The Shrewsbury and Telford Hospital NHS Trust

Anaemia and Iron Infusion (ferinject)

(Management of iron deficiency anaemia in pregnancy and postnatal period and management of iron infusion)

Version 3.2

Lead Person	:	Marc Wilkinson Consultant Obstetrician and Gynaecologist
Care Group	:	Women and Children's
First Implemented	:	28th May 2013
This version Implemented	:	20th June 2025
Planned Full Review	:	August 2026
Written by	:	Marc Wilkinson Consultant Obstetrician and Gynaecologist
Consultation with	:	Pharmacy Department
Keywords	:	Anaemia (pregnancy), iron deficiency (pregnancy), iron infusion (pregnancy)
Comments	:	Any references to SaTH Guidelines in the text pertain to the latest version of the guideline on the intranet. Printed copies may not be the most up to date version.

This guideline should be read in conjunction with
Postpartum Obstetric Haemorrhage (125) Blood Products (Refusal) (010)
Iron Infusion SOP (022)

Version	Implementation Date	History	Ratified By	Full Review Date
1	28th May 2013	New	MGG Maternity Governance	May 2016
1.1	30th September 2014	Amended references to Wards due to reconfiguration	GC authorised	May 2016
1.2	15th December 2014	Updating to IV Iron Infusion. Cross Reference to Iron Infusion SOP	MGG	May 2016
2.0	20th September 2016	Full Version Review	MGG Maternity Governance	September 2021
2.1	19th April 2017	▪ Minor revision to Table 1. ▪ Addition of low MCV indication to assess serum ferritin Table 2 ▪ removal of appendix 1 ▪ Table 3 & 4 moved to follow Table 2	MGG	September 2021
3.0	21st August 2023	▪ Updated iron dosage in line with latest guidelines ▪ Updated tables 1-3 ▪ Appendix 1. Included SOP for ferinject	Maternity Governance	August 2026
3.1	23rd August 2024	Minor update for considerations when assessing pallor as a symptom of anaemia for darker skin tones	Maternity Governance	August 2026

3.2	20th June 2025	Added management flow chart and additional actions where folic acid or B12 deficiency is detected	Maternity Governance	August 2023

1.0 Introduction

'In this guideline we use the terms 'woman' or 'mother' throughout. These should be taken to include people who do not identify as women but are pregnant or have given birth'

1.1 It is normal for haemoglobin (Hb) concentration to fall in pregnancy - increased plasma volume compared to red cell mass in pregnancy results in physiological haemodilution (Pavord *et al*., 2019)
1.2 Iron deficiency - increased utilisation of iron during pregnancy which is required for fetal growth and development and increased maternal erythropoiesis
1.3 In the UK, the prevalence of anaemia to be between 24% and 46% in the booking or 28-week checks
1.4 Iron-deficiency anaemia (IDA) accounts for 85% of cases of anaemia
1.5 Maternal anaemia is associated with stillbirth and perinatal death, small for gestational age infants and maternal PPH

2.0 Aims and objectives

2.1 To identify the process for screening for IDA
2.2 To identify the care and management of pregnant women who have IDA

3.0 Definitions

3.1 **Anaemia** is defined as a reduction in the haemoglobin concentration of the blood (Moss and Hoffbrand 2015). The cutoffs vary with gestation
3.2 **Iron deficiency** is defined by a ferritin of <15 µg/L.
3.3 **Haemoglobin (Hb)** is the specialised protein molecule carried in the red blood cells, which enables them to carry oxygen to the tissues and to return carbon dioxide from the tissues to the lungs (Moss and Hoffbrand 2015).
3.4 **MCV** mean cell volume normal value >82 fL
3.5 **Ferritin** is an intracellular protein that stores iron and releases it in a controlled fashion.

