNKY-
čím vybočujete z
průměru



- Jasná evidence o prospěchu PBM z pohledu výsledků zdravotní péče i ekonomiky financování zdravotní péče (snížení celkových nákladů na poskytovanou péči) = **NEMUSÍME PŘESVĚDČOVAT O VÝZNAMU**
- Výzva EU k implementaci PBM v jednotlivých zemích a existence národních PBM programů ve srovnatelných zemích (Rakousko, Německo) = **NEMUSÍME STAVĚT „NA ZELENÉ LOUCE“**
- Nástrojem PBM jsou převážně organizační změny v procesu poskytování perioperační a chirurgické péče, plus účelnost a bezpečnost hemoterapie = **NEMUSÍME VYTVÁŘET NOVÉ LÉČEBNÉ POSTUPY**
- Zavedení PBM nevyžaduje zvláštní přístrojové nebo stavební investice, jde primárně o účinnější organizaci a synchronizaci běžně dostupných postupů při poskytování léčebné péče = **NEZVYŠUJE NÁKLADY**

STRENGTHS

SILNÉ STRÁNKY-
čím vybočujete z
průměru



- snadno popularizovatelné = **MOTIVACE PACIENTŮ**



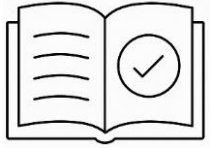
WEAKENESSES

SLABÉ STRÁNKY-
co je třeba
vyvážit



- Pacient v ČR nemá zaručenu bezpečnou transfuzní léčbu a mnozí lékaři ani netuší, co to znamená a jak by k tomu mohli přispět.
- Přístup k podávání transfuzí je v ČR obecně zastaralý, převládá spíše benevolentní přístup.
- Transfuze jsou často podávány bez zřetelné a plně obhajitelné indikace, nemocnice nemají vypracovány lokální indikační kritéria, ani auditovatelné indikátory transfuzní léčby.
- Nemocnic nemají často vypracovány **SPECIFICKÉ LOKÁLNÍ PROTOKOLY** (ani pro léčbu závažného krvácení)

DOPORUČENÍ vs PROTOKOL



Říká, co máte dělat

- Pro komplexní klinická rozhodnutí
- Založené na důkazech pro široké klinické rozhodování
- Když je k dispozici více možností
- Vydávají národní/mezinárodní organizace
- Poradní, nezávazné x 'lege artis'
- Vysoká flexibilita
- Široký záběr
- Náročné aktualizovat (za několik let)



Říká, jak to dělat

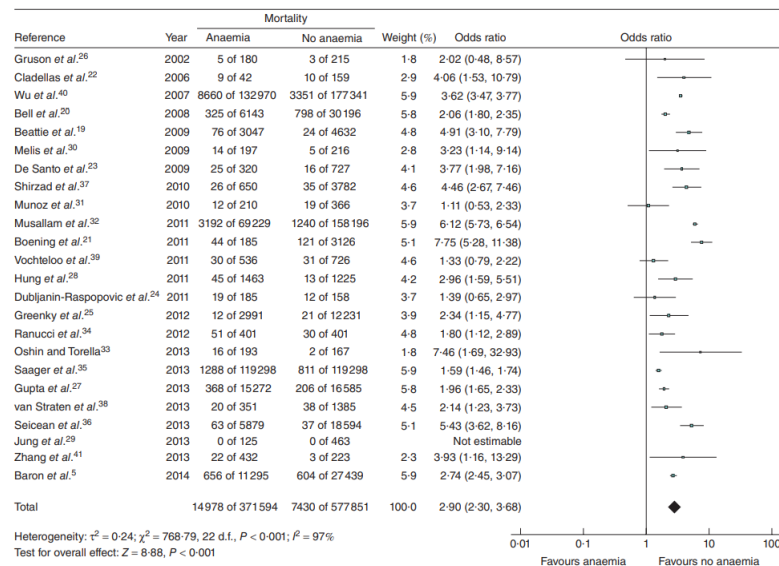
- Pro konkrétní instituci a konkrétní scénáře
- Postavená na doporučeních
- Zajistit včasnou a konzistentní odezvu
- Definuje, co dělat, jak to dělat, kdo je zodpovědný a v jakém časovém rámci
- Závaznost v rámci instituce
- Nízká flexibilita
- Úzký rozsah
- Umožňuje jasné sledování souladu s předpisy
- Lze kdykoli aktualizovat

