Patient Blood Management

and Securing the Blood Supply

Under Clinical Transfusion Governance

Dr. Joan Power, NHO Conference

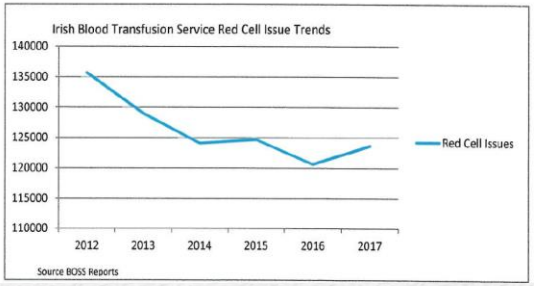
October 2018

IBTS notices of Blood Shortage 2017 (n=17)

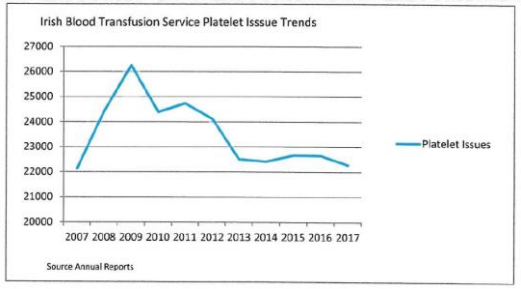
Patient Blood Management

TRENDS OVER TIME

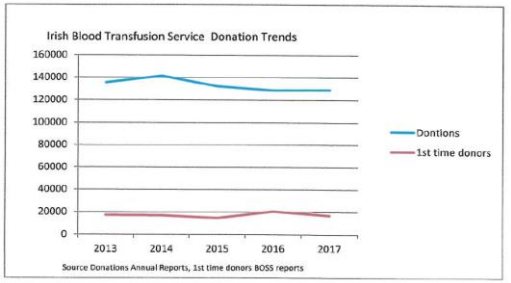
Irl Red Cell Issues