4.0 Diagnosis

4.1 The diagnosis of anaemia caused by iron deficiency can be made through history, examination, and investigations
- Iron deficiency does occur in pregnancy due to the increased utilisation of iron during pregnancy
- Iron deficient anemia can occur prior to pregnancy

4.2 **Clinical signs and Symptoms of anaemia -** non-specific and cannot be relied on for diagnosis

But can include:
- Pallor**
- Weakness
- Lethargy
- Shortness of breath
- Dizziness
- Headache
- Raised or thread pulse rate
- Palpitations

**Skin changes can be subtle in darker skin tones and so special consideration should be taken when assessing pallor as a symptom of anaemia. Pallor associated with anaemia can present as paleness in the conjunctiva and mucosa around the mouth, rather than in other areas, such as the skin on the limbs. Inspect the mucus membranes for an ash grey colour, using ambient lighting.

4.3 Laboratory investigations – also refer to Table 1

- **Full blood Count**

  All women will be offered a Full Blood Count (FBC) to screen for anaemia at **booking** and at **28 weeks**.

  Additional FBC is required if the woman develops signs and symptoms of anaemia.

  Recheck FBC at 36-37 weeks if a woman is booked for a MLU birth and has previously Hb<100g/L.

- **MCV**

  An unreliable marker of iron deficiency in pregnancy. A low MCV, defined as an MCV <80 fL, is highly sensitive, but not specific, for iron-deficiency anaemia

- **Ferritin**

  Serum ferritin level is considered to be a reliable indicator of iron deficiency in the first trimester (in the absence of infection or inflammation). But in the second and third trimesters it is of limited use, serum ferritin levels fall independently of iron stores.

  A normal serum ferritin does not exclude iron deficiency in pregnancy

  Ferritin should be measured in patients with known haemoglobinopathies to identify concomitant iron deficiency and to exclude iron loading states

4.4 Definition of Anaemia is defined depending upon the Hb concentration and gestation.

- 1st trimester – Hb <100g/l
- 2nd and 3rd trimester – Hb <105g/l
- Postnatal – Hb <100g/l

4.5 A serum ferritin concentration less than 15 micrograms/L diagnostic of iron depletion in all trimesters

- Treatment with iron should be considered when levels fall below 30 micrograms/L, This indicates early iron depletion, which will continue to fall

4.6 Further investigations are not usually required if anaemia develops during pregnancy, unless:

- Severe anaemia.
- No response to iron supplementation.
- An alternative cause of iron deficiency is suggested
  - Poor dietry intake
  - Drug history (aspirin, NSAIDs, SSRI, clopidogrel, or corticosteroids).
  - A family history of Iron deficiency anaemia
  - Bleeding disorders and telangiectasia.
  - Haematological disorders (e.g. thalassaemia).
  - Gastrointestinal disorders. (e.g. coeliac disease)
  - A history of excessive bleeding, heavy bruising or blood donation.
  - Menstrual history
  - Weight loss

4.3 If iron deficiency anaemia is pre-existing and/or related to factors outside pregnancy

- The underlying cause should be determined and treated
- Referral to other specialities should be made for further investigation if:
  - Failure of a trial of iron treatment
  - Red flag symptoms consider referral via two-week-wait cancer pathway

5.0 Management of iron deficient anaemia (see table 1 for summary)

5.1 Insufficient evidence on the risks and benefits of, routine iron supplementation in pregnancy

Preparations e.g. Pregaday containing iron and folic acid are used during pregnancy in women who are at high risk of developing iron and folic acid deficiency. See table 1

5.2 Dietary advice – all women should receive dietary advice, it is not possible to replenish iron stores through iron alone.

5.3 If anaemia is diagnosed – a trial of oral iron should be commenced and repeat FBC carried out in 2-4 weeks

5.4 If ferritin <30 µg/l commence elemental iron

5.4 Dose of elemental oral iron 40-80mg per day
increased dose does not increase the effect but leads to worsened side effect risking non-compliance

5.5 If no improvement after 2 weeks of optimal treatment more definitive investigations should take place to exclude other causes