OPPORTUNITIES

PŘÍLEŽITOSTI -
včas rozpoznat a
reagovat



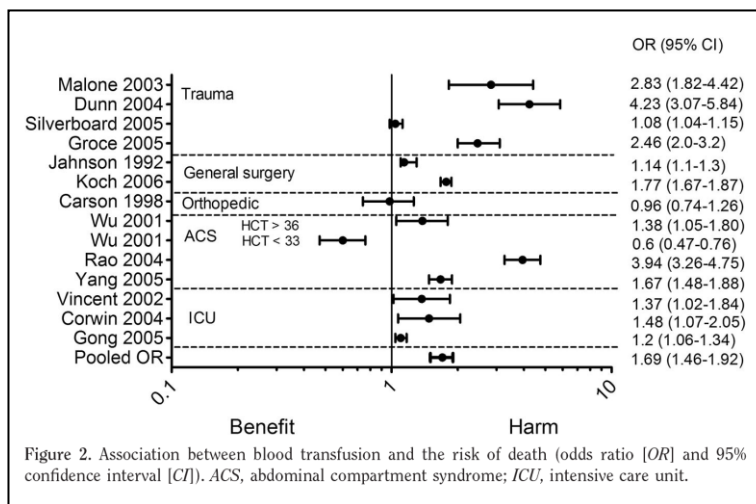
▪ Zavedení nových postupů vedoucích k zlepšení péče o pacienty



Fowler. *BJS* 2015; 102: 1314-1324

Efficacy of red blood cell transfusion in the critically ill: A systematic review of the literature*

Paul E. Marik, MD, FACP, FCCM, FCCP; Howard L. Corwin, MD, FACP, FCCM, FCCP



Marik. *Crit Care Med* 2008; 36:2667-2674

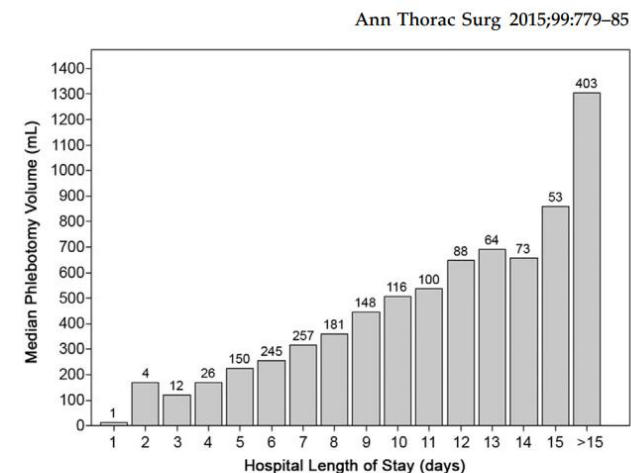


Fig 3. Hospital length of stay and cumulative median phlebotomy volume. The numbers above each bar represent the number of patients with that length of stay and median phlebotomy volume. As length of stay increases, the median phlebotomy volume increases in a dose-dependent manner.

OPPORTUNITIES

PŘÍLEŽITOSTI -
včas rozpoznat a
reagovat



- **Zavedení nových postupů vedoucích k zlepšení péče o pacienty**
- **Zavedení postupů PBM jako auditovatelného indikátoru kvality poskytované péče.**
- Zavedení administrativních/ekonomických nástrojů ze strany státních orgánů/plátců zdravotní péče, jež by motivovaly zdravotnická zařízení k zavedení programu PBM do rutinní klinické praxe.
- Vytvoření edukačního systému ve spolupráci pojišťoven, farmaceutických firem (?) a odborných společností, a to včetně programů využívajících metody simulační medicíny (certifikované kurzy).



