Saving blood, saving lives: Case Study

The Patient Blood Management Guidelines were developed following increasing evidence of transfusion-related adverse outcomes, leading to the emergence of new practices, including restrictive transfusion strategies and the increased use of alternatives to transfusion in the management of anaemia. Produced by the National Blood Authority (NBA), approved by NHMRC and endorsed by the Australia and New Zealand Society of Blood Transfusion, the Guidelines have led to positive outcomes for patients.

Origin

While the use of blood and blood products in hospitals remains a critical element of clinical practice, there is increasing evidence that blood transfusions pose a risk to patients and that a significant proportion of transfusions are unnecessary or could have been avoided.

Patient Blood Management (PBM) describes a range of medical and surgical strategies that aim to manage and preserve the patient's own blood, which in turn helps to avoid or reduce the need for a blood transfusion. It is a patient-centred approach that aims to improve clinical outcomes by avoiding unnecessary exposure to blood components.

PBM includes the three pillars of:
- optimisation of blood volume and red cell mass
- minimisation of blood loss
- optimisation of the patient's tolerance of anaemia.

Adoption of PBM presents the opportunity to reduce the prevalence of iron deficiency anaemia, reduce the need for transfusion, standardise transfusion practice and improve patient outcomes while achieving substantial budgetary savings.

To support the adoption of PBM across Australia, governments sponsored the NBA to facilitate the development of evidence-based PBM Guidelines.

Development and Investment

In 2008, the NBA established an Expert Working Group (EWG) to define the scope and structure of the PBM Guidelines. The EWG split the Guidelines into six modules, with each module aimed at assisting and guiding healthcare professionals in making clinical decisions when managing the following specific patient populations:

1. Critical bleeding/massive transfusion
2. Perioperative
3. Medical
4. Critical care
5. Obstetrics and maternity
6. Neonatal and paediatric.

Together, these six modules were to replace the 2001 NHMRC/Australasian Society of Blood Transfusion (ASBT) *Clinical practice guidelines on the use of blood components*.

The EWG developed a set of generic research questions that were investigated for each module, as well as specific research questions relevant to each module's patient population.

The NBA established six Clinical/Consumer Reference Groups (CRGs) that included multi-disciplinary membership with representation from clinical colleges, societies and consumer groups. CRGs provided expert oversight to the evidence review process and the translation of evidence into clinical guidance for each patient population.

The EWG and CRGs together included 13 members who had been supported by NHMRC grant funding prior to their work on the PBM Guidelines. Collectively, these members received: 1 Career Development Fellowship; 4 Centres of Research Excellence (CRE) grants; 1 Development Grant; 1 Early Career Fellowship; 4 Partnerships Grants; 4 Postgraduate Scholarships; 1 Practitioner Fellowship; 30 Project Grants (PGs); and 1 Targeted Call for Research (TCR) grant.

Collaboration

A multilevel management framework was established by the NBA to coordinate the development of the Guidelines, consisting of:

- a Steering Committee (now the PBM Advisory Committee), responsible for the initial development and governance of the entire project and that now oversees the implementation strategy for the Guidelines
- a multidisciplinary EWG, responsible for providing advice on scope, clinical oversight and integration of the six modules
- a CRG for each module
- systematic reviewers and a technical writer, to review the literature and develop a draft of each module and accompanying technical report
- a public consultation process, to enable stakeholders to review and provide comments on the draft modules
- an independent systematic review expert, to provide advice and mentoring to the systematic reviewers, technical writer and CRGs, and to ensure the development process complied with NHMRC requirements.

To answer the research questions, comprehensive search strategies were designed and systematic reviews of the scientific literature were undertaken. The body of evidence was consolidated into evidence statements and rated in accordance with NHMRC's FORM methodology, which consisted of five components (evidence base, consistency, clinical impact, generalisability and applicability) which were used by guideline developers to structure their decisions.

All six modules were developed in accordance with NHMRC's procedures and requirements for meeting the NHMRC standard for clinical practice guidelines.