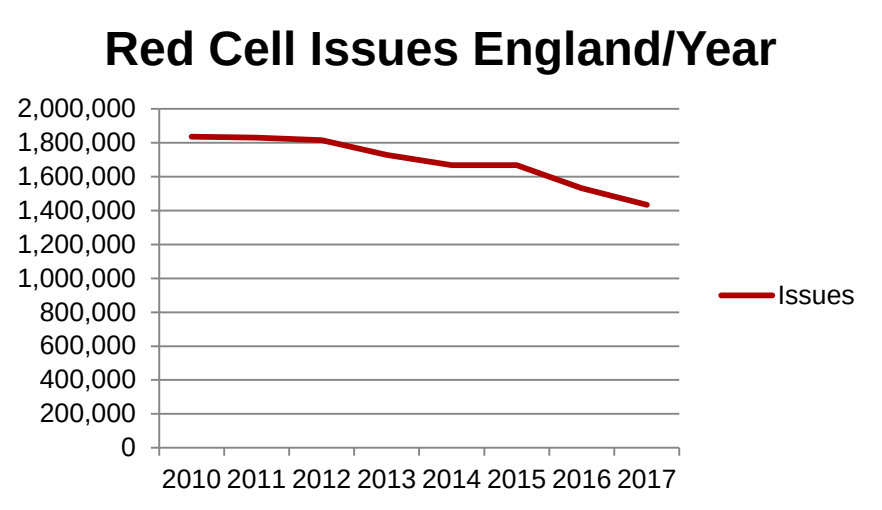
Plt. Issues



Donations



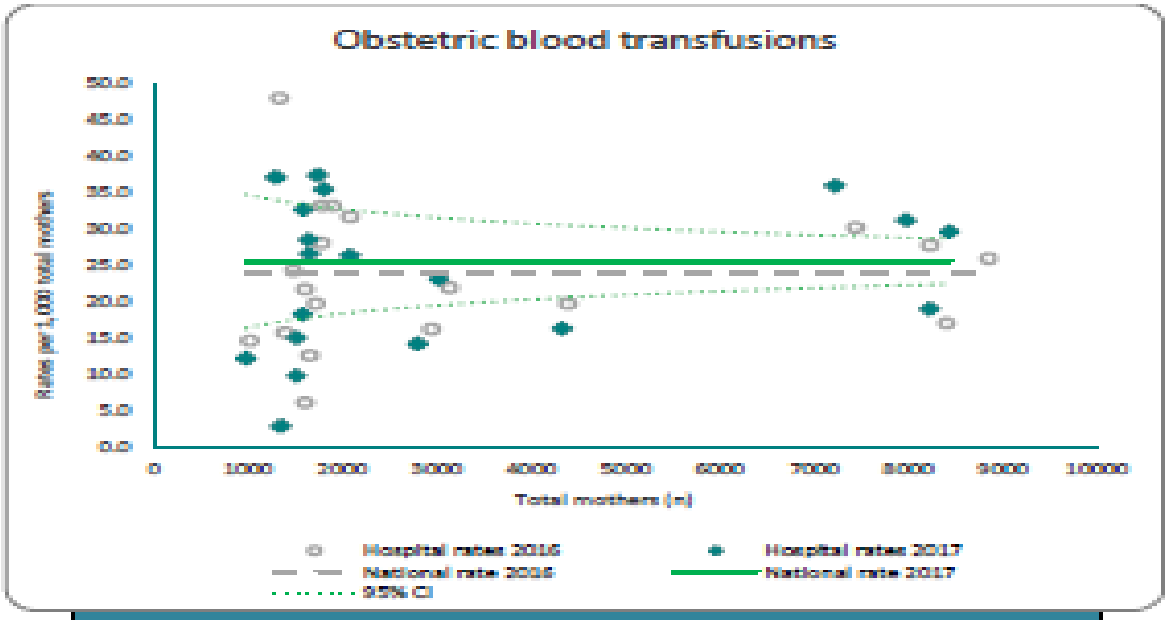
UK



Australia

WA 2008 → 2013 – 5 year project. Red cell issues 31.8/1,000 Pop → 19.4/1,000 Pop

Trends Over Time



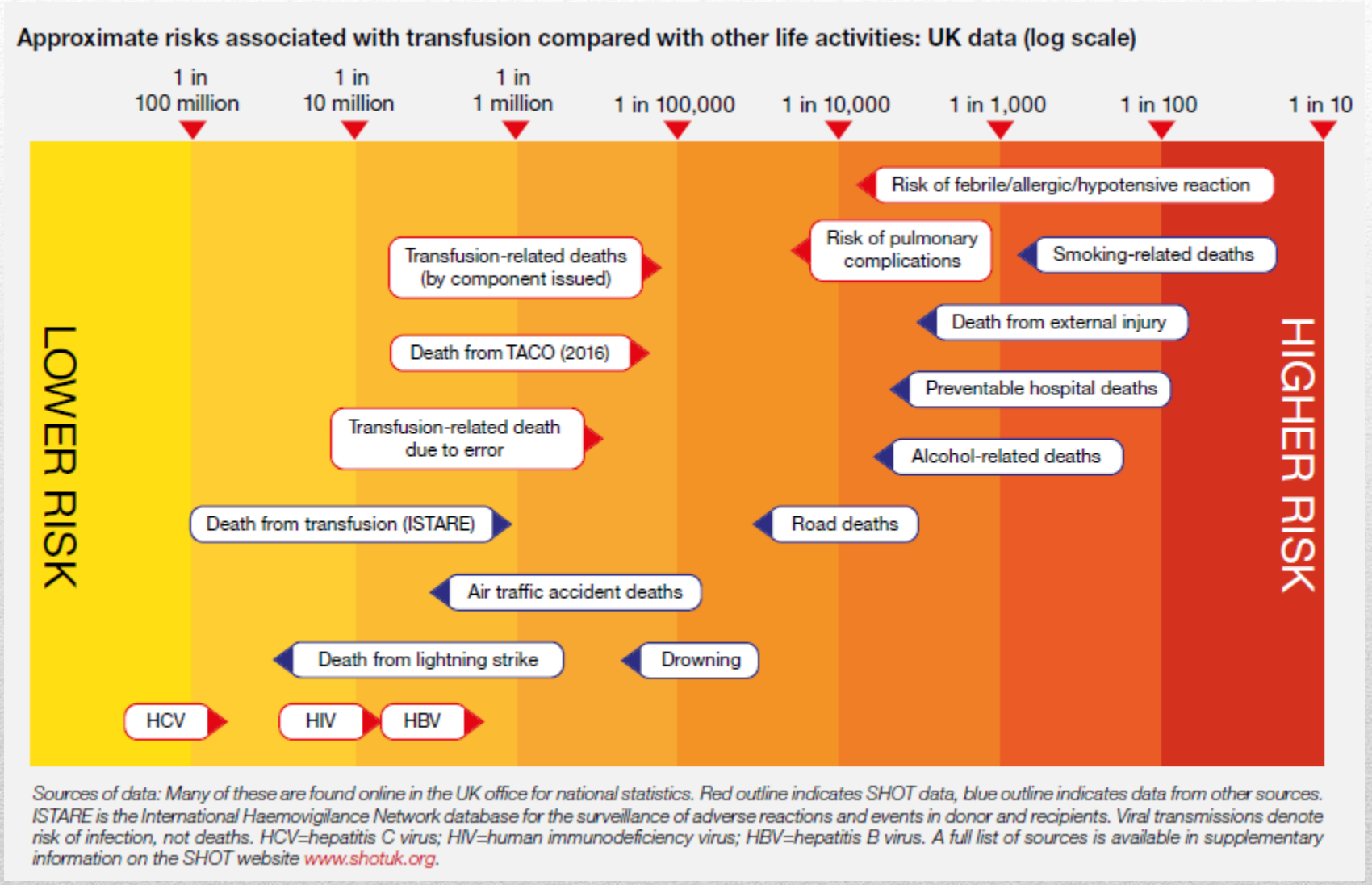
	2016	2017
Rate *(per 1,000 mothers)*	24.0	25.6
95% CI	22.8-25.2	24.3-26.9
Total OBTs (n)	1,507	1,555
Total mothers (n)	62,736	60,744

