West Midlands RTC

University Hospitals Coventry and Warwickshire NHS Trust

In Action!

Janine Beddow
Transfusion Matron

Beth Summers
PBM Practitioner

Introducing UHCW

- One of the busiest teaching hospitals in the country
- 2 main hospital sites (UHCW/RSX)
- Located in the south of the region
- Very high blood user
- Trauma centre
- 3 MHPs per week (2014)
- Circa 6200 staff
- 1000 + Drs of all grades
- 2400 Registered Nurses / Midwives

Openness Partnership Improve Learn

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NCA of Blood Transfusion in Medical Patients 2011 (Published 2013)

- Audit was in 2 parts
- Part 1**: (9123) 53%** of these patients had a transfusion outside of the parameters set as standards (4818)
- Part 2 :**1592** records **20%** (**963**) patients had an anaemia that could have been treated by other means

  - 18% of patients were not investigated to determine the cause of their anaemia
  - 60% that were investigated were inadequately treated
  - Correlation between body weight and Hb increment

Specific NCA Recommendations

- Anaemia should be investigated for underlying cause
- Decision to transfuse should take into account laboratory findings, patients signs and symptoms and the underlying cause of anaemia
- Clinicians should be made aware that Hb increment is dependant on patients weight
- In medical patients with anaemia there should be medical reassessment after each transfusion
- Further research is required to provide the evidence of appropriate transfusion in medical patients

PBM: Launched July 2014

- *'Patient Blood Management'* represents an international initiative to manage their blood use effectively.

- Evidence shows that the implementation of PBM improves patient outcomes by on the avoidance of transfusion and reducing the inappropriate use of blood

The need for change at UHCW…

Evidence of Over transfusion (NCA)

UHCW RBC usage Was starting to increase

POW!!

1 fatality during July 2014 as a result of TACO

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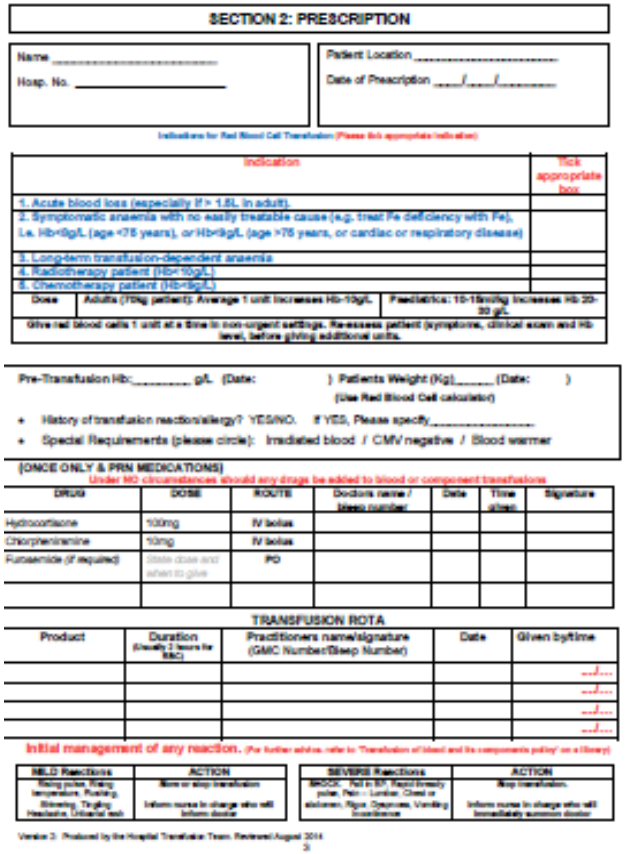
How did we do it?: Phase 1

- Conversations: Medical Director, Associate Medical Directors, and Clinical Directors
- Used HTC members
- Campaign ‘ Don’t use 2 until you review’
- Aligned campaign to Trust values
- Presented NCA and local data
- Provided education at speciality level
- ‘Grand Round’
- Engagement on wards (Used Blood Track)
- Adapted Transfusion Pathway (Added weight)
- Implemented Transfusion Algorithm and RBC Calculator

Our Tools



SECTION 2: PRESCRIPTION

Name _____
Hosp. No. _____

Patient Location _____
Date of Prescription ____/____/____

Indications for Red Blood Cell Transfusion (Please tick appropriate indication)

Indication	Tick appropriate box
1. Acute blood loss (especially if > 1.5L in adult).	
2. Symptomatic anaemia with no easily treatable cause (e.g. treat Fe deficiency with Fe), i.e. Hb<8g/L (age <75 years), or Hb<9g/L (age >75 years, or cardiac or respiratory disease)	
3. Long-term transfusion-dependent anaemia	
4. Radiotherapy patient (Hb<10g/L)	
5. Chemotherapy patient (Hb<9g/L)	
Dose: Adults (70kg patient): Average 1 unit increases Hb 10g/L. Paediatrics: 10-15ml/kg increases Hb 20-30 g/L. Give red blood cells 1 unit at a time in non-urgent settings. Re-assess patient (symptoms, clinical exam and Hb level, before giving additional units.	

