

The Queen Elizabeth Hospital  
King's Lynn

NHS Foundation Trust



# 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?

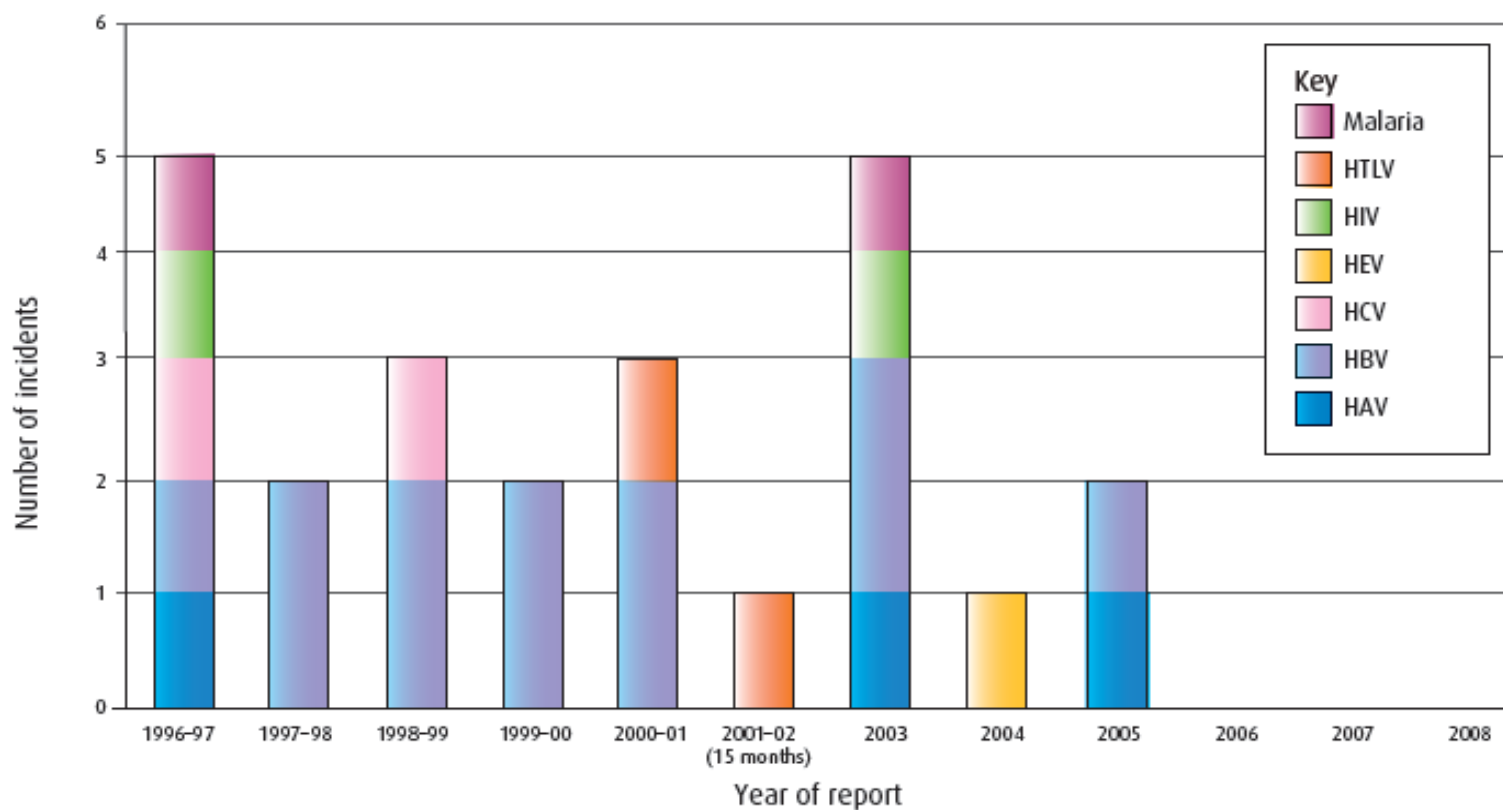
- Unpleasant symptoms
  - Lethargy
  - Dyspnoea
  - Fatigue & Insomnia
  - Light headedness & dizziness
  - Disorientation
- Increased susceptibility to infection
- Decrease in thermoregulation
- Increased bleeding
- Delayed wound healing
- Excessive fatigue and failure to cope
- Depression

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)\*†



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## NB We need blood for really sick people

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## Why are they anaemic?

