Guideline for the Management of Iron Deficiency Anaemia in Pregnancy and the Postnatal Period

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1.0 Introduction

The guideline uses the terms 'woman' or 'mother' throughout. These should be taken to include people who do not identify as women but who are pregnant.

Iron Deficiency Anaemia is the most common haematological problem in pregnancy, occurring in 33% of all pregnancies. Out of the identified cases of anaemia 90% are due to iron deficiency in pregnancy.

Pregnancy causes a 2-3-fold increase in the requirement for iron, and a 10-20-fold increase in folate requirement.

Iron deficiency anaemia can contribute to maternal and neonatal morbidity and mortality and is associated with:

- Maternal susceptibility to infections
- Physical weakness
- Preterm labour
- Placental abruption
- Postpartum haemorrhage
- Postnatal depression
- Low birth weight babies
- Neonatal iron deficiency anaemia in the first three months of life.

2.0 Objective

- To provide guidance for all staff caring for women with iron deficiency anaemia. Ensuring timely diagnosis and effective management of iron deficiency in pregnancy and the postnatal period and to outline the management of women with iron deficiency anaemia in labour.

3.0 Scope

This guideline applies to all providing care for iron deficient and anaemic pregnant women.

4.0 Main body of the document

4.1 Clinical Signs and Symptoms

Maternal signs and symptoms of anaemia:

- Tiredness
- Weakness
- Pallor
- Headaches
- Poor concentration
- Irritability
- Palpitations
- Tachycardia
- Dizziness
- Dyspnoea
- Hair loss

4.2 Laboratory tests

Full blood count (FBC) will show a low haemoglobin (Hb), low mean cell volume (MCV), low mean cell haemoglobin (MCH) and low mean cell haemoglobin concentration (MCHC).

NB. In some cases the MCV and MCHC will be low but the Hb may be normal.

In pregnancy, anaemia is diagnosed with the following haemoglobin levels:

- < 110g/l up to 12 weeks
- <105g/l from 12 weeks to delivery
- <100g/l in the postpartum period (6 weeks from delivery)

Anaemia can be diagnosed by an MCV, <80fl at any stage of pregnancy.

Blood film may show microcytic, hypochromic red cells. However, microcytic, hypochromic indices may also occur in Haemoglobinopathies.

Serum ferritin reflects iron stores and is one of the key indicators of iron deficiency in pregnancy. Serum ferritin levels are also affected by inflammatory changes.

In pregnancy iron deficiency is diagnosed if the serum ferritin level is <30µg/l.

4.3 Diagnosis

Diagnosis of iron deficiency anaemia is made when:

- Laboratory tests indicate iron deficiency anaemia
- Other causes of anaemia have been ruled out
- Serum ferritin level is <30µg/l ; a level of <30µg/l indicates iron depletion
- The woman has a positive result from a trial of oral iron therapy i.e. there is a rise in the woman's Hb level after 2-3 weeks of oral iron therapy

4.4 Management in the Antenatal period

Women are routinely screened for anaemia at booking, 28 and 36 weeks gestation.

Women are to receive verbal and written advice regarding diet in pregnancy, including information on iron rich foods and factors that can promote or inhibit iron absorption.

Women with known haemoglobinopathy are to have serum ferritin checked and be commenced on iron supplements if their ferritin level is <30µ/l.

Women with unknown haemoglobinopathy status and with evidence of iron deficiency anaemia following an FBC are to commence oral iron whilst screening is carried out.

Women with a normal Hb but a low MCV are to have their ferritin checked.

Women with a serum ferritin <30µ/l are to commence oral iron.

In all cases treatment is to continue for a further 3 months after the Hb has recovered to within the normal ranges, a repeat test is to be arranged to ensure the Hb remains within the normal range.

4.4.1 Booking or up to 12 week's gestation

For the management of anaemia found at booking or up to 12 weeks please see appendix two.

Women are to be given advice on how to take oral iron supplements correctly. Ideally Iron supplements are to be taken on an empty stomach, 1 hour before meals with a source of vitamin C (e.g. orange juice) to maximise absorption. Other medications or antacids are not be taken at the same time. However gastrointestinal toxicity (nausea and epigastric discomfort, constipation, diarrhoea) affects 35-59% of women and can lead to non-compliance with treatment. Therefore, in order to increase compliance with treatment, women are advised to take oral iron with food if they experience these symptoms.

