Getting to outcomes (GTO) approach towards stewardship of patient blood management for the Malaysian health care system

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ABSTRACT

Introduction: The Patient Blood Management (PBM) program provides optimal stewardship of limited blood resources using evidence-based practice. PBM applies evidence-based strategies for reducing costs and improving patient outcomes while conserving scarce blood bank resources. However, implementing a PBM program requires multidisciplinary collaboration, organizational support, organizational change, and motivating a wide range of stakeholders. The COVID pandemic has abridged blood donations globally to the point that there is a chronic critical shortage in many locations.

Materials and Methods: This paper explored the application of the Getting To Outcomes® (GTO) implementation science framework to support effective PBM implementation. GTO integrates Readiness Assessment and Empowerment Evaluation techniques to assess local needs, build capacity, and ensure stakeholder alignment. These methods are particularly useful for adapting programs to dynamic healthcare environments.

Results: Evidence from the literature indicates that GTO enhances organizational readiness, engages diverse stakeholders, and promotes sustainable implementation. The structured 10-step process of GTO enables PBM programs to be tailored to local settings. A hub-and-spoke peer-mentoring model is also proposed to support wider adoption.

Conclusion: Systematic execution and sustainability of PBM Programs is facilitated by structural approach of the implementation of science in adapting PBM programs to local needs, using framework such as the Readiness Assessment and Empowerment Evaluation from the Getting to Outcomes model. Successful implementation guided by this framework could support the development of hub-and-spoke networks of peer mentorship and help fulfill the World Health Organization's call to strengthen patient blood management worldwide.

KEYWORDS:
Implementation Science strategies, Patient Blood Management, Getting to Outcomes

INTRODUCTION

Patient blood management (PBM) is a patient-centered, systematic, evidence-based approach to improve patient outcomes by managing and preserving the patient's own blood while promoting patient safety and empowerment.[1] Major topics addressed in the PBM framework include iron deficiency, anemia, blood loss, and coagulopathy.[2–4] Blood transfusion is reserved for situations where all alternative strategies have been evaluated and deemed insufficient, with shared decision-making (SDM) ensuring that patients are actively involved in determining their own care.[5-6] PBM was first introduced in Western Australia in 2008, and since then it expanded worldwide. PBM was endorsed by World Health Assembly Resolution WHA63.12 in 2010.[7] Policy briefs on the urgent need for PBM implementation have been introduced by World Health Organization (WHO) since 2010.[4,8-9]

Iron Deficiency Anemia (IDA) affects 1.24 billion people globally and is a leading cause of long-term disability, especially among women.[10] Preoperative anemia is common, affecting 30–60% of patients undergoing major surgeries.[11] In Malaysia, one in five individuals is anemic, with higher prevalence among women, rural populations, retirees, and low-income groups.[12] Transfusions, while necessary, are linked to increased complications and prolonged hospital stays.[13] A study showed that implementing PBM can reduce transfusion needs and lower costs by approximately RM3,690 per patient annually.[14] Despite its benefits, PBM remains champion-driven rather than standard practice. A key milestone of advancing PBM practice was the launch of Malaysia's National Document Consensus Statement on PBM by the Health Minister on May 16, 2024 which marked a step toward broader implementation and potential cost savings.[15]

While this national initiative is a significant milestone, the sustained implementation of PBM requires a systematic, evidence-based approach. The Getting to Outcomes (GTO) framework provides a structured model for planning, executing, and evaluating PBM strategies to ensure effectiveness and long-term sustainability.

A well-implemented PBM program reduces transfusion risks, adverse events, morbidity, mortality, hospital stays, and medical costs.[1,6,16-18] However, despite strong evidence, resources, and policy support, its adoption remains

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limited.[5,19-20] Global gaps persist due to barriers at multiple levels such as policy, organizational, and multidisciplinary which are further influenced by interpersonal and intrapersonal factors.[19,21-22] Internal barriers, such as healthcare providers' knowledge and attitudes, impact awareness, willingness to change, and adherence to best practices. Meanwhile, external barriers including education, infrastructure, financial constraints, and regulatory policies further hinder implementation.[23-24] Addressing these challenges requires a comprehensive approach that strengthens policy adherence, enhances organizational support, and fosters multidisciplinary collaboration.