Pre-Transfusion Hb:_____ g/L (Date:) Patients Weight (Kg)_____ (Date:)
(Use Red Blood Cell calculator)

- History of transfusion reaction/allergy? YES/NO. If YES, Please specify_____
- Special Requirements (please circle): Irradiated blood / CMV negative / Blood warmer

(ONCE ONLY & PRN MEDICATIONS)
Under NO circumstances should any drugs be added to blood or component transfusions

DRUG	DOSE	ROUTE	Doctors name / bleep number	Date	Time given	Signature
Hydrocortisone	100mg	IV bolus				
Chlorpheniramine	10mg	IV bolus				
Furosemide (if required)	State dose and when to give	PO				

TRANSFUSION ROTA

Product	Duration (Usually 2 hours for RBC)	Practitioners name/signature (GMC Number/Bleep Number)	Date	Given by/time
				../..
				../..
				../..
				../..

Initial management of any reaction. (For further advice, refer to "Transfusion of blood and its components policy" on e-library)

MILD Reactions	ACTION	SEVERE Reactions	ACTION
Rising pulse, Rising temperature, Flushing, Shivering, Tingling, Headache, Urticarial rash	Slow or stop transfusion. Inform nurse in charge who will inform doctor	SHOCK - Fall in BP, Rapid thready pulse, Pain - Lumbar, Chest or abdomen, Rigor, Dyspnoea, Vomiting, Unconscious	Stop transfusion. Inform nurse in charge who will immediately summon doctor

Version 3: Produced by the Hospital Transfusion Team. Reviewed August 2014
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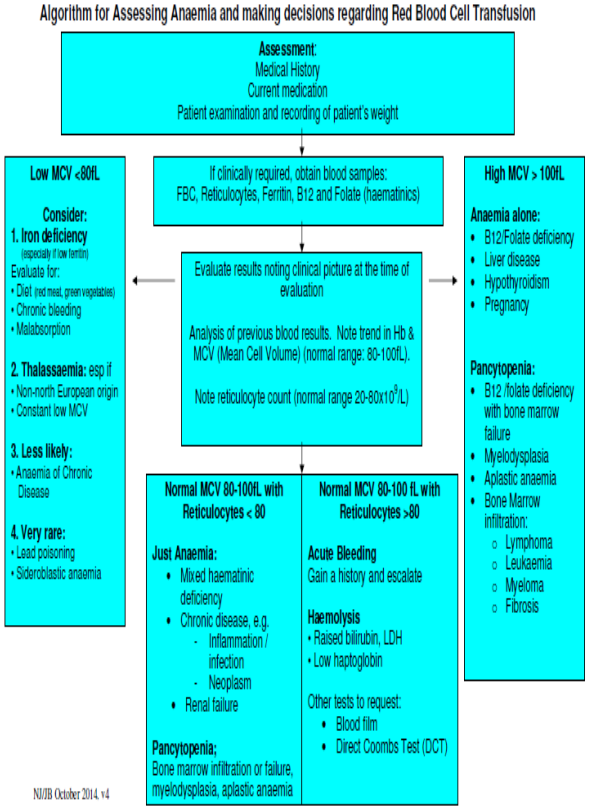

Algorithm for Assessing Anaemia and making decisions regarding Red Blood Cell Transfusion

Assessment:
Medical History
Current medication
Patient examination and recording of patient's weight

If clinically required, obtain blood samples:
FBC, Reticulocytes, Ferritin, B12 and Folate (haematinics)

Evaluate results noting clinical picture at the time of evaluation

Analysis of previous blood results. Note trend in Hb & MCV (Mean Cell Volume) (normal range: 80-100fL).

Note reticulocyte count (normal range 20-80x10^9/L)

Low MCV <80fL

Consider:
1. Iron deficiency (especially if low ferritin)
Evaluate for:
- Diet (red meat, green vegetables)
- Chronic bleeding
- Malabsorption

2. Thalassaemia: esp if
- Non-north European origin
- Constant low MCV

3. Less likely:
- Anaemia of Chronic Disease

4. Very rare:
- Lead poisoning
- Sideroblastic anaemia

Normal MCV 80-100fL with Reticulocytes < 80

Just Anaemia:
- Mixed haematinic deficiency
- Chronic disease, e.g.
  - Inflammation / infection
  - Neoplasm
- Renal failure

Pancytopenia;
Bone marrow infiltration or failure, myelodysplasia, aplastic anaemia

Normal MCV 80-100 fL with Reticulocytes >80

Acute Bleeding
Gain a history and escalate

Haemolysis
- Raised bilirubin, LDH
- Low haptoglobin

Other tests to request:
- Blood film
- Direct Coombs Test (DCT)

