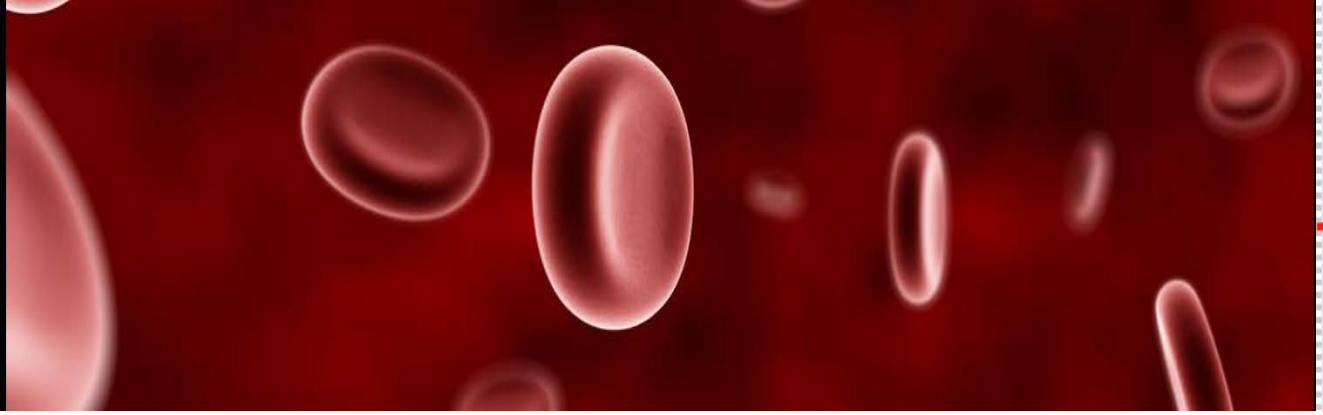


NHSBT 2015 Audit of PBM

- Mr Toby Richards
- Professor of Surgery
- Vascular Surgeon
- University College London
- Monash University, Melbourne

PREVENTT

Preoperative intravenous iron to treat anaemia in major surgery

Thank You / Disclosures

NHS National Institute for Health Research

<u>Grants:</u>
NHMRC
NIHR – HTA
SHINE award for Innovation
Rosetree Foundation
NIAA
Mason Trust
UCH vascular charity
UCH friends charity
Vifor Pharma
Covidien / UCL
Vifor Pharma / UCL
Pharmocosmos
Acelity

NIHR – RfPB
Stoke Association

CRN

The Health Foundation Inspiring Improvement

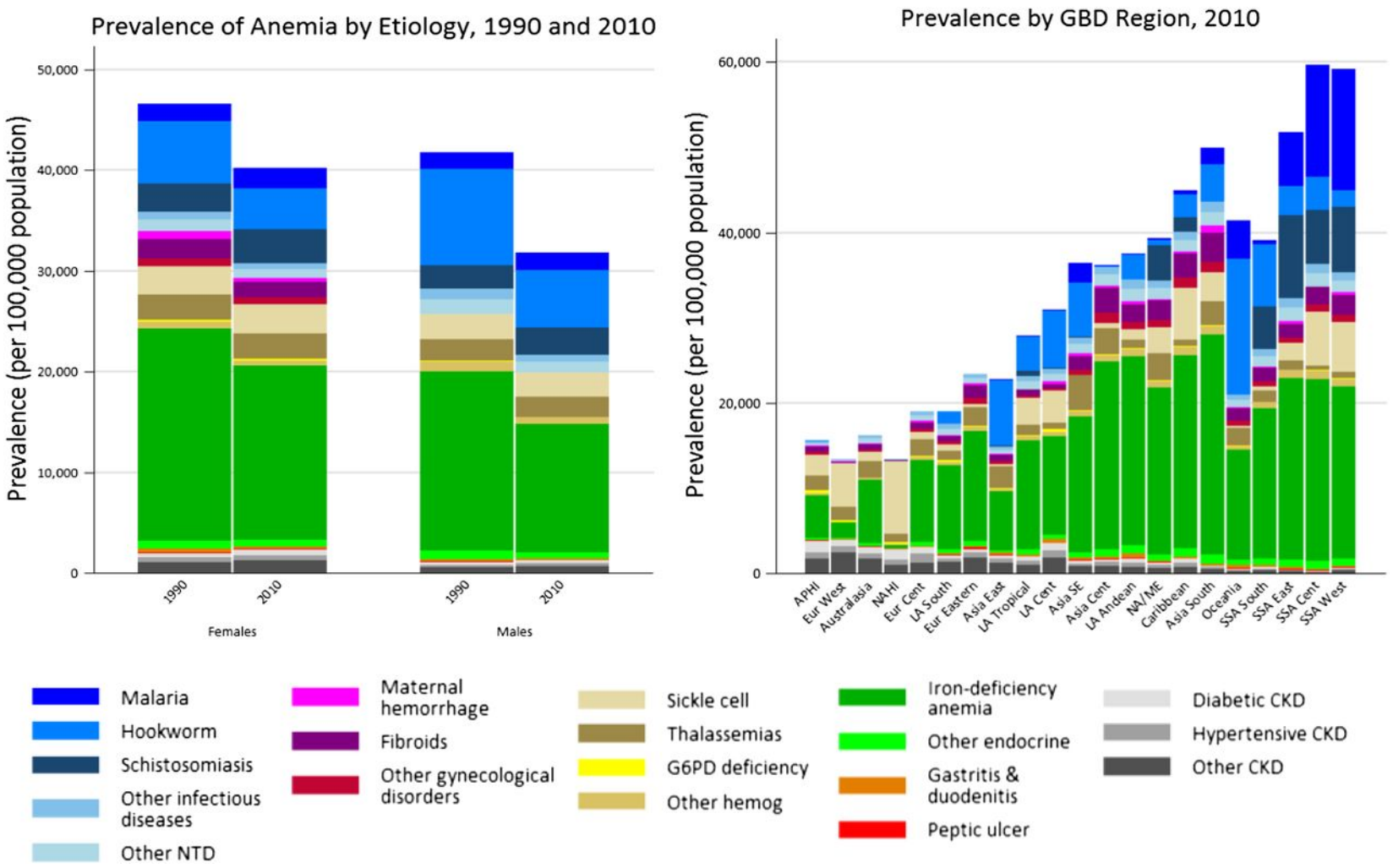
<u>Industry:</u>
Gideon-Ricter
Pharmocosmos
Vifor Pharma
Medtronic
Covidien
Acelity
Saatchi & Saatchi Health
Veniti
Cook
Gore
Baxter
KCI

<u>Associations:</u>
K-PBM
LATM
AAGBI
ASGBI
FIGO
BBTS
NHSBT
NATA
BioIron
ACTA / STS
VS
CX iLegx
ESVES
LSHTM
UCL

HTA

THE IRON CLINIC

Global and regional cause-specific anemia prevalence for 1990 and 2010.



Nicholas J. Kassebaum et al. Blood 2014;123:615-624

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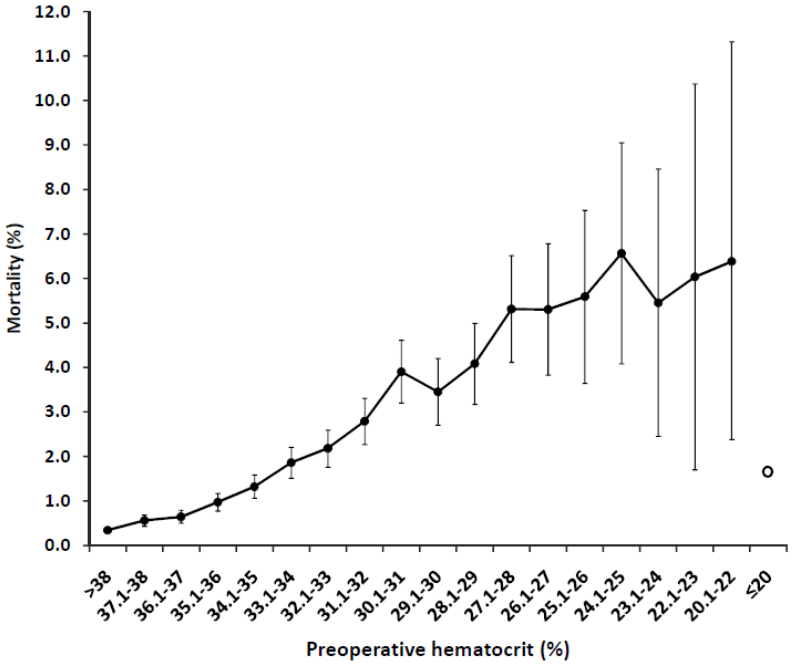
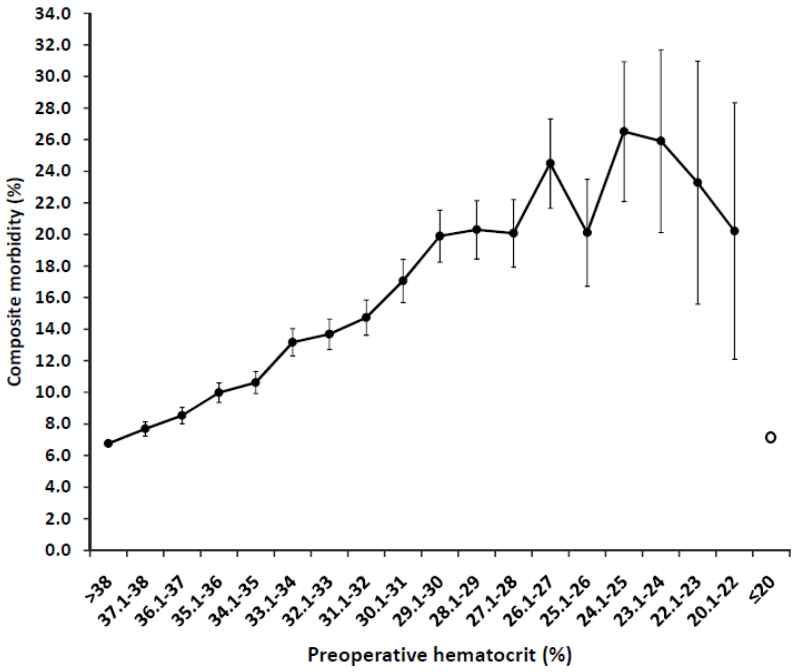
THE LANCET