Therefore, the formation and effective implementation of a wide-ranging PBM program require evidence-based interventions, multidisciplinary collaboration, organizational readiness, and change to adopt and sustain the program.[19,25-26] The successful execution of an enhanced recovery pathway involves coordinated efforts and education across multiple departments and members of the health care team, also known as "stakeholders." PBM decisions must involve all levels of stakeholders through multidisciplinary, multi-professional, multimodal, and individualized approaches involving general practitioners, care physicians, surgeons, anesthesiologists, hematologists, pharmacists, transfusion medicine specialists, nurses, administrators, and ultimately the patient.[5,19,23] Not coordinating the motivations of these stakeholders can emasculate a PBM program. According to the “Knowledge-Attitude-Behavior Framework”, all stakeholders have to be aware and conversant of the policy and guidelines aligned, afterward knowledge will influence attitudes, and attitudes affect the practice behavior.[24,27] The intertwining between these three is dynamic and sometimes reciprocal.[27]

Implementation

In general, the PBM framework emphases on the risks of iron deficiency, anemia, blood loss, and coagulopathy.[17,18,26] PBM implementation approaches may vary among subspecialties, surgical routes, institutions, and organizational settings. The creation and effective implementation of a comprehensive PBM program require evidence-based interventions and there are communal barriers experienced. However, there is currently no conclusive evidence to suggest which implementation strategies are most effective.[19,22]

GTO is a Prevention Support System intervention, which is conceptualized by the Interactive Systems Framework and provides the necessary guidance and tools, tailored to individual capacity and program performance. The Readiness Assessment, and Empowerment Evaluation techniques developed by GTO align stakeholders in planning, demonstrate local needs, and identify when an organization is ready for policy change or policy sustainability developed by RAND corporation and the University of South Carolina.[25,28-34]

For the implementation of a complex, multidisciplinary initiative like PBM within the MOH hospital system, the GTO framework is recommended as the core operational model due to its pragmatic and structured approach.[29,30] In contrast to frameworks like PRECEDE-PROCEED, which require an exhaustive and potentially resource-prohibitive diagnostic process, GTO offers a well-balanced, 10-step guide that is adequate for the task without being overwhelming for clinical teams operating under resource constraints.[30,35] This flexible structure provides an accessible "roadmap" for frontline staff, fostering a common language essential for aligning diverse stakeholders. Furthermore, its integrated focus on capacity building, planning, and continuous quality improvement directly addresses the primary challenges of standardizing clinical practice and embedding sustained organizational change within a hospital setting.[29,30]

Despite its operational advantages, it is important to recognize the scope of the GTO framework. GTO does not invariably translate to improved final health outcomes. The framework's diagnostic steps are intentionally more streamlined than the deep analysis found in models like PRECEDE-PROCEED which provide just enough structure to guide clinical teams without the burden of an overly complex investigation.[30,35] Similarly, its evaluation components are focused on program-level improvement, which empowers the implementation team through an actionable and manageable process, rather than assessing the broader public health impact detailed in frameworks like RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) or CFIR (Consolidated Framework for Implementation Research).[36] Therefore, GTO serves as a highly effective and motivating engine for implementation, and its efficacy is optimized when its focused, practical steps are understood as a tool to empower the multidisciplinary clinical team through a clear and achievable process. GTO embeds stakeholder engagement and empowerment evaluation throughout the implementation process, enabling diverse teams to co-design strategies, adapt interventions to local contexts, make data-informed adjustments, and build long term capacity for sustainability.[29,30]

GTO 10-step systematic methods bridge the gap between ideal program design and real-world implementation. This validated comprehensive planning approach (manual, training, technical assistance) place the logic and tools of evaluation into the hands of stakeholders, equipping them to address challenges related to program planning, implementation, and success evaluation (See Table II). Empowerment evaluation engages stakeholders in every step of implementation to be accountable in their own specific settings, and to use program data to make mid-course corrections.30 This powerful approach to broadening participation has not been used in PBM. Introduction of this GTO as evidence base intervention into PBM implementation theory is a way forward to advance understanding and the impact.