High MCV > 100fL

Anaemia alone:
- B12/Folate deficiency
- Liver disease
- Hypothyroidism
- Pregnancy

Pancytopenia:
- B12 /folate deficiency with bone marrow failure
- Myelodysplasia
- Aplastic anaemia
- Bone Marrow infiltration:
  - Lymphoma
  - Leukaemia
  - Myeloma
  - Fibrosis

NJ/JB October 2014. v4

RED BLOOD CELL (RBC) CALCULATOR

This is a **guide** to aide your decision-making when prescribing RBC. RBC are not the treatment of choice for iron deficiency or other haematinic deficiencies. **The BCSH recommended adult therapeutic dose of RBC is 4ml/kg**, which should lead to an approximately 10g/L rise in haemoglobin. The historic 'One unit of RBC to give a Hb rise of 10g/L' is for a 70 -80 kg person. Patients who weigh less, or more, than 70 - 80kg are at risk of under- or over-transfusion. The latter may lead to 'Transfusion Associated Circulatory Overload' (TACO). If you suspect TACO has occurred, report urgently to the Blood Bank who will investigate and report to 'Serious Hazards of Transfusion' (the national haemovigilance organization).

The paediatric dose uses the same calculation; 4ml/kg for a 10g/L Hb rise. A suggested infusion rate of 5ml/kg/hr is advocated but will depend on the clinical situation.

The prescribed dose of RBC must be guided by the clinical situation.
The target haemoglobin in non bleeding patients should be to alleviate symptoms and elevate to just above the transfusion trigger. Remember 'DON'T USE TWO, UNTIL YOU REVIEW':

	Indications, and transfusion 'triggers', for red cell transfusion
1.	Acute blood loss (especially if > 1.5L in an adult).
2.	Symptomatic anaemia with no easily treatable cause e.g. Hb <80g/L (age <75yrs), *or* Hb <90g/L (age >75yrs, or cardiac/respiratory disease)
3.	Long-term transfusion-dependent anaemia – aim to keep Hb > 95-100g/L
4.	Radiotherapy patient (keep Hb >100g/L)
5.	Chemotherapy patient (keep Hb >90g/L)

RBC CALCULATOR

Patient weight in Kg*	Red blood cell volume/units calculator		
	4ml/Kg	ml or units of RBC per 10g/L rise	ml or units of RBC per 20g/L rise
25kg	100ml	100ml	200ml
30kg	120ml	120ml	240ml
35kg	140ml	140ml	280ml
40kg	160ml	160ml	1
45kg	180ml	180ml	1
50kg	200ml	200ml	1
55kg	220ml	220ml	1
60kg	240ml	1	2
65kg	260ml	1	2
70kg	280ml	1	2
75kg	300ml	1	2
80kg	320ml	1	2
85kg	340ml	1	2
90kg	360ml	1.5	3
95kg	380ml	1.5	3
100kg	400ml	1.5	3

* If weight between thresholds, use the next tier up.
The volume of a RBC unit is variable: mean =275mls. Clinical judgement is required.
This is only a **guide** to dosing of RBC transfusion. Ensure you complete a clinical assessment.
BCSH: Guidelines for administration of blood components, addendum 2012. Patient Blood Management 2014.