Articles

Preoperative anaemia and postoperative outcomes in non-cardiac surgery: a retrospective cohort study

Khaled M Musallam, Hani M Tamim, Toby Richards, Donat R Spahn, Frits R Rosendaal, Aida Habbal, Mohammad Khreiss, Fadi S Dahdaleh, Kaivan Khavandi , Pierre M Sfeir, Assaad Soweid, Jamal J Hoballah, Ali T Taher, Faek R Jamali





Harms associated with single unit perioperative transfusion: retrospective population based analysis

Elizabeth L Whitlock,[1] Helen Kim,[1] Andrew D Auerbach[2]

the bmj | BMJ 2015;350:h3037 | doi:10.1136/bmj.h3037

346 Hospitals in USA 2009-2011

N =1,583,819 Elective surgery

41,421 Transfused

52% 2 units

Variable	No (%) without stroke/ MI (n=1 575 775)	No (%) with stroke/ MI (n=8044)	Multivariate OR
0	1 524 850 (97.4)	7 548 (93.8)	(reference)
1	12 715 (0.81)	132 (1.6)	2.33 (1.90 to 2.86)
2	21 420 (1.4)	222 (2.8)	2.37 (2.00 to 2.81)
3	2 881 (0.18)	45 (0.56)	3.13 (2.28 to 4.31)
≥4	3 909 (0.25)	97 (1.2)	4.87 (3.86 to 6.14)

NOT Older or Sicker ?

NOT Operation

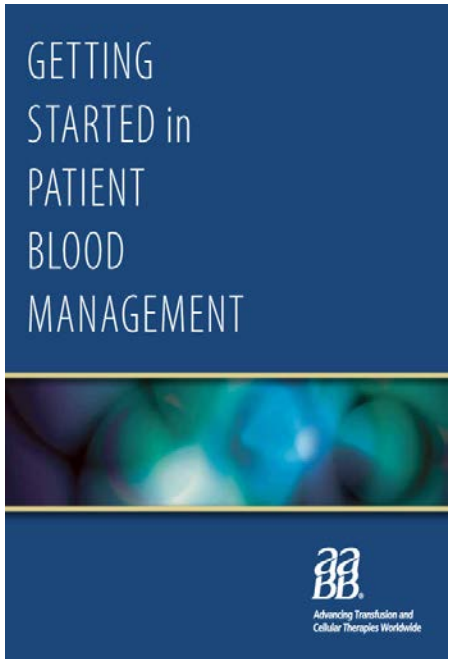
Variable	Whole dataset	Propensity score matched		P value
		Not transfused	Transfused	
No of patients	1 583 819	41 421	41 421	—
No (%) with stroke/MI	8044	336 (0.81)	496 (1.1)	<0.001*
Adjusted odds ratios for stroke/MI†				
pRBC use (units) (reference: 0 units):				
1	2.33 (1.90 to 2.86)	1.71 (1.31 to 2.24)		<0.001
2	2.37 (2.00 to 2.81)	1.73 (1.36 to 2.20)		
3	3.13 (2.28 to 4.31)	2.24 (1.56 to 3.22)		
≥4	4.87 (3.86 to 6.14)	3.16 (2.36 to 4.23)		

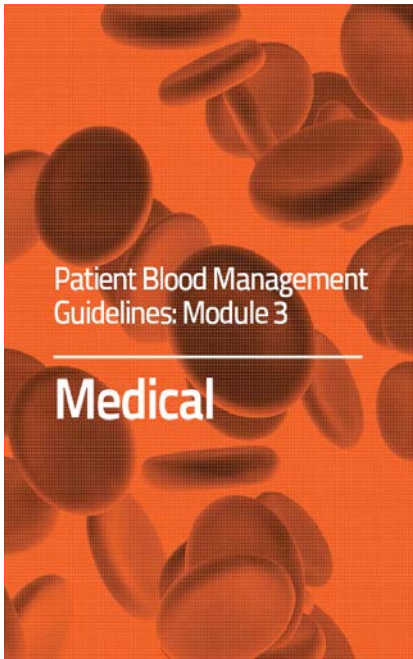
Subgroup variable	Colectomy (partial and total)	Small bowel resection	Hip/knee replacement or revision	Spine, including fusion and laminectomy	Hysterectomy
No of patients	37 989	16 179	432 419	196 802	112 960†
No (%) transfused	1748 (4.6)	647 (4.0)	15 516 (3.6)	3903 (2.0)	1747 (1.6)
No (%) with stroke/MI (%)	689 (1.8)	309 (1.9)	1447 (0.33)	670 (0.34)	115 (0.10)
Odds ratio for stroke/myocardial infarction (95% CI)					
pRBC use (units) (reference: 0 units):					
1	2.36 (1.33 to 4.19)	2.05 (0.66 to 6.30)	1.26 (0.78 to 2.03)	1.43 (0.65 to 3.14)	5.21 (1.15 to 23.7)
2	2.21 (1.38 to 3.54)	2.84 (1.32 to 6.11)	1.77 (1.22 to 2.56)	1.73 (0.90 to 3.33)	7.57 (3.33 to 17.2)
3	2.56 (1.06 to 6.17)	1.80 (0.23 to 13.9)	3.29 (1.61 to 6.74)	3.87 (1.46 to 10.3)	4.79 (1.45 to 15.8)
≥4	1.96 (0.84 to 4.54)	4.37 (1.45 to 13.1)	3.05 (1.29 to 7.21)	4.27 (1.73 to 10.5)	9.46 (2.29 to 39.0)

Patient Blood Management (PBM)

WHO WHA63.12

"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)."

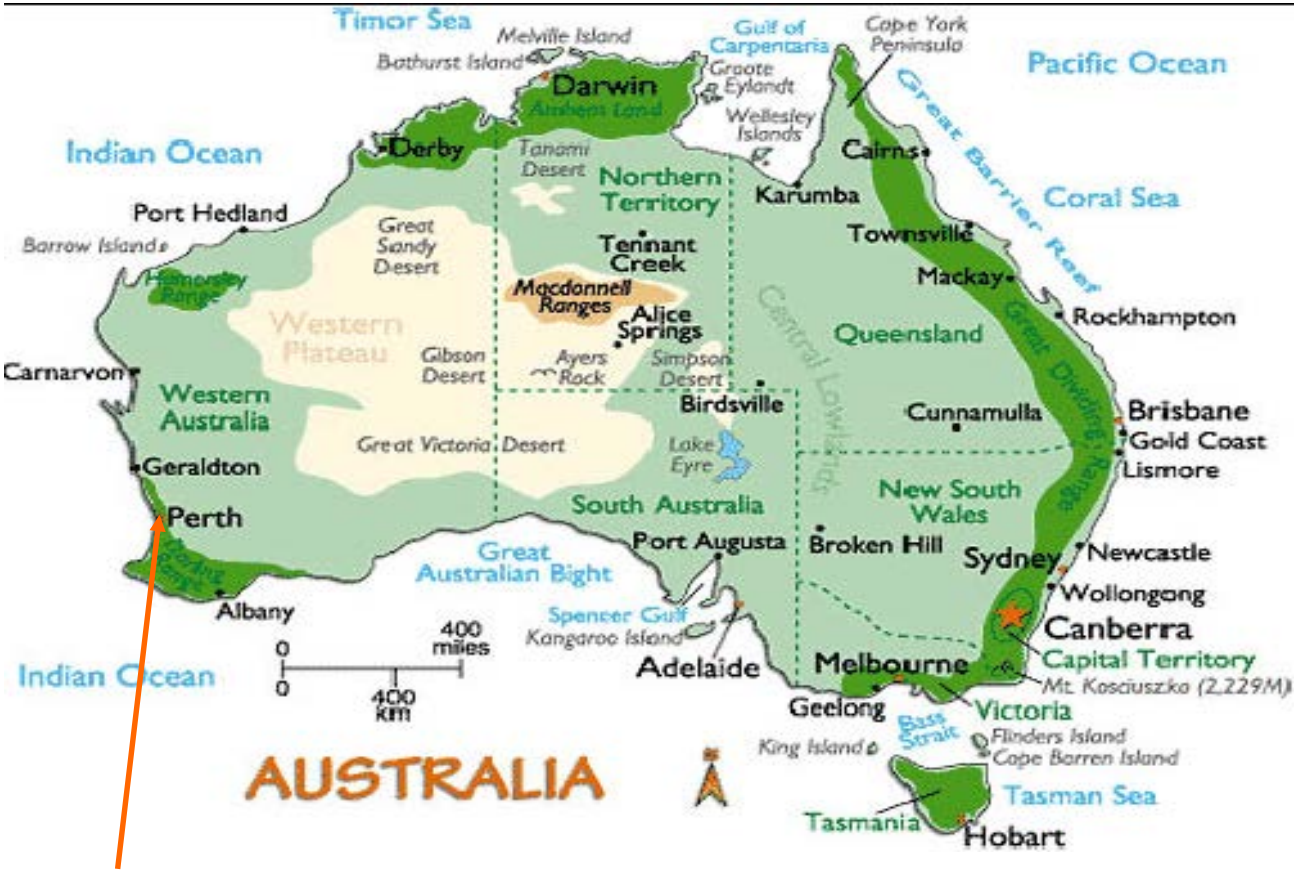




Benchmarking

- Audit
- Anaemia
- Anaemia management
- Transfusion protocol
  - Major Haemorhage
  - Single unit
- Transfusion usage

Western Australia



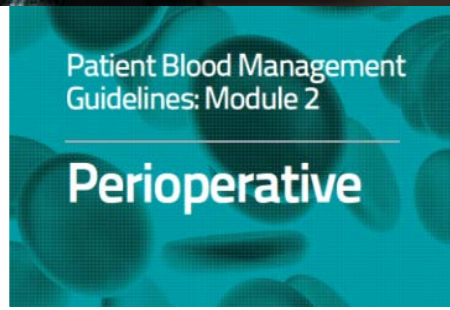
77 % or the population resides in the Perth Metropolitan Area

