



Working differently with anaemia in Medicine and beyond

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Why do we need to work differently?

- Better for patients?
 - Accurate, newer tests, cheaper blood tests?
 - Less admissions?
 - Community based ?
 - Consistent wellbeing rather than peaks and troughs
 - Reduced co-morbidities?
 - Safer? Longer lasting effects
- Costs? Blood, Admissions (numbers and LOS),
- Beds?
 - Surgical
 - Medical
 - Obstetrics



Where do we need to concentrate?

- Respiratory
- Cardiac
- IBD
- Palliative Care/Cancer
- Pre-op assessment
- Colorectal surgery
- Obstetrics



What problems does anaemia cause patients?

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- Unpleasant symptoms
 - Lethargy
 - Dyspnoea
 - Fatigue & Insomnia
 - Light headedness & dizziness
 - Disorientation
- Increased susceptibility to infection
- Decrease in thermoregulation
- Increased bleeding
- Delayed wound healing
- Excessive fatigue and failure to cope
- Depression

Source: WHO

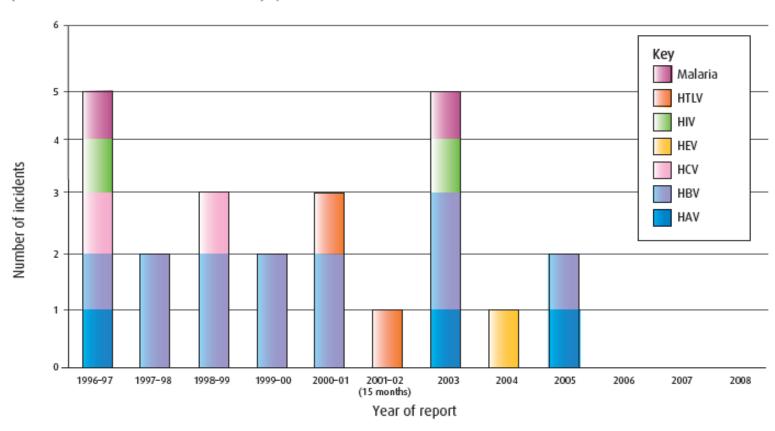


What problems does transfusion cause patients and hospitals?

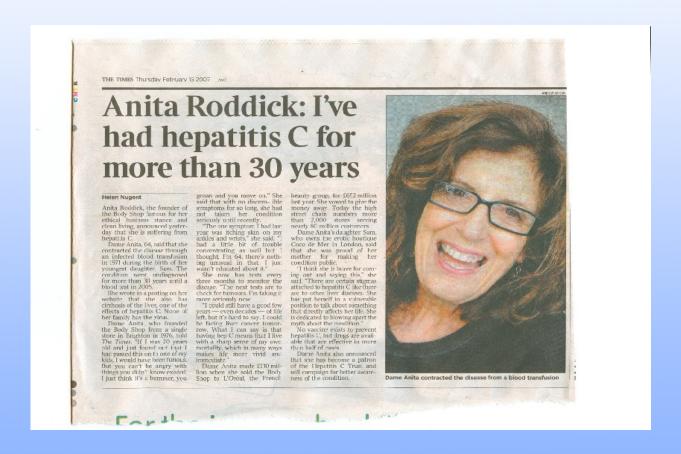
- Increased infections
- Increased length of stay
- Transmitted infections (rarely)
- Transfusion associated cardiac overload
- Reactions (rarely)
- Discharge with "adequate" Hb but still anaemic. Rebound?
- Money



Figure 23 Number of viral and parasitic TTI incidents, by year of report and infection type (Scotland included from October 1998)*†







NB We need blood for really sick people



Why are they anaemic?

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Exclude everything you can.