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<sub>12</sub>?
  - 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 **will not work** 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 with or without anaemia 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

TIL

ANAEMIA

06/04/1930 F 03/12/2012

Specimen No : HH204660Y

Haematology

<PgUp/PgDn> for more

03/12/2012 16:07 Blood

White Blood Cell Count	12.50	x10 <sup>9</sup> /L	( 4 to 10 )	Auth
Auto Neutrophil Count	11.69	x10 <sup>9</sup> /L	( 1.8 to 7.7 )	Auth
Auto Lymphocyte Count	0.36	x10 <sup>9</sup> /L	( 1.5 to 3.5 )	Auth
Auto Monocytes	0.37	x10 <sup>9</sup> /L	( 0.2 to 1.0 )	Auth
Automated Eosinophils	0.01	x10 <sup>9</sup> /L	( 0.02 to 0.5 )	Auth
Automated Basophils	0.01	x10 <sup>9</sup> /L	( 0 to 0.1 )	Auth
Red Blood Cells	3.42	x10 <sup>12</sup> /L	( 3.8 to 4.8 )	Auth
Haemoglobin	8.5	g/dL	( 12.5 to 16.5 )	Auth
Haematocrit	0.274	L/L	( 0.360 to 0.460 )	Auth
MCV	80.0	fL	( 81 to 99 )	Auth
MCH	25.0	pG	( 27 to 32 )	Auth
MCHC	31.2	g/dL	( 31.5 to 34.5 )	Auth
Platelet Count	288	x10 <sup>9</sup> /L	( 150 to 400 )	Auth

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

06/04/1930 F 26/11/2012  
ONW

MAU [REDACTED] ANAEMIA

Tests added at 00:45 27/11

Specimen No : CC506891R Chemical Pathology

<PgUp/PgDn> for more

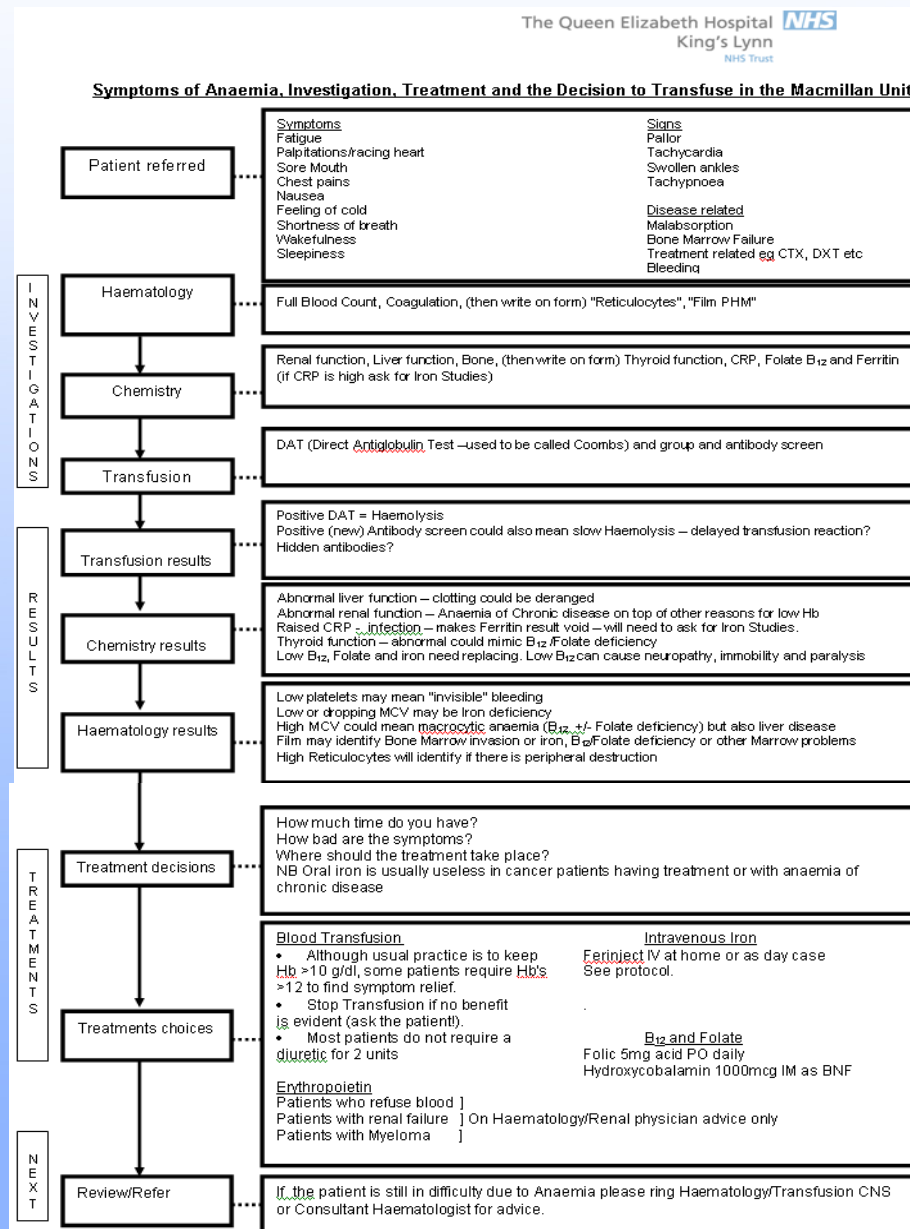
Calcium	2.00	mmol/L	( 2.20 to 2.60 )	Auth
Total Bilirubin	14	umol/L	( 0 to 20 )	Auth
Alkaline Phosphatase(ALK)	55	U/L	( 20 to 140 )	Auth
Alanine Transaminase (ALT)	21	U/L	( 10 to 49 )	Auth
Iron	2.9	umol/L	( 9.0 to 30.4 )	Auth
Total iron binding capacity	35	umol/L	( 45 to 81 )	Auth
Iron Saturation	8	%		Auth
TSH	1.72	mIU/L	( 0.55 to 4.78 )	Auth
Free T4	11.3	pmol/L	( 11.5 to 22.7 )	Auth
IgG	9.28	g/L	( 5.3 to 16.5 )	Auth
IgA	2.38	g/L	( 0.8 to 4.0 )	Auth
IgM	0.58	g/L	( 0.5 to 2.0 )	Auth
Anti parietal cell Ab	In progress			
Ferritin	1601.7	ng/mL	( 10 to 291 )	Auth
Serum Folate	8.7	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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# 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

