Pre-operative optimisation revisited

Emma O'Donovan
Haematology Consultant

1968 WHO definition of Anaemia

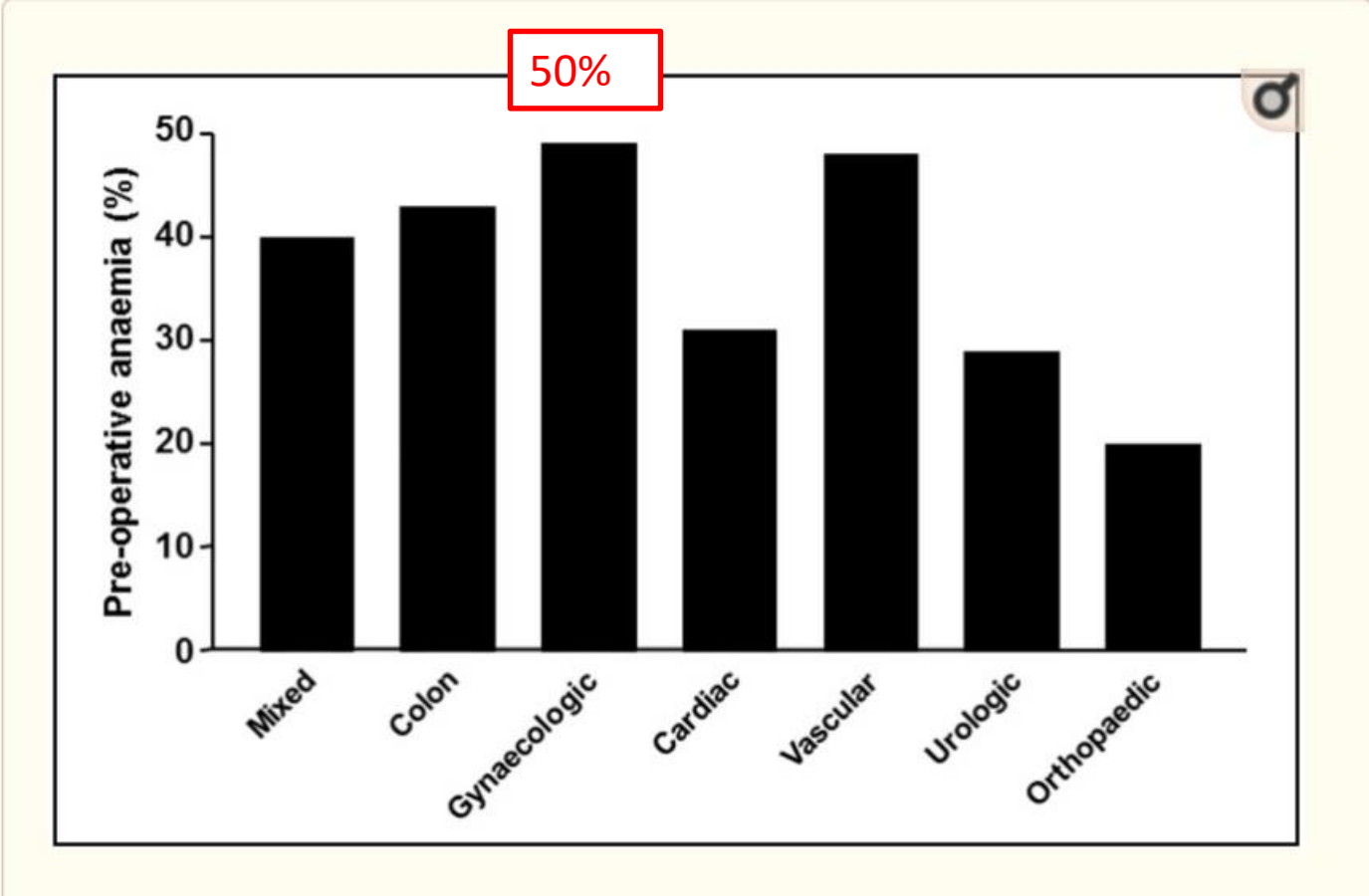
- HB < 130 for men,
- HB < 120 for non-pregnant women,
- HB < 110 for pregnant women.

Prevalence of anaemia as defined by the WHO is 12.7% for men and 30.2% women, rising to 40.8% in pregnancy.

Transfusion triggers are the same for men and women.

Women with a pre-operative Hb of 120 g/L are twice as likely to require a transfusion as men with an Hb of 130 g/L

Anaemia is common pre-op



Munoz Blood Transfus. 2014 Apr; 12(2): 146–149

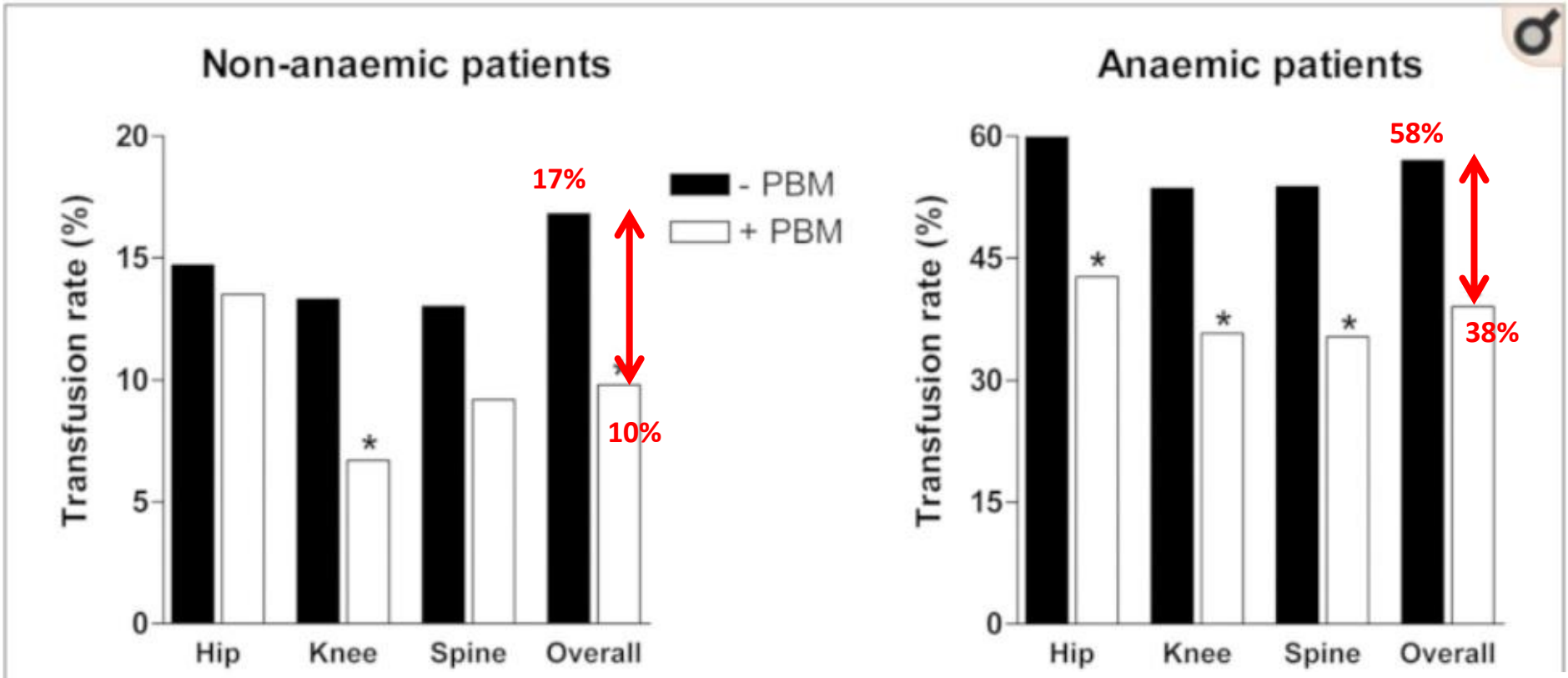
We can make a difference

Patient Blood Management (PBM) can make significant improvements.