- Do the tests
 - Full Blood Count,
 - Coagulation,
 - Reticulocytes,
 - Film
 - Liver function
 - Renal Function
 - Thyroid function
 - CRP,
 - Folate
 - B12
 - Iron Saturation or Ferritin ?
 - Consider LDH
 - Direct Anti-globulin Test

- Plus
 - Endoscopy
 - Urine tests
 - Bleeding history
 - Recent surgery?
 - Examination
 - Medication
- Decide on the appropriate treatment
 - Blood?
 - Iron. Oral or IV?
 - B_{12} ?
 - Folic acid?
 - Nothing?
 - Steroids?
 - Epo?



Let's just get one thing straight

- Inflammation increases the release of Hepcidin by the liver which binds with Ferroportin trapping Iron in the stores rather than releasing it into the circulation to be used.
- Inflammation = no iron absorption
- No Iron absorption = Iron deficiency either actual or functional
- Ferritin is misleading if patients have ANY inflammation (Chronic Disease, Cancer, Arthritis, Obesity) and oral Iron <u>will not work</u> in this situation
- Iron Saturation (TSat) more accurately describes the availability of Iron regardless of stores (ie the %of Transferrin bound by Iron).It should be >20%



Chronic Cardiac and Respiratory diseases

- Account for large percentage of urgent admissions especially in the winter
- FAIR-HF study
 - Stefan Anker et al NEJM 2009:361
 - Improvement in Iron status <u>with or without anaemia</u> improves symptoms, functional capacity and quality of life.
- Could these patients be picked up and treated in the community?
- Could be reduce admissions in crisis or with infections?



Case study

- 82 year old woman
- Admitted with Hb 6g/dl
- "tired, SOB++, in failure"
- Longstanding Ischaemic Heart Disease
- Both hips replaced in the past year
- Hb in January 12g/dl
- No gut symptoms
- On oral Iron

The Queen Elizabeth Hospital MHS

TIL (ANAEMIA	06/04/1930 F 03/12/2012					
Specimen No: HH204660Y	Haematology	<pgup pgdn=""> for more</pgup>					
03/12/2012 16:07 Blood White Blood Cell Count Auto Neutrophil Count Auto Lymphocyte Count Auto Monocytes Automated Eosinophils Automated Basophils Red Blood Cells Haemoglobin Haematocrit MCV MCH MCHC Platelet Count	12.50 x10^9/L 11.69 x10^9/L 0.36 x10^9/L 0.37 x10^9/L 0.01 x10^9/L 0.01 x10^9/L 3.42 x10^12/L 8.5 g/dL 0.274 L/L 80.0 fL 25.0 pG 31.2 g/dL 288 x10^9/L	(4 to 10) Auth (1.8 to 7.7) Auth (1.5 to 3.5) Auth (0.2 to 1.0) Auth (0.02 to 0.5) Auth (0 to 0.1) Auth (3.8 to 4.8) Auth (12.5 to 16.5) Auth (0.360 to 0.460) Auth (81 to 99) Auth (27 to 32) Auth (31.5 to 34.5) Auth (150 to 400) Auth					

¹ Date 2 Earlst 3 Latst 4 rep seQ 5 Spec 6 DFT 7 Matches 8 Options 9 eXit X



MAU Marka added at 00.45 27/11	ANAEMIA			06/0	4/1930) і	E 26/11/2012 ONW			
Tests added at 00:45 27/11 Specimen No : CC506891R Ch	emical Pa	thology			<pgup< th=""><th>o/Po</th><th>gDn> f</th><th>or</th><th>more</th></pgup<>	o/Po	gDn> f	or	more	
Calcium -	2.00	mmol/L		(2.20	to	2.60)	Auth	
Total Bilirubin	14	$\mathtt{umol/L}$		(0	to	20)	Auth	
Alkaline Phosphatase(ALK)	55	U/L		(20	to	140)	Auth	
Alanine Transaminase (ALT)	21	U/L		(10	to	49)	Auth	
Iron	2.9	$\mathtt{umol/L}$		(9.0	to	30.4)	Auth	
Total iron binding capacity	35	umol/L		(45	to	81)	Auth	
Iron Saturation	(8)	ક	٠.						Auth	
TSH	1.72	mIU/L	*	(0.55	to	4.78)	Auth	
Free T4	11.3	pmol/L		(11.5	to	22.7)	Auth	
IqG	9.28	g/L		(5.3	to	16.5)	Auth	
IgA	2.38	g/L	,	(0.8	to	4.0)	Auth	
IqM	0.58	g/L		(0.5	to	2.0)	Auth	
Anti parietal cell Ab	In pro	_								
Ferritin		ng/mL		(10	to	291)	Auth	
Serum Folate	8	ng/mL		•				•	Auth	
Vitamin B12	(193)	pg/mL							Auth	