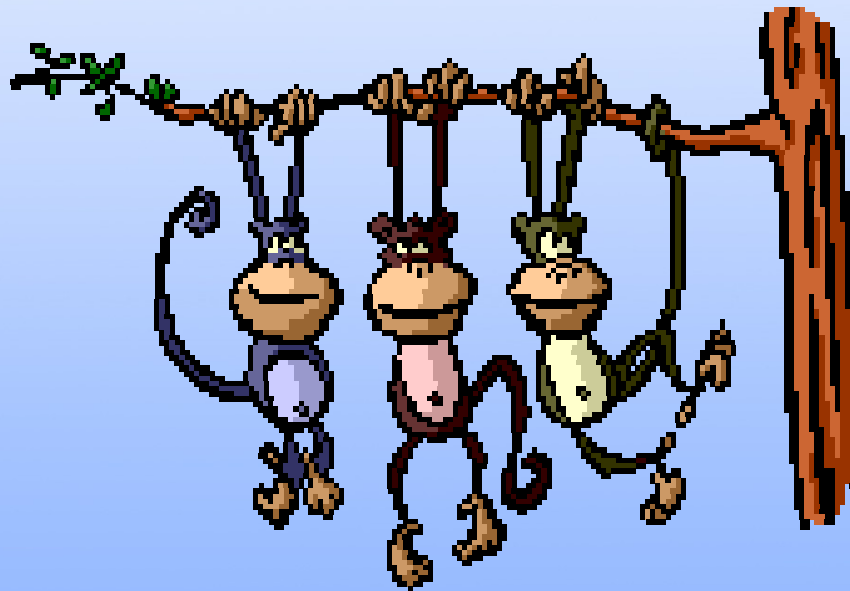
# Plan

- Check bloods
- FBC, Reticulocytes, Film, Clotting
- Renal & Liver function
- B<sub>12</sub> 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?