Identifying anaemic patients and treating their anaemia pre-op,

Using restrictive transfusion

Using surgical & medical techniques to optimise blood loss

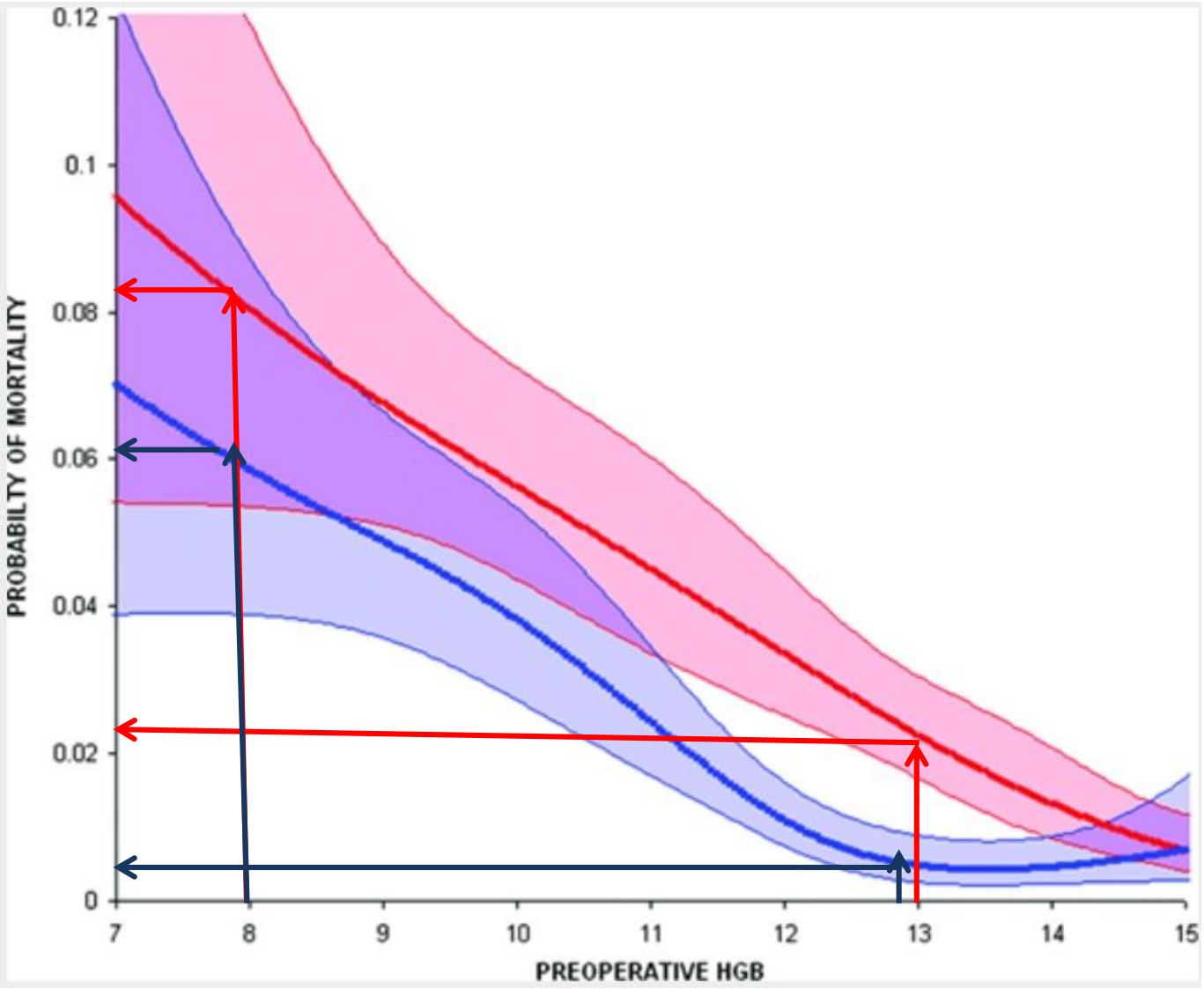


Theusiger et al Blood Transfus. 2014 Apr; 12(2): 195–203.

Perioperative Medicine | March 2009

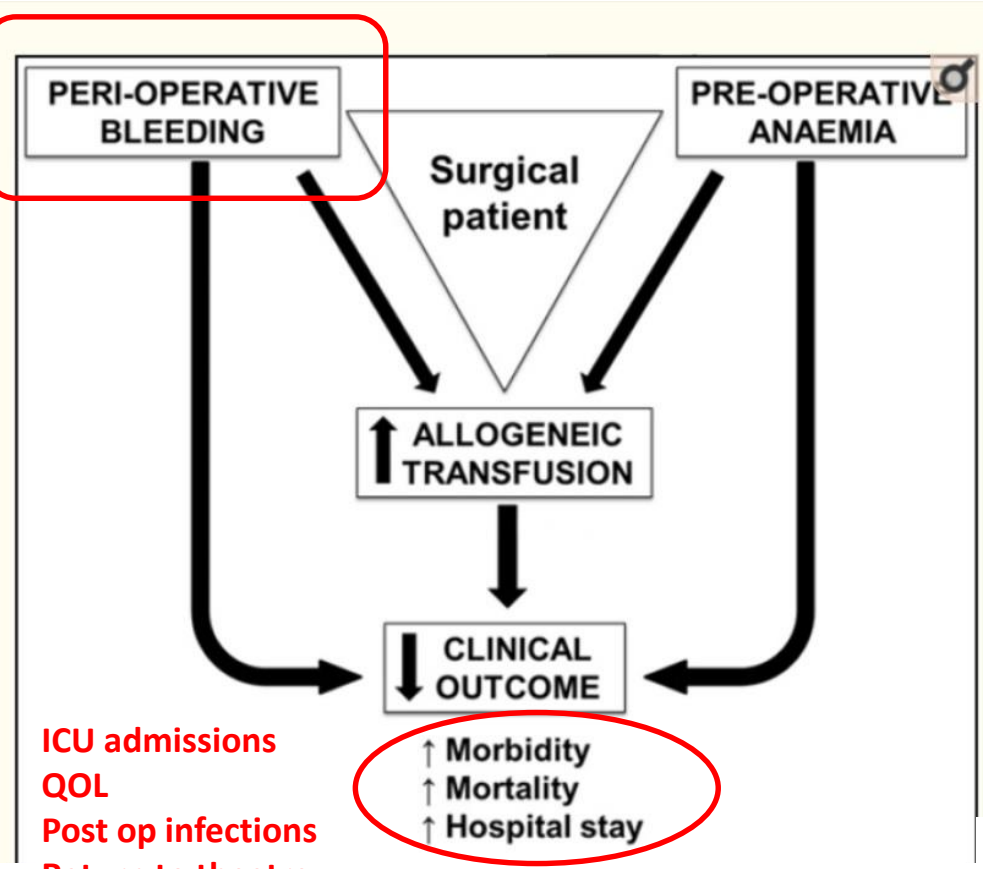
Risk Associated with Preoperative Anemia in Noncardiac Surgery: A Single-center Cohort Study

W Scott Beattie, M.D., Ph.D., F.R.C.P.C.; Keyvan Karkouti, M.D., M.Sc., F.R.C.P.C.; Duminda N. Wijeysundera, M.D., F.R.C.P.C.; Gordon Tait, Ph.D.



- 8000 patients
- Non-cardiac surgery,
- 40% patients had preoperative anaemia,
- five-fold increase in 90-day postoperative mortality

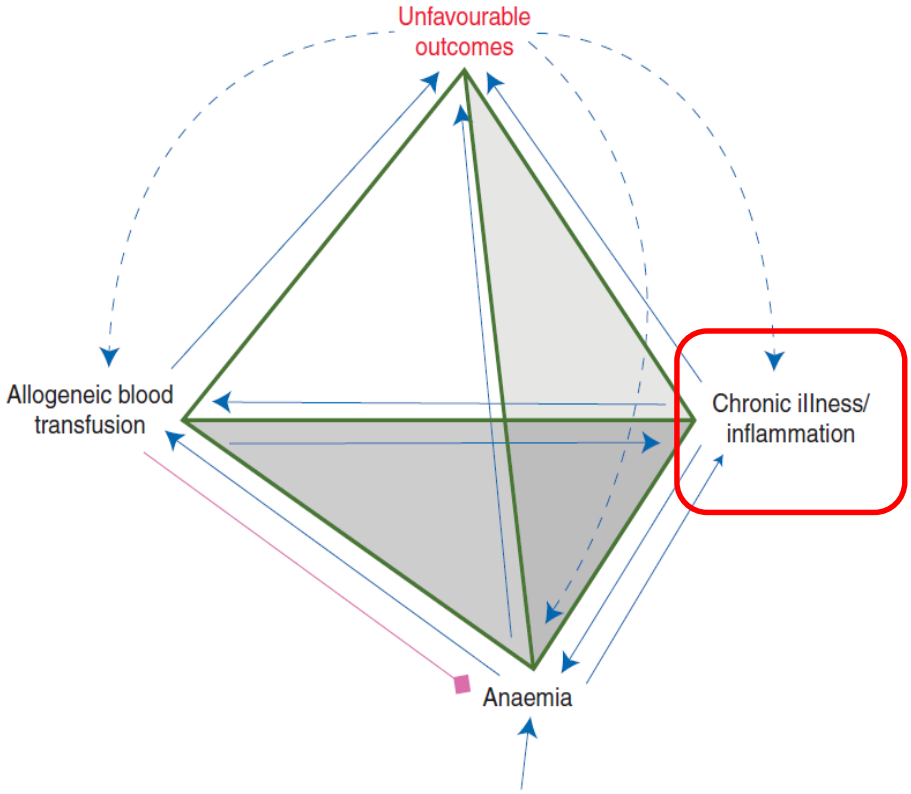
Anaemic patients have worse outcomes in surgery



ICU admissions
QOL
Post op infections
Return to theatre
Readmission
90day mortality

Blood Transfus. 2015 Jul; 13(3): 370–379.
Prepublished online 2015 Jun 16. doi: 10.2450/2015.0014-15
PMCID: PMC4614288
PMID: 26192787

Pre-operative anaemia: prevalence, consequences and approaches to management



British Journal of Anaesthesia 107 (S1): i41–i59 (2011)
doi:10.1093/bja/aer350

BJA

What is really dangerous: anaemia or transfusion?