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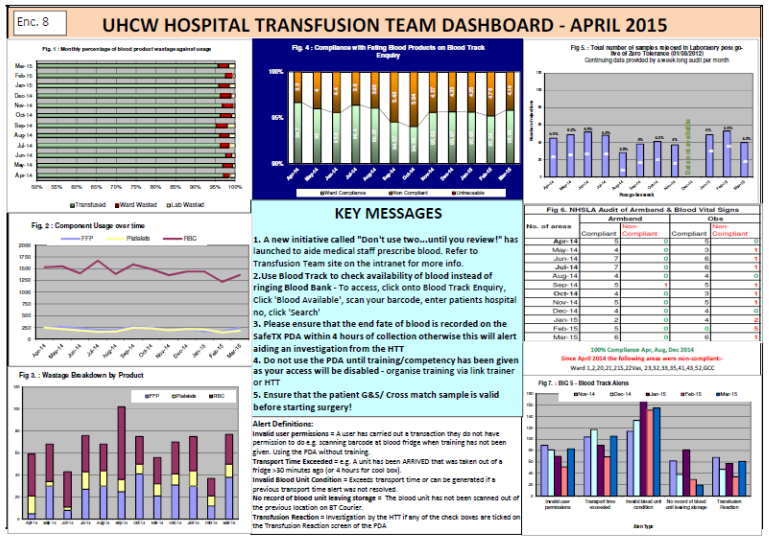
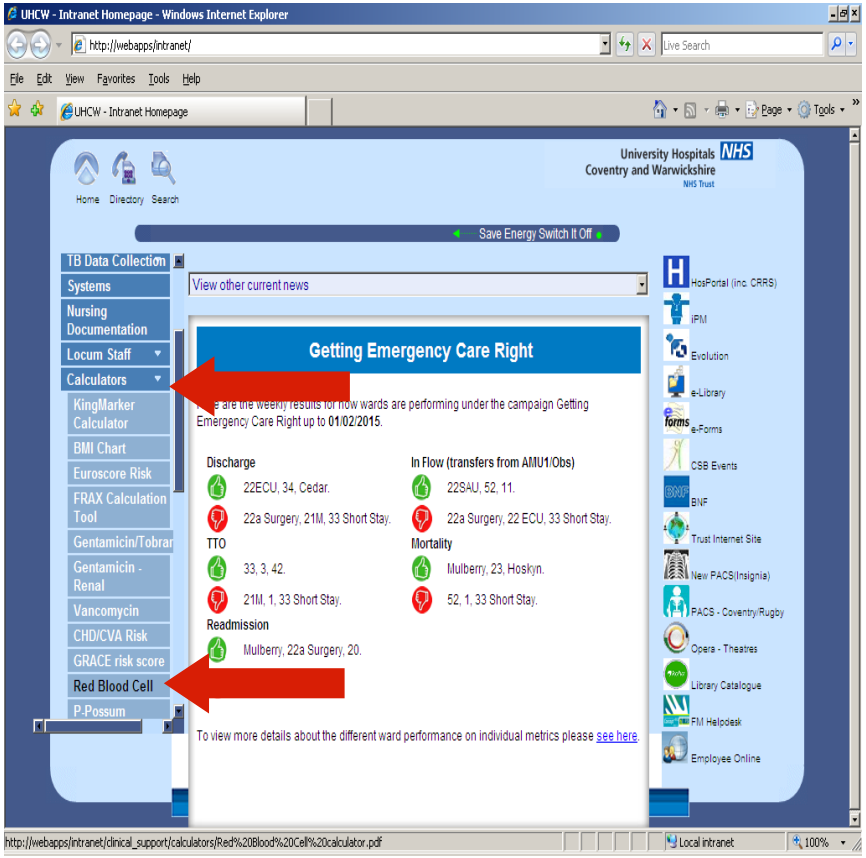
Making single unit transfusions work

- Implemented November 2014
- Trust wide
- However ultimate focus on specific wards
- Transfusion Dashboard





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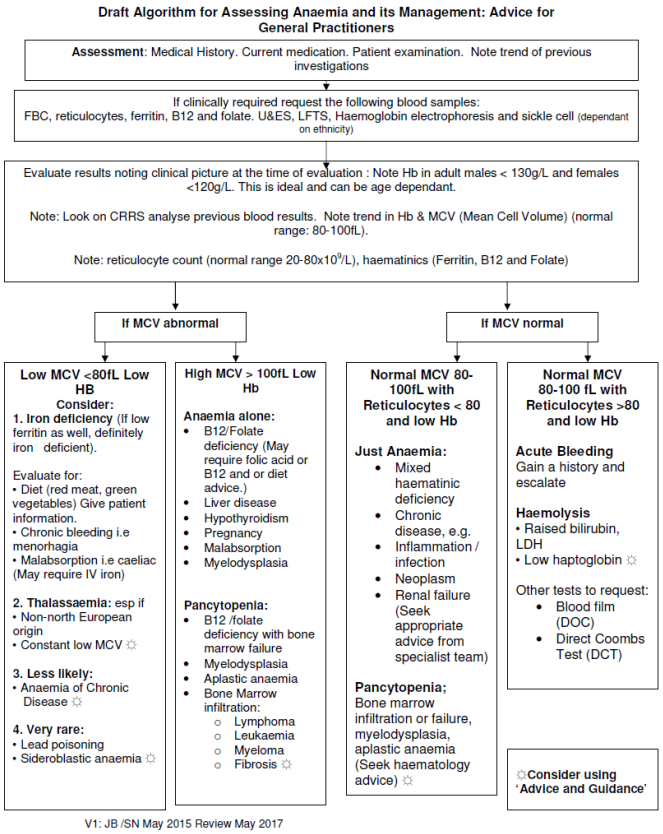
Phase 2

- ‘Birds eye view’
- PBM Practitioner (12 month secondment)
- Pre Op Algorithm and education
- GPAU (Follow the transfusion)
- GP Algorithm / Gateway
- GP education



Draft Algorithm for Assessing Anaemia and its Management: Advice for General Practitioners

Assessment: Medical History. Current medication. Patient examination. Note trend of previous investigations

If clinically required request the following blood samples:
FBC, reticulocytes, ferritin, B12 and folate. U&ES, LFTS, Haemoglobin electrophoresis and sickle cell (dependant on ethnicity)

Evaluate results noting clinical picture at the time of evaluation : Note Hb in adult males < 130g/L and females <120g/L. This is ideal and can be age dependant.

Note: Look on CRRS analyse previous blood results. Note trend in Hb & MCV (Mean Cell Volume) (normal range: 80-100fL).