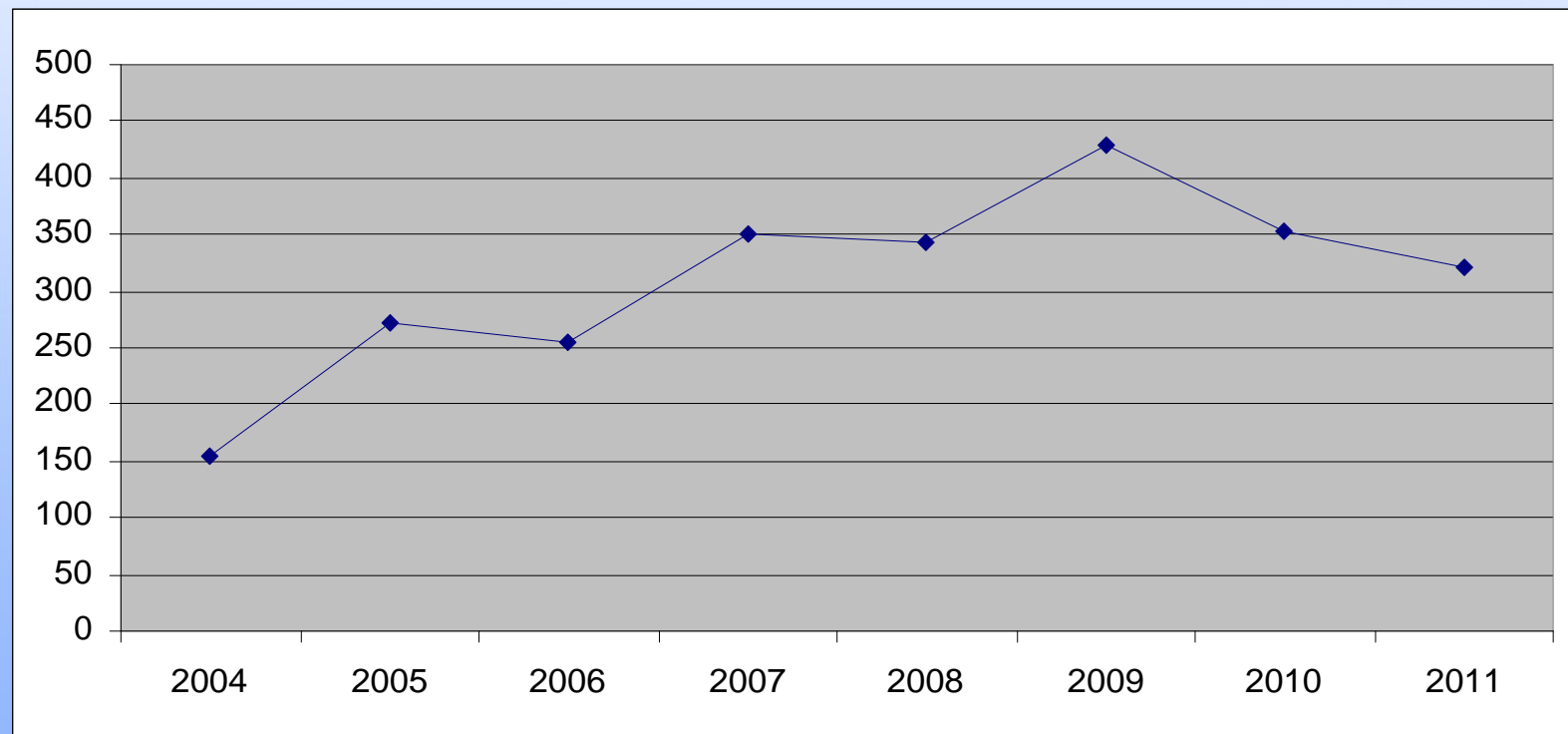
# Colorectal Surgery

- 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?