The planning phase (steps 1-6) focuses on identifying needs, setting goals, assessing resources, and developing strategies to ensure readiness for execution. An advisory team will tailor the GTO framework for PBM, addressing implementation barriers and stakeholder roles. To drive culture change, it is crucial to identify PBM’s key barriers, drivers, and stakeholder roles.[37] The advisory team, with members from key partner organizations, ensures collaboration and adaptability to evolving challenges like

Table I: Stakeholders, accelerators, and challenges/barriers for patient blood management

Stakeholders	Accelerator	Challenges/Barrier
Government Ministry of health	Support from hospital administration and committed PBM committee	No uniform approach- stakeholders- guidance-implementation and monitoring Limited PBM experience
Healthcare provider level	Patient safety	No legal framework, standards, accreditation and quality certification Limited infrastructure and support
Hospital Administrator	National policy and organizational guidelines	Segmentation and fragmentation of health system Number of stakeholders
Primary care physician	Extensive PBM engagement: promotion, education, awareness, publication and certification.	Lack of awareness, promotion and education Lack of knowledge on current transfusion practice
Surgeon including surgical scheduler, advanced practice providers and trainees	Motivation towards evidence-based practices for better care and practices	Scared or resistant for practice change Attitude of strong belief in transfusion
Obstetrics gynecology	Interdisciplinary alignment and collaboration	Lack of interdisciplinary commitment and communication Change in work practice
Anesthesiologist and anesthesia team, including nurse anesthetists	Quality assurance metric and obligation: Audit, benchmarking and improvement strategies	No quality and metric planning, guide and monitoring Collaboration
Hematologist	Health economic analyses, cost saving and cost transparency	Perceived high cost and too slow progress Communication
Transfusion Medicine Specialist and blood bank	Blood shortage. reduced complication and transfusion adverse events	No resources or selective information dissemination Cost for alternative implementation
Others: Nurses, Pharmacist, information technologist (IT) personnel, laboratory personnel	Patient demand	No involving patient/patient request immediate surgery/litigation fear Quality matric
Patients and patient advocate	Blood scarcity	Assume blood is always available Sustainability
Public health/health research	Opportunities for improvement, competition for implementation and evidence base medicine publication	No motivation and demotivation Resources and cost No funding and resources. Medication not available
Pharmaceutical industries and insurance company	Funding, resources, available equipment, incentive PBM engagement, clear agreement provider and insurance	with outdated equipment and point of care testing (POCT) Resources and cost

Table II: The 10 steps of GTO

No.	GTO Step	Purpose
1	Needs and resources assessment	This step helps you identify and document the need for a program and related existing community resources.
2	Goals and desired outcomes	This step prompts you to develop a goal, specific desired outcomes, relevant program activities to reach the goal, and a logic model that displays all these elements.
3	Best or promising practices	This step guides you to review existing best/promising practices for achieving the established goals/objectives and selecting the best approach.
4	Assess fit	This step provides a structure to determine whether the program you identified during GTO Step 3 is appropriate for your target, community, and organization.
5	Address capacities issue	This step provides a structure to determine whether the program(s) you identified during GTO Step 3 (e.g. human, financial, technical, intellectual) can be carried out effectively with the knowledge, skills, and resources of your organization and its partners. Also, to address any capacity gaps.
6	Develop a plan Implementation plan and conduct process evaluation	This step helps you make a detailed work plan for delivering and evaluating the program you identified in Step 2 and 3 and selected at the end of Steps 4 and 5.
7	Outcome evaluation	This step provides guidance on what to include in, and how to gather data for, a process evaluation, which tells you how well you delivered the program (monitoring implementation)
8	Continuous Quality	This step helps with planning an outcome evaluation and using the results from it. An outcome evaluation reveals how well you met the goals and desired outcomes you set for the program in Step 2. Assess the effectiveness of the innovation.
9	Improvement	This step provides a framework for using process and outcome evaluation data to make program improvements. Short-term (mid-course) and long-term (strategic) corrections across the stages of the program.
10	Sustainability	This step guides you through some questions to consider when making decisions about whether your organization should continue a program.

