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Anaemia in Pregnancy:
Management in the Antenatal and Postnatal Period

Introduction and Aim

According to the NICE classification, local audit data in 2015 indicated that nearly 10% of women are anaemic when giving birth in Cardiff. Since implementing the COVID anaemia pathway in 2020, this figure has fallen to 7% of women.

This guideline details the C&V maternity strategy to detect and treat iron deficiency during the antenatal period to prevent the development of iron deficiency anaemia (IDA during pregnancy.

We describe the use of oral iron to combat iron deficiency, the introduction of Ferritin levels in routine antenatal bloodwork and detail the use of IV iron where oral iron therapy has failed or is unsuitable.

Executive Summary

All women commenced on oral iron should be provided with information on the best way of taking oral iron and dietary advice on iron rich foods in pregnancy, which can be found in Section 6.

Criteria for referral to consultant led antenatal clinic are relatively unchanged. This guideline includes the indications for IV iron therapy, and the protocols for the administration of IV Iron therapy.

There is also guidance on the definition and management of postnatal anaemia.

Objectives

- Guidance on the appropriate frequency of tests to screen for anaemia.
- Advice on the management of anaemia identified in the antenatal and postnatal period.

This guideline replaces previous guidelines:
– *Administration of CosmoFer to Pregnant Women 2007 (Update 2019/Version 5)*
– *Guidance on administering Iron for anaemia in pregnancy and postnatal and for testing Ferritin levels 2014*
– Full Blood Count Screening 2010
And the following sub-sections
– *Routine antenatal investigations (Antenatal Care Guideline 2018)*
– *Low Hb or Ferritin results (Antenatal Screening Guideline 2018)*

Scope

This procedure applies to all our staff in all locations including those with honorary contracts.

Equality Health Impact Assessment	An Equality Health Impact Assessment (EHIA) has/has not been completed. (please delete as necessary) Where it has not been completed indicate why e.g. 'This is because a procedure has been written to support the implementation the ……. Policy. The Equality Impact Assessment completed for the policy found here to be a negative/positive/no impact.
Documents to read alongside this Procedure	
Approved by	Maternity Professional Forum Quality and Safety Meeting, Maternity

Accountable Executive or Clinical Board Director	Title of post holder
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Disclaimer

If the review date of this document has passed, please ensure that the version you are using is the most up to date either by contacting the document author or the Governance Directorate.

Summary of reviews/amendments			
Version Number	Date of Review Approved	Date Published	Summary of Amendments

2	11.6.2020 Anaemia working group and Q&S	11.6.2020	Revised document Main amendments: Additions to consent information (rare risk of fetal bradycardia). Requirement for pre- infusion CTG Amendment to prescription chart, dilution changed from 500mls to 250ml, rate changed to 25mls/hr initially. Management of hypersensitivity reactions – new algorithm adapted from Newcastle Hospitals Trust
3.	June 2022	20 August 2022	Removal of amendments made for COVID 19 pandemic

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2 Introduction

Iron deficiency is the commonest cause of anaemia in pregnancy and is potentially a preventable condition. It is well recognised that iron stores decrease in pregnancy, due to the physiological changes of pregnancy and the needs of the growing foetus.

Un-supplemented ingestion of iron from the diet is insufficient to meet this increased demand therefore iron levels decrease significantly during this time. An iron deficient state causes iron deficiency anaemia (IDA) where there is impaired production of red blood cells leading to abnormally low levels of haemoglobin in the mother[1].

IDA has recognised adverse consequences for both mother and baby during pregnancy[1,2]. Common maternal symptoms are fatigue and breathlessness on exertion. The rates of IUGR and stillbirth are increased in anaemic mothers. IDA may also increase the risk of developing post-partum depression and difficulty with breast feeding.

There is also an increased maternal risk of post-partum haemorrhage and increased risk of the need for blood transfusion.

According to the NICE classification, local audit data in 2015 indicated that nearly 10% of women are anaemic when giving birth in Cardiff. Since implementing the COVID anaemia pathway in 2020, this figure has fallen to 7% of women.

Recent evidence has highlighted the role of Ferritin levels when investigating and treating IDA. Ferritin is a protein biomarker that may act as a surrogate for determining whole body iron stores therefore helping to identify women who would benefit from iron supplementation[1].

There is much work around pre-optimisation for surgery in non-pregnant adults where a target Hb of >130 has been shown to improve outcomes and reduce blood transfusion requirements[3], although there is also evidence that once the Hb levels increase over 130, adverse pregnancy outcomes may increase[4].