Note:

There is considerable variation across hospitals on this metric: the rate of women receiving blood transfusions ranges from 3 to 37 per 1,000 mothers. This metric and definition will be reviewed in 2018. It should be viewed in conjunction with Metric #28, Primary postpartum haemorrhage (see page 31).

Patient Blood Management

SHOT 2017 ANNUAL REPORT



Sources of data: Many of these are found online in the UK office for national statistics. Red outline indicates SHOT data, blue outline indicates data from other sources. ISTARE is the International Haemovigilance Network database for the surveillance of adverse reactions and events in donor and recipients. Viral transmissions denote risk of infection, not deaths. HCV=hepatitis C virus; HIV=human immunodeficiency virus; HBV=hepatitis B virus. A full list of sources is available in supplementary information on the SHOT website www.shotuk.org.

Aim

- Improve the care of patients who may need transfusion in an effort to improve patient outcomes

Strategy

- Timely use of evidenced-based medical and surgical concepts designed to maintain Hb concentration, optimise haemostasis and minimise blood loss *Society for the Advancement of Blood Management . Professional definition Patient Blood Managemnt, Sept.2012.:http//www.sabm.org//*

Implement this strategy in 3 core Pillars

Recent Advances ??

- "In treating acute anaemia, no attempt need be made to replace the whole amount of blood that has been lost, or indeed anything approaching it…"

Keynes, 1922

- Differing Transfusion thresholds (inc. 7g/dL >recent GI bleed), investigation of pre-op anaemia, cavé repeated sampling

Mollison *et al*.,1993

Impetus for Re-visit (1)

- **Securing the Blood Supply**
  (↑ patient survival, ageing population)
- **Clinical Governance**
- **Healthcare Improvement Science**

  Blood Transfusion Focus on Quality and Performance

  -strong focus on quality, now refocus on *Performance*

  (as previously 'Clinical Pathology Accreditation')
- **Evidence of cost saving** Butcher & Richards 2018

Impetus for Re-visit (2) after Estcourt & Roberts

- **Concern at TT ^{v}CJD risk** – Optimal clinical application
- **TRICC** – non-inferior restrictive transfusion thresholds for patients in critical care Herbert 1999 NEJM
- **Austrian Benchmark study**- 3 predictors for RBC Trx in elective surgery: pre-op anaemia, volume of surgical loss, not adopting restrictive threshold for Trx Gombotz et al.Transfusion 2007
- **Cochrane Systematic Review-** safe restrictive transfusion policy cavé ACI Carson 2016
- **Surgical technical developments-** minimally invasive surgery

Evolution

- **Society for the Advancement of Blood Management (2001)**

Patient centred decisions; Managing anaemia;
Interdisciplinary blood conservation modalities; Optimising coagulation.
Goal improved patient outcomes

- **WHO Concept Paper (2010)**

Prevention of conditions that might need blood transfusion;
Appropriate diagnosis & optimal treatment; Use of alternatives;
Blood conservation; Good surgical and anaesthetic techniques.

Patient Blood Management

Evolution

- **Australia NBA Clinical advisory Council (2006)**

Advised replacement of product-focused Guidelines (2001) with patient-focused Guidelines, noted PBM excellent clinical framework for these → development of modules for 6 patient populations.