¹ Date 2 Earlst 3 Latst 4 rep seQ 5 Spec 6 DFT 7 Matches 8 Options 9 eXit X Cursor Up/Down for more

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The Queen Elizabeth Hospital NHS King's Lynn Symptoms of Anaemia, Investigation, Treatment and the Decision to Transfuse in the Macmillan Unit Symptoms Fatique Signs Pallor Palpitations/racing heart Tachycardia Patient referred Sore Mouth Swollen ankles Chest pains Tachypnoea Nausea Feeling of cold Disease related Shortness of breath Malabsorption
Bone Marrow Failure Wakefulness Treatment related eg CTX, DXT etc Sleepiness Haematology Full Blood Count, Coagulation, (then write on form) "Reticulocytes", "Film PHM" Renal function, Liver function, Bone, (then write on form) Thyroid function, CRP, Folate B₁₂ and Ferritin (if CRP is high ask for Iron Studies) Chemistry DAT (Direct Antiglobulin Test -used to be called Coombs) and group and antibody screen Transfusion Positive (new) Antibody screen could also mean slow Haemolysis - delayed transfusion reaction? Hidden antibodies? Transfusion results Abnormal liver function - clotting could be deranged Abnormal renal function — Anaemia of Chronic disease on top of other reasons for low Hb Raised CRP - intection - makes Ferritin result void - will need to ask for Iron Studies. Chemistry results Thyroid function - abnormal could mimic B₁₂ /Folate deficiency Low B₁₂, Folate and iron need replacing. Low B₁₂ can cause neuropathy, immobility and paralysis Low platelets may mean "invisible" bleeding Low or dropping MCV may be Iron deficiency High MCV could mean macrocytic anaemia (B₂₂ ±/- Folate deficiency) but also liver disease Film may identify Bone Marrow invasion or iron, B₂₀Folate deficiency or other Marrow problems Haematology results High Reticulocytes will identify if there is peripheral destruction How much time do you have? How bad are the symptoms? Where should the treatment take place? Treatment decisions NB Oral iron is usually useless in cancer patients having treatment or with anaemia of chronic disease Blood Transfusion Intravenous Iron Although usual practice is to keep Ferinject IV at home or as day case Hb >10 g/dl, some patients require Hb's >12 to find symptom relief. Stop Transfusion if no benefit is evident (ask the patient!). Treatments choices Most patients do not require a B₁₂ and Folate Folic 5mg acid PO daily diuretic for 2 units Hydroxycobalamin 1000mcg IM as BNF Patients who refuse blood] Patients with renal failure | On Haematology/Renal physician advice only Patients with Myeloma

If the patient is still in difficulty due to Anaemia please ring Haematology/Transfusion CNS

or Consultant Haematologist for advice.

Review/Refer

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Palliative Care

- Appropriate Treatment
- Flow chart for diagnosis
- Support from all Palliative Care Staff
- Discuss at MDT
- Junior Doctor led
- Measure QOL using FACT-AN
- Choice of treatments?