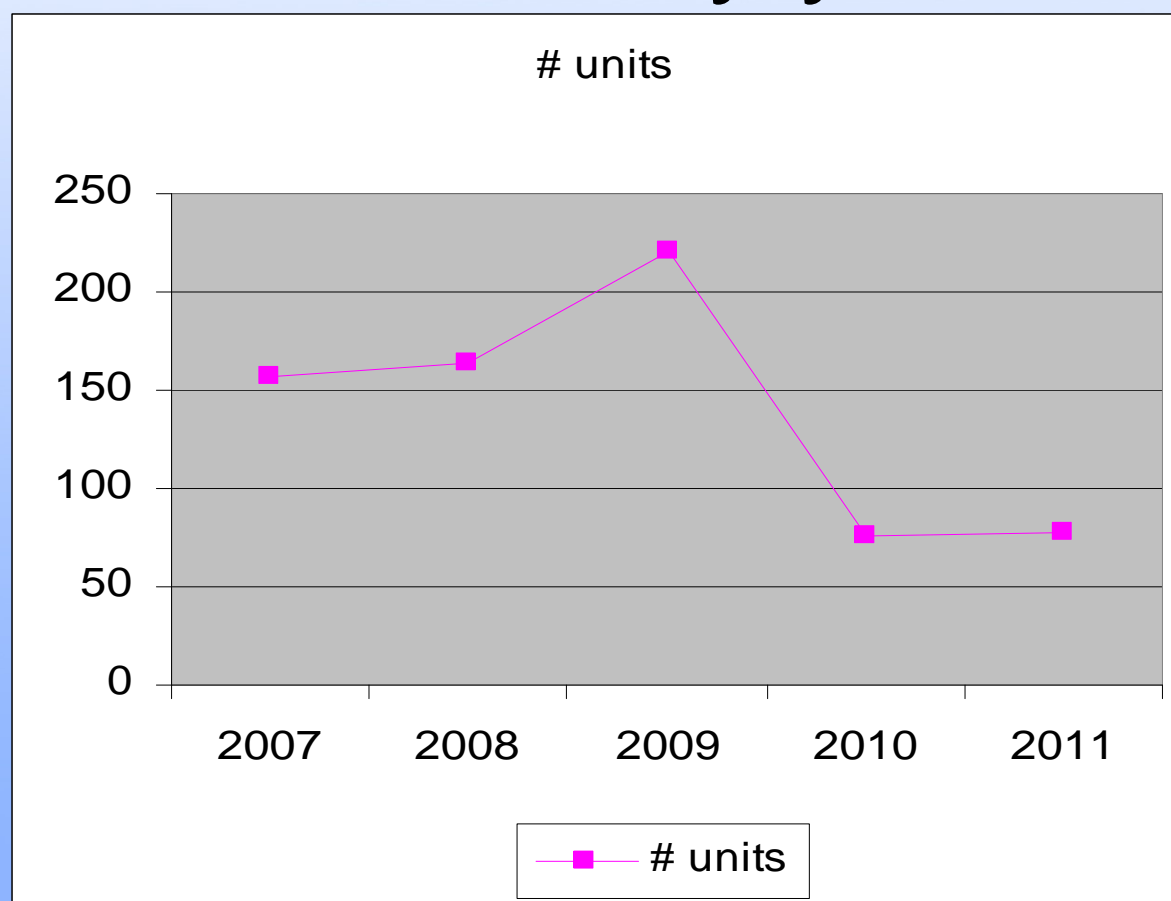
# Obstetrics @ QEH

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# Number of PPH



# Units used by year



claire.atterbury@qehkl.nhs.uk

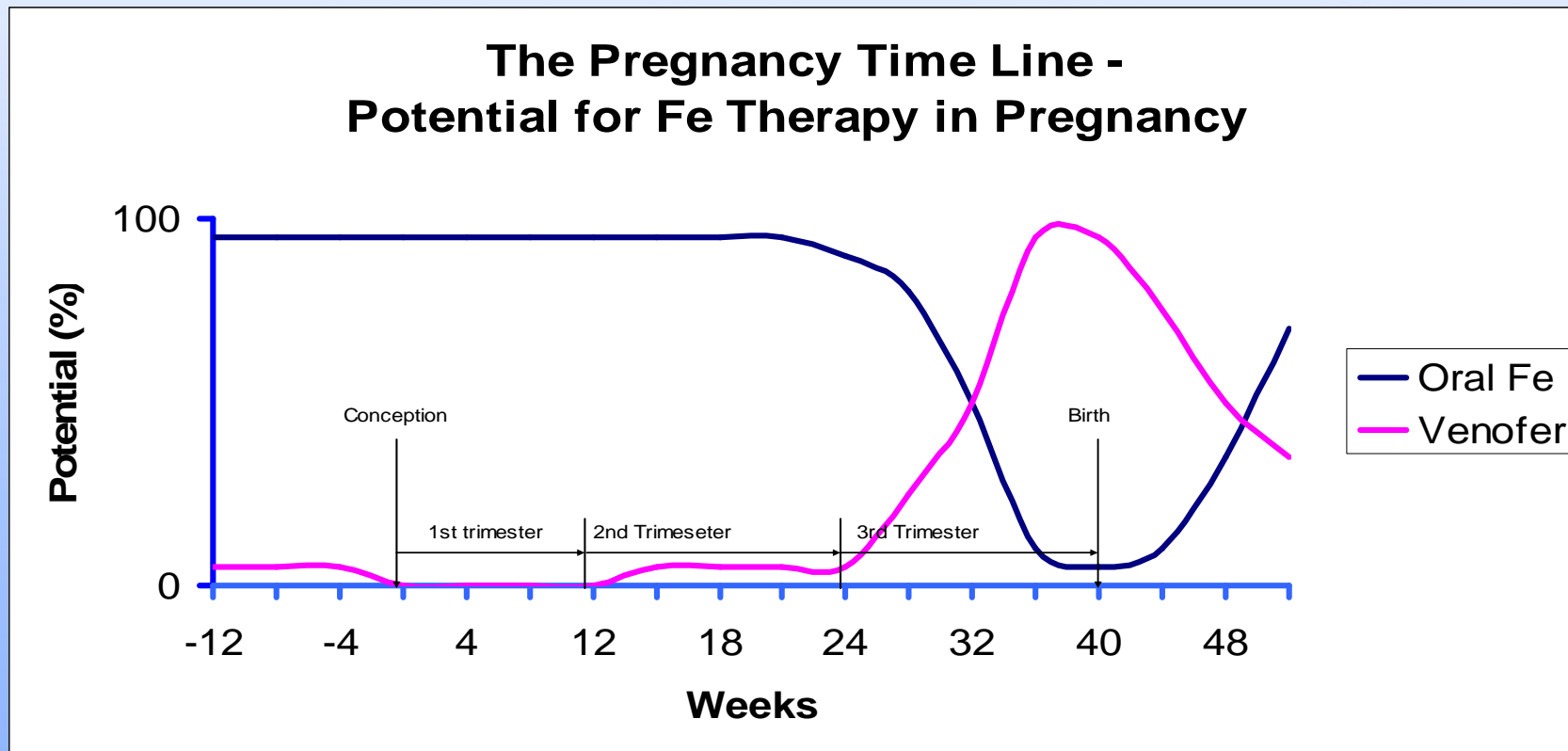
## How did we achieve this?