- **UK PBM Concept Launch (2012)**

Collaborative initiative NBTC and NHSBT, Survey of readiness in Trusts 2013, Recommendations launch 2014, collaboration with Trusts

- **European Union (2016)**

- **AABB (2016)**

- **WHO (2016)** **WHA 63.12 (6)**

to establish or strengthen systems for the safe and rational use of blood products and to provide training for all staff involved in clinical transfusion, to implement potential solutions in order to minimize transfusion errors and promote patient safety, to promote the availability of transfusion alternatives including, where appropriate, autologous transfusion and patient blood management;

International Choosing Wisely Initiative

Techniques

- **Framework**

- Health- system- wide, Collaborative, Education,

  Prospective audit tools -electronic transfusion ordering/ decision making system (eg. Cerner/Oxford), Audit, Feedback on guideline compliance

- **Surgical/obstetric patients**

- Timely diagnosis and treatment of anaemia, Intra-op blood recovery, Acute normo-volaemic haemodilution, Meticulous surgical technique, Minimally invasive surgery, perioperative antifibrinolytics, Topical sealants and haemostatic agents, avoiding peri-operative hypothermia,

- **All patients**

- Minimise blood loss from lab tests- frequency of testing, low volume phlebotomy containers, restrictive transfusion threshold, one unit at a time in stable, non-bleeding patient

'Renaissance of Transfusion Medicine' Estcourt & Roberts

- Pillar 1

  Optimise red cell mass

- Pillar 2

  Minimise blood loss

- Pillar 3

  Manage anaemia

  And evidence based use of Platelets, Plasma and alternatives to Transfusion

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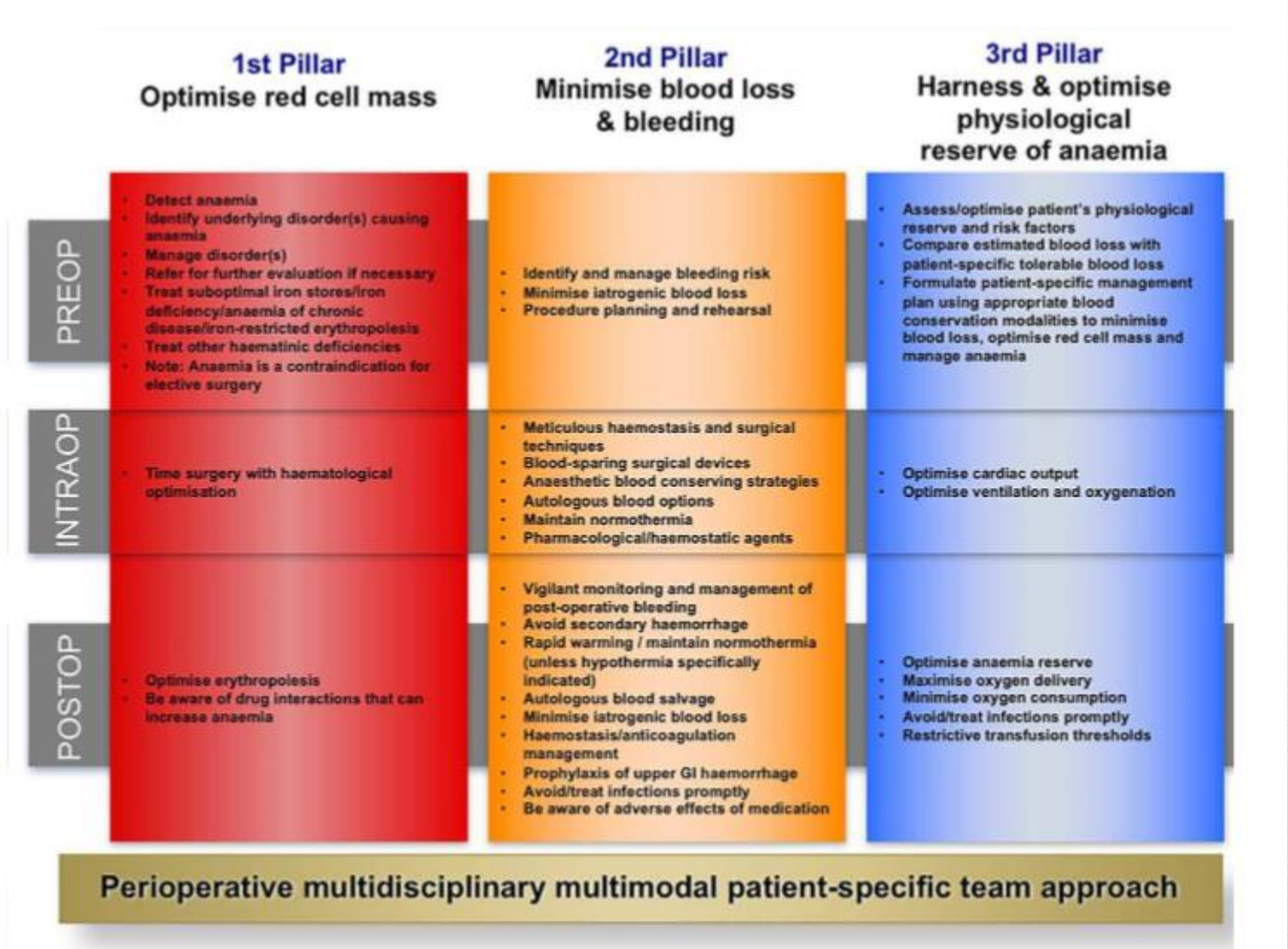