A. Shander[1,2,3,4*], M. Javidroozi[1], S. Ozawa[5] and G. M. T. Hare[6,7]

Transfusion is risky; SHOT 2016

- Mortality 1 per 100,000,
- Morbidity 5 per 100,000,
- 1% Transfusion Associated Circulatory Overload/Transfusion associated dyspnoea (TACO/TAD)
- 1:1000 Transfusion Related Acute Lung Injury (TRALI)
- Blood bourne infections:
  - <1:1000000 Hepatitis B,
  - <1:1000000 Hepatitis C,
  - <1:1000000 Hepatitis E,
  - <1:1000000 HIV,
  - Prion disease,
  - CMV,
  - ???NEXT INFECTION
  - Bacterial contamination (1 per year nationally)
- 3.5:100,000 Transfusion reactions
  - Febrile transfusion reactions
  - Haemolytic transfusion reactions (immediate or delayed)
  - Life threatening ABO mismatch
- ?Next new risk

The New England
Journal of Medicine

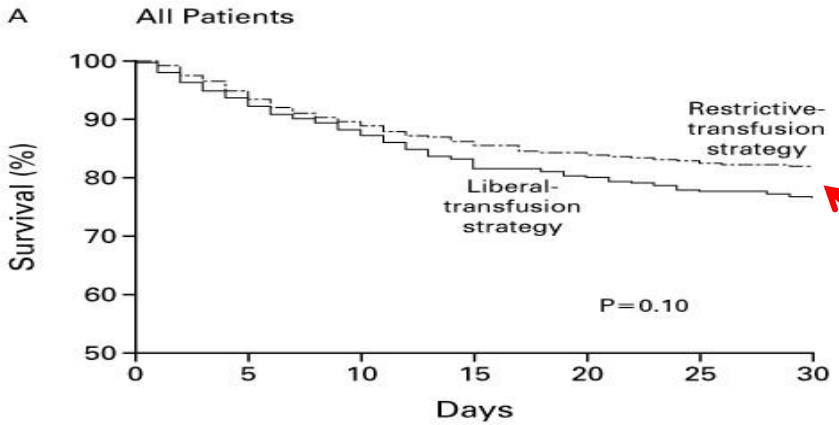
VOLUME 340 FEBRUARY 11, 1999 NUMBER 6

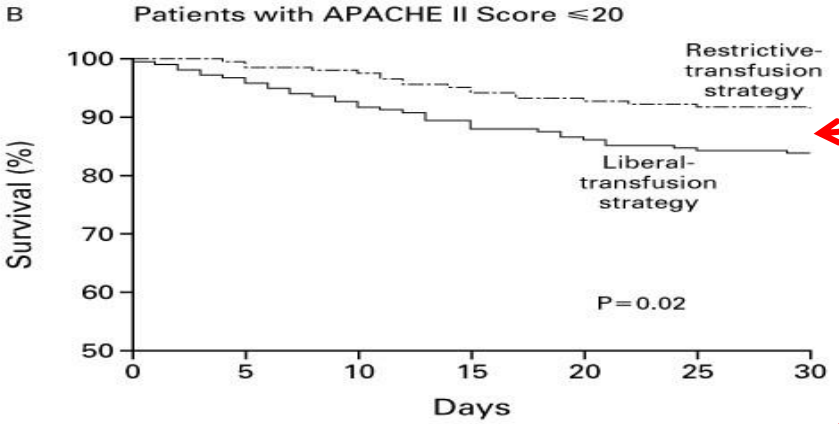
A MULTICENTER, RANDOMIZED, CONTROLLED CLINICAL TRIAL OF TRANSFUSION REQUIREMENTS IN CRITICAL CARE

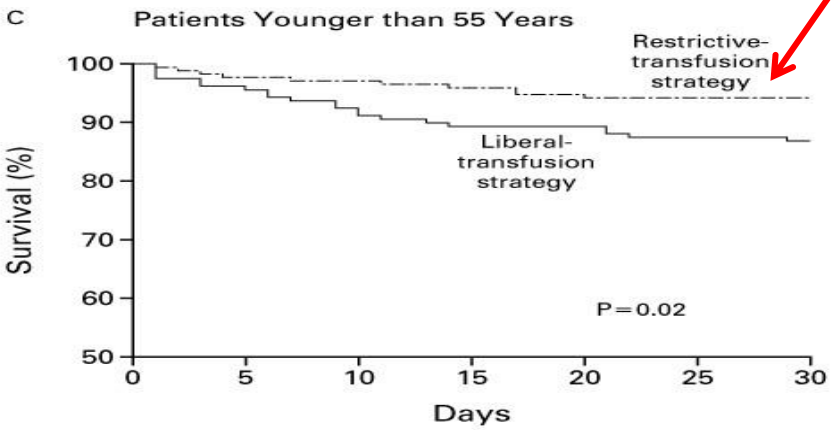
838 critically ill patients admitted to ICU in Canada with Hb <90
Randomly allocated to

Liberal transfusion (Hb kept 100-120g/L)

Restrictive transfusion (Hb kept 70-90g/L)







- 30-day mortality 18.7% vs. 23.3% P=0.11.
- Significant improvement in mortality in Restrictive transfusion IF
  - APACHEII score of «20 (8.7% vs 16.1% P=0.03)
  - Age < 55 (5.7% vs13.0% P=0.02),
  - NOT IF cardiac disease (20.5% vs 22% P=0.69). The mortality rate during hospitalization was significantly lower in the restrictive-strategy group (22.2 percent vs. 28.1 percent, P=0.05).
- A restrictive strategy of transfusion is superior to a liberal transfusion strategy in critically ill patients, with the possible exception of patients with acute myocardial infarction and unstable angina.

Ideal scenario

- Identify anaemia pre-op
- Identify cause of anaemia pre-op
- Treat cause pre-op

- Aim for normal HB pre-surgery (Hb ≥130)

Any Guidelines….?

NICE
National Institute
Health and Care E

bjh guideline

British Committee for Standards in Haematology Guidelines on the Identification and Management of Pre Operative Anaemia

Anaesthesia 2017, 72, 233–247 doi:10.1111/anae.13773

Consensus Statement

Kate Ryan,[7] Craig Taylor[8] and

eacta
European Association of Cardiothoracic Anaesthesiology

European Journal of Cardio-Thoracic Surgery 53 (2018) 79–111
doi:10.1093/ejcts/ezx325 Advance Access publication 3 October 2017

EACTS

2017 EACTS/EACTA Guidelines on patient blood management for

British Journal of Anaesthesia **106** (1): 13–22 (2011)
doi:10.1093/bja/aeq361

BJA

Detection, evaluation, and management of preoperative anaemia in the elective orthopaedic surgical patient: NATA

NICE
National Institute for Health and Care Excellence

NICE Guidelines NG 24; 2015

Iron replacement	PO iron before +/- after surgery if IDA (check after 3-4 weeks) IV iron before +/- after surgery for IDA patients who: Don't tolerate/respond to oral iron, or there is insufficient time for PO iron to work
RBC **NOT massive Blood loss**	Give ONE unit and then clinically review and recheck HB Trigger transfusion if Hb <70 in all patents Trigger transfusion if HB <80 ONLY IF IHD or respiratory disease
RBC **Massive blood loss**	Follow MBL protocol
Platelets **Bleeding patient**	Trigger 1 pool transfusion if platelet count is $<30\times10^9$/L. Trigger 1 (or more) pools transfusion if platelet count is $<100\times10^9$/L) ONLY IF Severe bleeding or bleeding at critical sites, e.g. CNS
Platelets **Pre surgery or invasive procedures**	Trigger 1 pool transfusion if platelet count $<50\times10^9$/L Consider 1 pool platelet transfusions if platelets are < 100×10^9/L in patients having surgery in critical sites, such as the CNS or eyes (not cataracts). Exceptions – BMA&T (N/A), central line placement (PLT 20), LP (PLT 50)
Platelets **Patient not bleeding**	Trigger 1 pool transfusion if platelet count $<10\times10^9$/L Exceptions – bone marrow failure, TTP, ITP, HITT, Reassess the patient's clinical condition and check the platelet count after each platelet pool.
FFP :Patient bleeding	15ml/KG FFP should be offered if there is abnormal PT/APTT and bleeding
FFP: Patient NOT bleeding	FFP should NOT be offered to correct abnormal blood results FFP should NOT be used to correct warfarin overdose (use Beriplex)
FFP **Pre surgery/procedure**	15ml/KG FFP if there is abnormal PT/APTT who are having invasive procedures or surgery with a risk of clinically significant bleeding. Reassess patient and recheck clotting after 15ml/kg
Cryoprecipitate **Bleeding patient**	Give 2 pools in the event of clinically significant bleeding where the Fibrinogen is <1.5g/Litre.
Cryoprecipitate **Patient NOT bleeding**	Do not use cryoprecipitate to correct an abnormal fibrinogen without bleeding Always reassess patient and recheck fibrinogen after 2 pools

NICE
National Institute for Health and Care Excellence

NICE Quality statement 138 2016

Statement	Description
Statement 1	People with iron-deficiency anaemia who are having surgery are offered iron supplementation before and after surgery.
Statement 2	Adults who are having 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.