Note: reticulocyte count (normal range 20-80x10^9/L), haematinics (Ferritin, B12 and Folate)

If MCV abnormal

Low MCV <80fL Low HB
Consider:
1. Iron deficiency (If low ferritin as well, definitely iron deficient).

Evaluate for:
• Diet (red meat, green vegetables) Give patient information.
• Chronic bleeding i.e menorhagia
• Malabsorption i.e caeliac (May require IV iron)

2. Thalassaemia: esp if
• Non-north European origin
• Constant low MCV ☼

3. Less likely:
• Anaemia of Chronic Disease ☼

4. Very rare:
• Lead poisoning
• Sideroblastic anaemia ☼

High MCV > 100fL Low Hb

Anaemia alone:
- B12/Folate deficiency (May require folic acid or B12 and or diet advice.)
- Liver disease
- Hypothyroidism
- Pregnancy
- Malabsorption
- Myelodysplasia

Pancytopenia:
- B12 /folate deficiency with bone marrow failure
- Myelodysplasia
- Aplastic anaemia
- Bone Marrow infiltration:
  - Lymphoma
  - Leukaemia
  - Myeloma
  - Fibrosis ☼

If MCV normal

Normal MCV 80-100fL with Reticulocytes < 80 and low Hb

Just Anaemia:
- Mixed haematinic deficiency
- Chronic disease, e.g.
- Inflammation / infection
- Neoplasm
- Renal failure (Seek appropriate advice from specialist team)

Pancytopenia;
Bone marrow infiltration or failure, myelodysplasia, aplastic anaemia (Seek haematology advice) ☼

Normal MCV 80-100 fL with Reticulocytes >80 and low Hb

Acute Bleeding
Gain a history and escalate

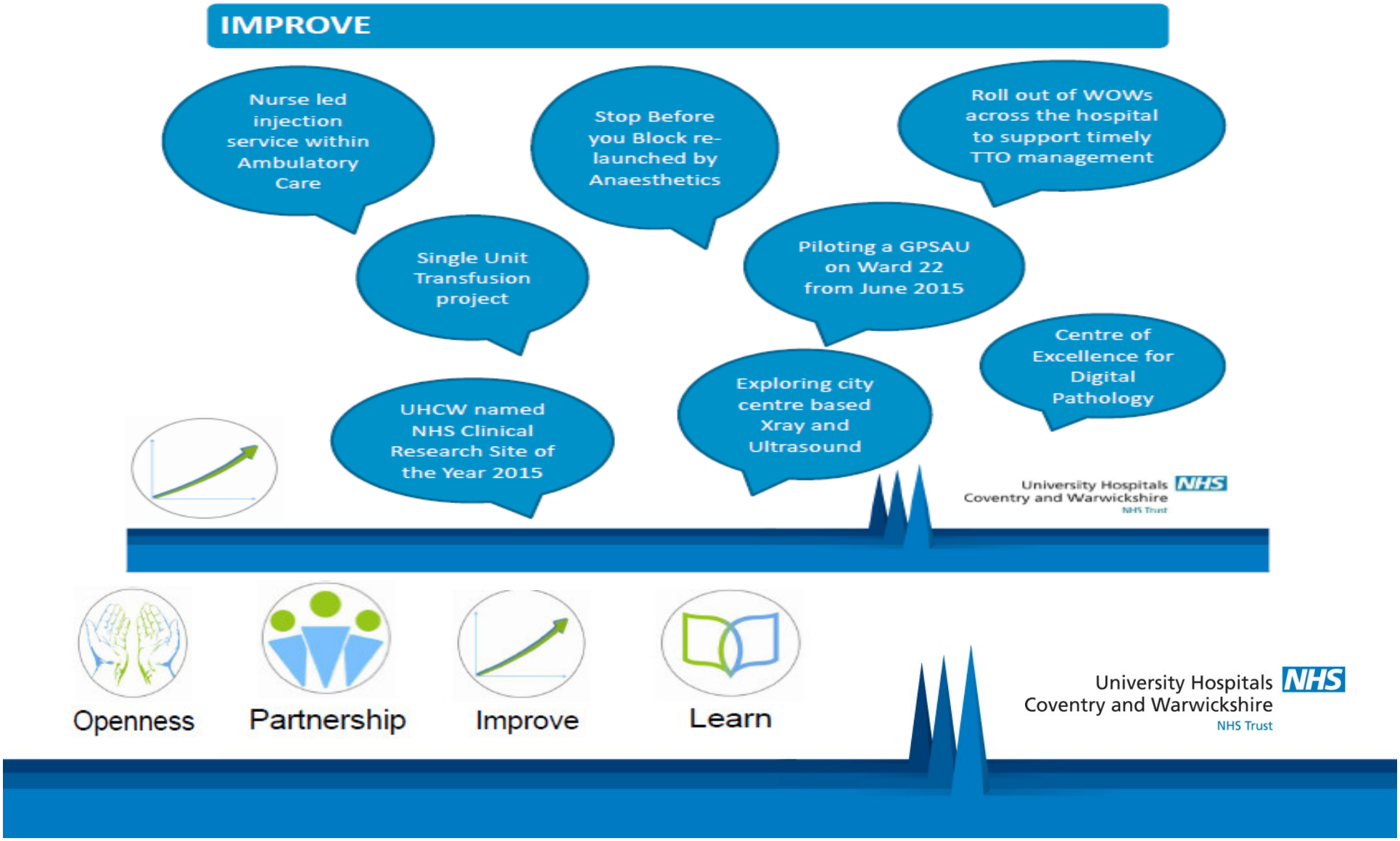
Haemolysis
• Raised bilirubin, LDH
• Low haptoglobin ☼