- Nepodaří se vytvořit materiál konsensuálně přijatý odbornými společnostmi a plátcí péče
- nebo bude materiál příliš komplikovaný.



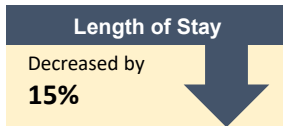
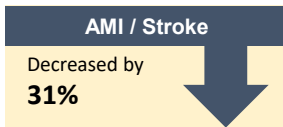
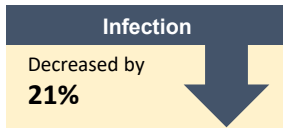
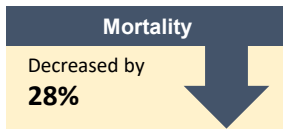
- Nepodaří se vytvořit materiál konsensuálně přijatý odbornými společnostmi a plátcí péče
- nebo bude materiál příliš komplikovaný.
- Nepodaří se zajistit dostatečnou edukaci zdravotnického personálu (lékařů i sester).
- Nepodaří se vytvořit dostatečné nástroje motivující poskytovatele péče (praktické lékaře a zdravotnická zařízení) k implementaci potřebných změn pro zavedení PBM.
- Nepodaří se udržet odpovídající podporu zavedení programu ze strany MZ

Real-life PBM programy

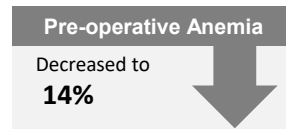
STATE-WIDE WESTERN AUSTRALIA DEPARTMENT OF HEALTH PBM PROGRAM¹



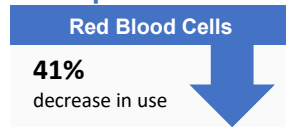
Improvement of Patient Outcomes



Improved Key Program Indicators



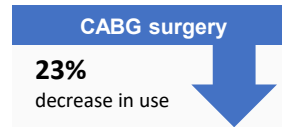
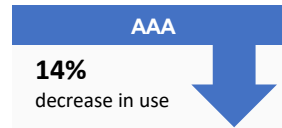
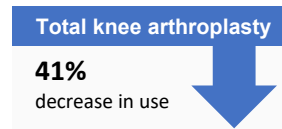
Blood & Plasma products



CANADIAN PROVINCIAL PBM PROGRAM OnTRAC²



Blood & Plasma products



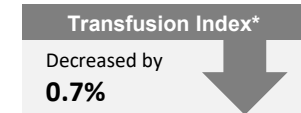
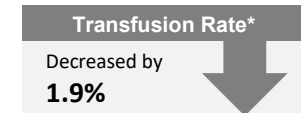
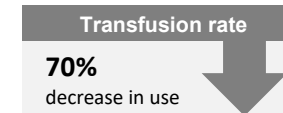
AUSTRIAN INSTITUTIONAL PROGRAMS²



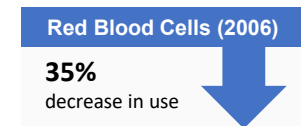
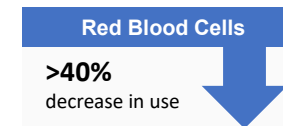
General Hospital Linz
(2008-14)