British Journal of Anaesthesia 106 (1): 13–22 (2011)
doi:10.1093/bja/aeq361

BJA

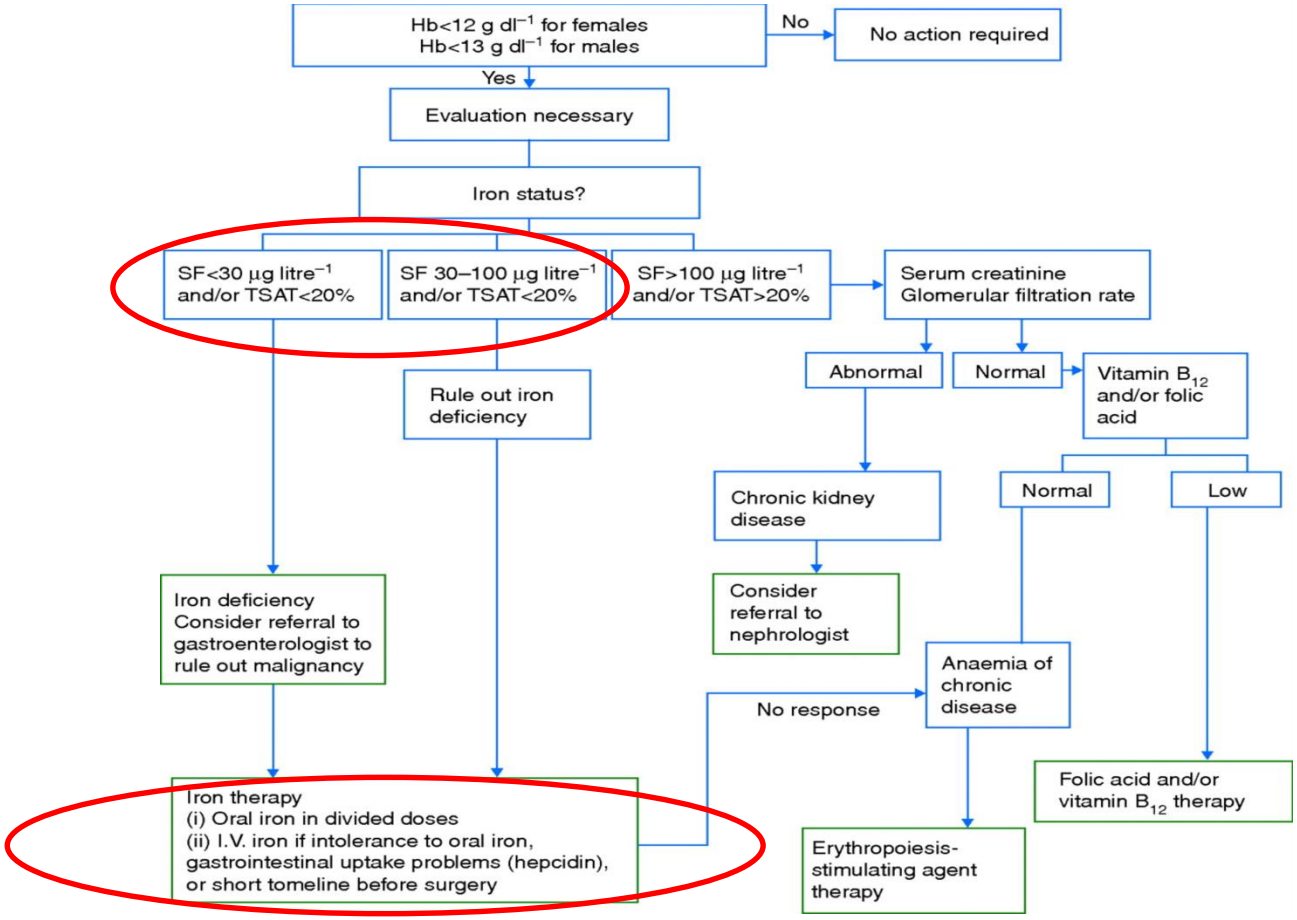
Detection, evaluation, and management of preoperative anaemia in the elective orthopaedic surgical patient: NATA guidelines BJA 2011

- Elective orthopaedic surgical patients have a Hb level checked 28 days before surgery.
- Hb before elective surgery should be within the normal range, according to the World Health Organization criteria.
- Investigations should be done to evaluate anaemia for nutritional deficiencies, chronic renal insufficiency, and/or chronic inflammatory disease.
- Nutritional deficiencies should be treated.
- Erythropoietin should be used for anaemic patients in whom nutritional deficiencies have been ruled out, corrected, or both.
- Anaemia should be viewed as a serious and treatable medical condition, rather than simply an abnormal laboratory value.
- Implementation of anaemia management in the elective orthopaedic surgery setting will improve patient outcomes.

British Journal of Anaesthesia **106** (1): 13–22 (2011)
doi:10.1093/bja/aeq361

BJA

Detection, evaluation, and management of preoperative anaemia in the elective orthopaedic surgical patient: NATA guidelines



BCSHGuideline 2015. Pre-op anaemia

bjh guideline

British Committee for Standards in Haematology Guidelines on the Identification and Management of Pre-Operative Anaemia

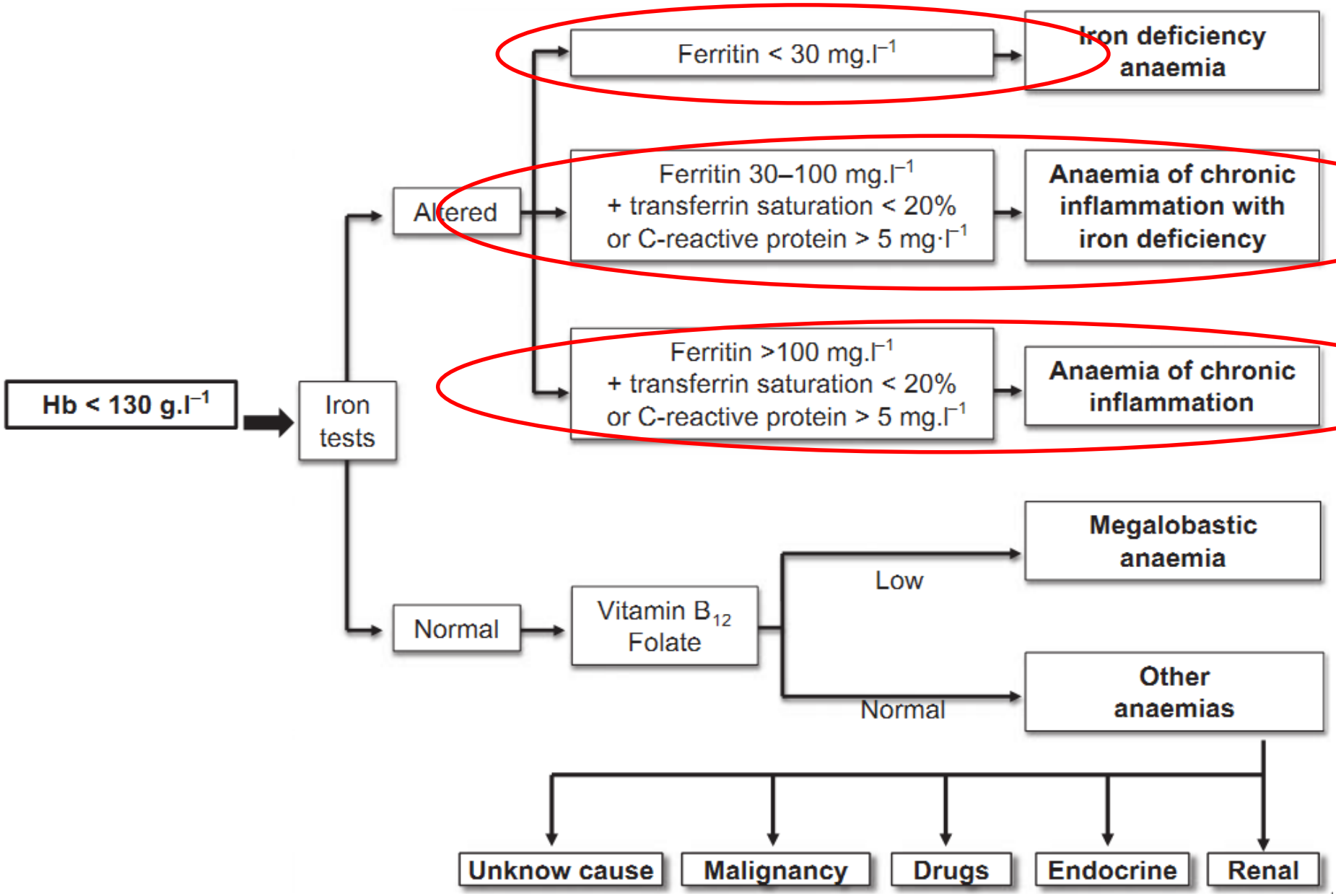
- Defer non-urgent surgery until anaemia is investigated and treated.
- Patients with unexplained IDA should be considered for further investigation and/or specialist referral
- Iron therapy is indicated in anaemic patients with absolute or functional iron deficiency.
- Oral iron is indicated in iron deficient anaemic patients whose surgery is not urgent.
- Replace iron in non-anaemic patients with low iron stores (ferritin <100) scheduled to undergo surgery with High EBL (>30g/L)
- Use IV iron when patients are intolerant of, or unresponsive to, oral iron.
- Intravenous iron is indicated in functional iron deficiency or where the interval between detection of anaemia and surgery is predicted to be short.
- Where the time to surgery is short use single dose IV iron (Monofer)
- Where transfusion avoidance is desirable erythropoietin use may be considered
- When erythropoietin is indicated pre-operatively, it should be given with iron supplementation to maximize its efficacy.

Anaesthesia 2017, 72, 233–247 doi:10.1111/anae.13773

Consensus Statement

International consensus statement on the peri-operative management of anaemia and iron deficiency

- Pre-op anaemia should be investigated and treated if EBL > 500 ml.
- Ferritin level <30 represents absolute iron deficiency.
- Inflammation and Iron deficiency (CRP > 5 mg +/- TFN sat < 20%, + ferritin level < 100.
- Postpone non urgent Major surgery to investigate and treat of pre-op anaemia.
- Pre-op, the target HB should be ≥ 130 g in both sexes.
- PO iron for patients with iron deficiency +/- anaemia with surgery within 6–8 weeks.
- Daily or alternate-day treatment with oral iron for patients with iron deficiency.
- IV iron is efficacious and safe, used if
  - patients do not respond to oral iron or
  - Patients are not able to tolerate PO iron, or
  - if surgery is planned for < 6 weeks.
- The diagnosis and treatment of anaemia and iron deficiency should commence as early as possible in the peri-operative period, and ideally as soon as the decision to undertake surgery is made.