Case Study

- 78 year old man
- Hb 7-8 g/dl
- Ca Prostate mild Haematuria
- Cardiac failure unstable
- No obvious other bleeding
- 2-3 units Transfusion weekly
- Utterly exhausted and becoming more frail



Plan

- Check bloods
- FBC, Reticulocytes, Film, Clotting
- Renal & Liver function
- B₁₂ Folate and Iron studies
- Direct Antiglobulin test
- Ferinject 800 mg
- Maintenance 200mg Venofer 6 weekly to death

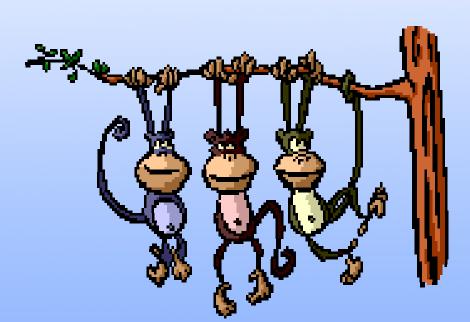


Case Study

- 23 year old woman
- Ca Cervix end stage
- Multiple treatments
- Small daughter
- Refusing transfusion
- Needlephobic



Plan



- Single dose Ferinject 900 mg
- Lived 14 weeks
- Acceptable QOL



IBD

- Oral Iron is contraindicated in IBD
- Maintenance IV Iron therapy reduces crises
- IBD therapy clinics
- Remember; reduce anaemia reduce infections and bleeding
- Increase QOL



Surgical Pre-assessment

- Reduced LOS for surgical patients
- Reduced complications
- Therefore happier patients
- Speedier patient through-put
- Partnership working between GP commissioners and Hospital teams
- Savings to be made for everyone?



Colorectal Surgery

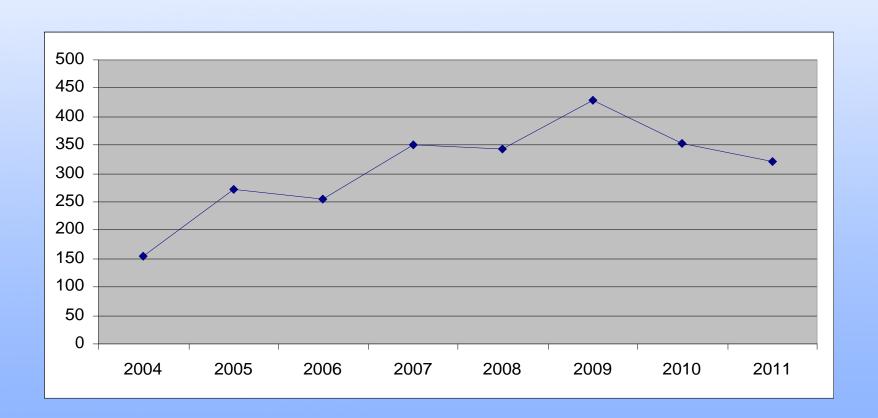
- PREVENTT RCT
- Pilot study on 3 sites
- Does reducing transfusion
 - Reduce LOS?
 - Reduce post op infections?
 - Reduce other complications?
 - Increase survival?
 - Save the NHS money?



Obstetrics @ QEH

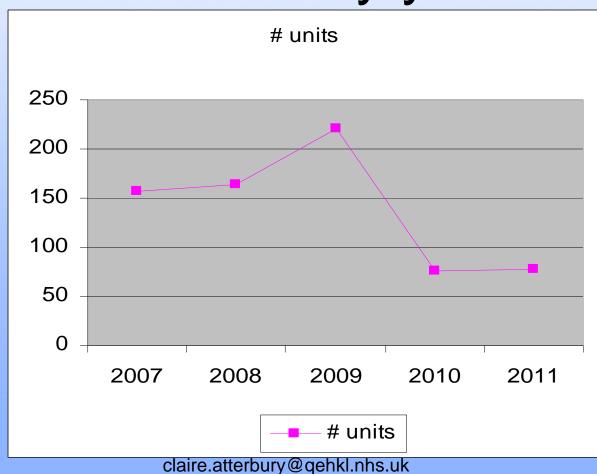


Number of PPH





Units used by year





How did we achieve this?