Oral iron at a minimum effective dose is preferable in the first instance to increment iron stores, given sufficient time to be effective and is preferred up to 28 weeks gestation. IV iron is preferable where there is limited time to increment iron stores, or where oral iron is either contraindicated or it is not tolerated by the patient, despite correct adherence to the appropriate dose and instructions for administration.

It is estimated the prevalence of anaemia (Hb **<**100g/L) may be as high as 20% in the postpartum period, with many women potentially undiagnosed[5]. In the postnatal period, iron deficiency anaemia is associated with emotional instability, depression and lower cognitive performance in the mother[6,7]. This may lead to reduced parent-child bonding and difficulty with breastfeeding[5]. Treating post-natal anaemia has proven benefits[8,9]. Therefore, targeted screening of women for anaemia in the postpartum period could identify those who may benefit from iron replacement.

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2.1 Definition of Anaemia

NICE Definition of Anaemia in Pregnancy[6]

- Hb ≤110g/L at booking until 28 weeks
- Hb ≤105g/L after 28 weeks

Indication of Iron insufficiency in Pregnancy[1]

- Ferritin ≤30mcg/L

Definition of Postnatal Anaemia[5]

- Hb <100g/L at 24 hours post delivery

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2.2 Abbreviations used within this guideline

Abbreviation	Definition
CAV UHB	Cardiff and Vale University Health Board
Hb	Haemoglobin
IDA	Iron Deficiency Anaemia
HSR	Hypersensitivity Reaction
IUGR	Intrauterine Growth Restriction
FBC	Full Blood Count
PET	Pre-eclampsia

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3 Antenatal Anaemia

3.1 Booking Bloods: screening for and managing anaemia

- All antenatal patients should have their FBC and ferritin taken at booking.
- The FBCs will be checked by the clinic midwife. Any woman with a booking Hb < 100 will have her result actioned by the clinic midwife. All other women will have their Hb recorded and actioned at 16 weeks by the community midwife, or clinic doctor if seen first.
- Iron should be provided as per the pathway.

Women should be provided with enough iron to last to 28 weeks, that will be 3 packets for women taking one tablet a day and 6 packets for women taking two tablets a
Women should also have an information leaflet explaining how to take iron and its potential side effects.

Please note, any women having booking blood tests (e.g. late booker) should have an FBC **and ferritin** performed.

Women who decline blood products should follow the specific guideline (LINK). Target hb is 130g/dl in these women.

Contraindications to oral iron: -
Known allergy to iron preparations
-Hemoglobinuria, hemosiderosis, haemochromatosis.
-Active peptic ulcer.
-Repeated blood transfusions.
- **Caution to oral iron: -**
Regional enteritis and ulcerative colitis

All women should be provided with the following: -

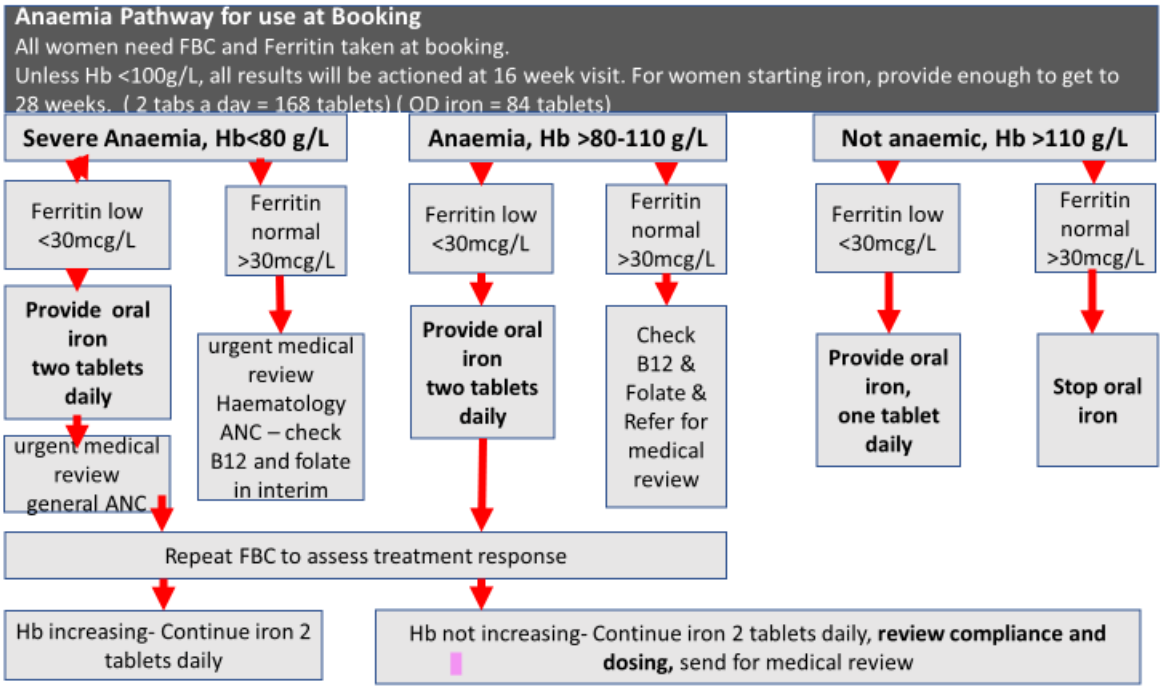
1) Anaemia in pregnancy leaflet and dietary advice (See appendix)
2) How to take iron tablets and common side effects (See appendix)