Hb < 130 g.l^{-1}
Iron tests
Altered
Ferritin < 30 mg.l^{-1}
Iron deficiency anaemia
Ferritin 30–100 mg.l^{-1}
+ transferrin saturation < 20%
or C-reactive protein > 5 mg·l^{-1}
Anaemia of chronic inflammation with iron deficiency
Ferritin >100 mg.l^{-1}
+ transferrin saturation < 20%
or C-reactive protein > 5 mg.l^{-1}
Anaemia of chronic inflammation
Normal
Vitamin B$_{12}$
Folate
Low
Megalobastic anaemia
Normal
Other anaemias
Unknow cause
Malignancy
Drugs
Endocrine
Renal

European Journal of Cardio-Thoracic Surgery 53 (2018) 79–111
doi:10.1093/ejcts/ezx325 Advance Access publication 3 October 2017

2017 EACTS/EACTA Guidelines on patient blood management for adult cardiac surgery

The Task Force on Patient Blood Management for Adult Cardiac Surgery of the European Association for Cardio-Thoracic Surgery (EACTS) and the European Association of Cardiothoracic Anaesthesiology (EACTA)

- Preoperative anaemia is associated with a worse clinical outcome.
  - ↑blood transfusion,
  - ↑ post op infections
  - ↑acute kidney injury (AKI),
  - ↑death.
- Transfusion after cardiac surgery is associated with significantly worse outcomes

Recommendations	Class[a]	Level[b]	Ref[c]
Oral or intravenous iron alone prior to cardiac surgery may be considered in mildly anaemic patients (women, Hb 100–120 g/l; men, Hb 100–130 g/l) or in severely anaemic patients (both genders, Hb ≤ 100 g/l) to improve erythropoiesis.	IIb	C	
Erythropoietin with iron supplementation should be considered to reduce postoperative transfusions in patients with non-iron deficiency (e.g. EPO, vitamin D or folate acid deficiency) undergoing elective surgery.	IIa	B	[81–83]
Preoperative erythrocyte transfusion is not routinely recommended in preoperative anaemic patients to prevent postoperative AKI.	III	C	

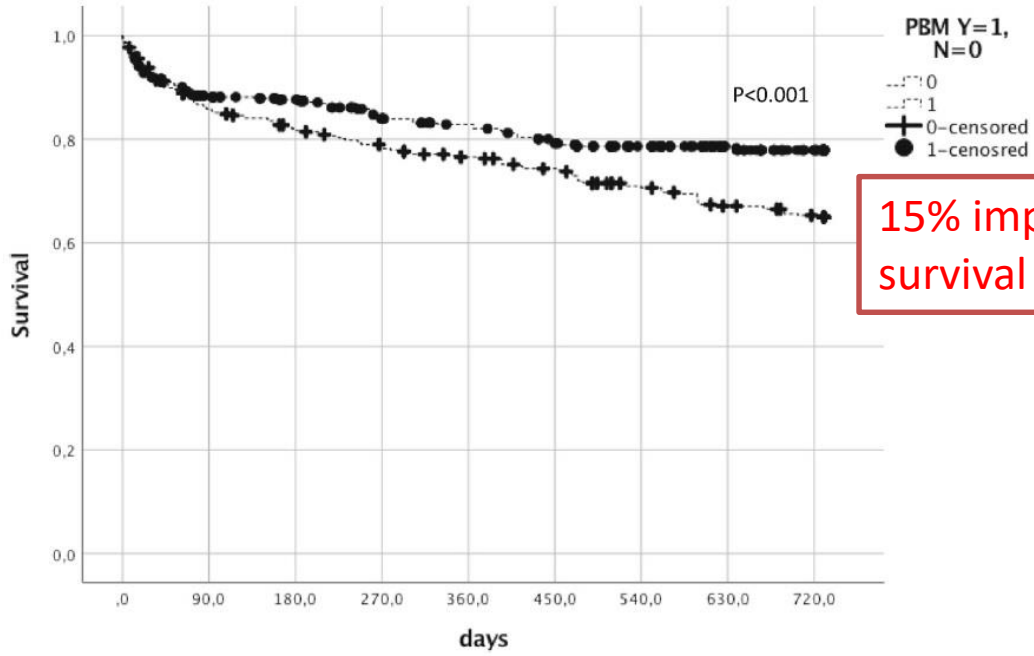
Keding *et al. World Journal of Surgical Oncology* (2018) 16:159
https://doi.org/10.1186/s12957-018-1456-9

World Journal of Surgical Oncology

RESEARCH Open Access

Patient Blood Management improves outcome in oncologic surgery

Consecutive patients undergoing abdominal oncological surgery before (n=389) and after (n=447) PBM



15% improvement in survival at 2 years

Fig. 1 Two-year overall survival comparing patients with and without Patient Blood Management

IV iron – the evidence

ARTICLES | VOLUME 3, ISSUE 9, PE415-E425, SEPTEMBER 01, 2016

Intravenous ferric carboxymaltose versus standard care in the management of postoperative anaemia: a prospective, open-label, randomised controlled trial

Iv iron given D1 post op reduced post op tx 5% → <1%

THE JOURNAL OF AABB

transfusion.org

TRANSFUSION

Perioperative intravenous iron, with or without erythropoietin, plus restrictive transfusion protocol reduce the need for allogeneic blood after knee replacement surgery

TKR patients had shorter LOS and less transfusions with pre-op IV iron.

Patient blood management in orthopaedic surgery: a four-year follow-up of transfusion requirements and blood loss from 2008 to 2011 at the Balgrist University Hospital in Zurich, Switzerland

Ortho surgery. IV iron reduced post op transfusion from 27% to 15%

Lippincott Williams & Wilkins Open Access

ANNALS OF SURGERY

Ann Surg. 2016 Jul; 264(1): 41–46.
Published online 2016 Jan 27. doi: 10.1097/SLA.0000000000001646

PMCID: PMC4902320
PMID: 26817624

The Important Role for Intravenous Iron in Perioperative Patient Blood Management in Major Abdominal Surgery

A Randomized Controlled Trial

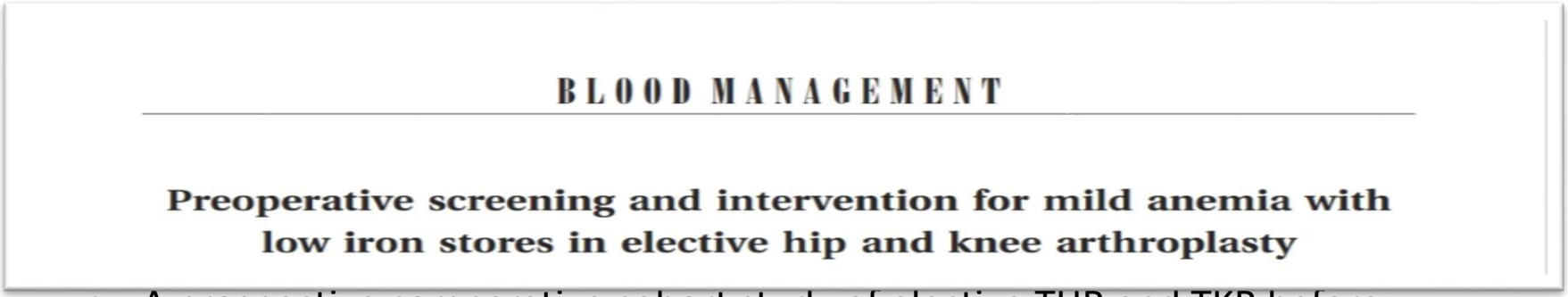
- 626 patients scheduled for abdominal surgery screened for IDA
- IDA defined as
  - ferritin <300
  - TFN sat <25%
  - Hb <130 men, <120 women.
- Usual care (n=32) Intervention group (n=40)
- Intervention group had 1x Ferrinject Pre-op and 1x dose post op.
- 60% reduction in transfusion

TABLE 4

Other Secondary Outcomes of Interest

	Intervention n = 40	Usual Care n = 32	*P*
Length of stay, d*	6 (1–19)	9 (1–23)	0.05
Infection†	4 (10%)	5 (16%)	0.5
Respiratory failure†	3 (7.5%)	3 (9%)	0.99
Renal impairment†	1 (2.5%)	1 (3%)	0.99
DVT†	0	1 (3%)	0.45
Readmission†	6 (15%)	3 (9%)	0.72
Discharged on oral iron†	5 (12.5%)	1 (3%)	0.22
Death†	1 (2.5%)	0	0.99
QoL (presurgery/intervention)‡	104 ± 15	96 ± 18	0.02
QoL (4 wk postsurgery)‡	96 ± 14	90 ± 26	0.24
Difference in QoL (pre–post)‡	8 ± 18	6 ± 17	0.70

Cost savings



BLOOD MANAGEMENT

Preoperative screening and intervention for mild anemia with low iron stores in elective hip and knee arthroplasty

- A prospective comparative cohort study of elective THR and TKR before (1814=control) and after (1622=intervention) the launch of Hb optimisation.
- There were a total of 196 anaemic patients in the intervention group (12.9%).
- A total of 120 patients (61.2%) had PO iron, 12 had (6.1%) IV iron.
- The intervention group had significantly less:
  - RBC transfusions, (121 less transfusions)
  - Return to theatre within 30 days, (15 vs 3)
  - Readmissions within 30 days, (81 vs 48)
  - Critical care admissions (12 less admissions)
  - a trend toward reduced LOS from 6 days to 4.9d,
- There was no difference in the LOS in the non anaemic patients. (3.58 d vs 3.45 d)
- Total savings £266,000 in the intervention group.
- The implementation of the anaemia screening and treatment program cost £28.98 per patient, but saved £191.47 per patient producing an overall saving of £162.46 per patient.