Other tests to request:
- Blood film (DOC)
- Direct Coombs Test (DCT)

☼**Consider using ‘Advice and Guidance’**

V1: JB /SN May 2015 Review May 2017

Trust Wide Perfomance



Results so far

- RBC usage has decreased
- We produce a quarterly report
- Patient activity has increased by 4.9% (April 2014 – March 2015)
- Recent request audit demonstrates 1/5th of all transfusions are single unit
- Recent transfusion data demonstrates further reductions in RBC usage
- Our challenge is to maintain the momentum!
- We need to audit and research this change

RBC Usage Comparison to previous year:						
Financial Year	Q1	Q2	Q3	Q4	Total	
2013/14	4556	4669	4505	4158	17888	
2014/15	4484	4647	4295	4028	17454	
Difference	-72	-22	-210	-130	-434	
Cost (Saving)	-£8,773.20	-£2,680.70	-£25,588.50	-£15,840.50	-£52,882.90	

The Role of the PBM Practitioner

- Change attitude towards RBC usage
- Create Leads/ Make contacts
- Patients advocate
- Audit and Re-audit
- Evidence based practice
- Time management
- Different focus

How to make PBM a SUCCESS!!!

- Combating common attitudes towards change
- Behavioural change- easier said then done!
- Acceptance of change- Evidence!
- Provide advice, be visible and approachable
- Take and make opportunities
- Networking/Contacts/Leads

Education, Promote, Monitor

- Generate conversations
- Generate ideas
- Can we learn from international citizens?
- Consultants - Are they ‘on board’?
- Ward presence
- Roving Board
- Competition

THINK! EVERY SINGLE TIME

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Importance of Audit

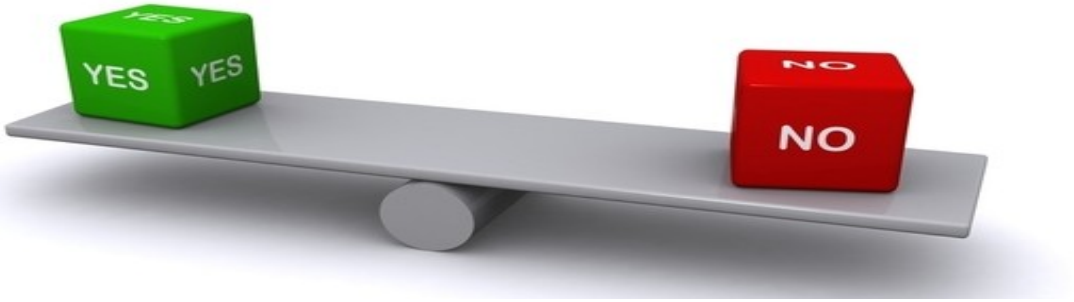
- PBM Audit
- Request Audit
- GCC Iatrogenic Audit

GCC Auditing Iatrogenic Anaemia

- Iatrogenic - of or relating to illness caused by medical examination or treatment.

- Iatrogenic anaemia in critically ill patients is one of the biggest causes of anaemia in this patient group.

- Finding the balance.