- e.g. folate, B12 deficiency or malabsorption

Pregnancy stage	Result	Action	Comments
Booking	Hb≥110g/l	Oral iron not indicated	▪ Highlight section in PIB for dietary recommendations.
	Hb <110g/l	Oral iron see Tables 2 and 43 for various available iron compounds **See Table 2 Indication for Ferritin level assessment and management**	▪ Highlight recommended instructions and diet. ▪ Enquire at next antenatal appointment tolerance with oral iron. ▪ If intolerant of tablet form consider alternative liquid preparation e.g. Sytron® (see **Table 2**)
28/40	Hb ≥105g/L	Oral iron not indicated	▪ If oral iron commenced in early pregnancy consider continuing and advise diet recommendations
	Hb <105g/L	Oral iron see Tables 2 and 3 for various available iron compounds	▪ If already taking oral iron commence alternative oral iron compound (see **Table 2**)

NB If Hb does not improve with iron supplement folate levels and B_{12} deficiency will be considered and appropriate tests performed. If either is found to be low then these should be corrected with appropriate treatment.

Any stage in pregnancy	Hb ≤70g/L or significant symptoms **or** intolerance to oral preparations (tablet or liquid) **no response** to oral iron therapy **or** >34/40 with	Follow up appointment at Consultant Antenatal Clinic if the woman has had previous appointments **OR** if no follow up at Consultant Clinic Refer to Risk Assessment and Support Team	▪ Discuss and consider iron infusion dependent on individual symptoms and gestation.

Table 1. Summary of management of anaemia

5.7 Only marginal difference between the different ferrous salts in terms of absorption of iron (see table 3 for different preparations)

Alternate day dosing or preparations with lower iron content should be used if nausea and epigastric discomfort

Iron salt	Dose per tablet	Elemental iron
Ferrous Fumarate	210mg	65mg
Ferrous Gluconate	300mg	35mg
Ferrous Sulphate (dried)	200mg	65mg
Ferrous Feredetate (Sytron®-liquid)	190mg/5ml	27.5mg/5ml

Table 2- Dose and elemental iron content per tablet or oral iron preparations

Preparation	Iron salt and dose per tablet	Elemental Iron content	Folic acid content
Pregaday	Ferrous fumarate 322 mg	100 mg	350 µg (mcg)

N.B. Recommended folic acid intake - 400 µg/micrograms daily for the first 12 weeks of pregnancy (5mg with diabetes or BMI ≥ 30)

Table 3 - Dose and elemental iron content per tablet of combined oral iron and folate preparations

6.0 Intravenous Iron therapy

6.1 IV iron replacement should be considered in the following situations:

- Rapid Hb response required
- Absolute non-compliance
- Intolerance of oral iron
- Proven malabsorption

Consider in all women who present after 34 weeks gestation and Hb <100 g/l

6.2 See appendix 1 for the organization and administration of the iron infusion

7.0 intrapartum management of patients with iron deficiency anaemia

7.1 Some women will remain anaemic despite optimal management and should NOT influence mode of delivery

7.2 If Hb <100g/l at time of onset of labour

- Deliver on the Consultant Unit
- Active 3rd stage of labour - Due to increased risk of PPH and lower iron stores for coping with hemorrhage

7.3 If the Hb is less than 70 g/l in labour, the decision to transfuse should be made according to the individual's medical history and symptoms.

- In women with continued bleeding or at risk of further bleeding, cardiac compromise or significant symptoms requiring urgent correction.

8.0 Postpartum anaemia

8.1 Following delivery check the FBC within 48 hours following delivery for

- Patients with estimated blood loss >500mls
- Uncorrected anaemia in antenatal period
- Signs and symptoms of anaemia

8.2 Women with Hb <100g/l should be offered oral iron 40-80mg daily

8.3 Once the Hb is in normal range treatment should continue for 3 months and until at least 6 weeks post-partum to ensure iron stores are replenished

- Women will be advised to see their GP for a repeat FBC and ferritin to ensure their iron stores are replete.

8.4 Consider IV iron for those previously intolerant or who did not respond to oral iron in the antenatal period

8.5 If the Hb is less than 70 g/l in the postnatal period, where there is no ongoing or threat of bleeding, the decision to transfuse should be made on an informed individual basis

- Women should be given full information regarding risks of transfusion with consideration of alternatives.
- Consent should be sought and documented

9.0 B12 and Folic Acid Deficiency

Both B12 and folate deficiency in pregnancy are diagnosed using pregnancy specific values.