4.4.2 12 weeks to 36 weeks gestation

For the management of anaemia between 12 and 36 weeks please see appendix two.

4.4.3 36 weeks gestation

For the management of anaemia after 36 weeks please see appendix two.

4.5 Management of Labour and Delivery

Effective management of iron deficiency anaemia in the antenatal period reduces the incidence of anaemia at the time of delivery.

Women with iron deficiency anaemia at the time of delivery (haemoglobin level <95g/l) will be advised to deliver in the maternity unit

- On admission Intra-venous (IV) access is required and blood must be sent for Group and screen
- Active management of third stage is recommended
- Prompt active management of a Postpartum Haemorrhage (PPH) is recommended
- Consider the use of prophylactic Syntocinon infusion post delivery
- Early discharge is not recommended

4.6 Management in the postnatal period

Women who are on iron supplementation at delivery will require oral iron supplementation for at least 6 weeks postnatal.

Routine FBC on postnatal women is not recommended. However, the FBC is to be checked within 48hrs of delivery in the following cases:

- Women with known iron deficiency anaemia at the time of delivery i.e. a Haemoglobin level of < 95g/l
- PPH >500mls
- Women with signs and symptoms of anaemia

Clinical assessment is to be used in conjunction with Hb estimation to decide the best method of iron replacement. There is little evidence to support the use of blood transfusion in fit, healthy women who are asymptomatic.

Women who are symptomatic of anaemia, haemodynamically unstable or continuing to bleed heavily will require review by a senior obstetrician to develop an appropriate management plan.

See appendix four for postnatal management of anaemia.

If a blood transfusion is offered and accepted by the woman use minimum volumes necessary to reverse the anaemia and review after one unit.

Repeat the FBC following transfusion according to individual clinical picture. Decision may be made in conjunction with the anaesthetist.

Commence oral iron (200mgs of elemental iron daily in two divided doses – see appendix two) for three months.

The FBC is to be checked at 3 weeks by the GP.

NB – women can decline a blood transfusion – please refer to the Trust guideline for the clinical management of Jehovah's Witness patients and others who refuse Blood Transfusions:
https://portal.bdghtr.trent.nhs.uk/SiteDirectory/TrustApprovedDocuments/TAD/Jehovahs%20Witness%20patients%20and%20others%20who%20refuse%20blood%20transfusions%20v2

4.7 Ferinject

Please see appendix one for the Ferinject Prescription and administration record and appendix four for the iron infusion leaflet.

Studies have found that pregnant women receiving IV iron, compared with oral iron, achieved the target Hb more often, had an increased HV after 4 weeks and had fewer side effects (Govindappagari & Burwick, 2018; Govindappagari & Burwick, 2019; Qassim et al, 2018).

4.7.1 Indications:

Ferinject is indicated for the treatment of iron deficiency in women with a serum ferritin of <30ug/l when:

- Absolute non-compliance with, or intolerance of, oral iron therapy
- Known malabsorption condition
- When a rapid Hb response is required e.g. late pregnancy >34/40 weeks if Hb <100g/l and iron deficient
- Postnatal in a stable patient to avoid blood transfusion

4.7.2 Contraindications:

- History of anaphylaxis or serious reactions to parenteral iron therapy
- First trimester of pregnancy (possibly teratogenicity)
- Active acute or chronic bacteraemia
- Chronic liver disease

4.7.3 Side effects

Up to 25% patients develop side effects with intravenous iron.

Ferinject® may cause anaphylactoid reactions, which can be immediate, severe and potentially life-threatening. Resuscitative medication and trained personnel are to be available whenever Ferinject® is administered. The risk of anaphylaxis is enhanced for patients with known (medical) allergies.

Fetal bradycardia may occur following administration of Ferinject®. This bradycardia is usually transient and as a consequence of a hypersensitivity reaction in the mother. Fetal monitoring is to be carried out in any patients who experience a hypersensitivity reaction. CTG if ≥28 weeks fetal auscultation if <28 weeks.

There is a risk of extravasation that can result in long-term brown discolouration of the surrounding skin.

Patients are to be observed carefully during and for at least 30 minutes after administration of Ferinject® (Johnston 2021).