Best Practice & Research Clinical Anaesthesiology 27 (2013) 43–58

Contents lists available at SciVerse ScienceDirect

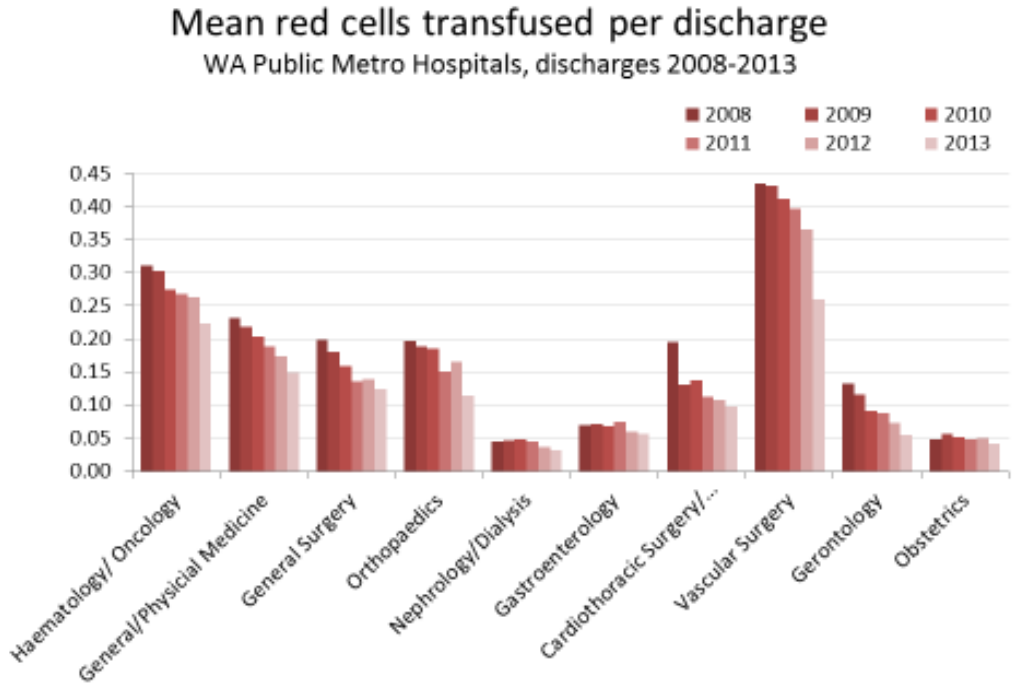
Best Practice & Research Clinical Anaesthesiology

journal homepage: www.elsevier.com/locate/bean

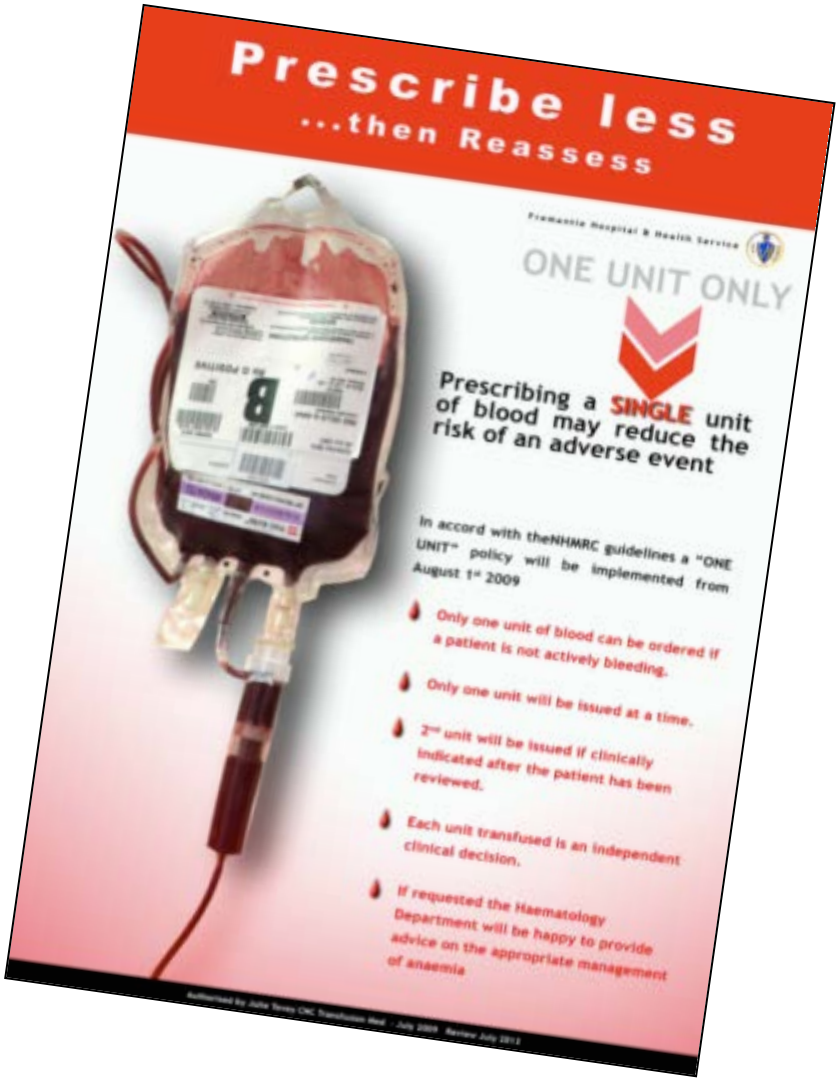


- 2008 W.A. Government PBM program
  - Jurisdictional Change Management
  - Quality improvement & Patient Safety
  - 5 years

– Literature Review
  - Multidisciplinary
  - Multimodal



EDUCATION: –
Patients, ALL staff, Seminars, 1 on 1, meetings



thebmj

BMJ 2015;351:h5832 doi: 10.1136/bmj.h5832 (Published 18 Nov...

NICE National Institute for Health and Care Excellence

PRACTICE

NICE guideline

GUIDELINES

Blood transfusion: summary of NICE guidance

Blood transfusion

What you need to know

- Consider alternatives to blood transfusion in surgical patients

NICE guideline

Published: 18 November 2015

Anaesthesia

Journal of the Association of Anaesthetists of Great Britain and Ireland

Anaesthesia 2016 doi:10.1111/anae.13489

Guidelines

AAGBI guidelines: the use of blood components and their alternatives 2016

National Comparative Audit of Blood Transfusion

2015 Audit of Patient Blood Management in Adults undergoing elective, scheduled surgery

(http://hospital.blood.co.uk/audits/national-comparative-audit/national-comparative-audit-reports/

Royal College of Physicians

National Comparative Audit of Blood Transfusion

NHS Blood and Transplant

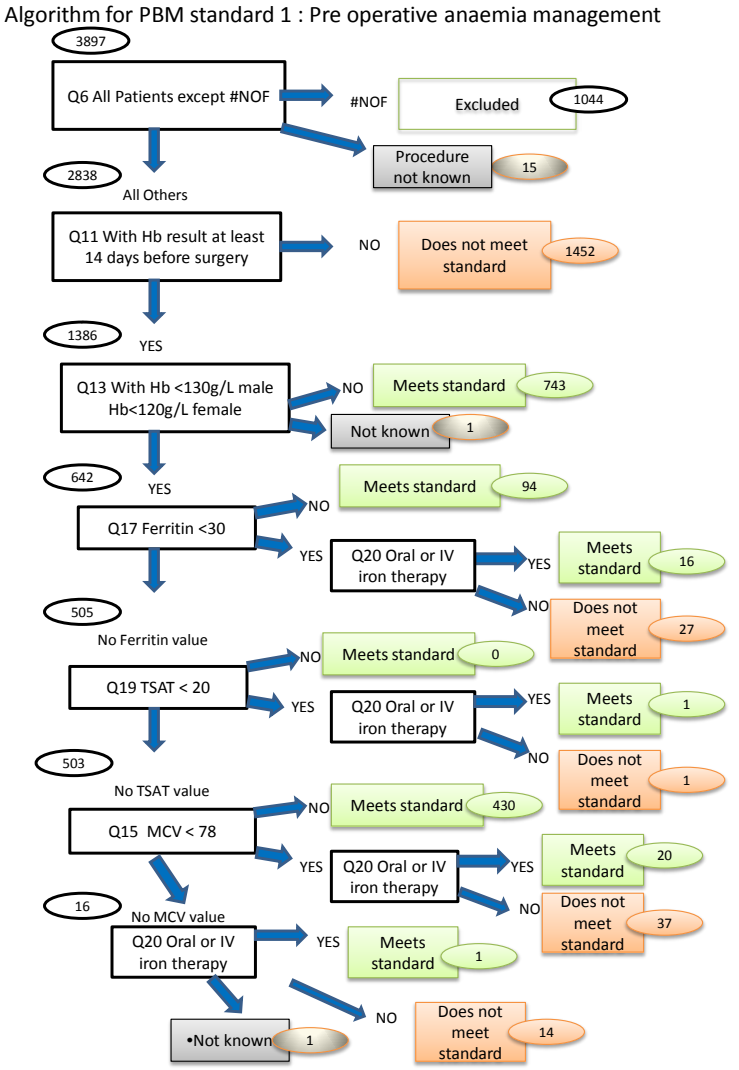
PBM	Algorithn
PBM1	Pre-operative anaemia management
PBM2	Pre-operative transfusion allowed
PBM3	Pre-operative transfusion allowed only if preoperative anaemia optimisation has been attempted where appropriate
PBM4	Pre-operative transfusion - single unit transfusion policy
PBM5	Pre-operative anticoagulant and antiplatelet management
PBM6	Patients having intra operative transfusion in whom at least one PBM measure has been attempted (where appropriate)
PBM7	Patients having intra operative transfusion in whom all PBM measure have been attempted (where appropriate)
PBM8	Post operative transfusion allowed (whether or not PBM measures attempted) - FIRST EPISODE
PBM9	Post operative transfusion following the single unit policy - FIRST EPISODE
PBM10	Post operative in whom at least one PBM measure has been attempted (where appropriate)- FIRST EPISODE
PBM11	Post operative in all PBM measures have been attempted (where appropriate) FIRST EPISODE

Royal College of Physicians

National Comparative Audit of Blood Transfusion

NHS Blood and Transplant

- PBM 1 – Iron Def. Anaemia
- 46-48% anaemic
  - Screen?
  - Identify?
  - Investigate?
  - Manage?