Isbister JP (2013) Cl Anaesthesiology, 27, 69-84

Clinical Practice - GI Haemorrhage

- **2nd most common indicator for Trx – UK**
  Likelihood Trx RC UGIB 43%, LGIB 26%
  PLT UGIB 3% , < LGIB
- **cavé anti coagulation, warfarin / DOAC**
  thrombocytopathy of liver disease

	2007 Audit UGIB (Hearnshaw *et al*., 2011), *N* = 6750, *N* patients (%)	2015 LGIB (Oakland *et al.,* 2017), *N*= 2528, *N* patients (%)
Period of data capture	2 months, 2007	2 months, 2015
Area	All of UK	All of UK
Shock	929 (13.8	58 (2.3)
Admitting Hb <70 g/L	788 (12.0)	140 (5.5)
Medications		
Aspirin	1874 (28)	584 (23.1)
Clopidogrel	359 (5.3)	235 (9.3)
Warfarin	473 (7.0)	270 (10.7)
Red Cell transfusion	2922 (43)	666 (26.7)
Platelet transfusion	189 (2.8)	44 (1.7)
FFP transfusion	503	56 (2.2)
Median LOS (IQR)	5 (2 – 12)	3 (1 – 7)
In-hospital mortality	675 (10)	85 (3.4)

Clinical Practice - GI Haemorrhage

What is known about the topic?

- Restrictive red cell transfusion may cause harm in patients with established cardiovascular disease.
- There is a lack of evidence supporting the use of platelet and fresh frozen plasma in gastrointestinal bleeding.
- Guidelines recommend the use of restrictive red cell transfusion in stable patients with bleeding.

What is new?

- Evidence for this comes from two major clinical trials in upper gastrointestinal bleeding; the effect size is largest in cirrhotic patients.
- Cardiovascular disease is common in gastrointestinal bleeding patients and is a strong determinant of patient outcome.
- Studies in other acute settings, such as stroke, have demonstrated harm with platelet transfusion.

What are the future key questions?

- Is restrictive red cell transfusion also appropriate in acute lower gastrointestinal bleeding?
- Is restrictive blood transfusion safe in patients with cardiovascular disease?
- Is there a role for transfusion of platelets and fresh frozen plasma in patients with cirrhosis and gastrointestinal bleeding?

Oakland, K, Jairath, V, Murphy M.F., T. Med, 2018, 28, 132 - 139

Clinical Practice – Elective Surgery

Anaemia a modifiable risk (unlike others)

All cause anaemia in young females 10%
10 – 33% elective surgical pts. admitted have co-existing anaemia.
Post –op anaemia ∞ preceding trauma ,surgery, haemodilution, phlebotomy, GI blood loss, Haemolysis, low endogenous EPO and marrow responsiveness: many studies assessing IV Fe infusion

- **PBM**

- **paramount to reducing risk ∞ peri-op anaemia, blood transfusion by structuring the interventions and decisions relating to anaemia and blood trx.**

- **significant benefits.**
- **Appropriate transfusion practice**
- **↓ Cost**
- **↓ LOS**

Clinical Practice – Elective Surgery

Table 1. Implementing PBM in elective surgery

Pillar 1. Management of anaemia		
Pre-operative	**Intra-operative**	**Post-operative**