These values can be found in the workflow in appendix 1 and are based on those provided at perinatology.com (see reference 9). Please note folic acid levels locally are not measured below 2µg/L and this is therefore used as the cut off for diagnosis.

The workflow also includes the current recommended regimen for replacement.

Deficiencies of B12 and Folate in young pregnant women are most likely secondary to dietary deficiency, but it is important to consider other causes. The following provides general guidance on this subject https://cks.nice.org.uk/topics/anaemia-b12-folate-deficiency/.

For this reason, women with B12 and folate deficiency require medical review, not just replacement.

For the purposes of the obstetrician, if the patient is well and otherwise asymptomatic, it is reasonable to provide replacement in pregnancy and write to the GP to arrange follow up and investigation.

Otherwise, referral should be made to the relevant speciality based on history, symptoms, and examination.

10.0 References

1. Antenatal care - NICE guideline [NG201] Published: 19 August 2021

2. Blood Transfusion in Obstetrics Green-top Guideline No. 47 May 2015

3. British National Formulary (BNF), December 2022

4. Electronic Medicines Compendium (EMC) Summary of Product Characteristics; Ferinject. https://www.medicines.org.uk/emc/product/5910/smpc#gref (accessed January 2023)

5. Ferinject - Package leaflet: Information for the patient Ferinject 50 mg iron/mL solution for injection/infusion

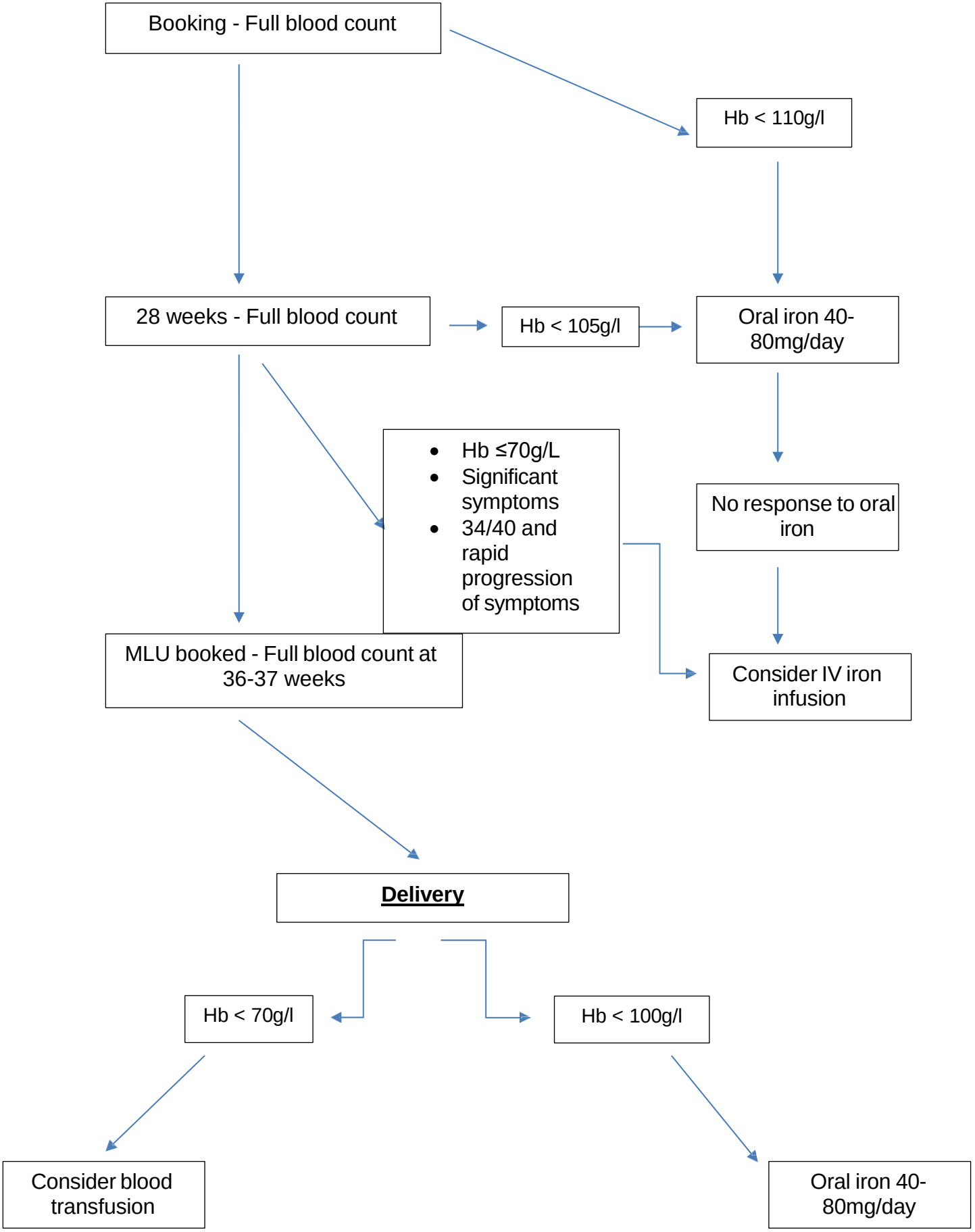
6. Moss PA an Hoffbrand AV (2015) Essential Haematology, Seventh Edition Wiley Blackwell London