Royal College of Physicians

National Comparative Audit of Blood Transfusion

NHS Blood and Transplant

POST OPERATIVE

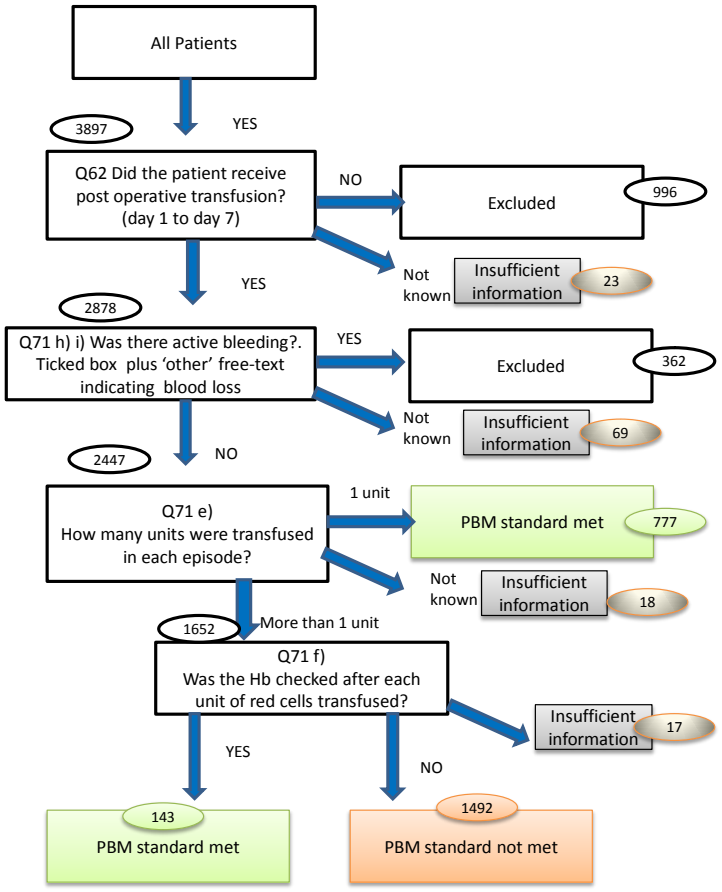
PBM 8: Restrictive Policy

PBM 9: Single unit Policy

PBM 10: BT + any PBM

PBM 11: BT + all PBMs

Algorithm for PBM standard 9 : Post operative transfusion following the single unit policy (FIRST episode)?



RESULTS

- 190 sites
- N=3897
- Average blood Loss = 1184ml (644-1940)
- 8168 units RBC
  - (£996,496 - £5,186,680)

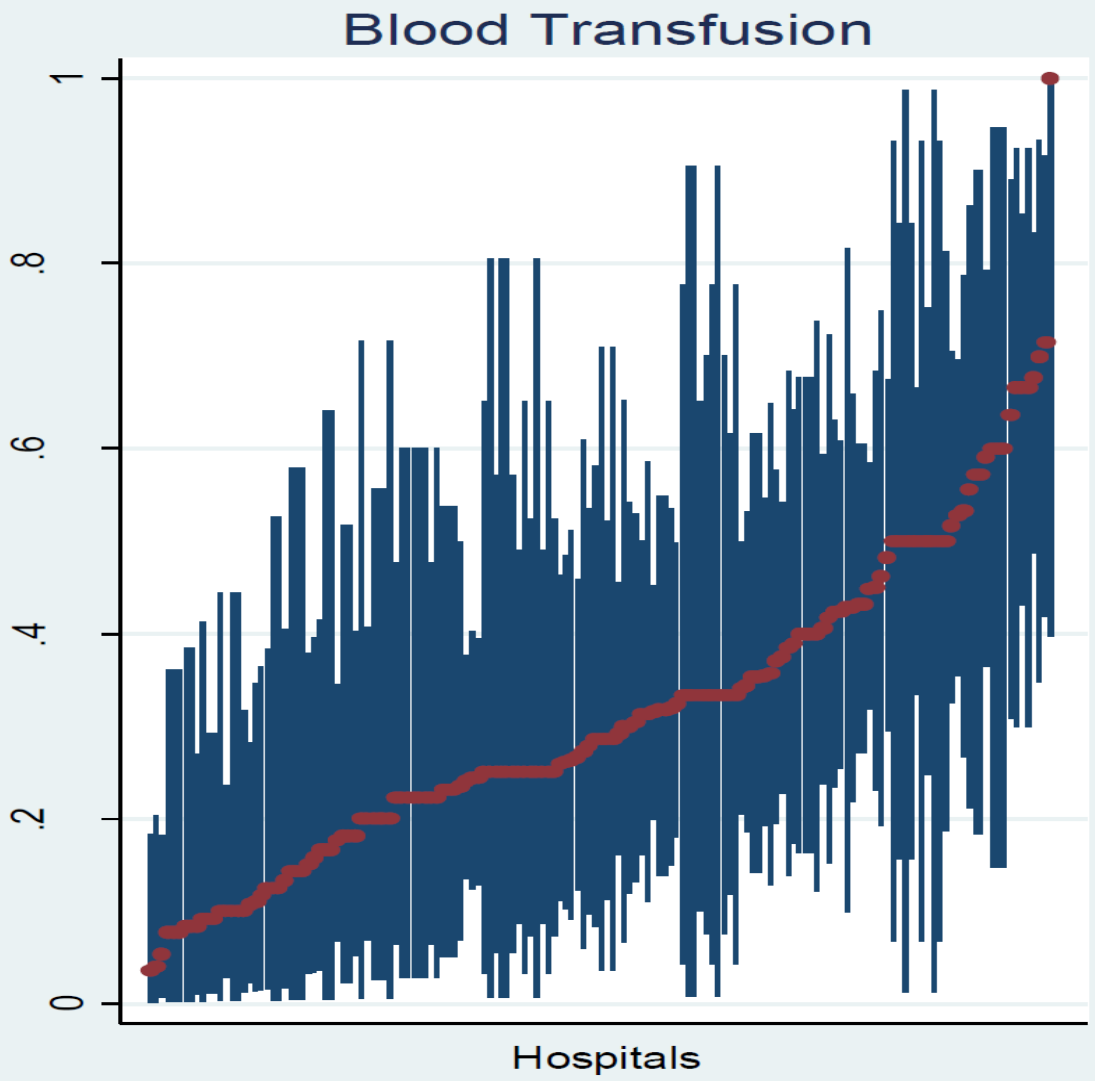
Royal College of Physicians

National Comparative Audit of Blood Transfusion

NHS Blood and Transplant

TYPE OF PROCEDURE	Total anaemic (F<120, M<130)
• Primary unilateral total hip replacement	52% (287/557)
• Primary bilateral total hip replacement	54% (15/28)
• Primary unilateral total knee replacement	53% (167/313)
• Primary bilateral total knee replacement	33% (9/27)
• Unilateral revision hip replacement	49% (118/243)
• Unilateral revision knee replacement	69% (43/62)
• Colorectal resection for any indication	69% (192/279)
• Open arterial surgery	47% (68/144)
• Primary coronary artery bypass graft	34% (39/113)
• Valve replacement +/- CABG	37% (151/406)
• Simple or complex hysterectomy	53% (168/317)
• Cystectomy	50% (17/34)
• Nephrectomy	66% (84/127)
• # neck of femur (arthroplasty)	77% (768/999)
Procedure not stated	77% (10/13)
Total	58% (2136/3662)

Benchmarking



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National Comparative Audit of Blood Transfusion

NHS Blood and Transplant

PREOPERATIVE

PBM1	Pre-operative anaemia management	46%
PBM2	Pre-operative transfusion allowed – Restrictive use	12%
PBM3	Pre-operative transfusion allowed (PBM 2) - but PBM 1 attempted where appropriate	2%
PBM4	Pre-operative transfusion - single unit transfusion policy	28%
PBM5	Pre-operative anticoagulant and antiplatelet management	63%

Pre - OP Anaemia

	No BT		BT		Total
Not Anaemic	1,029	(75.8)	329	(24.2)	1,358
Anaemic	935	(67.3)	455	(32.7)	1,390
Total	1,964	(71.5)	784	(28.5)	2,748

Anaemic patients were 52% more likely to receive blood transfusion ($p < 0.0001$)

Pre - OP Anaemia

- LOS anaemia 7 days (5-12)
- LOS non-anaemia 7 days (5-10)