4.7.4 Consent

All patients are to receive information about the risk of Ferinject®, verbal consent is to be obtained and documented in the patient records. The patient leaflet within the medicine box is to be given to the patient a digital copy can be found here.

4.7.4 Total Dose Infusion

- Ferinject® will be administered during a planned daytime admission as an outpatient, to a locally agreed area, from Monday to Friday only. As an inpatient this can be administered at any time.
- Administration can only be undertaken in a clinical area where emergency equipment is available as there is a risk of anaphylaxis and be controlled via an infusion pump.
- Please contact pharmacy to check total dose if required.
- If, at any time, during the IV administration of Ferinject®, any signs of a hypersensitivity reaction, intolerance or extravasation are detected, administration must be stopped **immediately**.
- The cumulative dose for repletion of iron using Ferinject® is based on the patient's body weight and haemoglobin (Hb) level and must NOT be exceeded. (Johnston 2021)

4.7.5 Maximum tolerated single dose

A single dose of Ferinject is not to exceed 1,000 mg of iron per day.

Do NOT administer 1,000 mg of iron more than once a week.

If the total dose is >1000 mg of iron, then the total dose is to be divided and administered each week over a total of two weeks. (Johnston 2021)

4.7.6 Post-iron repletion assessments

Re-assessment is to be performed by the clinician based on the individual patient's condition. The Hb level is to be re-assessed no earlier than 4 weeks following completion of the first treatment cycle to allow adequate time for erythropoiesis and iron utilisation.

Oral iron is to be stopped at least 24 hours before infusion of Ferinject® and it is not be started for at least 5 days following the last infusion of Ferinject®. (Johnston 2021)

4.7.7 Postnatal use of Ferinject

Use of IV iron postnatally is to be considered in women who are previously intolerant of, or do not respond to, oral iron and/or where the severity of symptoms of anaemia requires prompt management (2B) (Pavord et al., 2019).

IV iron can be used in a stable postpartum patient if she is not actively bleeding or requiring immediate increase in Hb.

Expect a 30g/l increase in Hb in 14 days.

4.7.8 Breastfeeding after Ferinject

A study of 65 patients who received therapeutic dose IV iron isomaltoside, showed a transient increase in iron in breast milk, 3 days after treatment, compared with oral iron. However, the mean iron concentration remained within the normal range and the difference disappeared one week after treatment (Holm *et al*, 2017a).

5.0 Roles and responsibilities

5.1 Midwives

To provide the best evidence-based care for women with anaemia in accordance with appropriate guidance.

5.2 Obstetricians

To provide care for women with anaemia in accordance with appropriate guidance

6.0 Associated documents and references

British Committee for Standards in Haematology (BCSH) (2011) UK guidelines on the management of iron deficiency in pregnancy. https://b-s-h.org.uk/media/2891/uk_guidelines_iron_deficiency_in_pregnancy.pdf

British Journal of Haematology. UK guidelines on the management of iron deficiency in pregnancy. Volume 156, Issue 5 pages 588-600 (March 2012) [online] https://onlinelibrary.wiley.com/doi/full/10.1111/j.1365-2141.2011.09012.x

Royal college of Obstetricians and Gynaecology (RCOG). Blood Transfusion in Obstetrics. Green-top Guideline No. 47. May 2015. https://www.rcog.org.uk/globalassets/documents/guidelines/gtg-47.pdf

World Health organisation (WHO) Global nutritional targets 2025: Anaemia policy brief (2014) [online] www.who.int/nutrition

World Health Organisation (WHO 2012) Guideline: Daily iron and folic acid supplementation in pregnant women. https://apps.who.int/iris/bitstream/handle/10665/77770/9789241501996_eng.pdf

UK Blood Transfusion Services (UK BTS) (2011) Anaemia: Essential guidance

Govindappagari, S. & Burwick, R.M. (2018) Treatment of iron deficiency anemia in pregnancy with intravenous versus oral iron: a meta-analysis of RCTs [10OP]. *Obstetrics & Gynecology*, **131**, 3S– 4S.

Govindappagari, S. & Burwick, R.M. (2019) Treatment of iron deficiency anemia in pregnancy with intravenous versus oral iron: systematic review and meta-analysis. *American Journal of Perinatology*, **36**, 366– 376.