- **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

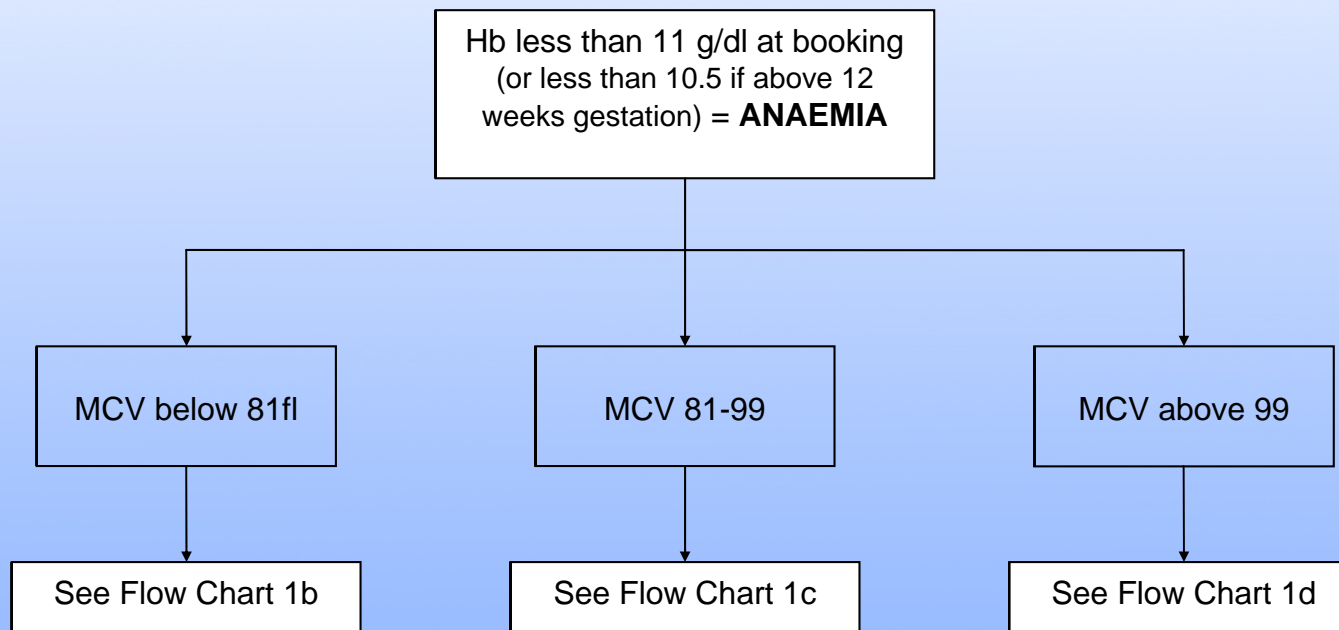
## What were (are) the challenges?

- 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 B<sub>12</sub> battering

# Iron Therapy Timeline in O&G



**Flow Chart 1a – Anaemia at Booking**



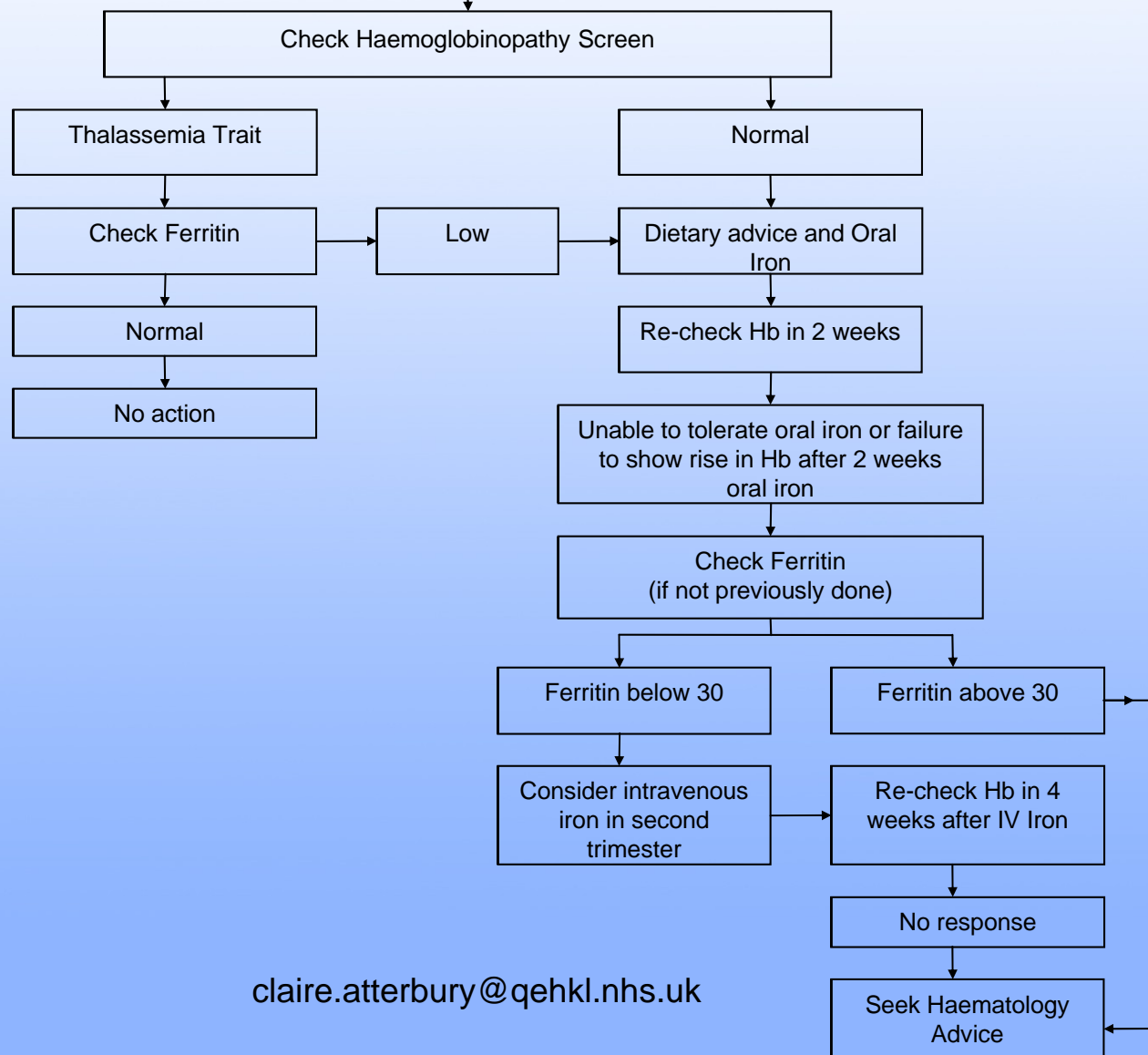
# Flow Chart 1b – Anaemia at Booking and MCV less than 81