7. Mukwende, M et al (2020) Mind the gap – a handbook of clinical signs in black and brown skin. St George's University of London, Institute of Medical and Biomedical Education

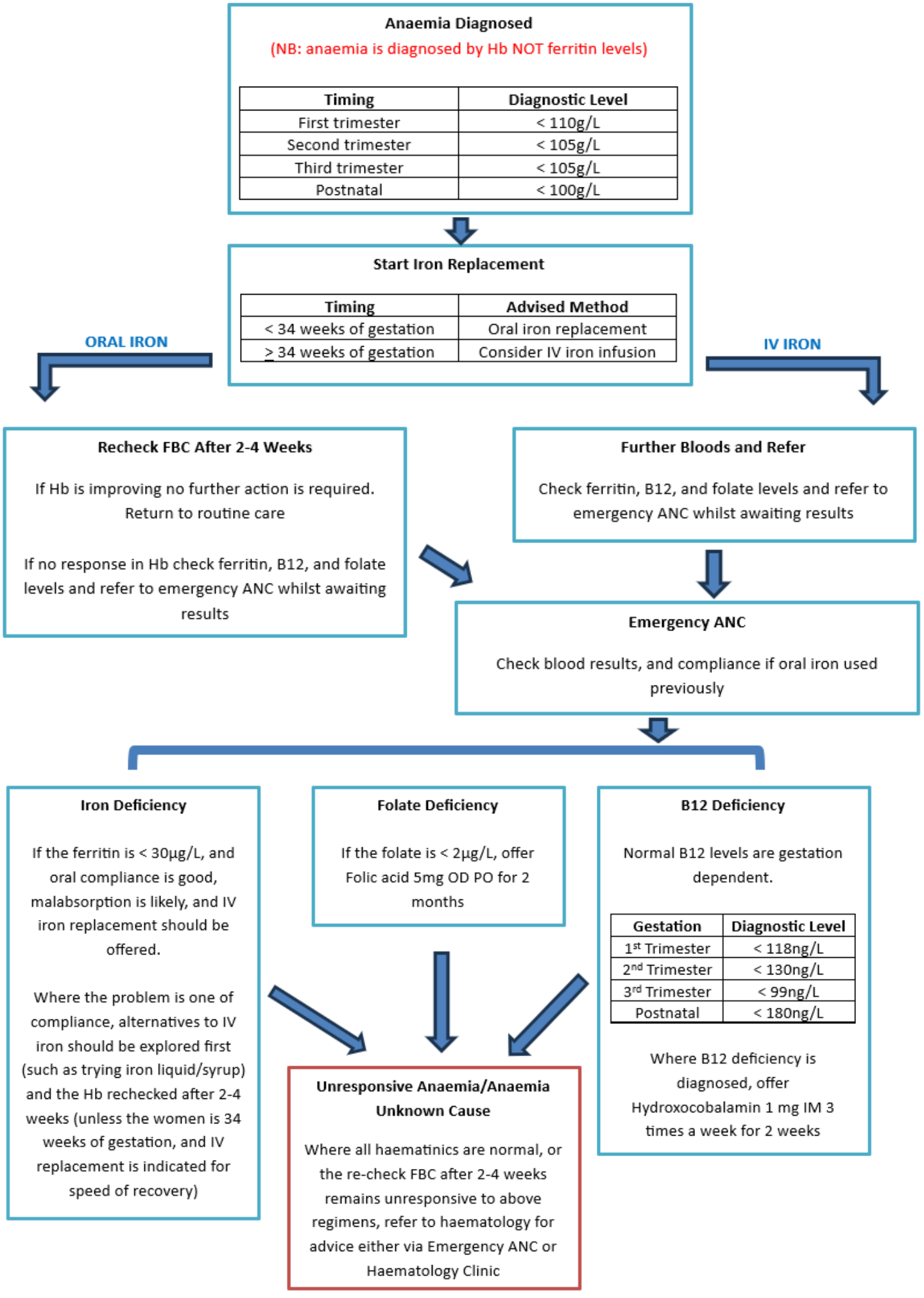
8. Pavord S, Daru J, Prasannan N, Robinson S, Stanworth S, Girling J; BSH Committee. UK guidelines on the management of iron deficiency in pregnancy. Br J Haematol. 2020 Mar;188(6):819-830. doi: 10.1111/bjh.16221. Epub 2019 Oct 2. PMID: 31578718. https://onlinelibrary.wiley.com/doi/10.1111/bjh.16221 (accessed January 2023)