Qassim, A., Mol, B.W., Grivell, R.M. & Grzeskowiak, L.E. (2018) Safety and efficacy of intravenous iron polymaltose, iron sucrose and ferric carboxymaltose in pregnancy: a systematic review. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, **58**, 22– 39.

Pavord et al., (2019). UK guidelines on the management of iron deficiency in pregnancy. British Journal of Haematology. **https://doi.org/10.1111/bjh.16221**

Johnston F (2021). Ferinject® infusion (Ferric carboxymaltose) Obstetrics. [CG] Ferinject® infusion (Ferric carboxymaltose) Obstetrics (nhsggc.org.uk)

7.0 Training and resources

Training will be delivered as outlined in the Maternity Training Needs Analysis. This is updated on an annual basis.

8.0 Monitoring and audit

Any adverse incidents relating to the management of iron deficiency anaemia will be monitored via the incident reporting system. Any problems will be actioned via the case review and root cause analysis action plans. The action plans are monitored by the risk midwife to ensure that improvements in care are made. The trends and any root cause analysis are discussed at the monthly risk meetings to ensure that appropriate action has been taken to maintain safety.

The guideline for the management of iron deficiency anaemia in pregnancy and the postnatal period will be audited in line with the annual audit programme, as agreed by the CBU.

The audit action plan will be reviewed at the monthly risk management meetings on a quarterly basis and monitored by the risk midwife to ensure that improvements in care are made.

9.0 Equality and Diversity

This section is mandatory for all Trust Approved Documents and must include the statement below:

The Trust is committed to an environment that promotes equality and embraces diversity in its performance as an employer and service provider. It will adhere to legal and performance requirements and will mainstream equality, diversity and inclusion principles through its policies, procedures and processes. This guideline should be implemented with due regard to this commitment.

To ensure that the implementation of this guideline does not have an adverse impact in response to the requirements of the Equality Act 2010 this policy has been screened for relevance during the policy development process and a full equality impact assessment is conducted where necessary prior to consultation. The Trust will take remedial action when necessary to address any unexpected or unwarranted disparities and monitor practice to ensure that this policy is fairly implemented.

This guideline can be made available in alternative formats on request including large print, Braille, moon, audio, and different languages. To arrange this please refer to the Trust translation and interpretation policy in the first instance.

The Trust will endeavor to make reasonable adjustments to accommodate any employee/patient with particular equality, diversity and inclusion requirements in implementing this guideline. This may include accessibility of meeting/appointment venues, providing translation, arranging an interpreter to attend appointments/meetings, extending policy timeframes to enable translation to be undertaken, or assistance with formulating any written statements.

9.1 Recording and Monitoring of Equality & Diversity

This section is mandatory for all Trust Approved Documents and must include the statement below:

The Trust understands the business case for equality, diversity and inclusion and will make sure that this is translated into practice. Accordingly, all guidelines will be monitored to ensure their effectiveness.

Monitoring information will be collated, analysed and published on an annual basis as part of Equality Delivery System. The monitoring will cover the nine protected characteristics and will meet statutory employment duties under the Equality Act 2010. Where adverse impact is identified through the monitoring process the Trust will investigate and take corrective action to mitigate and prevent any negative impact.

Appendix 1

Peripartum IV Anaemia Treatment

Ferinject Prescription and Administration Record

Barnsley Hospital NHS Foundation Trust

Consultant:	Ward:	Allergies/ Sensitivities: Signature: Date:	Booking Weight (Kg):

Affix PAS label or complete patient details below
Name:
Unit number:
Date of Birth:
NHS number:

Pre-Treatment Diagnosis			
Hb (g/L)		Folate	
MCV		Vitamin B12	
Ferritin		No known haemoglobinopathy	

Indication:

Pre-Infusion Checklist	Initial/Sign
Risks/benefits and alternatives explained	
Inform patient that no oral iron is to be taken until 5 days after the infusion.	
Other types of anaemia have been excluded e.g. folate deficiency, haemolytic anaemia	

Treatment Protocol

Booking Weight	Ferinject Dose	Volume of Ferinject Injection to be used	
35 – 49 Kg	**700mg**	14mL	All doses are to be added to 250mL sodium chloride 0.9% and infused, using an infusion pump, at a rate of 1000mLs/Hr (minimum infusion time 15 mins)
50 Kg and above	**1000mg**	20mL	