75% of non-anaemic patients leave hospital by day 10

75% of anaemic patients leave hospital by day 12

- Adjusting for sex, age and surgery type,

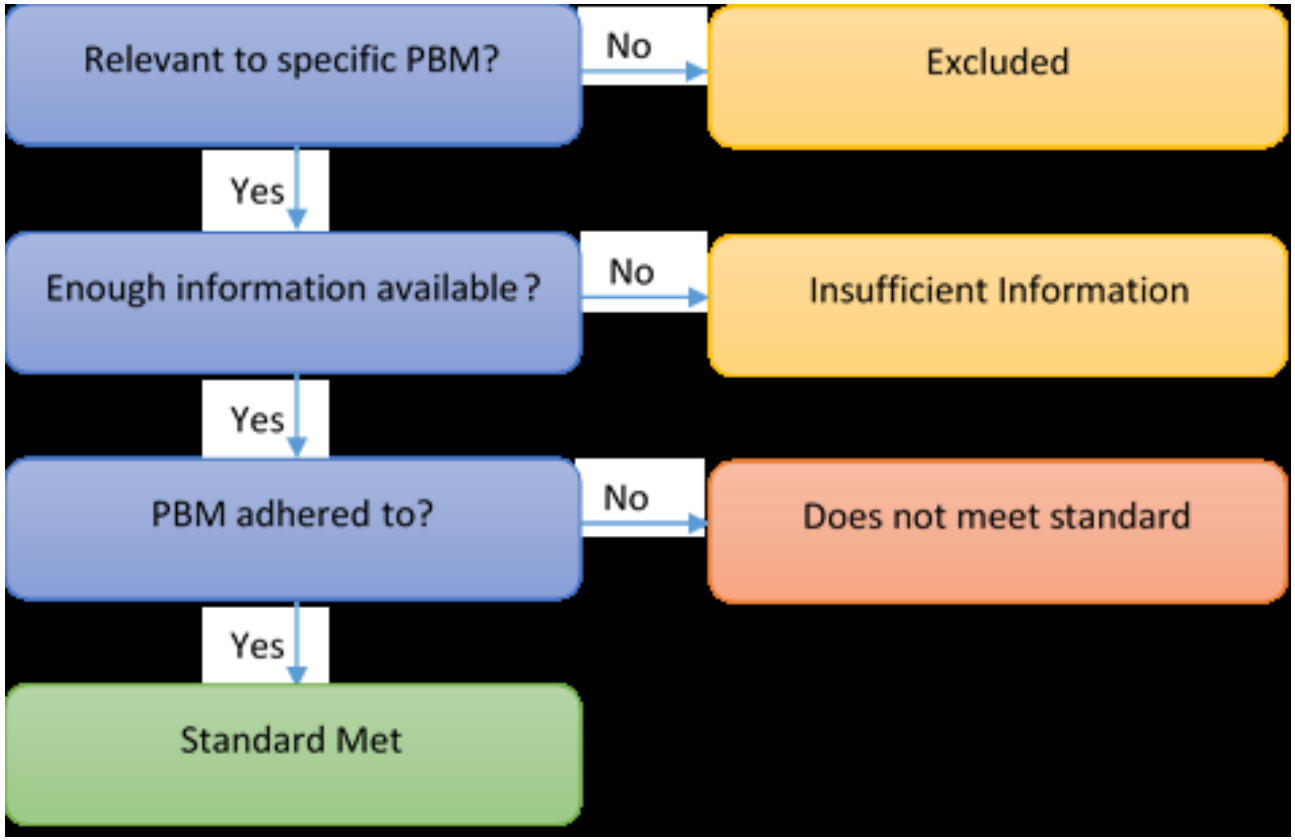
  LOS 7.5% longer p=0.004, 95% C.I. [1.02, 1.13]

Pre - OP Anaemia

	Did not die		Died		Total
Not Anaemic	1,354	(99.2)	11	(0.8)	1,365
Anaemic	1,359	(97.1)	40	(2.9)	1,399
Total	2,713	(98.2)	51	(1.9)	2,764

Anaemic patients were 3.62 times more likely to die
p-value = 0.0001, 95% C.I. [1.85, 7.11]

Analysis


Relevant to specific PBM?
No
Excluded
Yes
Enough information available?
No
Insufficient Information
Yes
PBM adhered to?
No
Does not meet standard
Yes
Standard Met

PBM Measurement	Crude difference in length of stay	Adjusted* difference in length of stay	p-value	95% C.I.
PBM1				
Meets standard		Baseline		
Does not meet standard	1.15	1.07	0.01	(1.02, 1.12)
PBM2				
Transfusion appropriate		Baseline		
Transfusion Not appropriate	1.08	1.03	0.88	(0.70, 1.51)
PBM3				
Transfusion appropriate		Baseline		
Transfusion Not appropriate	0.37	0.48	0.09	(0.21, 1.12)
PBM4				
Meets standard		Baseline		
Does not meet standard	0.86	0.93	0.67	(0.65, 1.33)
PBM5				
Meets standard		Baseline		
Does not meet standard	1.40	1.31	<0.0005	(1.16-1.51)
PBM6				
Meets standard		Baseline		
Does not meet standard	0.95	0.99	0.92	(0.85, 1.15)
PBM7				
Meets standard		Baseline		
Does not meet standard	1.09	1.18	0.02	(1.03, 1.35)

Iron Deficiency

Royal College of Physicians

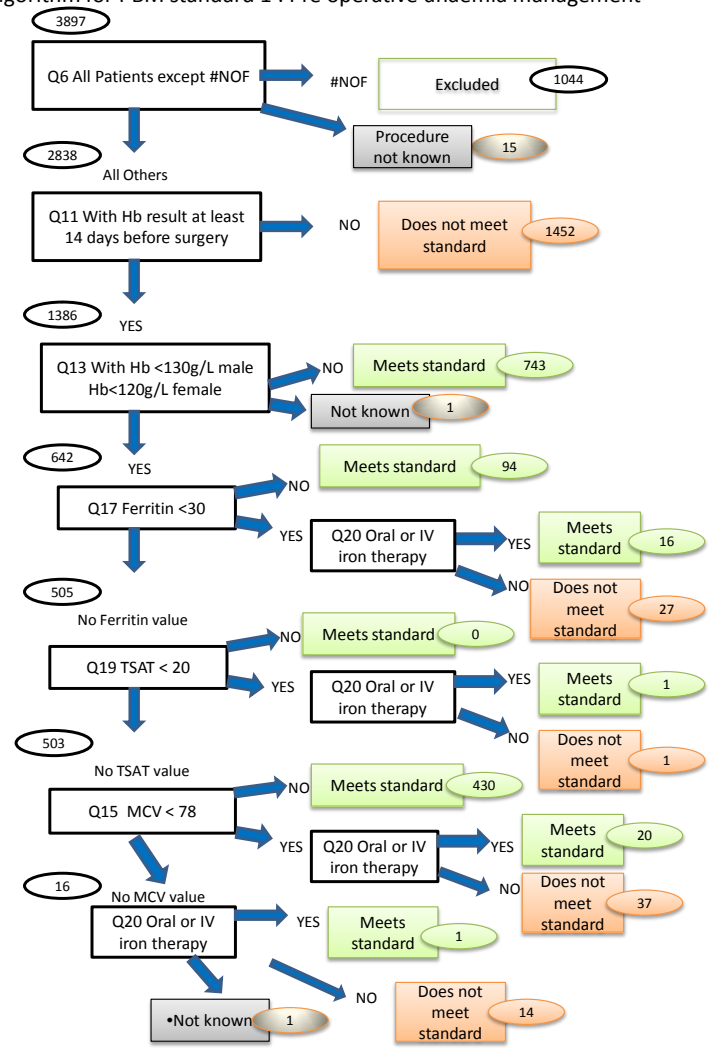
National Comparative Audit of Blood Transfusion

NHS Blood and Transplant

- <u>PBM 1 – Anaemia</u>
- 46-48% anaemic
  - Screen?
  - Identify?
  - Investigate?
  - Manage?

46%

Algorithm for PBM standard 1 : Pre operative anaemia management



European Journal of Heart Failure (2016)
doi:10.1002/ejhf.514

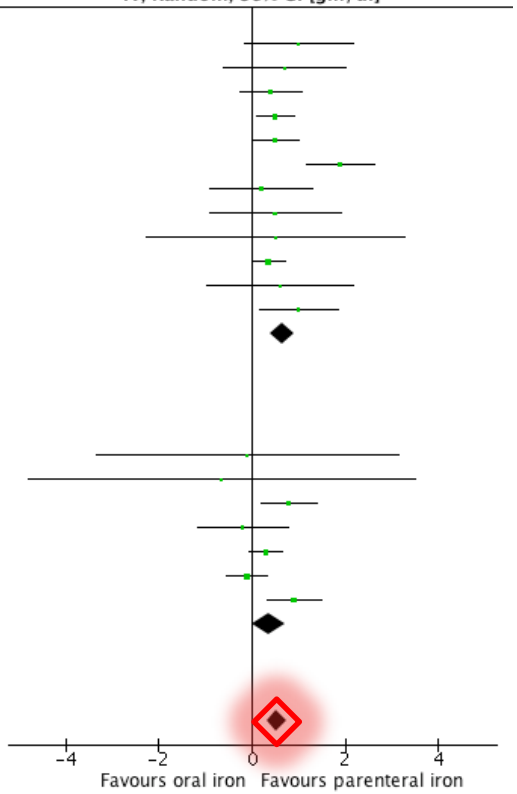
REVIEW

Systematic review and meta-analysis of iron therapy in anaemic adults without chronic kidney disease: updated and abridged Cochrane review

Ben Clevenger[1], Kurinchi Gurusamy[1], Andrew A. Klein[2], Gavin J. Murphy[3], Stefan D. Anker[4], and Toby Richards[1]*

IV iron v Oral

Study or Subgroup	Parenteral iron Mean [gm/dl]	SD [gm/dl]	Total	Oral iron Mean [gm/dl]	SD [gm/dl]	Total	Weight	Mean Difference IV, Random, 95% CI [gm/dl]
1.4.1 Final haemoglobin								
Auerbach 2004	12.2	2.2	37	11.2	2.2	21	2.9%	1.00 [-0.18, 2.18]
Auerbach 2004	11.9	3.1	41	11.2	2.2	22	2.4%	0.70 [-0.62, 2.02]
Bager 2013	13.9	1.37	42	13.5	1.71	41	6.4%	0.40 [-0.27, 1.07]
Bisbe 2014	11.5	1.2	59	11	1.1	62	10.2%	0.50 [0.09, 0.91]
Dangsuwan 2010	10	0.8	22	9.5	0.9	22	8.7%	0.50 [-0.00, 1.00]
Kim 2009	10.5	1.4	30	8.6	1.4	26	5.7%	1.90 [1.16, 2.64]
Kulnigg 2008	12.3	3.1	136	12.1	3.8	60	3.2%	0.20 [-0.89, 1.29]
Lindgren 2009	13	3.1	45	12.5	3.8	46	2.1%	0.50 [-0.92, 1.92]
Prassler 1998	10.5	3.1	12	10	3.8	12	0.6%	0.50 [-2.27, 3.27]
Reinisch 2013	12.59	1.91	219	12.23	1.33	108	11.2%	0.36 [0.00, 0.72]
Schroder 2005	12.3	2.3	18	11.7	2.4	17	1.8%	0.60 [-0.96, 2.16]
Velhal 1991	12.1	3.1	115	11.1	3.8	139	4.7%	1.00 [0.15, 1.85]
Subtotal (95% CI)			**776**			**576**	**59.9%**	**0.65 [0.38, 0.92]**
Heterogeneity: $Tau^2 = 0.06$; $Chi^2 = 16.31$, df = 11 (P = 0.13); $I^2 = 33\%$								
Test for overall effect: Z = 4.69 (P < 0.00001)								
1.4.2 Change in haemoglobin								
Abrahamsen 1965	4.7	3.6	10	4.8	3.8	10	0.4%	-0.10 [-3.34, 3.14]
Beck-da-Silva 2013	1.04	3.6	8	1.69	3.8	5	0.3%	-0.65 [-4.81, 3.51]
Henry 2007	2.4	1.1	41	1.6	1.7	44	7.2%	0.80 [0.20, 1.40]
Maccio 2010	1.6	3.6	73	1.8	2.3	75	3.8%	-0.20 [-1.18, 0.78]
Olijhoek 2001	0.2	0.7	25	-0.1	0.6	24	11.1%	0.30 [-0.06, 0.66]
Olijhoek 2001	1.5	0.9	29	1.6	0.8	29	9.7%	-0.10 [-0.54, 0.34]
Van Wyck 2009	3.2	2.3	228	2.3	3.8	225	7.6%	0.90 [0.32, 1.48]
Subtotal (95% CI)			**414**			**412**	**40.1%**	**0.35 [-0.02, 0.71]**
Heterogeneity: $Tau^2 = 0.09$; $Chi^2 = 11.17$, df = 6 (P = 0.08); $I^2 = 46\%$								
Test for overall effect: Z = 1.88 (P = 0.06)								
Total (95% CI)			**1190**			**988**	**100.0%**	**0.53 [0.31, 0.75]**
Heterogeneity: $Tau^2 = 0.08$; $Chi^2 = 30.43$, df = 18 (P = 0.03); $I^2 = 41\%$								
Test for overall effect: Z = 4.74 (P < 0.00001)								
Test for subgroup differences: $Chi^2 = 1.70$, df = 1 (P = 0.19), $I^2 = 41.1\%$								