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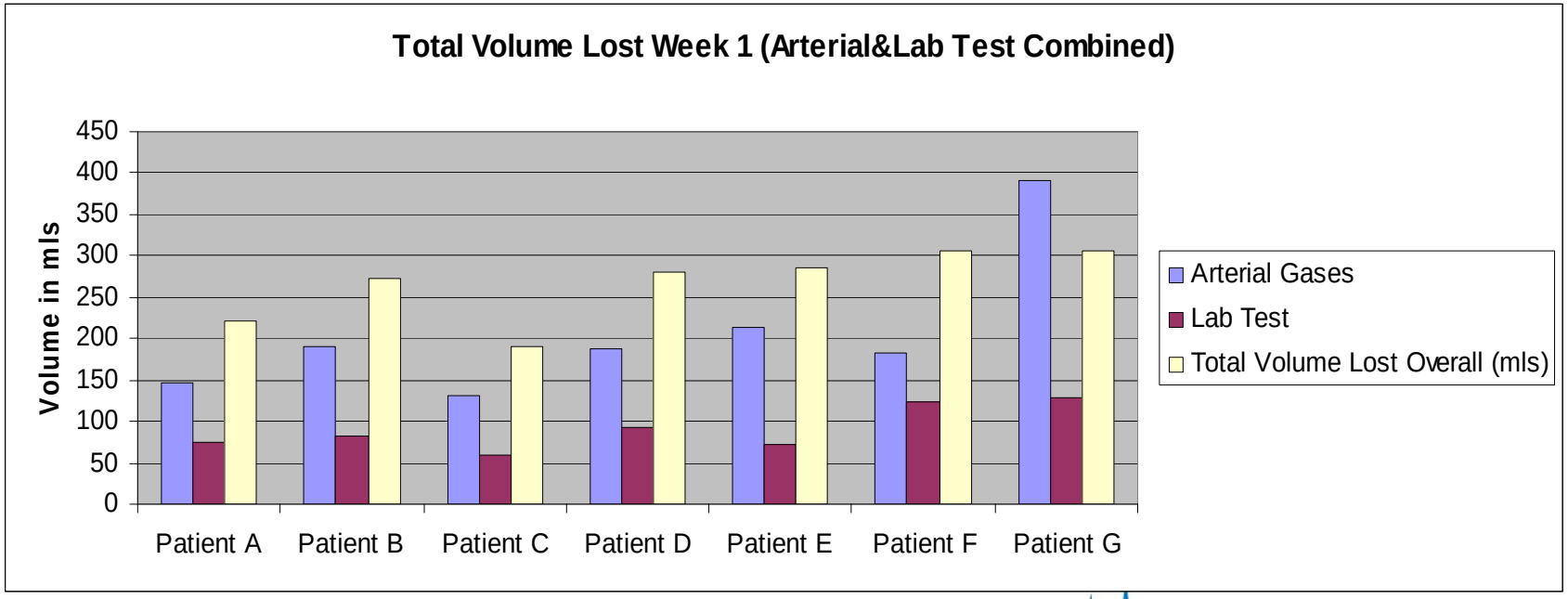
Key Findings: Week 1

- Average blood loss total: 265.4 mls
- Total loss range from 190 – 305.8 mls
- Laboratory range from 60 – 129 mls
- Arterial gas range from 123 – 390 mls



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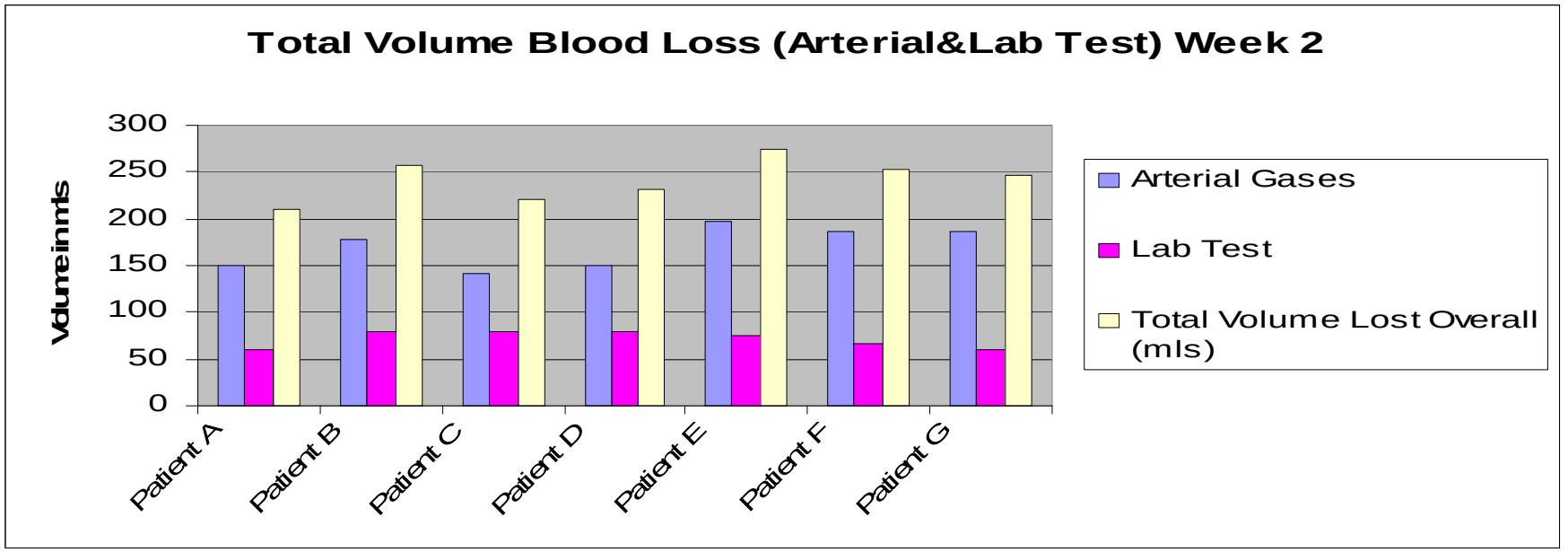
Key Findings: Week 2

- Average total blood loss: 241.8 mls
- Total loss range: 210.8 – 273.6 mls
- Arterial Gases loss range: 140.4 – 197.6 mls
- Laboratory Test loss range: 60 – 80 mls



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So how do we compare?