Prescription and Administration record:

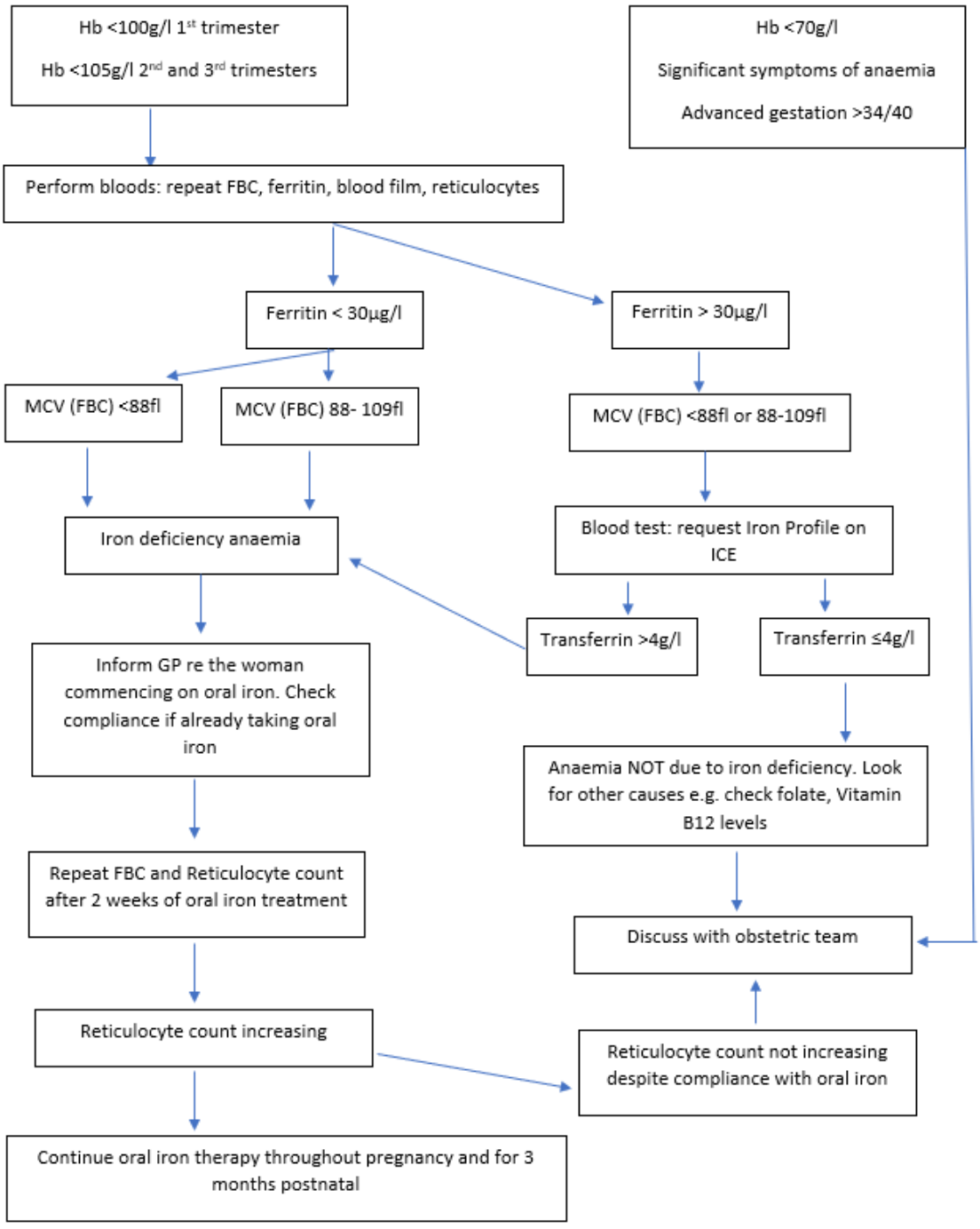
Date	Time	Drug	Dose	Infusion Fluid	Infusion Rate	Prescriber Signature and Bleep No.	Pharm.	Batch numbers	Administered by	Checked by
		Ferinject	**…….mg**	Sodium Chloride 0.9%, 250 mL	1000mLs/Hr		Ph. Check: D: AC:			