• Diagnosis of anaemia (ideally two weeks prior to planned surgery).
• Identification of the underlying cause of anaemia: perform full blood count (FBC).
  • Performed by GP as a part of referral process or initial surgical outpatients.
  • Educate surgical/perioperative teams which procedures are most likely to require anaemia screening, e.g. *major* open abdominal surgery.
• Diagnosis of IDA and vitamin B_{12}/folate deficiency.
• Extended diagnosis of anaemia, e.g. further referral to gastroenterology, endoscopy and haematology.
• Treatment of anaemia.
  • IV iron, vitamin B_{12}/folate and EPO.
	• Optimising cardiovascular and pulmonary tolerance.
	• Haemodynamic monitoring in high-risk procedures/patients.
		• Manage post-operative anaemia (whether developed as a consequence of surgery or pre-existing).
		  • IV iron/EPO.
		  • Avoidance of unnecessary 'top-up' transfusions.

Pillar 2. Managing perioperative bleeding		
Pre-operative	**Intra-operative**	**Post-operative**
• Identifying at-risk patients (surgical outpatients/pre-operative assessment). • Including full medical and pharmaceutical review.	• Ensuring physiological management and optimal conditions for haemostasis (e.g. normothermia, pH >7·2). • Point-of-care testing (e.g. viscoelastic testing). • Cell salvage. • Surgical technique.	• Monitor and manage ongoing bleeding, e.g. cell salvage. • Maintain physiological conditions. • Minimise unnecessary phlebotomy. • Haemostasis/anticoagulation management.

Pillar 3. Managing post-operative anaemia		
Pre-operative	**Intra-operative**	**Post-operative**
• Patient-focused care – identifying and optimising patient's physiological reserve.	• Cell salvage.	• Evidence-based transfusion thresholds. • Manage IDA with IV iron.

Butcher, A,. Richards, T. Cornerstone of patient blood management in Surgery- Transfusion Medicine 2018 28 – 150 - 157

Clinical Practice – Elective Surgery

Table 2. NICE quality standards (NICE, 2016)

Standards	
Statement 1	People with iron deficiency anaemia who are undergoing surgery are offered iron supplementation before and after surgery.
Statement 2	Adults who are undergoing surgery and expected to have moderate blood loss are offered tranexamic acid.
Statement 3	People are clinically reassessed and have their haemoglobin levels checked after each unit of red blood cells they receive, unless they are bleeding or are on a chronic transfusion programme.
Statement 4	People who may need or who have had a transfusion are given verbal and written information about blood transfusion.

Clinical Practice - Neonates and Infants

- **Frequently transfused -90% ELBW, 58% <32/40**
- **Transfusion trigger ∞ Hb, clinical scenario & symptoms**

Non-bleeding Neonatal Hb triggers

7g-Late stable / 8g-Wk 3 on 0_2/ 9g-Wk 2 on 0_2

11g-moderate CPD (CPAP,O_2)/ 12g-ICU severe CPD/ Day 1

15g- ECMO, cyanotic heart disease

- **Knowledge inadequate**

- **optimal trigger, physiological response at different gestational and post natal age ?**
- **impact of reduced endogenous erythropoietin production, developmental impact, impact on NEC, ROP, IVH ?**

Implementation

Healthcare Improvement Science K Forerests, SNBTS

Structured approach to Test, Implement and Spread improvement across system applies to PBM Framework with refocus on Performance

- **Key Performance indicators**
  reflect strategic value drivers, specific & critical to the Service and promote frontline ownership
- **'Turn data into intelligence'**
  Well defined, consistent data item collection & recording
  (numerator, denominator, inclusions and exclusions)

  of high quality
  to give a full picture across the system

  allow Benchmark against relevant comparisons

  (clinical activity, distance to supply etc.)

  allow actionable insights that facilitate safe, effective and appropriate transfusion

Implementation

Effective Strategies inc.; NBA, Ensuring successful implementation

- Evidence based content
- Adaptation for local use
- Effective data collection system (assess and feedback data by specialty and clinician)
- Clinical involvement in Clinical Pathway development
- Evidence-practice gap identification
- Identification of potential barriers to change
- Incorporation of reminder systems
- Use of ongoing education and communication
- Use of effective clinical leadership, including local opinion leaders, as part of a structured system
- Development of policies and procedures for a multimodal approach

Implementation-Australia

PBM Governance

Jurisdictional blood committee & NBA clinical advisory committee. Strategy to facilitate activities, development of materials at a National level that support implementation at a health provider level, suite of tools for local customisation.