9. Perinatology.com 2025. Normal Reference Ranges and Laboratory Values in Pregnancy. Online, available at: Normal Reference Ranges and Laboratory Values In Pregnancy

Process summary flow chart



Appendix 1 Management flow chart



Clinically Checked By		

The Shrewsbury and Telford Hospital NHS Trust

FERINJECT® INTRAVENOUS INFUSION PRESCRIPTION AND ADMINISTRATION

Patient Name	Cons
Address	Ward
Unit Number	D.O.B

Patient's Weight (kg): _____kg
(In pregnant patients use booking weight)

Patient's Current Hb (g/L): _____ g/L

Indication	**Chronic anaemia unresponsive to oral iron**

RECORD

This form is used for prescribing parenteral iron doses in iron deficiency anaemia in adults. It is not designed for use in haemodialysis patients and in paediatrics (<14 years).

	Date treatment to start:
Does the patient have any known allergy? **YES / NO (circle)**	**State allergy if known:**

Ferinject® Dosing

Non-renal patients greater than 14 years of age

For patients with a Hb value ≥140 g/L, an initial dose of 500 mg iron should be given and iron parameters should be checked prior to repeat dosing.

The cumulative dose for repletion of iron using Ferinject is determined based on the patient's body weight and haemoglobin (Hb) level and must not be exceeded. The following table should be used to determine the **cumulative** iron dose:

Hb (g/L)	Body weight 35kg to <70kg	Body weight ≥70kg
<100	1500mg	2000mg
≥100	1000mg	1500mg

- A **single** dose of Ferinject should **not** exceed **1000mg** of iron per day and should not be administered more than **once per week**
- A **maximum single dose** of 20mg/Kg can be administered by intravenous drip
- A cumulative iron dose of 500 mg should not be exceeded for patients with a body weight <35 kg
- **Cumulative doses** greater than 1000mg must be split and **given one week apart** (e.g. - for a 1500mg cumulative dose - 1000mg should be given on Day1 and 500mg on Day 8)
- For overweight patients, ideal body weight should be used when determining the iron requirement.

Cumulative total dose required: (from the Table above)	..... mg	**Maximum single dose/week:** (max 20mg/kg or 1000mg, whichever is lower)	..... mg

CKD/PD renal patients

Ferinject® dosing in CKD/PD patients is based on a **SINGLE dose** of 1000mg (or 20mg/kg, whichever is lower).