National Cancer Waiting Times Monitoring Dataset Guidance – Version 9.0

2ww Cancer Pathway

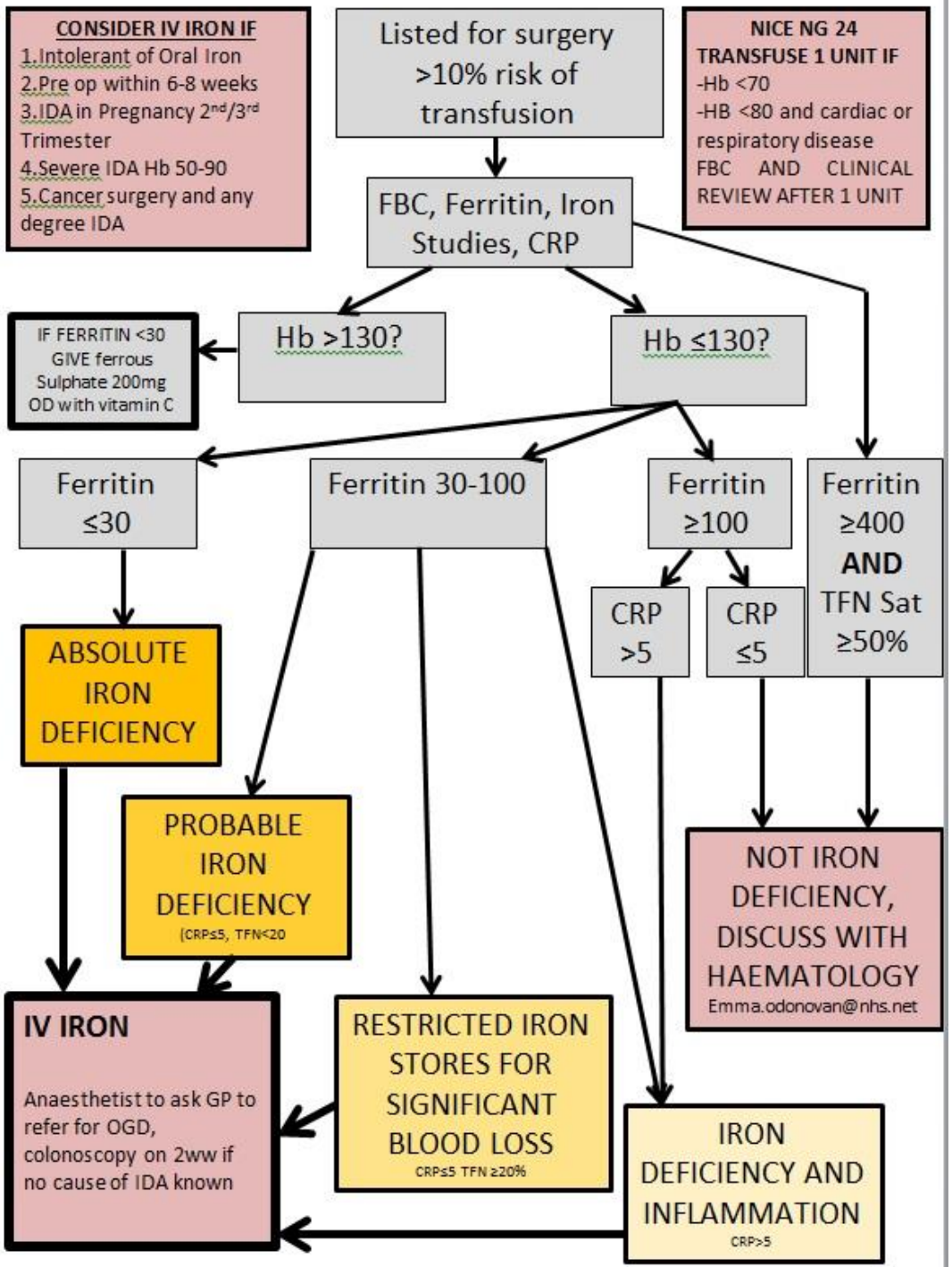
6.4 Enabling Treatments

The enabling treatments that can be classed as FDTs are:

- colostomy for bowel obstruction
- insertion of oesophageal stent
- non-small cell lung cancer stent
- ureteric stenting for advanced cervical cancer
- insertion of a pancreatic stent if planned to resolve jaundice before the patient has a resection or starts chemotherapy
- Gastrojejunostomy
- Monofer Infusion
- Cystodiathermy

So how do we use this Guidance at SASH?

- Introduction of IV iron flowchart pre-op
  - Hb 130 target for male and female
  - Iron studies requested for all high risk surgery (>10%)
  - IV iron for all IDA
- Ongoing audits of progress.
- Business case for a dedicated IV iron nurse.
- Contact all GPs whose patients require blood transfusion for IDA to educate and inform them.
- Standardised SASH consent forms for transfusion


CONSIDER IV IRON IF
1.Intolerant of Oral Iron
2.Pre op within 6-8 weeks
3.IDA in Pregnancy 2nd/3rd Trimester
4.Severe IDA Hb 50-90
5.Cancer surgery and any degree IDA
Listed for surgery >10% risk of transfusion
NICE NG 24
TRANSFUSE 1 UNIT IF
-Hb <70
-HB <80 and cardiac or respiratory disease
FBC AND CLINICAL REVIEW AFTER 1 UNIT
FBC, Ferritin, Iron Studies, CRP
IF FERRITIN <30 GIVE ferrous Sulphate 200mg OD with vitamin C
Hb >130?
Hb ≤130?
Ferritin ≤30
Ferritin 30-100
Ferritin ≥100
Ferritin ≥400 AND TFN Sat ≥50%
CRP >5
CRP ≤5
ABSOLUTE IRON DEFICIENCY
PROBABLE IRON DEFICIENCY
(CRP≤5, TFN<20
NOT IRON DEFICIENCY, DISCUSS WITH HAEMATOLOGY
Emma.odonovan@nhs.net
IV IRON
Anaesthetist to ask GP to refer for OGD, colonoscopy on 2ww if no cause of IDA known
RESTRICTED IRON STORES FOR SIGNIFICANT BLOOD LOSS
CRP≤5 TFN ≥20%
IRON DEFICIENCY AND INFLAMMATION
CRP>5

SASH Pre-op audit

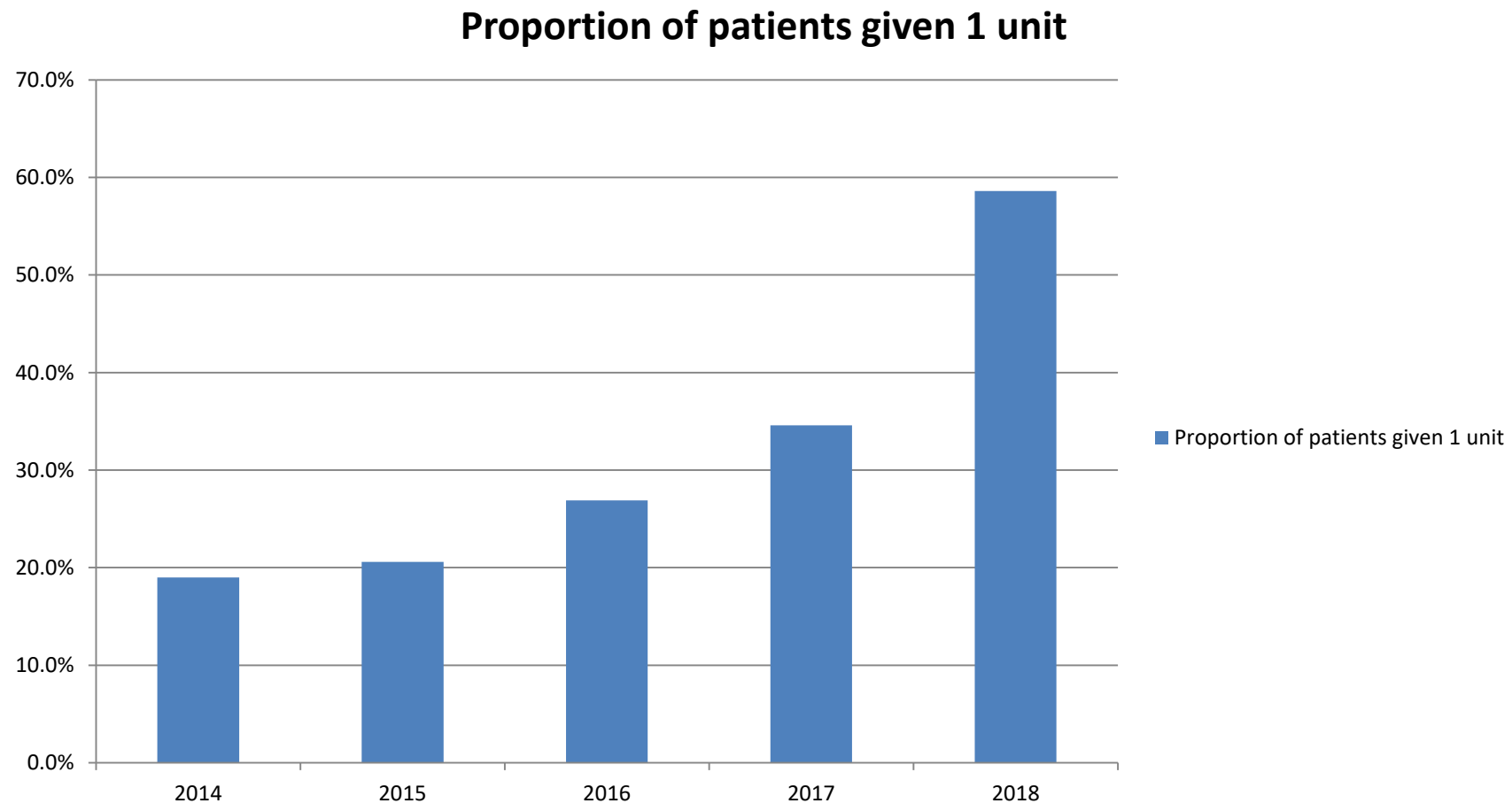
Before flowsheet (52 weeks ago)