Preoperative Iron

- 18.3% of anaemic patients oral iron

Explanatory Variables	Mean change in haemoglobin	p-value	95% CI
Iron Supplements (IV and/or Oral)	0.22	0.70	(-0.91, 1.35)
Pre-operative anaemic status			(-0.18, -0.14)
Not anaemic	Baseline	<0.0005	
Mild	0.84		(-0.04, 1.71)
Moderate	3.76		(2.86, 4.67)
Severe	20.38		(17.77, 22.98)

- 1% had IV iron (n=27)

Explanatory Variables	Mean change in haemoglobin	p-value	95% CI
Iron Supplements (IV only)	4.62	0.001	(1.30, 7.94)
Pre-assessment anaemic status			(-0.17, -0.14)
Not anaemic	Baseline	<0.0005	
Mild	0.82		(-0.05, 1.69)
Moderate	3.73		(2.84, 4.61)
Severe	20.01		(17.43, 22.59)

Preoperative Anaemia

	Blood Transfusion					
	Yes		No		OR	p-value
	n	(%)	n	(%)		
PBM1						
Meets standard	316	(24.4)	980	(75.6)	1.46	<0.0005
Does not meet standard	481	(32.0)	1,024	(68.0)		

logistic regression, adjusting for age, sex and surgery type

Anaemic patients are 78% more likely to receive a blood transfusion

(p-value < 0.0005, 95% C.I. [1.48, 2.14]).

PBM 1: Preoperative Anaemia Management

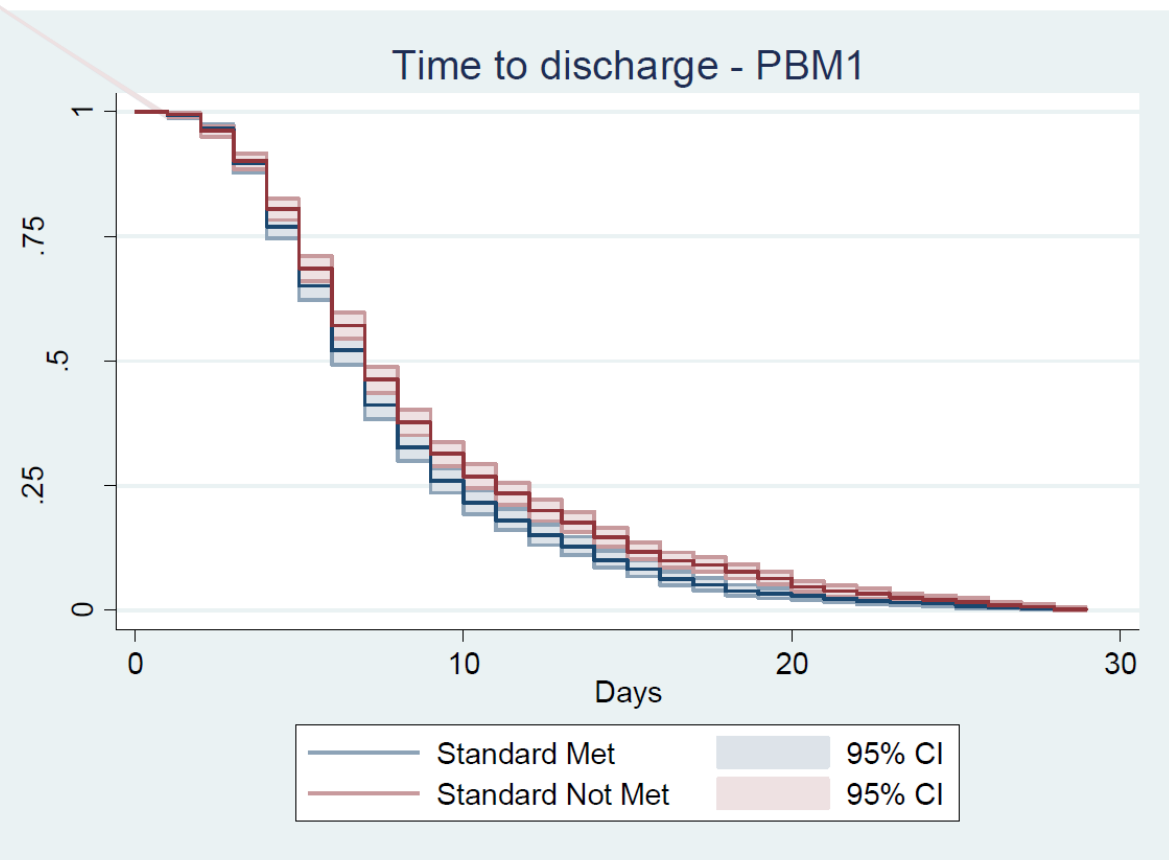


Figure 5- time to discharge, PBM1 by adherence

- Overall 7% Longer LOS
- 61% in Elderly
- > 2x in BIG ops

PBM 5
Anti-Coagulation & Anti Platlets

- 18% patients (710/3890)
- 347 anti-coagulant
- 349 anti-platelet
- 14 both

Patient on Warfarin pre-operatively	8.3% (318/3813)
INR result before surgery	
• ≤1.0	49
• 1.1-1.4	164
• 1.5-1.9	50
• 2.0-2.4	17
• 2.5-2.9	6
• 3.0-3.4	7
• 3.5-4.4	8
• 4.5-5.9	2
• 6.0-7.9	-
• ≥8.0	2

	National
Patients on any antiplatelet therapy	9.3% (363/3890)
Stopped therapy	77% (279/363)
Stopped at least 5 days pre-op	57% (149/261)

PBM 5

PBM 5

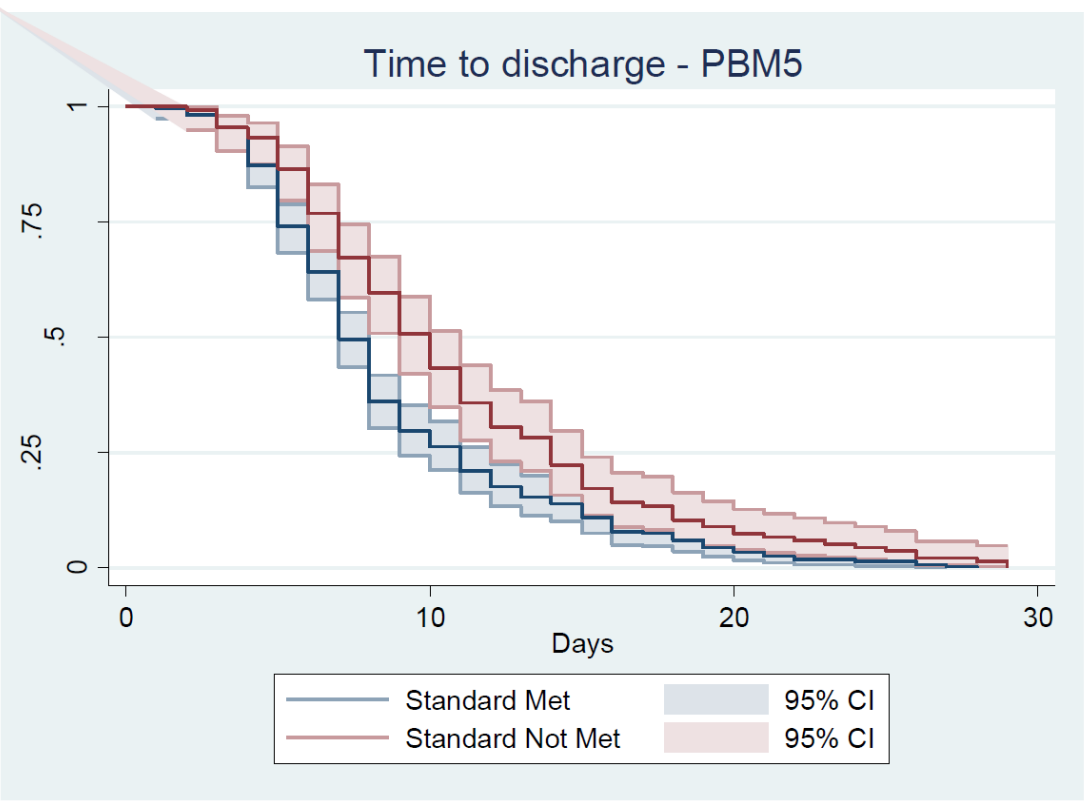


Figure 6- time to discharge, PBM5 by adherence

- N=541
- 30% Longer LOS
- P<0.0005 [1.16-1.51]