Table III: The Getting to Outcome (GTO) Framework For the Patient Blood Management Program

GTO Step	Core Objective	Key Activities & Responsibilities with Healthcare Examples	Key Stakeholders
1. Needs & Resources Assessment	To understand the current situation and establish a foundation for the PBM program.	• Form a multidisciplinary steering committee with champions from key departments. • Assess current practices: Audit transfusion triggers (e.g., pre-transfusion hemoglobin levels), calculate the crossmatch-to-transfusion (C/T) ratio, and review blood ordering patterns. • Assess resources: Map the availability of point-of-care testing (POCT), IV iron infusion services, and cell salvage technology. • Identify gaps: Pinpoint issues like the lack of a standardized preoperative anemia screening protocol or inconsistent use of blood conservation agents. • Gather patient perspectives: Conduct surveys or focus groups to understand patient awareness of transfusion risks and alternatives.	Hospital Leadership, Clinical Department Heads (Surgery, Anesthesia, Hematology), Transfusion Medicine, Nursing, Pharmacy, Patients/Patient Advocates.
2. Goals & Objectives	To set clear, specific, and measurable goals for the PBM program.	• Define target population: Initially focus on high-volume elective surgeries (e.g., orthopedic or general surgery). • Establish specific KPIs: For example, "Reduce red blood cell units transfused per 1,000 patient days by 20% within two years" or "Ensure 70% of anemic elective surgery patients are identified and treated preoperatively." • Develop a logic model: Visually map how PBM activities (e.g., establishing an anemia clinic) will lead to short-term outcomes (e.g., increased preoperative hemoglobin) and long-term goals (e.g., reduced mortality, complications, and costs). • Run safe and inexpensive care awareness on transfusion alternatives.	Steering Committee, All Clinical Staff, Hospital Administration, Patients.
3. Best Practices	To select evidence-based PBM strategies that align with the program's goals.	• Review evidence: Systematically review national and international PBM guidelines (e.g., WHO, AABB). • Develop local protocols: Achieve consensus on and formalize core clinical protocols, such as implementing a restrictive transfusion threshold, standardizing the use of tranexamic acid in major surgeries, and creating a clear pathway for preoperative anemia management. • Run engagement awareness on transfusion alternatives.	Steering Committee, Clinical Champions, All Clinical Staff, Patients.

COVID-19.[5,23] (See Table III). The implementation phase puts planned interventions into action while the formative evaluation phase (7-10) uses the GTO empowerment evaluation procedure in monitoring progress, refining strategies, and ensuring sustainability. This evidence-based, systematic approach enhances program effectiveness, accountability, and long-term impact. Stakeholder capacity to make adjustments will be tracked, with local conditions balanced against program fidelity. The fidelity of PBM will be assessed by the local advisory committee and central evaluation teams. Observational data will guide adjustments to training or support, and adherence to longitudinal data collection on outcomes will serve as a key performance measure.[29,31] This structured, evidence-based approach strengthens accountability and supports sustainable culture change in patient blood management. Table III therefore serves not only as a consolidated overview of the GTO framework, but also as a practical, context-adaptable guide that Malaysian hospitals can use to plan, implement, and evaluate PBM initiatives within their own settings.

Implementation matrix in PBM

Successful PBM implementations are the result of careful planning, constant collaboration, and customized strategies that balance critical priorities for the plan with specific needs and expectations from stakeholders. Recognizing effective measures for Patient Blood Management implementation depends on the aim, measures, and expected outcome based on the economic and healthcare context in the organization or country (See Table IV).[18,37]

Malaysia faces unique systemic barriers that hinder widespread adoption. These barriers are largely shaped by funding limitations, hierarchical decision-making processes, and demographic pressures on the blood supply. Overcoming these challenges requires a structured, context-specific implementation strategy anchored in the GTO framework.[29,30]

Funding Limitations

Malaysia's predominantly tax-based public healthcare system allocates finite resources to high volume service delivery, leaving limited funding for quality improvement initiatives like PBM.[4] Costs associated with PBM include training, anemia screening programs, intraoperative blood conservation technology, and point-of-care diagnostics. To address this barrier, evidence demonstrating PBM's cost-effectiveness in reducing transfusions, complications, and length of hospital stay should be generated and presented to policymakers. Pilot PBM programs in major tertiary hospitals could showcase measurable financial benefits, supporting the case for dedicated funding.[19,22] Additionally, public-private partnerships, including collaborations with private hospitals and NGOs, could further provide seed funding for initial implementation.[16]

Institutional Hierarchies

Decision making in public hospitals often follows a centralized, top-down structure, requiring approvals from hospital directors, state health authorities, and the Ministry of Health. This hierarchy can slow innovation and limit flexibility for departmental level PBM pilots. Overcoming this