- 201 patients in 1 week
- 72 had blood tests
  - 0 had iron studies requested
- 12 (17%) had IDA
  - 4=Hb<130 + Ferr <100
  - 8=Hb <130 +Ferr <30 (11%)
    - 1 received IV iron (via GP)

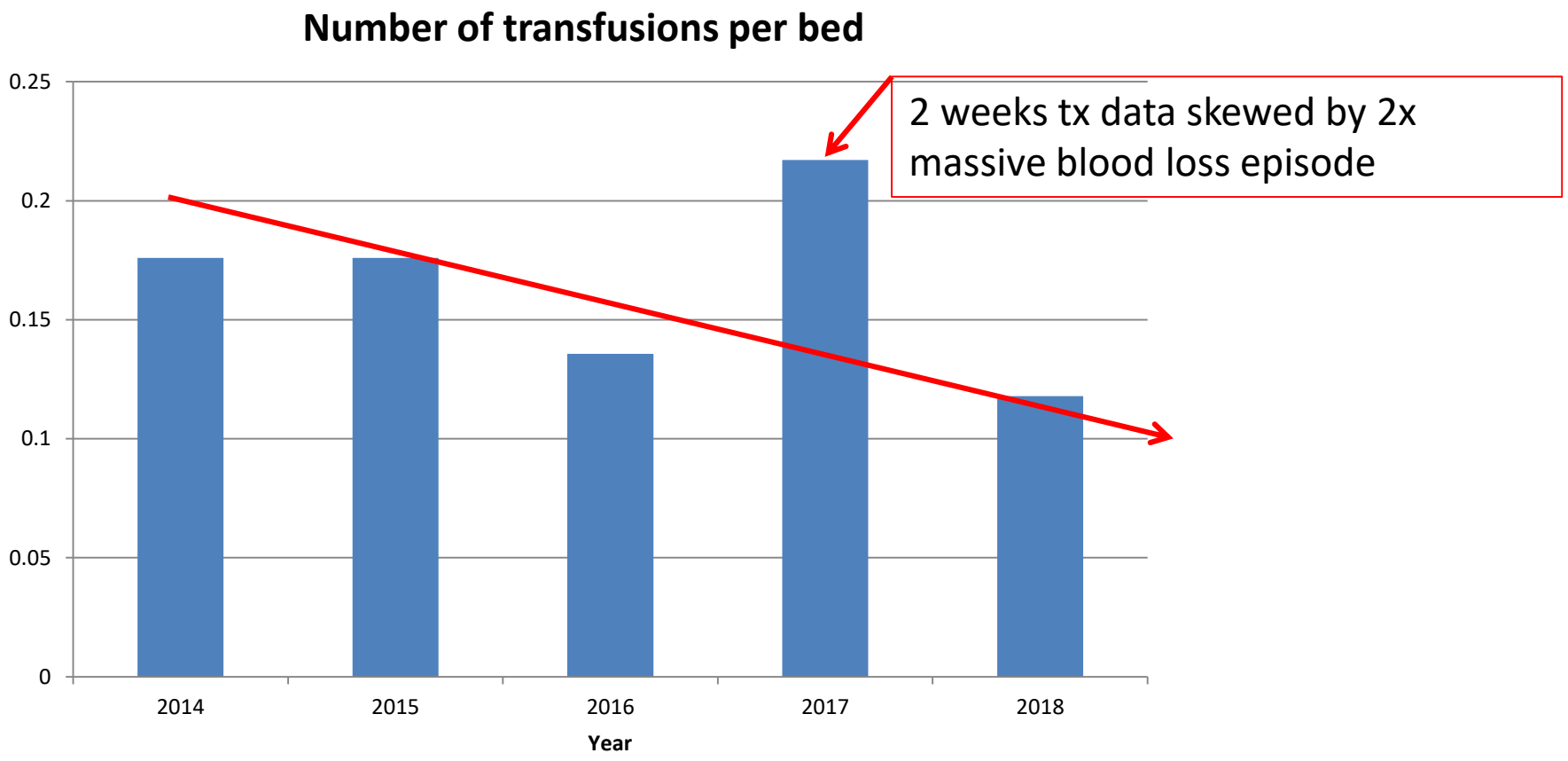
After flowsheet (2 weeks ago)

- 178 patients in 1 week
- 86 had blood tests,
  - 46 had iron studies requested
- 14 (30%) had IDA
  - 6=Hb<130 + Ferr <100
  - 8=Hb 130 + Ferr <30 (17%)
    - 3x IV iron so far…