- Andrews et al (1999) daily loss of 45.7mls **arterial gases only**
- Ellstrom (1989) daily loss 39mls for **arterial gases only**
- Tarpey & Lawler (1990) 66mls per day **total blood loss** (arterial gases 23.6mls)
- Low et al (1995) 57mls daily **total blood loss**
- UHCW (2015) 50.72mls daily total blood loss

Observations

- Patients on average lost 265.4mls per person in the first 5 days. This is the equivalent volume of one unit of blood and 5.3% total blood volume.
- Daily blood lost on average was 53.8mls higher than some international studies.
- Patients over 70 had a higher number of samples taken in week one.
- It cannot be concluded that samples are being unnecessarily drawn, given the dynamic state of critically ill patients.
- Laboratory tests are taken at a regular frequency, could this be a pattern that could be reviewed?

What Next?

- Reduce the volume of blood taken for phlebotomy by taking smaller samples
- Lower Vacuum Set Blood Bottles
- Liaise with Pathology
- Liaise engineers
- Liaise with GCC
- Make it real - Present findings
- Pilot!!

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Producing Patient Information

- Anaemia: The Basics
- Diet and Anaemia: Eating to best manage anaemia
- How can I increase iron in my child's diet?
- IV Iron Therapy
- Erythropoietin: What is EPO?

Future Projects
TEG in Trauma

- Engagement
- Support
- Trial

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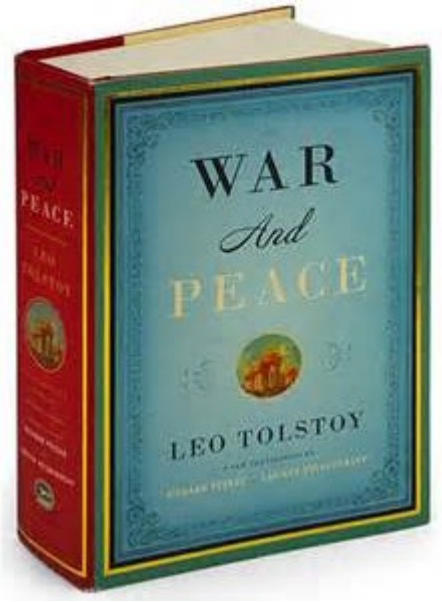
Policy

- Anaemia Policy
- Guidance
- Evidence base
- Where do you draw the line?



Do you need someone like me?

- Time
- Out on the wards
- Audit data collection- In depth
- Different focus
- Education
- Facilitate
- Policy

- Measure success

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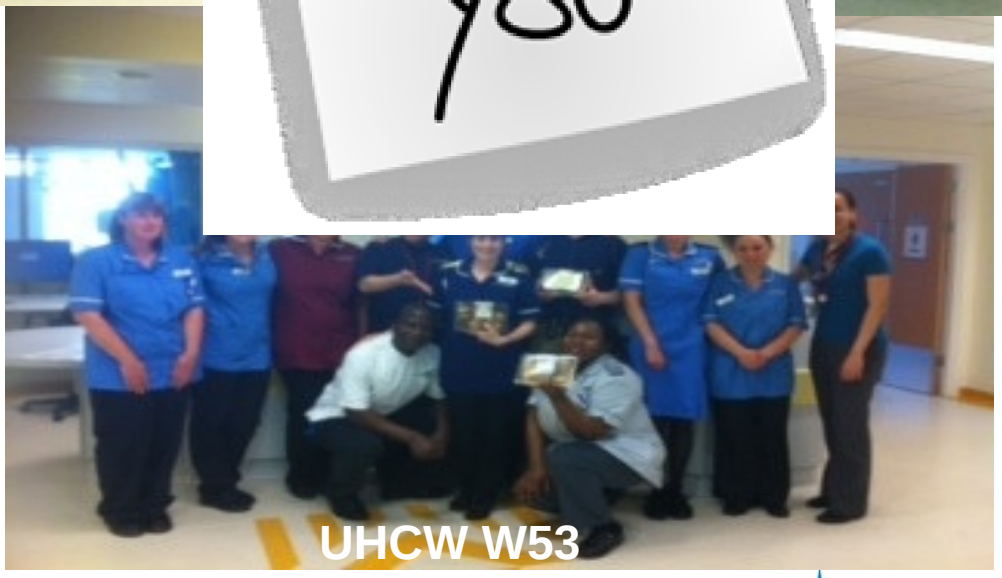
UHCW W40

UHCW Oak ward



UHCW W53

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