2017 – 6 yr WAus PBM initiative – educational jurisdictional wide

↓pre-op anaemia, ↓ trx ↓ LOS, improved outcome Leahy et al 2017 Transfusion 56, 1347-58

Implementation

- **PBM tools-National reference set of best practice guidelines inc. feedback and improvement loops with sustainable web based interface.**
- **Education and training- BloodSafe eLearning Australia programme,**

  Post-graduate certificate in Transfusion medicine –U of Melbourne, Conferences
- **Promotion and communication- website, networking**
- **Key data sets incorporated into ITC strategy**

Implementation-AABB PBM standards

- Institutional support including Budget support for PBM
- Active programme with performance metrics and clinician feedback ensuring compliance with guidelines. Patient outcomes relating to transfusion
- Pre-transfusion pt. testing and evaluation; Assessment of need for usage
- Ordering of blood before procedure start time inc. plan for pts with abs ;Id and manage pre-op anaemia; Pre-procedure optimization of pt. coag function inc. dc meds/herbal suplements; Use of appropriate perioperative techniques
- Strategies to reduce blood loss and manage anaemia and coagulopathy in non-surgical pts inc. minimize blood loss from laboratory testing
- Treatment of massive blood loss
- Inventory Management - % blood components wasted, by type
- Process for patient ID; Process to ID pts who may refuse to consent and formal care programme
- Haemovigilance programme

Implementation-UK

- National safety and quality health standards 2013
- NTC
- Survey of readiness in NHS Trusts (149) 2013, Surveys 2015 <50% actively managing anaemia, 27% implement restrictive threshold. Further work required
- NHSBT PBM Toolkit- -single unit transfusion
- NHSBT National comparative audit 2015-20% inappropriate use RCC, 20-30% plt/plasma
- 5 point anaemia plan 2016
- PBM Team lead via ongoing programme of support, education, Audit, research and specialist advice to ensure co-ordinated approach to improving transfusion practice regionally, nationally and internationally
- Special requirements Ap. 2016

Patient Blood Management

Ireland -National Blood Strategy Group (Chair Dr Orlaith O'Reilly)

- **Established by Minister for Health & Children 2001 to support; -**
  - **The development of best practice in blood utilization, blood stock Mgt, Implementation of Guidelines (in light of vCJD deferral impact on blood supply)**
- **Report to the Minister for Health & Children 2004**

(1) Activities

- **Inventory snap shot**

  Strong neg relationship between % O neg used and no of Cons. Haematologists

  11.4% O Rh D neg use (21 hospitals) Red Cell out dating 10% (37 hospitals)

- **Peri-operative audit** (prior training of HVOs) 51 pts, 201 components,

  Mean pre Hb 7.7g/ post 9.7g.

  Large inappropriate use of blood in this elderly transfused population (median 68 yrs)

  Marked preference for ordering and transfusing even number of blood components

  Deficient prescription and documentation.

  12% single unit transfusions

- **Blood Utilisation Survey 2001** (48 hospitals + servicing 18 others)

  > 530,000 in-pts + 370,000 day case

  Practices – HTC 78%, pre-trx GDE 80%, MSBOS 73%, Pre OT anaemia assessment43%, Pt information 40%, intra-op salvage 11 hospitals (5 in active use)

National Blood Strategy Implementation Group

National Total in 2001 (Estimates)					
	Received from IBTS	Transfused	Outdated	Wasted	Patients Transfused
Red Cells	124,044 *137,785 - 2010* *110,741 - 2017*	113,033 115,739 - 2010 110,262 - 2017	8,068 >10% 0.43%	2,943	30,104 ? ?
%	100	91 *84 -2010* *99 - 2017*	6.5	2.4	
Platelets	14,095 *23,500 - 2010* *20,176 - 2017*	12,999 *19,270 - 2010* *19,349 - 2017*	1,082 >10% 4.1%	444	1,766 ? ?
%	100	92 *82 -2010* *96 -2017*	7.7	3.2	

Table 23: Estimated red cells and platelets activity at national level.
With additional *2010, 2017 figures - personal communication T. Finch, HSE*

Patient Blood Management

ROI

Single Unit Transfusion
'Turn data into intelligence ??