Ferinject® dose: 1000mg (or 20mg/kg, whichever is lower) as a single maximum dose

Administration

Day	Date	Drug	Prescribed Dose	Diluent	Duration	Admin by	Checked by	Time	Pharm Dis	Pharm Chk	Pharm Date
1		**Ferric Carboxymaltose (Ferinject®)**		Sodium Chloride 0.9% 250ml*	Minimum 15 Minutes						
8		**Ferric Carboxymaltose (Ferinject®)**		Sodium Chloride 0.9% 250ml*	Minimum 15 Minutes						

***NB.** ● doses ≥**200 to <500mg** must be given in **100ml Sodium Chloride 0.9%** (over at least 6 minutes);
● doses **100-200mg** must be given in **50ml Sodium Chloride 0.9%**.

Patients must be observed for adverse effects for a minimum of 30 minutes after the end of each infusion.

Prescriber's Signature …… Date: ……..……

Prescription Form: Ferinject

Created on: 20/09/2014 **Created by:** Matt Brown

Version number: 4

Revised: 01/10/2015 **Revised By:** Marko Puzovic

Purpose of revision: Amendment of dosing following changes to SPC & amendment of Hb values

Document checked by (Pharmacist): Susan Watkins Document Authorised for use by (Consultant): Dr S McKew

Original document master signed by document creator, checking pharmacist and authorising consultant and is located in Pharmacy (RSH).

The Shrewsbury and Telford Hospital NHS Trust

Standard Operating Procedure (SOP)

SOP Title	Iron Infusion		
SOP Number	022		
Care Group	Women and Children's		
Version Number	4		
Effective Date	21st August 2023	Review Date	August 2026
Author	Marc Wilkinson		
Approved by	Maternity Governance		
Approval date	June 2023		
Distribution	All Maternity Areas		
Location	Maternity Services		

Document Control				
Version	Date	Author	Status	Comments
1	16th December 2014	Claire Murgatroyd	NEW	Approved at MGG.
1.1	11th June 2015	Claire Murgatroyd	Revision	Amendment to name - "Infusion" not "Transfusion"
2.0	2nd November 2016	Claire Murgatroyd	Review	Full version revision to department for location of infusion
2.1	25th February 2019	Guideline Midwives	Revision	Section 8: Removal of the requirement for a CTG following an iron infusion
2.2	28th June 2019	Guideline Midwife	Revision	Section 8: Removal of the requirement for a CTG on admission when the woman reports normal fetal movements and no other risk factors present.
3.0	24th January 2022	Interim Outpatient Manager	Full review	Full version review. Approved MGG and Maternity Governance
4	21st August 2023	Marc Wilkinson	Full review	

SOP Objectives	• To ensure that health care professionals administering iron infusions in maternity are aware of the process to ensure safety of the women receiving them. • Improve communication between staff to staff and staff to women
Scope	Staff who book women for iron infusion and staff who administer iron infusions
Performance Measures	"Compliance with this SOP will be audited as part of the Shrewsbury and Telford Hospital NHS Trust's five-year rolling programme of NICE and local guideline audits, unless circumstances require an earlier or more frequent audit. The audit will be carried out using the auditable standards and the results will be reported and acted on in accordance with the Trust Clinical Audit Policy (CG25)".

	Brief	Responsibility
	"In this SOP we use the terms 'woman' or 'mother' throughout. These should be taken to include people who do not identify as women but are pregnant or have given birth".	
1.0	**Preparation** **Appt in emergency ANC; entry 1.2; clinic contact DAU for appt (DAU enter appt on Badger); prescription completed in clinic and emailed to pharmacy (original copy forwarded to DAU); DAU will liaise with pharmacy to arrange collection (DAU can contact woman with appt, and email prescription to pharmacy if necessary, i.e. woman left/not present in clinic).** 1.1 Iron infusions can be arranged via the antenatal clinic and antenatal day assessment (DAU) and an appointment will be made. 1.2 Ensure no history of previous adverse reactions to iron preparations. Autoimmune or inflammatory conditions e.g. eczema, asthma and other allergies make allergic reactions to intravenous iron preparations more likely. 1.3 Iron infusion should not be given in the 1st Trimester and only in the 2nd and 3rd trimester if the benefit outweighs the risks).	
2.0	**Patient Information** 2.1 The woman needs a full explanation of the procedure, side effects, possible risk of reaction, including reassurance of an immediate response in the event of any reaction (BNF 2013). 2.2 The woman will be given an Iron Infusion patient information leaflet when attending antenatal clinic. This can be downloaded from the Patient Information Leaflets for Maternity or in Supporting Documents and Forms both on the intranet (can be found under Women's Services and Maternity).	
3.0	**Ordering** 3.1 The iron infusion prescription and administration form must be fully filled in, including the woman's weight. The original form will be emialed to pharmacy at least 48 hours prior to appointment. 3.2 The prescription is based FBC and Ferritin, taken within 2 weeks of the infusion. 3.3 The forms are available from the trust intranet at the following link http://intranet/pharmacy/ferinject_prescription_information.asp **Click on Ferinject-Prescription and Administration Record Form or see appendix**	