Landeskrankenhaus
Gänserndorf-
Mistelbach

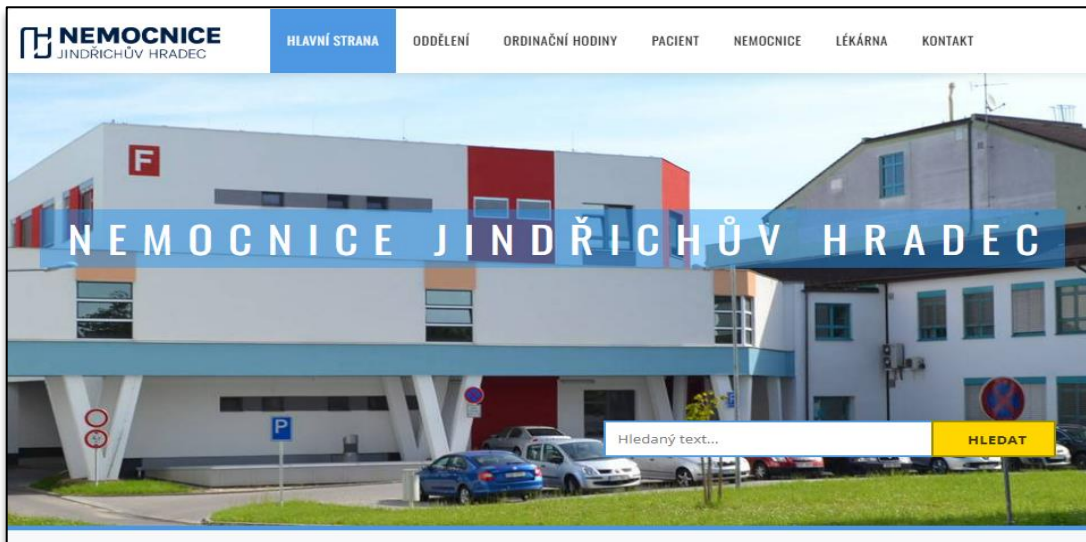
Improved Key Program Indicators



Blood & Plasma products



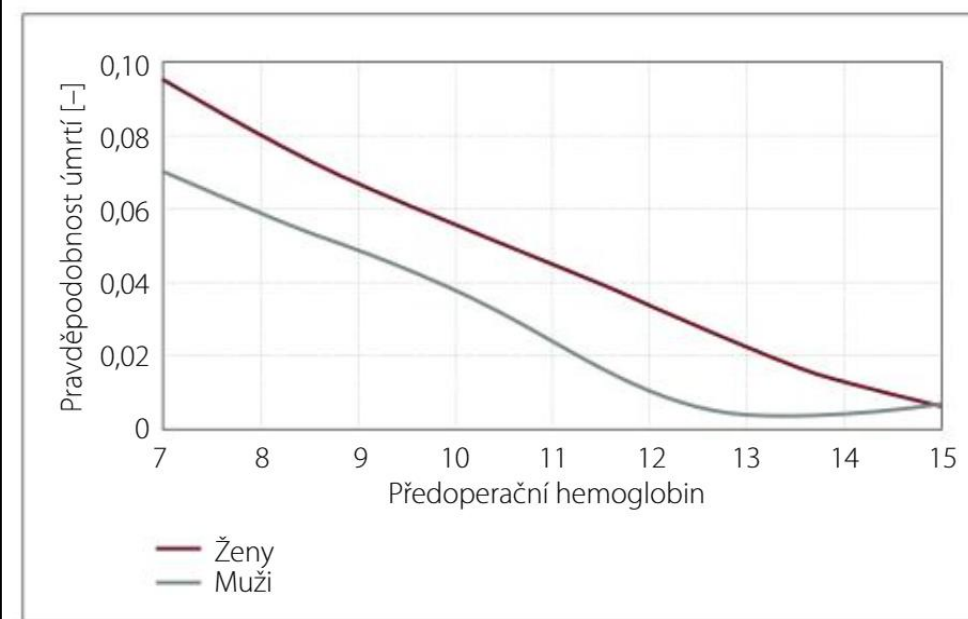
Adapted from: EC PBM Guideline for Hospitals, pages 44-46



Tabulka 1 Srovnání některých parametrů v prvních šesti měsících let 2023 a 2024. Vlastní zpracování.