Table IV: Patient Blood Management Implementation Matrix

Implementation matrix in PBM	Purpose
Coordination of PBM implementation practices	Accreditation and certification Awareness survey Extension of promotion: local, state and national level
Implementation best practice	Identifying hospital champion Identifying PBM coordinators Incentive and rewards IT expansion and impact outcome
Measurable outcome	Metrics, data, and benchmarking Number of PBM-related presentations and publications published Research Expanding PBM knowledge
Transfusion practices	Blood request Blood utilization Group Screen and Hold (GSH) vs Group Cross-matched (GXM) CT ratio Adherence to MSBOS
Anemia management	Pre anesthesia anemia referral Infusion or anemia clinic data collection Impact on early pre anemia referral and intervention
Patient-centered practices	Shared decision Informed consent Morbidity and mortality Patient safety impact
Transfusion associated adverse events	Transfusion transmitted infection (TTI) Transfusion associated Adverse events
Cost	Saving of PBM vs. transfusion Blood cost transparency Length of stay Established funding options and incentives Funding impact analysis towards the betterment of PBM implementation e.g. POCT, thromboelastogram (TEG)
Multidisciplinary engagement	PBM implementation survey involving multidisciplinary and multi-professional level
Education and Awareness	Number of continuous medical education (CME) across departments, public Change in guidelines, protocol, and curriculum Social media engagement and education

barrier requires early engagement of hospital leadership to integrate PBM into institutional policies and strategic plans.[24] Establishing formal multidisciplinary implementation teams which include surgeons, anesthetists, transfusion medicine specialists, nurses, and administrators. Mission is to foster horizontal collaboration, streamline decision-making, and ensure shared ownership of PBM initiatives.[38] At the national level, Malaysia's 2024 MOH Consensus Statement on PBM marks a key policy milestone. Greater awareness, dissemination, and enforcement of this statement alongside its integration into national clinical guidelines, similar to antibiotic stewardship programs would strengthen institutional commitment and accelerate PBM adoption.

Patient Demographics and Blood Supply Constraints

Malaysia faces rising demand for blood transfusions due to its aging population, high surgical volumes, and increasing prevalence of chronic diseases such as diabetes, cancer, and chronic kidney disease.[12] Simultaneously, voluntary blood donation rates remain low, compounded by misconceptions about blood donation and logistical barriers for donors.[39] To mitigate, PBM programs should prioritize preoperative anemia screening and treatment pathways, including intravenous iron supplementation and erythropoiesis-stimulating agents.[40] Parallel public health campaigns aimed at culturally tailored donor recruitment and patient education on PBM benefits can reduce transfusion dependence and improve patient acceptance of alternatives.

Scale-up strategies: PBM Hubs and peer support

Hubs that have developed expertise in PBM can serve as peer support for new PBM sites, by building communication between individuals with similar roles. These can be informal (38) or formalized networks with a Project ECHO model for ongoing support via a monthly teleconference structure.[34] The program director of a successful Hub can advise a new site's program director on policies and implementation strategies accordingly. In addition, the program director would be able to connect with specific stakeholders who have been involved in a particular setting e.g. surgical leadership, and surgical nurses can reach out to their peers in a PBM Hub for advice and examples.

Most of these interactions can be conducted by teleconference, thus leveraging the reach of a Hub over a large region. The PBM program can provide some funding for the Hub to compensate them for these efforts.

LIMITATIONS

This paper reviews the authors' experiences collated from documented international literature and reviews

supplemented by conversation and discussion with members of PBM and bloodless medicine society, organization, and implementers. As the methods did not include formal quantitative or qualitative evaluation, the information presented is descriptive and reflects the individual and cumulative perspectives of the authors.

CONCLUSION

The implementation of Patient Blood Management (PBM) in Malaysia has recently gained national recognition, but its long-term success depends on structured planning, ongoing evaluation, and strong stakeholder engagement. PBM is practically and evidently manageable within healthcare systems, and the use of implementation science can help generalize lessons learned, leading to faster scale-up and better sustainability. The Getting to Outcomes framework provides a strategic multidisciplinary roadmap to ensure PBM is effectively integrated, continuously improved, and sustained across Malaysia's healthcare system. By incorporating readiness assessments and empowerment evaluation of outcomes, GTO can enhance patient safety, optimize blood resources, and strengthen the overall healthcare infrastructure. This structured approach will facilitate long-term adoption and ensure PBM becomes a standard practice in clinical care nationwide.

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