<table>
<tr><th></th><th>Brief</th><th>Responsibility</th></tr>
<tr><td></td><td>Or access via trust Intranet
• Clinical Services and Department □ Pharmacy □ Pharmacy Iron Prescriptions Information (select as above)</td><td></td></tr>
<tr><td>4.0</td><td>Calculating the dose

4.1 The appropriate dose is calculated using the desired Hb or ferritin level and the woman's body weight at booking (table 1).

4.2 Ferinject may be administered by intravenous infusion up to a maximum single dose of 1,000 mg of iron (up to a maximum of 20 mg/kg body weight).

4.3 The cumulative dose for repletion of iron using Ferinject is determined based on the patient's body weight and haemoglobin (Hb) level and must not be exceeded. The following table (Table 1) should be used to determine the cumulative iron dose.

<table>
<tr><th>Hb (g/L)</th><th>Women with body weight
35 kg to <70 kg</th><th>Women with body weight
≥70 kg</th></tr>
<tr><td><100</td><td>1500mg</td><td>2000mg</td></tr>
<tr><td>≥100</td><td>1000mg</td><td>1500mg</td></tr>
</table>
Table 1 The cumulative iron dose</td><td></td></tr>
<tr><td>5.0</td><td>Administration

5.1 Do not administer 20 mL (1,000mg of iron) as an injection or infusion more than once a week.
• Most pregnant women will require a greater dose than this and will be given an appointment for a further infusion a week later.
• Note maximum 20ml/kg (i.e. if <50kg weight needs lower dose).</td><td></td></tr>
<tr><td>6.0</td><td>Attendance at Day Assessment Unit PRH

6.1 On admission to the DAU, a full set of observations will be taken including temperature, pulse, respirations and blood pressure, abdominal palpation and auscultation of fetal heart.

6.2 Pharmacy will confirm what time the preparation is available.

6.3 The infusion will be given over 30 minutes.

6.4 Observations will be taken and recorded before the onset of the infusion, 15 minutes after commencement and once the infusion is completed and recorded on a MEWS chart.

6.5 If the woman shows any sign of reaction the infusion will be discontinued immediately, and a doctor urgently called to initiate appropriate management. Document accordingly. Refer to Maternity Anaphylaxis guideline.

6.6 Observation for adverse reactions and potential anaphylaxis (i.e., sudden onset and rapid progression of symptoms/ life-threatening</td><td></td></tr>
</table>

	Brief	Responsibility
	Airway and/or **B**reathing and/or **C**irculation problems/ Skin and/or mucosal changes i.e. flushing, urticaria, angioedema 6.7 Infusion site should be checked regularly due to possibility of phlebitis and venous spasm. 6.8 The woman will be discharged **no sooner than 30 minutes** following completion of the infusion.	
7.0	**Follow up** 7.1 Most pregnant women will require two infusions and will be given an appointment for a further infusion a week later. 7.2 Women will be given a form for a Full Blood Count and Ferritin level check for 2- weeks following the iron infusions (dependent on gestation, if term). 7.3 An antenatal clinic appointment may be required if response to iron infusion has not increased haemoglobin and/or ferritin.	
8.0	**Patient Safety** 8.1 The safety of IV iron products are monitored closely in the UK and Europe. Suspected adverse reactions will be reported via the yellow card system at www.mhra.gov.uk/yellowcard. (Local Policy 2013)	