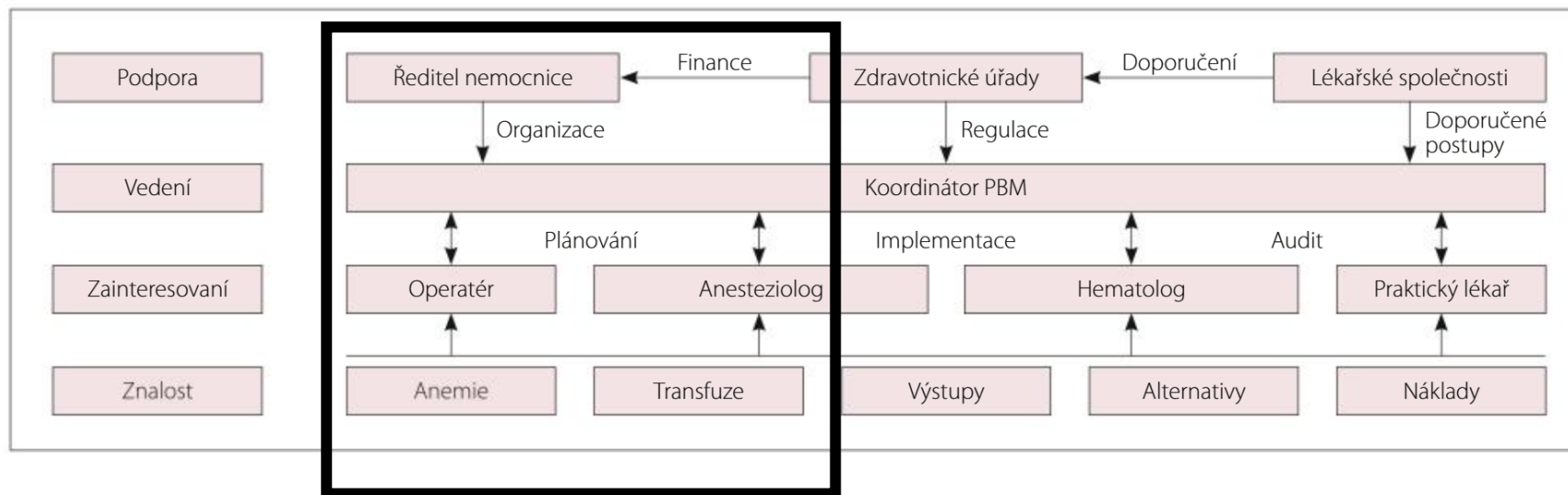
Operační výkon	TEP kyčle	TEP kolene
Počet operací		
2023	107	69
2024	141	104
Spotřeba krve na jednu operaci		
2023	0,37	0,29
2024	0,18	0,11
Délka hospitalizace (dny, průměrně)		
2023	9,11	8,87
2024	7,52	6,84

Obrázek 1 Devadesátidenní mortalita mužů a žen v závislosti na předoperační hladině hemoglobinu. Upraveno podle [5].



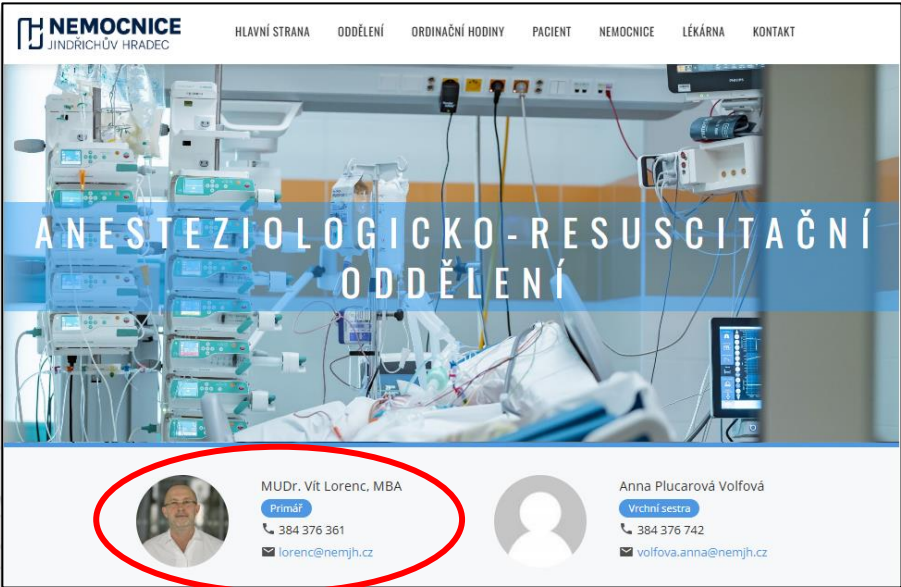
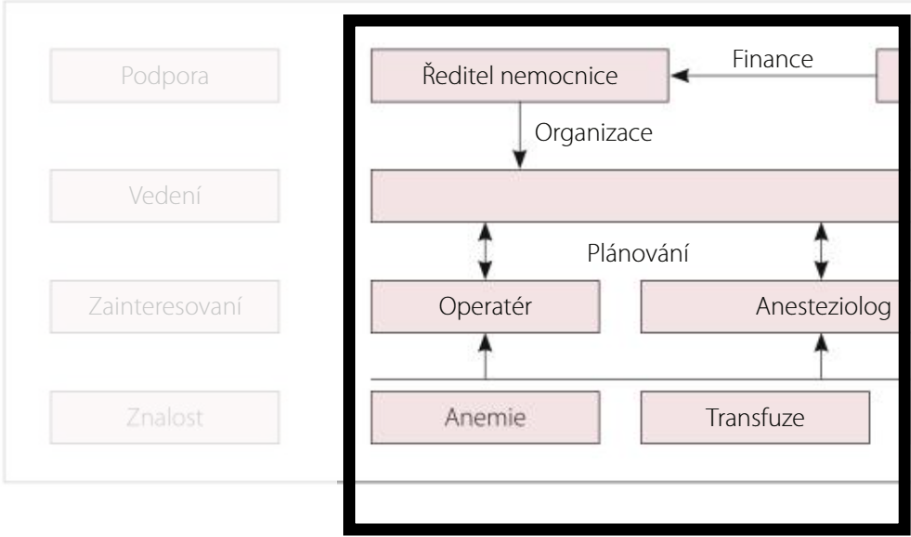
Proč zrovna tam uspěli ?