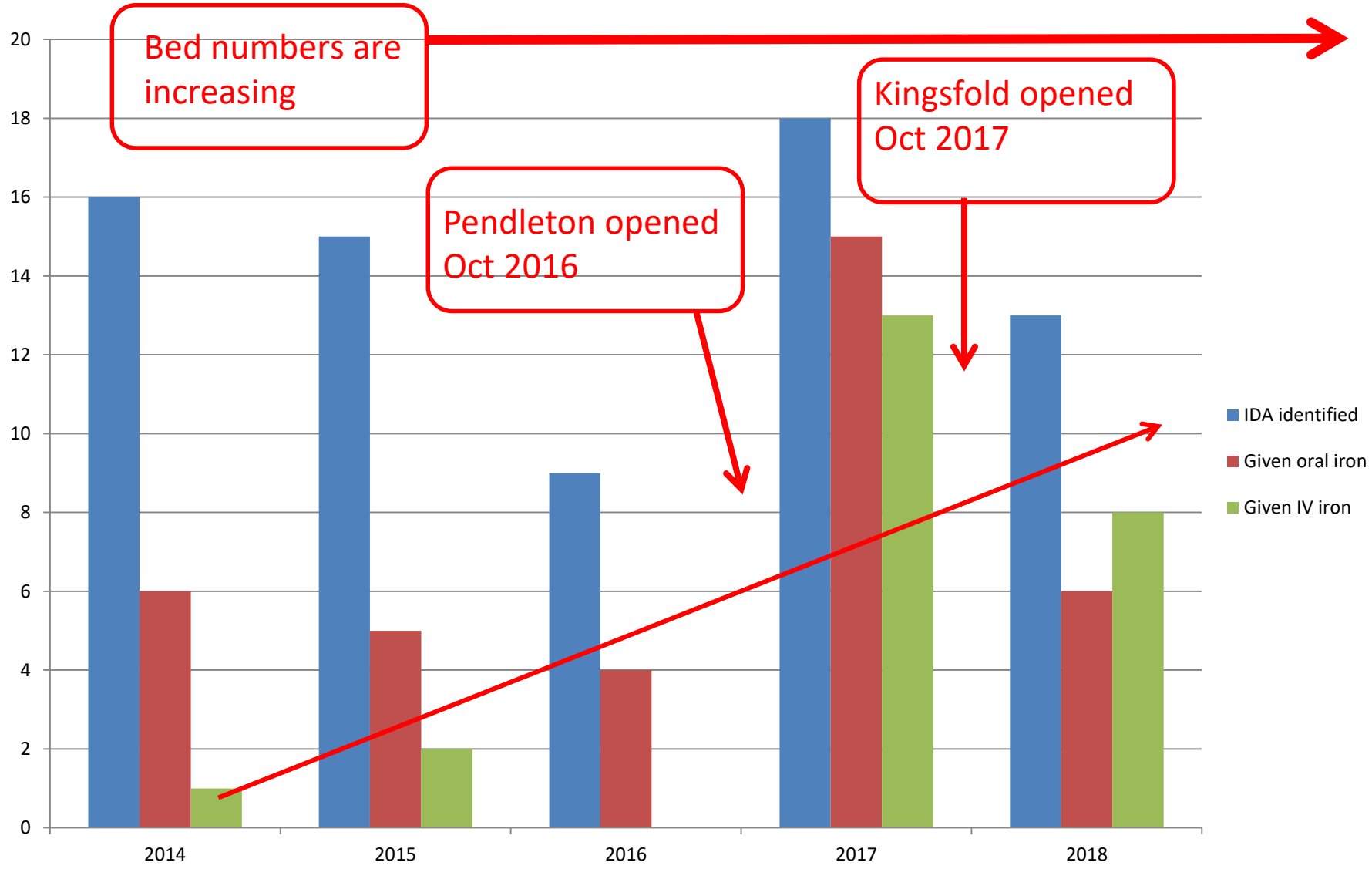
Year on year transfusion @SASH



Transfusions per SASH bed

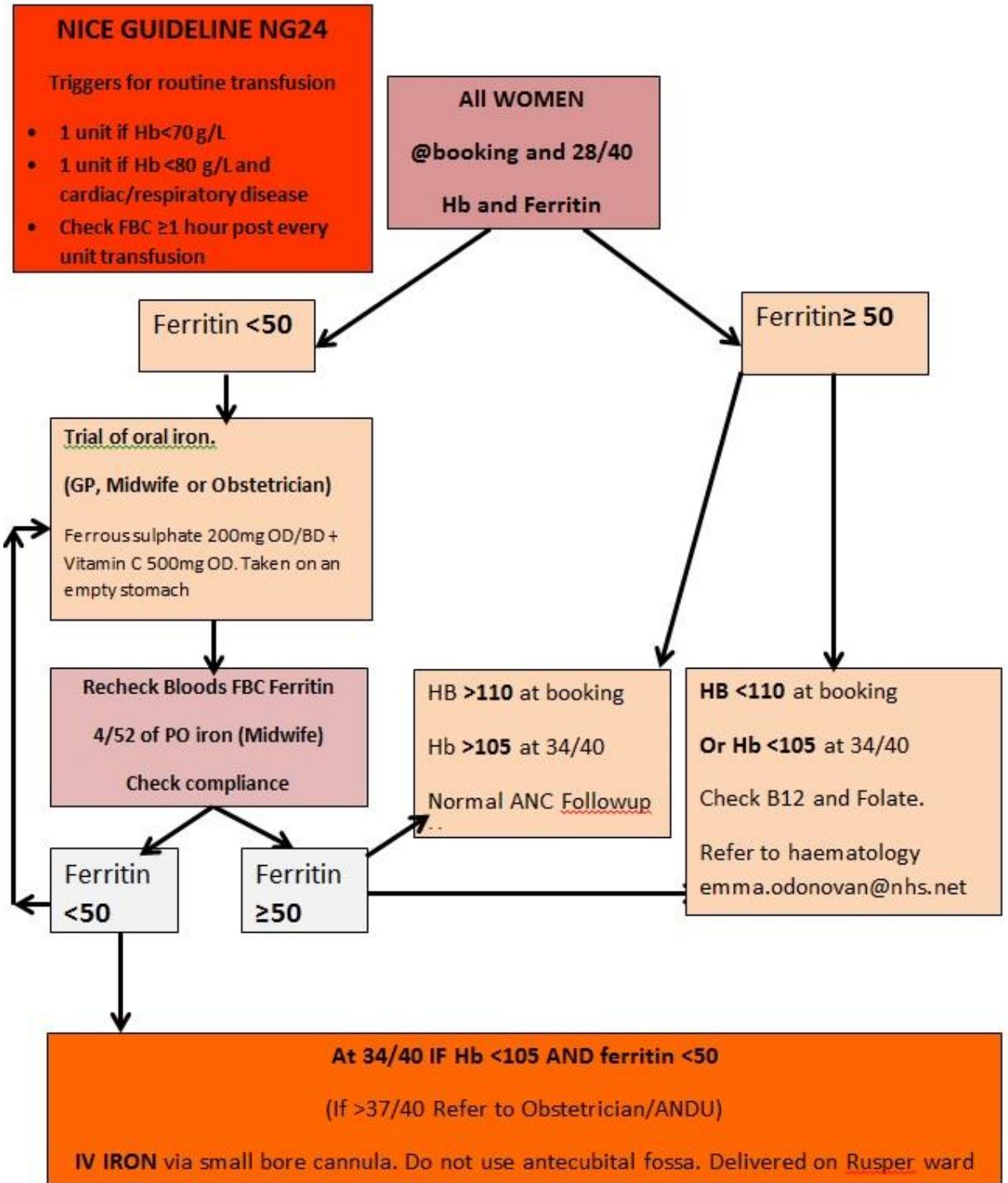


Year on year IDA @SASH



What next?

- Continue year on year audits – can we continue to improve on QS138 targets?
- Obstetric anaemia flowsheet
- Introduction of Monofer prescription sheet.
- Erythropoietin pre-op?
- Monofer as First definitive Treatment?


NICE GUIDELINE NG24
Triggers for routine transfusion
1 unit if Hb<70 g/L
1 unit if Hb <80 g/L and cardiac/respiratory disease
Check FBC ≥1 hour post every unit transfusion
All WOMEN
@booking and 28/40
Hb and Ferritin
Ferritin <50
Ferritin≥ 50
Trial of oral iron.
(GP, Midwife or Obstetrician)
Ferrous sulphate 200mg OD/BD + Vitamin C 500mg OD. Taken on an empty stomach
Recheck Bloods FBC Ferritin
4/52 of PO iron (Midwife)
Check compliance
HB >110 at booking
Hb >105 at 34/40
Normal ANC Followup
HB <110 at booking
Or Hb <105 at 34/40
Check B12 and Folate.
Refer to haematology
emma.odonovan@nhs.net
Ferritin <50
Ferritin ≥50
At 34/40 IF Hb <105 AND ferritin <50
(If >37/40 Refer to Obstetrician/ANDU)
IV IRON via small bore cannula. Do not use antecubital fossa. Delivered on Rusper ward

PRE OPERATIVE MONOFER PRESCRIPTION CHART

Name DOB MRN NHS	Allergies: Please circle as appropriate. If previous allergy to IV iron: Do not prescribe IV Iron NONE KNOWN / DRUG ALLERGY KNOWN Signature.....Date..... Name..... Drug/allergen..... Description of reaction.....

Prescriber to complete all boxes shaded in grey

Monofer to be prescribed if haemoglobin < 130 g/L and ferritin <100 mcg/L. and surgery is expected to have EBL > 500ml, or >10% risk of transfusion – see Preoperative Anaemia Pathway

Step 1 Justify need for parenteral iron therapy – please see pre-op IV flowchart

Hb (<130 g/L)	Ferritin (<100mcg/L)	Transferrin Saturation %	Planned surgery,	Date of op	Weight (kg)

Step 2 Dose = 20mg/kg – tick dose as appropriate (calculate at 20mg/kg if weight <50kg)

Weight	<50 kg	50-59 kg	60-69 kg	70-79 kg	80-89 kg	90-99kg	≥100kg
Dose	20mg/kg	1g	1.2g	1.4g	1.6g	1.8g	2g

Step 3 Complete the Monofer Prescription Schedule

Drug name and infusion	DOSE	ROUTE	DATE	Prescriber signature	TIME GIVEN	GIVEN BY
Sodium Chloride 0.9% for	5ml	IV				
Iron (III) Isomaltoside (Monofer®) in 500ml Sodium Chloride 0.9% over 60 minutes		IV Infusion				
Sodium Chloride 0.9% for flushing cannula	5ml	IV				

Step 4. Prescribers Signature

PRINT Name	Grade	Signature	Date

Step 5. Clinical Check by Pharmacist, dispensing and accuracy check

Clinical check	Dispensing	Final check	Date

Patient details

Affix addressograph

Pre-administration questionnaire

Past medical history (please tick)	Liver disease		Previous sensitivity to IV iron	
	Rheumatoid arthritis/SLE		Other drug allergies	
	Asthma		Eczema	

If any of the above are ticked, the patient will be at a greater risk of hypersensitivity reactions. Please be aware that the infusion may need to be slowed down or stopped.

Contraindications to IV iron; If ticked do not administer Iron	
Previous hypersensitivity reaction to IV Iron?	
Asthma - if severe or uncontrolled.	
1st trimester of pregnancy	
Iron overload syndrome requiring or potentially requiring venesection?; e.g. polycythaemia rubra vera, porphyria, or haemochromatosis	

Monitoring

	Time	Temp	Respiratory rate	Blood pressure	Pulse
Before Infusion					
After 30 minutes		n/a			
After 60 minutes		n/a			
30 minutes after infusion completes		n/a			

Anaphylaxis

Acute severe anaphylactic reactions may occur with IV iron administration. They usually occur within the first few minutes of administration and are characterised by sudden onset respiratory failure and/or cardiovascular collapse.

Urticaria, rashes, itching, nausea and shivering may also occur. Administration must be stopped immediately if signs of an anaphylactic reaction are observed. Appropriate resuscitation medication must be available including hydrocortisone IV and adrenaline. Please call immediately for medical assistance if anaphylaxis is suspected.

Emergency management of anaphylaxis			Signature
Adrenaline	500 micrograms/0.5 mL of 1:1000	IM	
Chlorphenamine	10mg	IV	
Hydrocortisone	100mg	IV	
Paracetamol	1g	PO	

BMJ Open

Preoperative prediction of potentially preventable morbidity after fast-track hip and knee arthroplasty: a detailed descriptive cohort study

8373 consecutive THA and TKA
Complications were designated medical or surgical
557 potentially preventable medical complications
The following seven characteristics were causes of significant readmission or LOS>4d.

- age ≥80 years,
- hypertension,
- use of anticoagulants,
- pulmonary disease,
- pharmacologically treated psychiatric disorder,
- anaemia
- use of walking aids

20% of all patients had ≥ 2 of the characteristics
40% of LOS >4d had ≥ 2 characteristics

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 DECEMBER 29, 2011 VOL. 365 NO. 26

Liberal or Restrictive Transfusion in High-Risk Patients after Hip Surgery

2016 post op #NOF patients age >50yrs (mean age 81) with risk factors for heart disease
Assigned to liberal or restrictive transfusion (<80 or <100)
NO difference seen between groups in

- Rates of death
- Inability to walk independently at 60-day follow-up
- Fatigue and ability to perform ADL scores at 60 days
- ICU admission
- Return to theatre
- LOS
- In-hospital morbidity.

Audit of all blood transfusion @SASH

- 89 patients transfused over 2 week period.
- Ferritin and iron studies added to every sample
- 56 patients (63%)1 unit.
- 32 patients (36%)2 units.
- 1 patient (1%) 3 units.
- 17 (19%) had absolute IDA
- 11(12%) had ferr 30-100

- Of 17pt with absolute IDA
  - 4 had 2 units
    - 2xUGI bleed. Long term IDA
    - 1xUGI bleed. Normal HB prev
    - 1xUGI bleed. No prev FBC
    - 1x post partum (Hb <109 @booking)
  - 11 had 1 unit
  - Most IDA received IV iron + 1 unit on kingsfold.
  - No IV iron except on kigsfold/pendleton
- Of 11pt with Ferr 30-100
  - 4 had 2 units
  - 7 had 1 unit