- Regular interdepartmental meetings
- Midwife education and understanding
- Find a champion or two
- Make it easy (algorithms)
- Back the staff up easy access for advice
- Make sure systems are in place
- Dietary information in "Bounty packs" explained to Mums

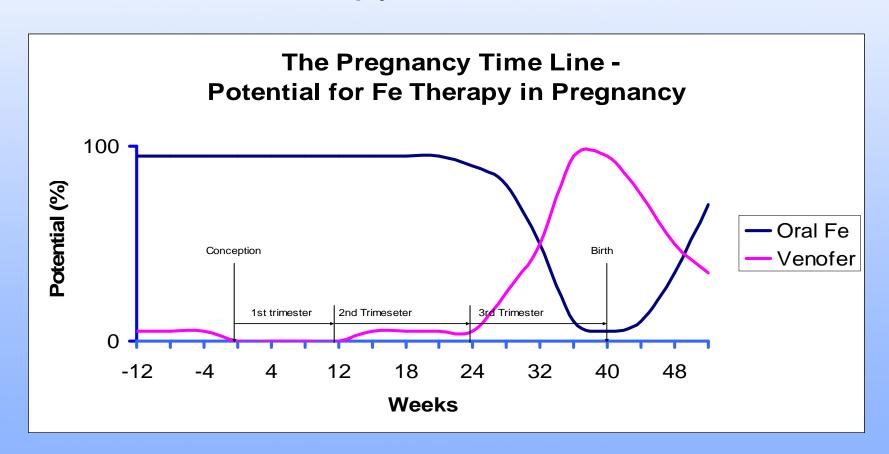


What were (are) the challenges?

- Doing something new
- Taking the calls
- Some medical colleagues
- Goldfish memories
- Changing the culture
- Other hospitals
- The cost of IV Iron (Iron deficiency is epidemic when you go looking for it)
- The B₁₂ battering