Obrázek 2 Organizační schéma implementace PBM. Upraveno podle [4].



Proč zrovna tam uspěli

Obrázek 2 Organizační schéma implementace PBM. Upraveno podle [4].

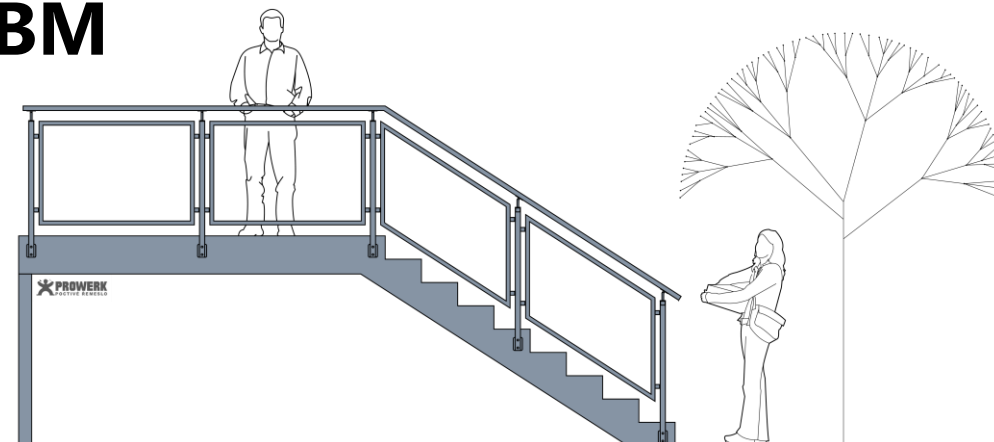


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Tisková mluvčí	Mgr. Šárka Velimská	720 824 748	velimska.sarka@nemjh.cz
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Vedoucí ekonomického oddělení	Ing. Klára Mayerová	384 376 763	mayerova.klara@nemjh.cz



ÚPĚŠNÁ STRATEGIE IMPLEMENTACE PBM

- Včasná identifikace klíčových zainteresovaných stran
- Silné vedení a klíčoví odborníci v klinické praxi
- Vzdělávání a školení
- Multidisciplinární pracovní skupina
- Vypracování protokolu
- Pilotní projekt
- Sledování a audit dat
- Plné zavedení



IT'S ABOUT TIME

jan.blaha@vfn.cz