Results and Translation

Once completed, the six modules included 52 recommendations plus 198 points of advice based on expert clinical consensus. Recommendations covered such topics as:

- the development of protocols for trauma patients with, or at risk of, critical bleeding requiring massive transfusion
- the use of iron supplementation for surgical patients with, or at risk of, iron-deficiency anaemia
- prevention of hypothermia in patients undergoing surgery
- the establishment by healthcare services of multidisciplinary, multimodal perioperative patient blood management programs
- the type of transfusion strategy to be employed with critically ill and paediatric patients
- the administration of iron supplementation to pregnant women.

Points of expert opinion concerned topics such as:

- the provision of dietary and other information to pregnant women to assist them to minimise anaemia
- the relationship between iron deficiency and when clamping of the umbilical cord occurs
- the need for institutions that provide care for neonates and paediatric patients to have a critical bleeding protocol for such patients.

NHMRC approved all modules, meaning NHMRC was satisfied that the modules were based on systematic identification and synthesis of the best available scientific evidence and included clear recommendations for health professionals. The modules were released progressively from 2011 to 2016 and were endorsed by many Australian, Australasian and New Zealand clinical colleges and societies.

Health Outcomes and Impact

Within Australia and also internationally, there has been a paradigm shift toward a focus on PBM, but uptake of PBM principles by the clinical community is variable. Understanding when and how blood and blood products are used has been critical to achieving improvement. The conduct of high quality research remains crucial to provide a strong evidence base to drive uptake of PBM principles.

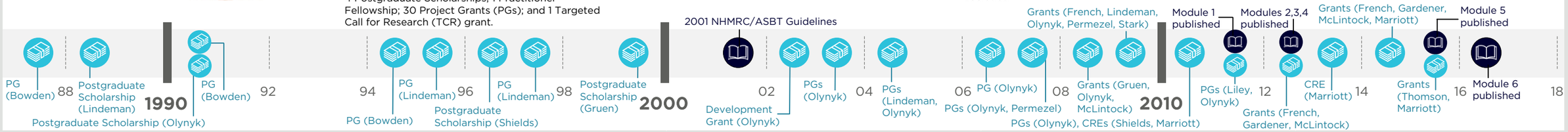
Since the launch of the PBM Guidelines and accompanying implementation strategy, Australia has seen a significant reduction in the use of red blood cells. The demand for red blood cells from 2012-13 to 2017-18 fell by over 23% and was accompanied by improvements in patient outcomes and financial savings of $107.1 million.

The implementation of the National Safety and Quality Health Service (NSQHS) Standards (which include a dedicated hospital accreditation standard for Blood and Blood Products and the revised Blood Management Standard) has also contributed to this decline in the use of red blood cells.

This reduction in use would not have occurred however, without the concerted effort of jurisdictional programs and clinical PBM champions and a willingness by healthcare professionals to adopt a patient focus rather than a product focus and to use blood and blood products more appropriately and safely.

Significant scope remains for consolidation of gains already made and further penetration of PBM in clinical practice.

The PBM Guidelines are currently under review. While the review is underway, the original modules remain in place to guide practice.



Research capacity and robust research systems are essential for generating and applying evidence in health advice, policy and practice.

The development of the Guidelines benefited from NHMRC s investment in building research capacity through its grant support to a number of members of the steering Committee, EWG and CRG (shown underlined).

Steering Committee

Clinical/ Consumer Reference Groups >

Chairs: Ms Stephanie Gunn, Dr Alison Turner

A/Prof Lilon Bandler, Dr Heather Buchan, Ms Karen Carey, Ms Cathy Clutton, Ms Vesna Cvjeticanin, Dr James Daly, Mr Ken Davis, Prof Henry Ekert, Dr Steve Flecknoe-Brown, Ms Trudi Gallagher, Dr Kerry Gunn, Ms Susan Ireland, Professor James Isbister, Ms Kathy Meleady, Ms Bronwyn Pearce, Dr Beverley Rowbotham, Dr Ben Saxon, Dr Rashmi Sharma, Ms Tracey Spigiel, Dr Amanda Thomson, Prof Simon Towler

Expert Working Group

Co Chairs: A/Prof Craig French, Dr Amanda Thomson

A/Prof Donald Bowden, A/Prof Mark Dean, Mr Shannon Farmer, Dr Chris Hogan, Ms Janine Learmont, A/Prof Helen Liley, Dr Robert Lindeman, A/Prof Larry McNicol, Prof John Olynyk, Prof Michael Permezel, Dr Kathryn Robinson, Dr Helen Savoia, Dr Richard Seigne, Dr Philip Truskett, Dr John Vinen