FOR ALL WOMEN ON IRON – REVIEW THE FOLLOWING AT ANTENATAL VISITS
1.COMPLIANCE
Number of tablets taken a day (for treatment of IDA, this should be 2 tabs a day)
For women who cannot take tablets; try alternative preparation: -Ferrous fumarate syrup 140mg PO BD.
Neither SPATONE nor FERROGLOBULIN are recommended for women with IDA

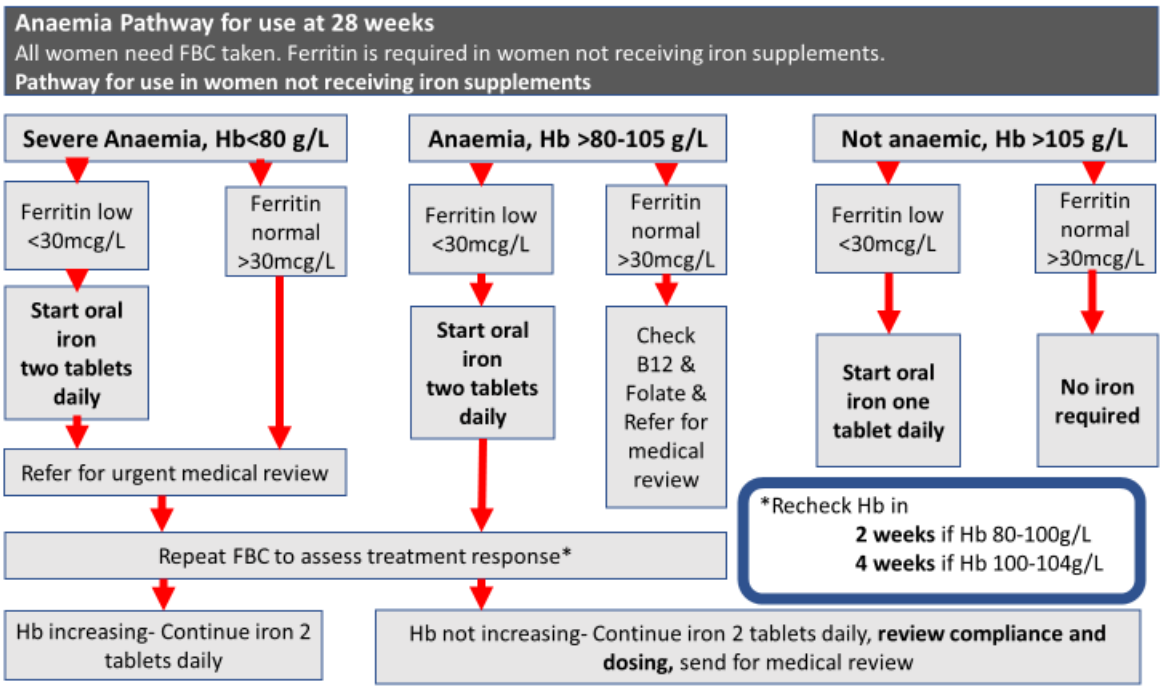
2.CONSTIPATION
Manage constipation by – reviewing how the tablets are being taken.
Taking correctly enables iron uptake in the stomach, rather than the large bowel, reducing the likelihood of constipation.
Dietary advice, brown pasta/ bread/ water
1st line: offer lactulose 15mls PO BD.
2nd line: offer laxido 1-3 sachets daily in divided doses. Maintenance 1-2 sachets daily.

