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EDITORIAL

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Advancing healthcare equity through patient blood management: Useful insights from a lower middle-income state

In 2021, the World Health Organization (WHO) called on all member states to urgently implement patient blood management (PBM) as a standard of care to improve outcomes for hundreds of millions of individuals while reducing overall healthcare expenditures [1]. Opportunities to establish a public health priority that yields more for less are rare and should be seized without hesitation. However, shifting the care paradigm towards PBM is complex and challenging. Major structural and process changes are required at different levels of national and jurisdictional healthcare systems as well as local hospitals and clinics. It also means a change in culture to overcome complacency and correct deep-rooted misconceptions within the medical establishment [2]. This is why fully implemented PBM programmes are still the exception even in the most medically advanced countries.

This raises the important question of whether extreme resource constraints in lower income countries further complicate the implementation of PBM or, to the contrary, offer an opportunity to alleviate these constraints and improve equity and access to healthcare. Change in healthcare is notoriously difficult because of a variety of factors, including the complexity of systems, regulatory and compliance requirements, financial constraints, the need for cross-disciplinary coordination, patient safety concerns and, perhaps most importantly, cultural factors and resistance to change.

As an answer to this critical question and the barriers to systemic change in healthcare delivery, the study by Brunetta et al. [3] published in the current issue of *Vox Sanguinis* offers a compelling narrative of success from Ceará, Brazil, a lower middle-income state by World Bank classification. Formalized by a 2016 state decree, Centro de Hematologia e Hemoterapia do Ceara, the state public blood centre and institution responsible for coordinating blood policy, was commissioned to implement a comprehensive health system-wide PBM programme. At its core, the implementation relied on government support, innovative education strategies and multidisciplinary collaboration. Pathways of care for different patient populations were revised with proactive involvement of anaesthesiologists, surgeons, haematologists, nurses, primary care physicians and pharmacists. Five outpatient clinics for diagnosing and managing anaemia were installed throughout the state, several perioperative anaemia clinics were established, referral and treatment processes for gynaecological patients with abnormal uterine bleeding were optimized and damage control resuscitation protocols for trauma patients were put in place. Where indicated, the use of cell salvage or normovolaemic haemodilution, as well as the administration of erythropoietin, intravenous iron, vitamin B12 and antifibrinolytics, became treatment standards. Real-time viscoelastic coagulation testing was introduced to optimize haemostasis and reduce blood loss. Adherence to a single-unit red cell transfusion policy with restrictive (conservative) transfusion thresholds reflected the effort to harness patient-specific anaemia tolerance.

With these educational, technological and clinical investments into blood health, Ceará's health system achieved substantial cost savings, exemplifying the potential for transformative healthcare improvements: Over 8 years, the accumulated direct costs of PBM measures were approximately $0.92 million, compared with direct cost savings of $4.77 million from reducing red blood cell utilization alone. Activity-based cost savings of transfusion were estimated to be as high as $23.8 million. Fully implemented PBM programmes in high-income countries have already demonstrated exceptional returns on investment with PBM [4, 5]. The programme in Ceará has now demonstrated that similar rates of return with PBM can be generated in lower middle-income regions of the world.

Despite the measurable success of Ceará's programme, some may argue that the study provides no evidence on improved patient-level outcomes. Without question, it would add value to have these clinical data. Nonetheless, given the burgeoning amount of patient-level evidence on the positive impact of PBM on morbidity, mortality, complications and mean length of hospital stay, and the aforementioned call to action of the WHO policy brief, the primary question is no longer whether PBM improves outcomes. This would be akin to questioning the benefit of comprehensive sepsis management in a study that describes the successful implementation of such management in a low-resource setting. Instead, the take-home message from the Ceará experience is that PBM implementation is feasible even under significant economic constraints and can free up resources for additional impactful local healthcare interventions.

These findings echo and reinforce the WHO's assertion that PBM can alleviate healthcare disparities by optimizing limited resources and enhancing efforts at universal health coverage. The WHO's most recent publication on PBM, titled *Guidance on Implementing Patient Blood Management to Improve Global Blood Health Status*, introduced the newly developed "8-model" [6]. It is a structured pathway for complex and comprehensive system

implementation in large sectors including the national healthcare system and surmounting the barriers to change. As was seen in Ceará's PBM implementation, it includes preparation and education, pilot testing and phased rollouts. Along with different PBM toolkits that were distinctly developed for specific patient populations and diverse resource levels, this new guidance document navigates the challenges that national and jurisdictional health authorities will encounter in making PBM the standard of care to achieve and maintain blood health for many in need.

When looking at this new guidance, including the PBM toolkit for lower and upper middle-income countries, Ceará's PBM leads will realize they have achieved an advanced level of PBM compliance. At the same time, they might also identify opportunities to further develop and broaden their programme. This could include the expansion of their multi-disciplinary PBM collaboration and technological integration, anchoring PBM within the current quality and safety framework, making PBM education mandatory, continuously updating and refining the respective curricula, systematically empowering patients on PBM, setting mandatory clinical PBM standards and starting regular auditing of each single hospital's PBM programme. Furthermore, establishing a PBM data collection and reporting system on the programme's impact on patient outcomes will be instrumental for further programme improvements and sustaining their momentum.

Brunetta et al. should be congratulated on their remarkable progress. As the global community strives to make healthcare equitable and sustainable, health authorities in other resource-constrained regions should look at Ceará's proof of principle, aiming to replicate its success and leverage similar significant health-economic benefits.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

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REFERENCES

1. World Health Organization. The urgent need to implement patient blood management: policy brief. Geneva: World Health Organization; 2021.
2. Hofmann A, Shander A, Blumberg N, Hamdorf JM, Isbister JP, Gross I. Patient blood management: improving outcomes for millions while saving billions. What is holding it up? Anesth Analg. 2022;135:511–23.
3. Brunetta DM, Mesquita Carvalho LE, Martins Beserra N, de Farias Lima CM, Barbosa Monteiro CML, de Facundo Alencar Araripe L, et al. Successful implementation of a patient blood management programme in a lower middle-income state. Vox Sang. 2024. https://doi.org/10.1111/vox.13772
4. 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.
5. Pavenski K, Howell A, Mazer CD, Hare GMT, Freedman J. ONTraC: a 20-year history of a successfully coordinated provincewide patient blood management program: lessons learned and goals achieved. Anesth Analg. 2022;135:448–58.
6. Guidance on implementing patient blood management to improve global blood health status. Geneva: World Health Organization; 2025.