Module 1: Prof Zsolt Balogh, Mr Shannon Farmer, A/Prof Craig French, Prof Russell Gruen, Dr Chris Hogan, A/Prof Larry McNicol, Dr Richard Seigne, Mr Daryl Teague, Dr Amanda Thomson, Dr Philip Truskett, Dr John Vinen

Module 2: Prof Zsolt Balogh, Mr Shannon Farmer, A/Prof Craig French, Prof Russell Gruen, Dr Chris Hogan, A/Prof Larry McNicol, Dr Richard Seigne, Mr Daryl Teague, Dr Amanda Thomson, Dr Philip Truskett, Dr John Vinen

Module 3: Dr Lilon Bandler, A/Prof Donald Bowden, A/Prof Mark Dean, Prof John Duggan, Mr Shannon Farmer, A/Prof Craig French, Dr Chris Hogan, Dr Robert Lindeman, Prof Lawrence McMahon, Ms Penny O'Beid, Dr Kathryn Robinson, Dr Amanda Thomson

Module 4: Mr Shannon Farmer, A/Prof Craig French, Dr Anthony Holley, Dr Santosh Verghese

Module 5: Dr Daniel Challis, Dr Marilyn Clarke, Mr Shannon Farmer, A/Prof Craig French, Dr Claire McLintock, Prof Michael Permezel, Dr Wendy Pollock, Dr Shelley Rowlands, Dr Helen Savoia, Dr Amanda Thomson, Ms Catherine Whitby

Module 6: Prof Donald Bowden, Dr Gemma Crighton, Mr Shannon Farmer, Dr Chris Fraser, A/Prof Craig French, Dr Glenn Gardener, Dr Susan Hale, A/Prof Helen Liley, Prof Rhonda Marriott, Ms Lauren Porter, Dr Sylvio Provenzano, Prof Linda Shields, A/Prof Michael Stark, Dr Christian Stocker, Dr Amanda Thomson, Dr Bronwyn Williams

National Blood Authority

The National Blood Authority (NBA) was established in 2003. It is a statutory agency within the Australian Government health portfolio that manages and coordinates arrangements for the supply of blood and blood products and services on behalf of all Australian governments. Funding, secretariat and project management for the PBM Guidelines were provided by the NBA.

The development of the Guidelines' recommendations was not influenced by the views or interests of the NBA.

Australian Government
National Health and Medical Research Council

NHMRC

References

Partners

NATIONAL BLOOD AUTHORITY AUSTRALIA

This case study was developed in partnership with the National Blood Authority, Australia.

The information and images from which impact case studies are produced may be obtained from a number of sources including our case study partner, NHMRC's internal records and publicly available materials.

The sources consulted for this case study were the PBM Guideline modules, as shown and described below:

- *PBM Guidelines Module 1 Critical Bleeding/Massive Transfusion* – which is intended to assist and guide healthcare professionals in making clinical decisions when managing patients with critical bleeding who require or are likely to require massive transfusion.
- *PBM Guidelines Module 2 Perioperative* – which is intended to inform healthcare practitioners, health educators, health service managers and policy makers about the pre, intra and postoperative care of patients undergoing surgery or invasive procedures, particularly those in which blood loss is anticipated.
- *PBM Guidelines Module 3 Medical* – which is intended to assist and guide clinical decisions and coordination of healthcare across the primary, secondary and tertiary care setting for patients with acute or chronic medical conditions requiring haematological intervention.
- *PBM Guidelines Module 4 Critical Care* – which is intended to assist and guide healthcare professionals in making clinical decisions when managing patients requiring critical care.
- *PBM Guidelines Module 5 Obstetrics and Maternity* – which is intended to assist and guide healthcare professionals in making clinical decisions when managing pregnant and postpartum women.
- *PBM Guidelines Module 6 Neonatal and Paediatrics* – which is intended to assist and guide healthcare professionals in making clinical decisions about blood management in neonatal and paediatric patients.

The PBM Guidelines may be accessed from https://www.blood.gov.au/pbm-guideline