Hospital/Ref	Date	Denominator	Single Unit Transfuson Rate
Hospital			
National Blood Strategy Implementaton Group established by MfH 24/64 acute hospitals reported transfusions on the day (67 RC Trx episodes with 201 units trx'd to 51 pts)	National Study Day Wednesday 19/02/2022	Peri-op (within 48 hrs) RC transfusion 19th June (Vs NBUG Guideline, Jan '01)	12% of RC transfused
Hospital A Dublin 4,500 RBC	Jul-Dec 2016	Trx within 24 hrs	40% of RC transfused
		Haematology pts (45% of all use) within 24 hrs	32% of RC transfused (88% double unit no inter-unit Hb check)
Hospital B Cork 1148 RBC	Jan-Feb 19th 2018	Bleeding & non-bleeding pts in a single transfusion episode – within 48 hrs	13% of transfusion episodes
		- within 72 hrs	9.1% of transfusion episodes
Hospital C Cork 133 crossmatches	Jan-June 2018	Per crossmatch	18% of crossmatches
Hospital D Limerick **71 pts./119 RCC 182 pts./330 RCC**	May – August 2010	Per transfusion episode	46%, 51%
UK National comparative Audit-TACO audit	**Mar-April 2017**	**157 hospitals 1788 non-bleeding in-pts, all>60 yrs**	**37% of pts**
- **Haematology**	July 2017	1091 out-pts 153 hospitals/3830 RCC	21% of pts. 43% in pts. (2016 – 27%) 24% OPD (2016 – 13%)

Patient Blood Management

National Blood Strategy Implementation Group

(2) Recommendations to support best practice development of blood initialization

- **Blood Stock**
  - Establish National Task Force , reporting to DoH, specific targets by end 2005
  - Regional SHU, Blood Stock mgt training for all MS
  - Procure integrated IT systems (as part of Pathology systems procurement)
- **Hospital Policies**
  - Establish pre-surgical assessment units, cell salvage, implement MSBOS
- **Overview Structures / Co-ordination**
  - DoH to request Royal College to host a National Transfusion Co. remit to prepare cl. GDE, monitor practice audits at agreed intervals.
  - Regional Network TC Chaired by Cons. Transfusion Medicine
  - HTC active, inc General Manager.
- **Resourcing**
  - Human – appoint Cons Haematologist in Transfusion Medicine to each tertiary Hospital specifically implement report's recommendations
  - IT – Procure blood ordering system prompting clinicians & transfusion gde
- **Training & Education**

Ongoing continuous PD for all Cl. Staff involved in blood use decision making.

Patient Blood Management

Progress in Ireland

- 2018 Proposal from Dean Faculty of Pathology for National Clinical Programme in Transfusion – supported by IBTS and HIS

Snapshots

- HAI 2018

"What have we learned from 21 years of Haemovigilance in the UK" P. Bolton Maggs

Proficiency based progression training – tackling WBIT CUH/UCC

Audit as training tool – Sligo University Hospital, Tallaght, SVUH, MRH Tullamore

Multidisciplinary team – May 2018 (early) " Active management of anaemia pathway" – NMH

Blood transfusion card – communication tool 80 transfusion dependent patients – OLCHC

Major Haemorrhage management – red cell : plasma UHW

- WBIT Audit 2017 –

  Haemovigilance network, D. Lundy

- MS MSc project 2018
  - Prospective auditing of blood transfusion UHL

Progress in Ireland (2)

Required

- National Framework/ National clinical programme (linked to NOCA) with PBM Implementation plan
- Target- single unit transfusion, ↓iatrogenic anaemia, pre-op anaemia mgt pathways,↓surgical blood loss, promote tolerance of anaemia, electronic decision making support

In situ

- Hospital HTC
- Specialist practitioners – Transfusion medicine consultants, consultant haematologists, medical scientists, Haemovigilance officers
- (National Office of Clinical Audit – NOCA)

‘Red Blood cell transfusion: A clinical Practice Guideline from the AABB

Recommendation 1;

The AABB recommends adhering to a restrictive transfusion strategy (7-8g/dL) in hospitalized, stable patients

(Grade: strong recommendation; high-quality evidence)

Caution re symptomatic CVD/ACS weak evidence

UK PBM

Transfuse one dose of blood component at a time eg one unit of red cell, plt, plasma in non-bleeding patient and reassess the patient clinically and with further blood count to determine if further transfusion needed

40-45% reduction in transfused RC Hayes et al 2017A.Int Jr Med 110,735-9

PBM Message to patients

You should only receive a Blood Transfusion if it is necessary and you should have the opportunity to discuss the risks, benefits and alternatives with your doctor

Thank you