Iron Therapy Timeline in O&G

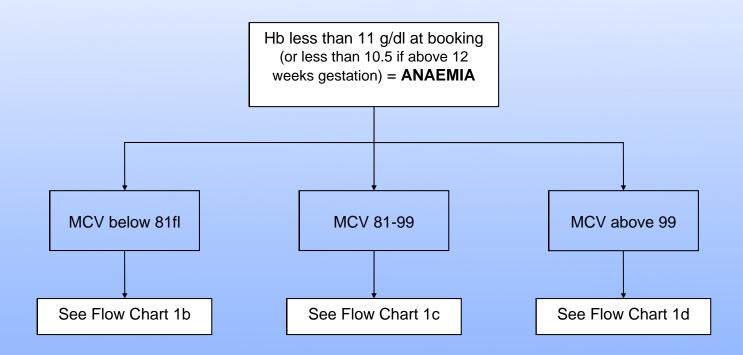


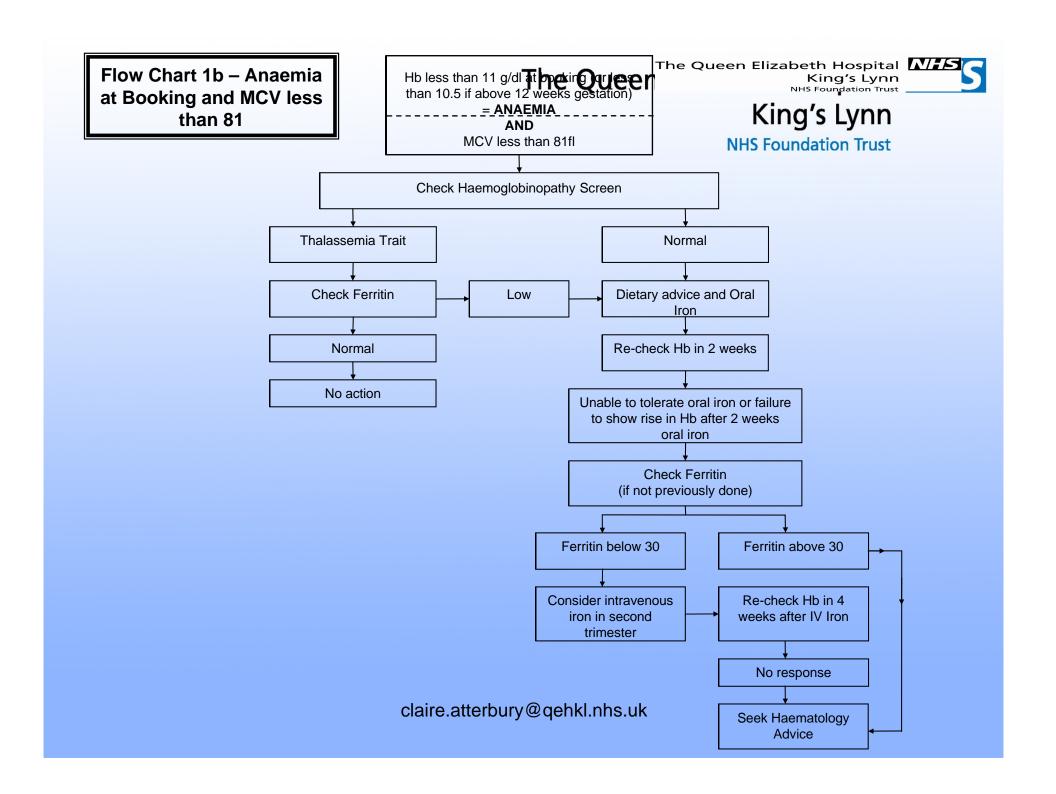


Flow Chart 1a - Anaemia at Booking

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And for the wee ones.....

- Poor uterine growth
- Decreased liquor
- Asymmetrical growth patterns
- Small for dates
- Premature delivery
- Low birth weight
- Failure to thrive (poor lactation)
- And if it continues poor concentration and reduced scholarly achievements (Source SMA!)
- And for the Midwife.....?

- 36 year old Journalist on the Mirror
- Not keen on blood transfusion
- On Pregaday
- Best friend a Transfusion Nurse Specialist!
- Hb 9.0 at 28 weeks
- MCV slightly lower than pre-pregnancy (91→87)



Plan

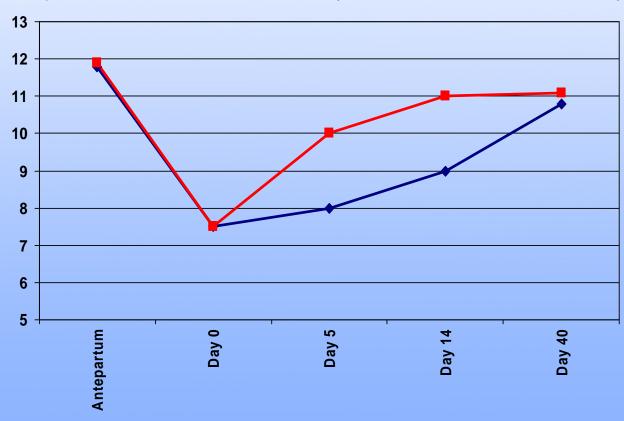
- Increase oral Iron to FeSO₄ 200mg TDS from week 28
- Continue folic acid to delivery

- Delivered at 42/40
- 1250 ml bleed
- Hb at 2 days PP 10g/dl



Oral Iron vs Venofer in the Postpartum

(Dr Nav Bhandal, John Radcliffe, Oxford, personal communication but in BJOG April 2007)