Hb less than 11 g/dl at booking (or less than 10.5 if above 12 weeks gestation)  
= **ANAEMIA**  
AND  
MCV less than 81fl

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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.....?

The Queen Elizabeth Hospital  
Case study



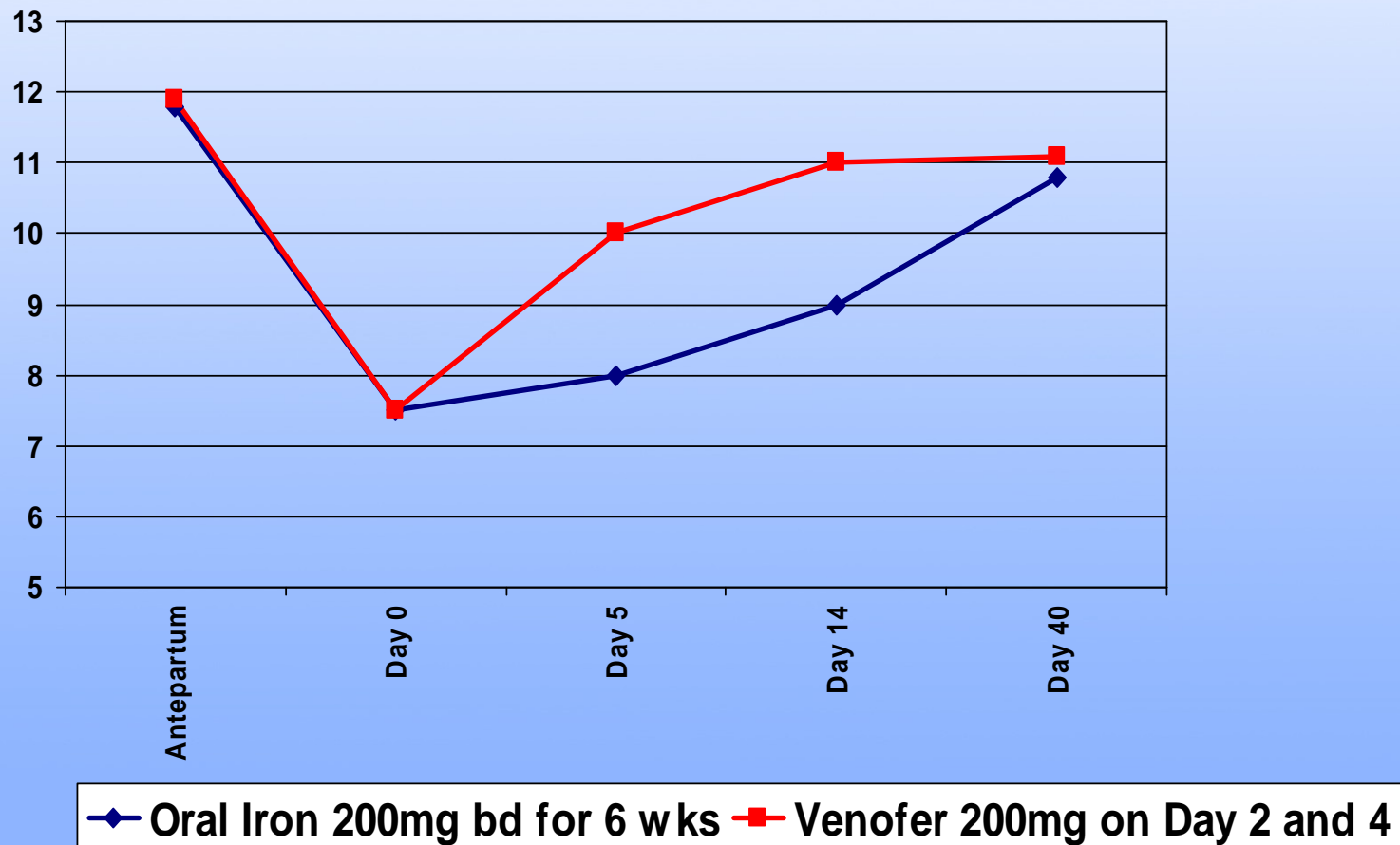
- 36 year old Journalist on the Mirror
- Not keen on blood transfusion
- On Pregaday
- Best friend a Transfusion Nurse Specialist!
- Hb 9.0 at 28 weeks
- MCV slightly lower than pre-pregnancy (91→87)