Royal College of Physicians

National Comparative Audit of Blood Transfusion

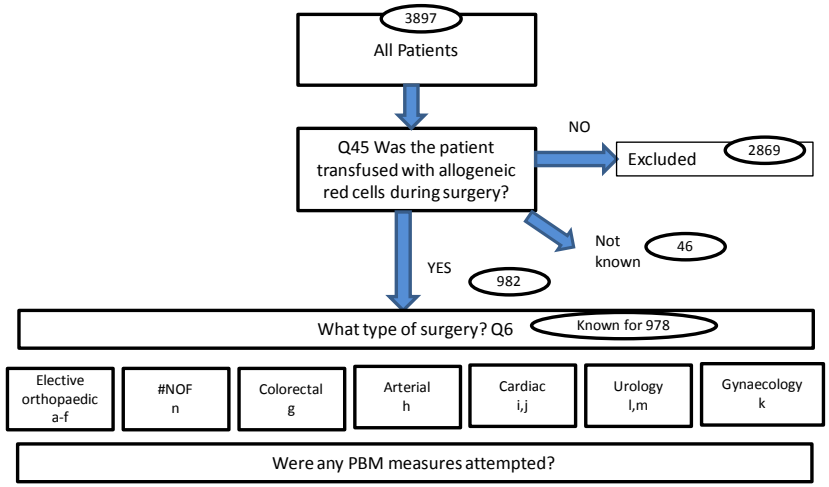
NHS Blood and Transplant

OPERATIVE

PBM 6: Any PBM measure before operative BT

PBM 7: All PBM measure before operative BT

Algorithm for PBM standard 6 :

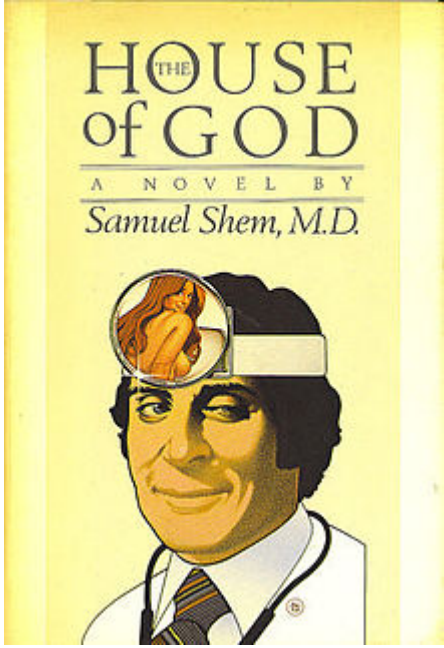


Meets pre op anaemia standard? Standard 1						
Yes / No / NK 93 / 102 / 0	N/A	Yes / No / NK 30 / 86 / 0	Yes / No / NK 22 / 40 / 0	Yes / No / NK 106 / 122 / 1	Yes / No / NK 28 / 54 / 0	Yes / No / NK 37 / 77 / 0
Meets pre op anticoagulant / antiplatelet standard? Standard 5						
Yes / No / Ex / NK 13 /14 /166 / 2	Yes / No / Ex / NK 13 / 5 / 158 / 4	Yes / No / Ex / NK 5 /3 /107 /1	Yes / No / Ex / NK 16 / 9 / 37 / 0	Yes / No / Ex / NK 54 / 25 / 144 / 6	Yes / No / Ex / NK 4 / 3 / 74 / 1	Yes / No / Ex / NK 2 / 1 / 111 / 0
Meets TXA / Aprotonin standard? Q35=pre/intra TXA or Q36=yes						
Yes / No / NK 124 / 64 / 7	N/A	Yes / No / NK 12 / 98 / 6	Yes / No / NK 8 / 53 / 1	Yes / No / NK 187 / 39 / 3	Yes / No / NK 11 / 68 / 3	Yes / No / NK 25 / 83 / 6
Meets cell salvage standard Q40 yes or Q40 no plus Q42=reasons b,c,d,e						
Yes / No / NK 99 / 86 / 10	N/A	N/A	Yes / No / NK 45 / 14 / 3	Yes / No / NK 166 / 57 / 6	Yes / No / NK 48 / 30 / 4	Yes / No / NK 64 / 40 / 10

If yes to any (where applicable) standard is met
If no to all (where applicable) standard is not met

Laws of the House of God

- GOMERS DON'T DIE.
- GOMERS GO TO GROUND
- AT A CARDIAC ARREST, THE FIRST PROCEDURE IS TO TAKE YOUR OWN PULSE.
- THE PATIENT IS THE ONE WITH THE DISEASE.
- PLACEMENT COMES FIRST.
- **THERE IS NO BODY CAVITY THAT CANNOT BE REACHED WITH A #14G NEEDLE AND A GOOD STRONG ARM.**
- AGE + BUN = LASIX DOSE.
- THEY CAN ALWAYS HURT YOU MORE.
- THE ONLY GOOD ADMISSION IS A DEAD ADMISSION.
- IF YOU DON'T TAKE A TEMPERATURE, YOU CAN'T FIND A FEVER.
- SHOW ME A BMS WHO ONLY TRIPLES MY WORK AND I WILL KISS HIS FEET.
- IF THE RADIOLOGY RESIDENT AND THE MEDICAL STUDENT BOTH SEE A LESION ON THE CHEST X-RAY, THERE CAN BE NO LESION THERE.
- THE DELIVERY OF GOOD MEDICAL CARE IS TO DO AS MUCH NOTHING AS POSSIBLE.



Royal College of Physicians

National Comparative Audit of Blood Transfusion

NHS Blood and Transplant

OPERATIVE

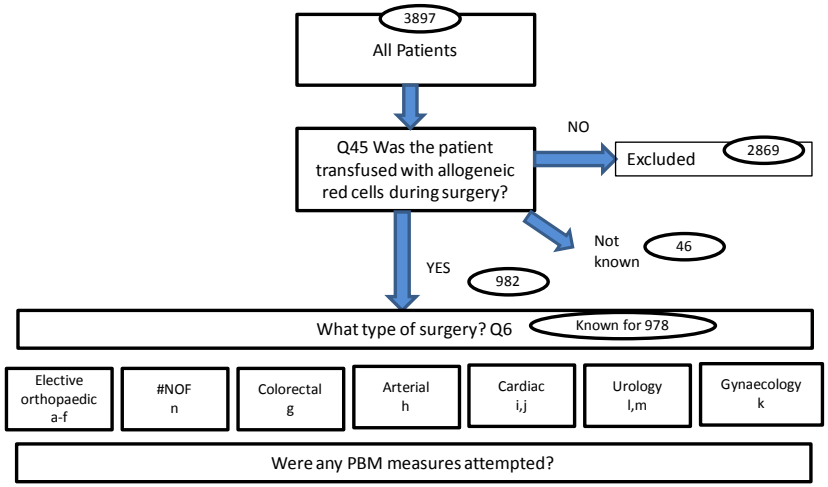
PBM 6: Any PBM measure before operative BT

83%

PBM 7: All PBM measure before operative BT

16%

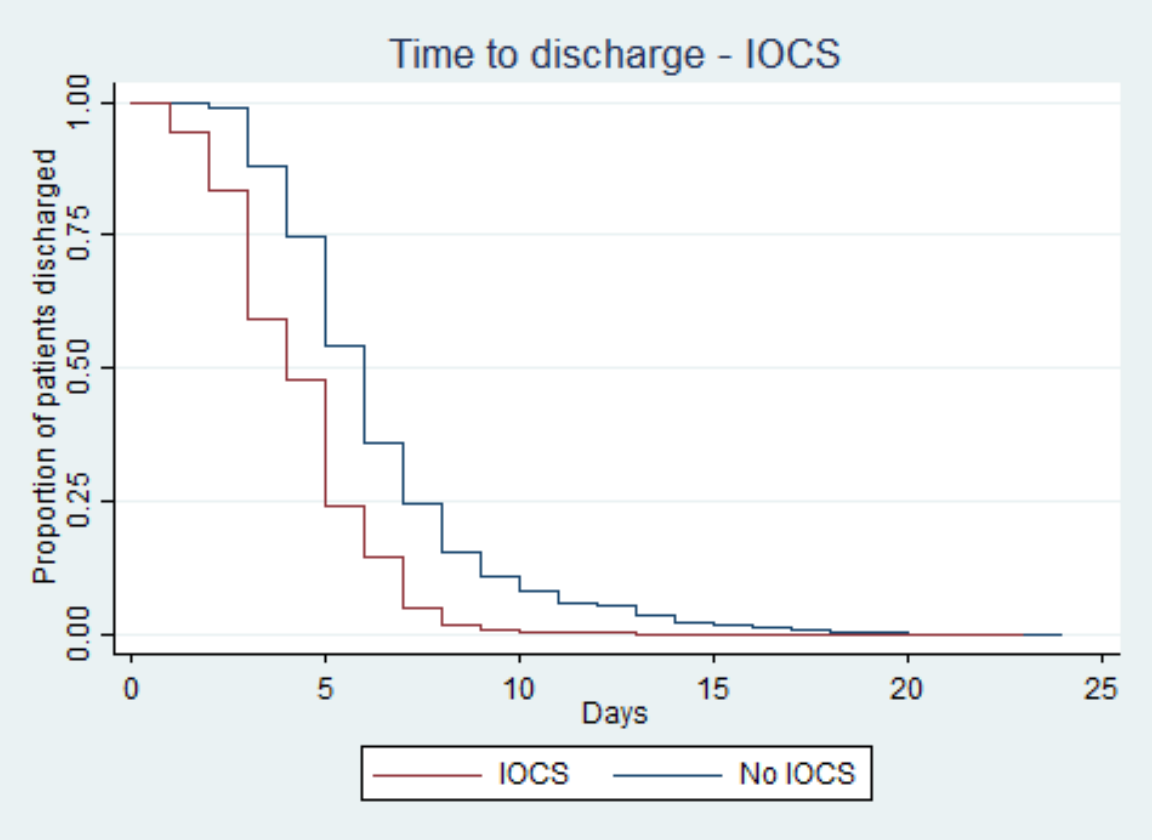
Algorithm for PBM standard 6 :