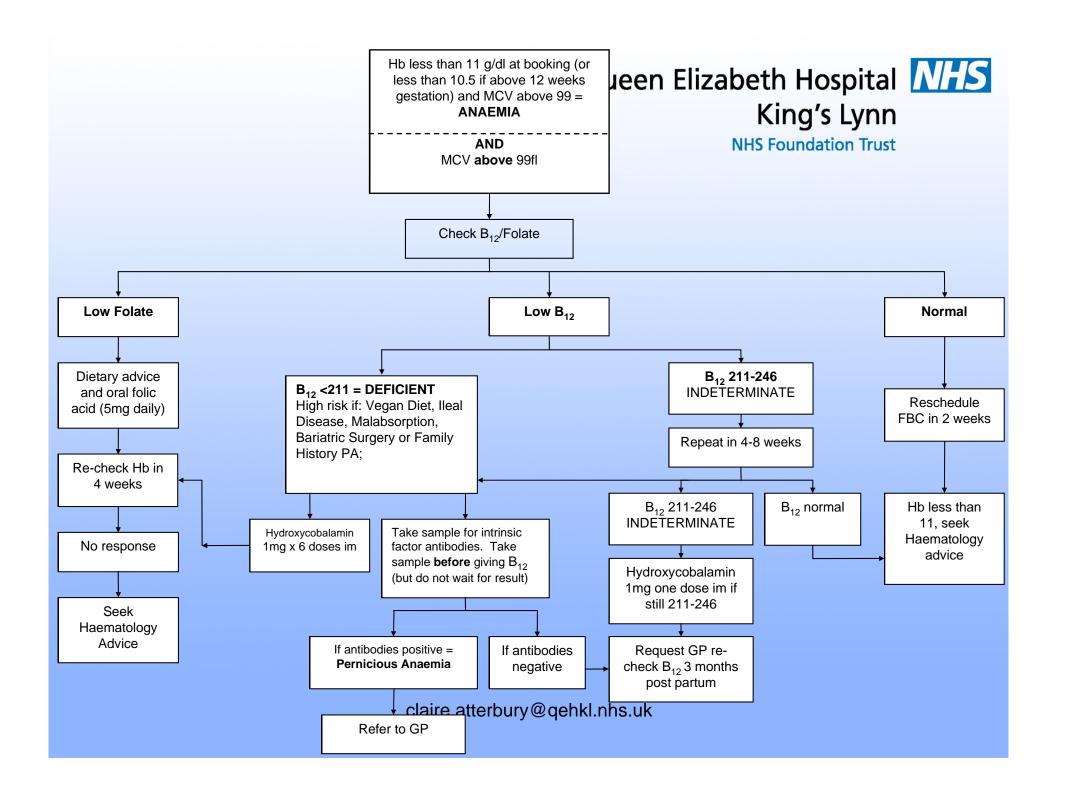


→ Oral Iron 200mg bd for 6 wks - Venofer 200mg on Day 2 and 4



Low B₁₂ - Risks to Mother and child.....

- Symptoms of anaemia
- Neuropathy can be severe in extreme cases
- Increased susceptibility to infection
- Neural tube defects
- Bone Marrow Failure
- But VERY difficult to say where a true deficiency is in pregnancy due to increased plasma volume



Case Study

- 22 year old 2 other children
- 37/40
- Admitted to Antenatal ward with Norovirus
- Christmas.
- Septic
- Distressed baby → Section
- Hb 3.1g/dl, Platelets 41 x10⁹/l, Neutrophils 0.3 x10⁹/l
- B₁₂ 99, Folate 1.6, CRP 280



Then...

- 14 days as inpatient
- Septic shock (managed on Labour Ward)
- 8 units of Red cells
- 1 unit of Platelets
- IV antibiotics +++
- Lots of stress and anxiety for everyone......



Back up a bit.....

- 30.9.08 28 week bloods showed MCV 109 and film comment "macrocytic anaemia. Probable B₁₂ deficiency"
- 6.11.08 MCV 116. Hb 9.0 Film comment "Macrocytic picture? Liver?B₁₂/Folate deficiency."
- 13.11.09 B₁₂ 117, Folate 0.9 (3-20) Red Cell Folate 48 (93-641)
- Patient given oral iron. Usual Midwife on AL. Patient moved house.
- 10.12.09 UTI E-Coli
- 27.12.09 Admitted with diarrhoea and vomiting. Baby distressed.