## Plan

- Increase oral Iron to  $\text{FeSO}_4$  200mg TDS from week 28
- Continue folic acid to delivery
- Delivered at 42/40
- 1250 ml bleed
- Hb at 2 days PP 10g/dl

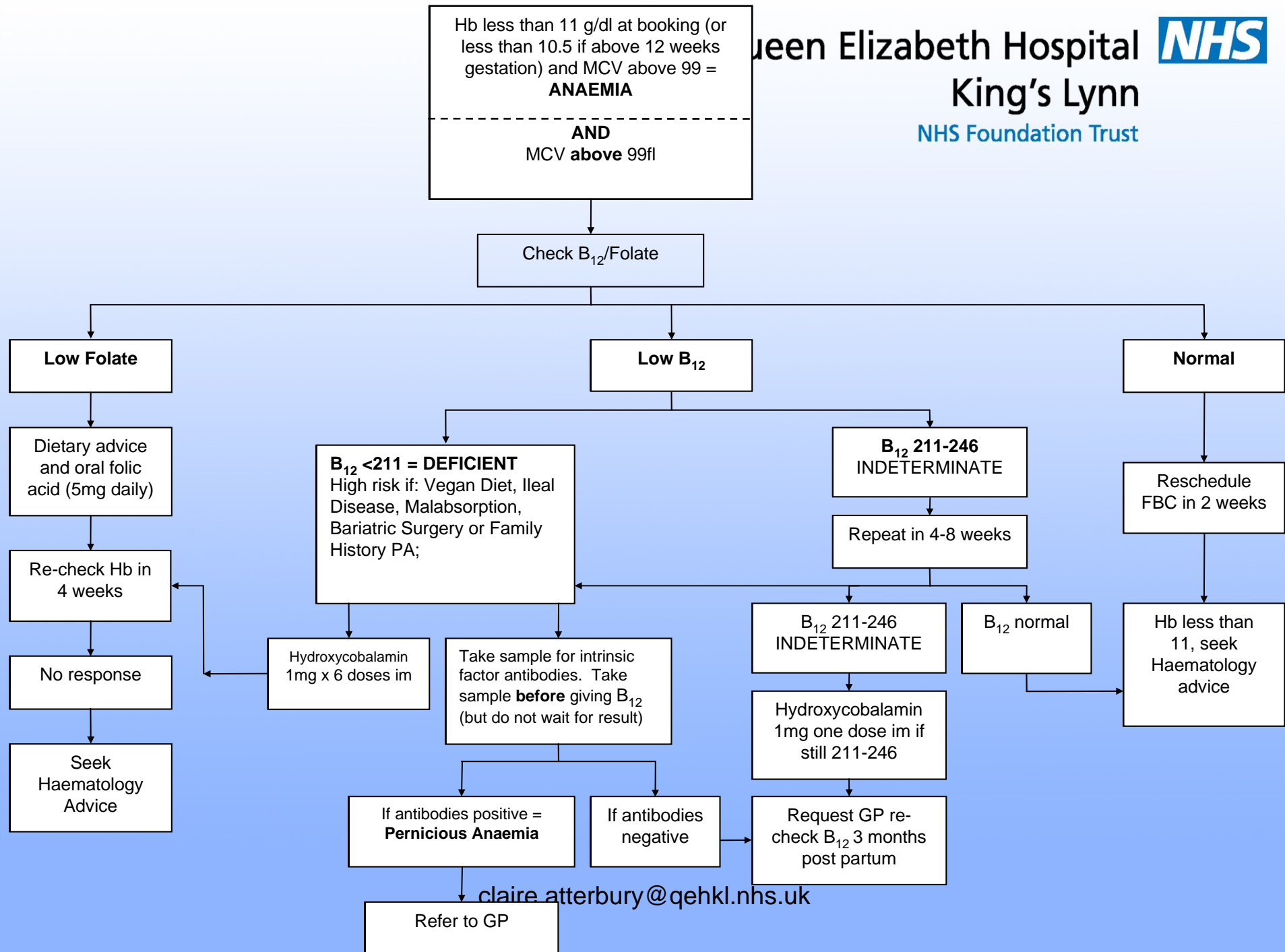
## Oral Iron vs Venofer in the Postpartum

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



## Low B<sub>12</sub> - 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  $41 \times 10^9/l$  , Neutrophils  $0.3 \times 10^9/l$
- B<sub>12</sub> 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 B<sub>12</sub> deficiency”
- 6.11.08 MCV 116. Hb 9.0 Film comment “Macrocytic picture ? Liver ?B<sub>12</sub> /Folate deficiency.”
- 13.11.09 B<sub>12</sub> 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.