Infusion monitoring: A full set of MEOWS observations is performed before commencement of the infusion, at 5 minutes and after the infusion is completed

Date	Time		BP	Pulse Rate	Respiratory Rate	O_2 SATS	MEOWS score	Signature
		Pre-infusion						
		During infusion (at 5 mins)						
		Post-infusion						

Chart reviewed by:	Date	Reviewed by Consultants/Maternity Governance:	Date	Medicines Management Committee	
Gill Dunning, Practice Facilitator Midwife Gillian Turrell, Lead Pharmacist	August 2018			Date of approval	
				Date of next review	

Appendix 2 Antenatal management of anaemia



Appendix 3 Postnatal management of anaemia

PROUD to care

NHS
Barnsley Hospital
NHS Foundation Trust

Flow chart 4: Postnatal Management

Monitor vital signs, if symptomatic escalate for review appropriately and individual management plan

Ensure women are aware of risks and benefits of all forms of treatment to ensure fully informed decision

Hb 80-100g/L

If asymptomatic and haemodynamically stable

- Oral Iron therapy for 3 months
  100-200mgs daily
  - GP to check FBC 3 months post delivery

Hb 70-80g/L

- Consider total dose iron infusion and commence oral iron therapy 200mgs daily 5 days post infusion. Continue iron for 3 months
  - Repeat FBC 6 days post delivery
    - Check FBC 3 months post delivery

Hb <70g/L

- Review by senior obstetrician
  - Consider blood transfusion and/or iron infusion. Discuss the risks and benefits of blood transfusion versus iron supplementation with the woman

Postnatal FBC only required for women:

- Already on iron supplementation at delivery
- Women with known Iron deficiency (Hb <90g/L)
- PPH >500mls
- Women with signs and symptoms of anaemia

Appendix 4

Iron infusions leaflet approved by

Appendix 5

Glossary of terms

FBC – Full Blood Count

GP – General practitioner

Hb – Haemoglobin

MCH – Mean Cell Haemoglobin

MCHC – Mean Cell Haemoglobin Concentration

MCV – Mean Cell Volume

NICE – National Institute for Health and Care Excellence

PPH – Postpartum haemorrhage

Appendix 6
Maintain a record of the document history, reviews and key changes made (including versions and dates)

Version	Date	Comments	Author

Review Process Prior to Ratification:

Name of Group/Department/Committee	Date
Reviewed by Maternity Guideline Group	04.03.2021
Reviewed at Women's Business and Governance meeting	17/03/2023
Approved by CBU 3 Overarching Governance Meeting	22/03/2023
Approved at Trust Clinical Guidelines Group	N/A
Approved at Medicines Management Committee (if document relates to medicines)	N/A

Trust Approved Documents (policies, clinical guidelines and procedures)

Approval Form

Please complete the following information and attach to your document when submitting a policy, clinical guideline or procedure for approval.

Document type (policy, clinical guideline or procedure)	Guideline
Document title	Guideline for the Management of Iron Deficiency Anaemia in Pregnancy and the Postnatal Period
Document author (Job title and team)	Consultant haematologist, Consultant obstetrician, Practice Educator Midwife, Obstetric Registrar, Maternity Voices Partnership (MVP)
New or reviewed document	Reviewed. Replaces; Peripartum IV anaemia treatment (Iron deficiency and anaemia)
List staff groups/departments consulted with during document development	Consultant haematologist, Consultant obstetrician, Practice Educator Midwife, Obstetric Registrar
Approval recommended by (meeting and dates):	**WB&G 17/03/2023** **CBU3 Governance 22/03/2023**
Date of next review (maximum 3 years)	23/03/2026
Key words for search criteria on intranet (max 10 words)	Ferinject Low Hb Ferrous sulphate
Key messages for staff (consider changes from previous versions and any impact on patient safety)	
I confirm that this is the <u>FINAL</u> version of this document	**Name: Jade Carritt** **Designation: Governance Midwife**

FOR COMPLETION BY THE CLINICAL GOVERNANCE TEAM

Approved by (group/committee): CBU3 Governance
Date approved: 22/03/2023
Date Clinical Governance Administrator informed of approval: 23/03/2023
Date uploaded to Trust Approved Documents page: 28/03/2023