Meets pre op anaemia standard? Standard 1						
Yes / No / NK 93 / 102 / 0	N/A	Yes / No / NK 30 / 86 / 0	Yes / No / NK 22 / 40 / 0	Yes / No / NK 106 / 122 / 1	Yes / No / NK 28 / 54 / 0	Yes / No / NK 37 / 77 / 0
Meets pre op anticoagulant / antiplatelet standard? Standard 5						
Yes / No / Ex / NK 13 /14 /166 / 2	Yes / No / Ex / NK 13 / 5 / 158 / 4	Yes / No / Ex / NK 5 /3 /107 /1	Yes / No / Ex / NK 16 / 9 / 37 / 0	Yes / No / Ex / NK 54 / 25 / 144 / 6	Yes / No / Ex / NK 4 / 3 / 74 / 1	Yes / No / Ex / NK 2 / 1 / 111 / 0
Meets TXA / Aprotonin standard? Q35=pre/intra TXA or Q36=yes						
Yes / No / NK 124 / 64 / 7	N/A	Yes / No / NK 12 / 98 / 6	Yes / No / NK 8 / 53 / 1	Yes / No / NK 187 / 39 / 3	Yes / No / NK 11 / 68 / 3	Yes / No / NK 25 / 83 / 6
Meets cell salvage standard Q40 yes or Q40 no plus Q42=reasons b,c,d,e						
Yes / No / NK 99 / 86 / 10	N/A	N/A	Yes / No / NK 45 / 14 / 3	Yes / No / NK 166 / 57 / 6	Yes / No / NK 48 / 30 / 4	Yes / No / NK 64 / 40 / 10

If yes to any (where applicable) standard is met
If no to all (where applicable) standard is not met

PBM 6: IOCS



- Overall Reduced BT

OR 0.58 p <0.0005, C.I. [0.47-0.71]

- Overall Reduced LOS

9.8%, p= 0.005, C.I. [3% - 16.2%]

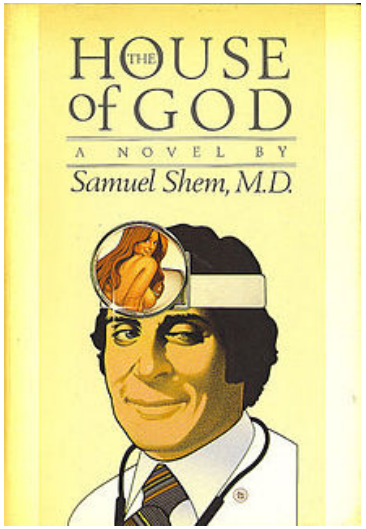
- THR Reduction 18.9%

P= 0.047, 95% C.I. [0% - 34.1%]

Management of Major Haemorrhage

- Surgical control
- Anaesthetic Control
- Blood products
- Cell salvage
- TXA
- Glue

- Post op?

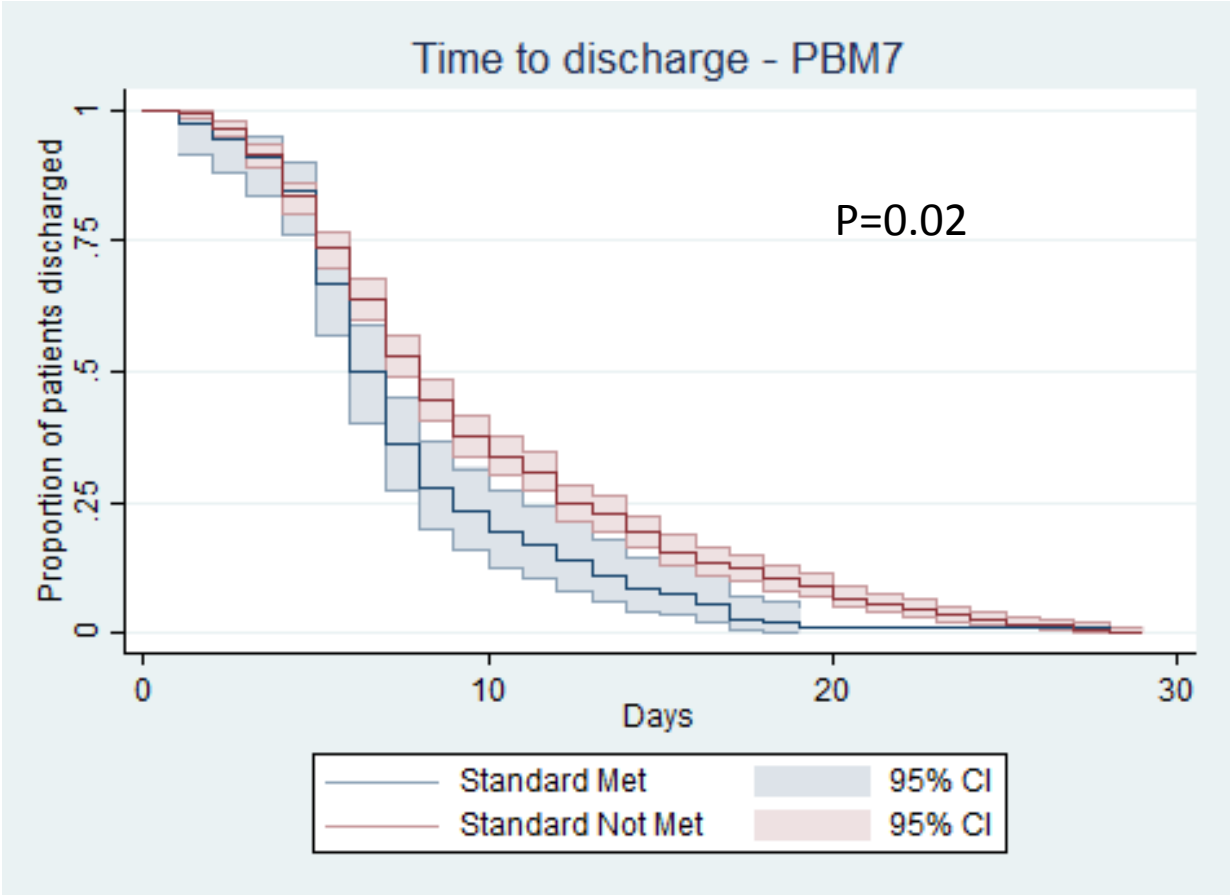


Rule 3

‘THE FIRST PROCEDURE IS TO TAKE YOUR OWN PULSE’

Patient Blood Management - PILLAR 2

- Anti-fibrionlytics
- Cell Salvage
- Adjuncts
- POC



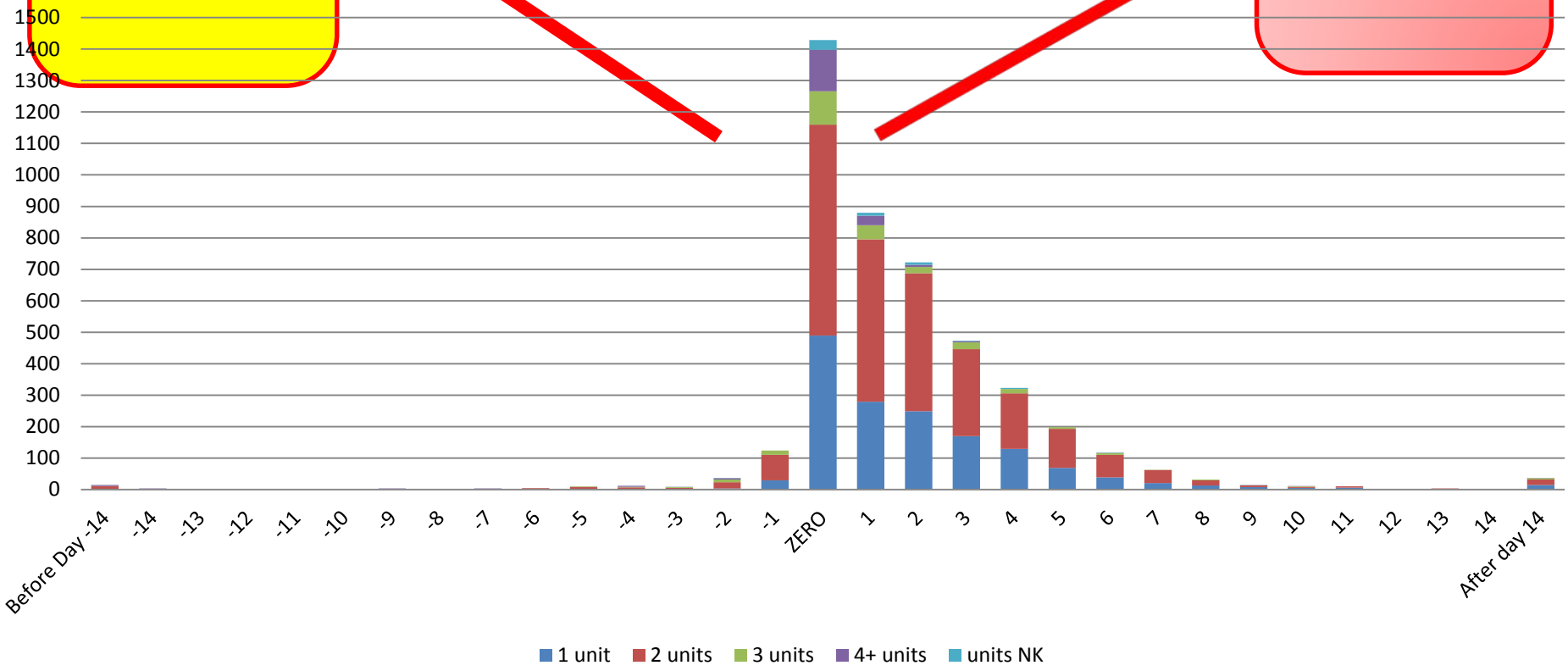
Surgical PBM

Pre OP
Anaemia Rx

Warfarin
Anti Plts

OP
Cell Salvage

Tranexamic acid
POC



Conclusions

- NHSBT Audit – worthwhile benchmarking

- PBM 1 Management Anaemia
- PBM 5 Management Anticoag/plt
- PBM 6 IOCS
- PBM 7 IntraOP PBM

- THESE WORK - Thank you for your hard work

PREVENTT

Preoperative intravenous iron to treat anaemia in major surgery

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THE IRON CLINIC