3.2 Antenatal anaemia pathway

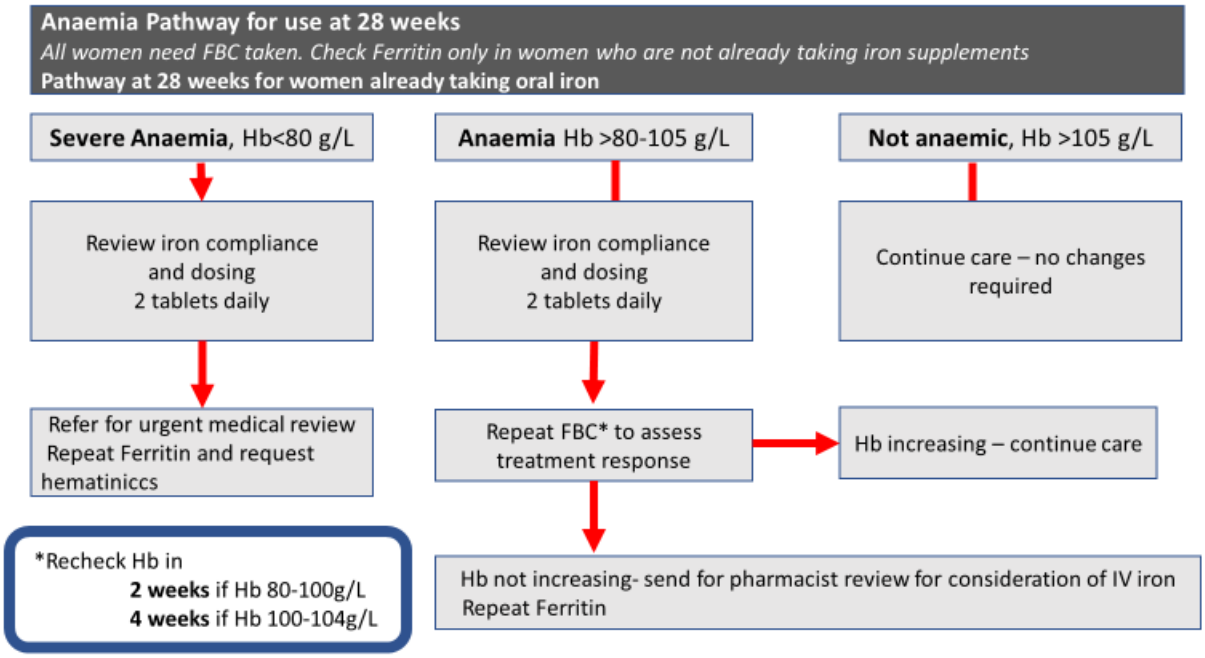
3.2.1 Antenatal anaemia pathway for use at booking for all women not on iron



3.2.2 Antenatal anaemia pathway for use at 28 weeks for all women not on iron



3.2.3 Antenatal anaemia pathway for use at 28 weeks for women already taking iron



***Oral Iron dosing regimen**
Once oral iron is commenced in pregnancy it should be continued until term. If already taking iron, there is no need to recheck ferritin. Ferritin <30µg/L without anaemia: **200mg ferrous sulphate or 210mg ferrous fumarate daily (one tablet).**
Ferritin <30µg/L with anaemia: **400mg ferrous sulphate or 420mg ferrous fumarate daily (2 tablets, once daily).**

****Criteria for referral to Obstetric Haematology antenatal clinic**
The following patients need medical review prior to starting iron therapy
1.Anaemia (Hb <110g/L) with any of the following:
Mean corpuscular volume (MCV) ≥105fL (In Interim, please take blood for B12 and folate)
Pancytopenia (WCC ≤4 x109/L or platelet count ≤140 x 109/L)
Ferritin >30 mcg/L (In Interim, please take blood for B12 and folate)
Iron overload disorder e.g. haemochromatosis
Other concerns meriting consultant review

The following patients need medical review in general ANC or pharmacist review, whilst continuing oral iron
Severe anaemia (Hb <80g/L) with ferritin <30mcg/L
Non-severe anaemia (Hb <100g/L) with ferritin <30mcg/L if Hb is not increasing on repeat FBC
Anaemia and low ferritin <30mcg/L with contraindication to oral iron, including:
Patient declines oral iron
Known allergy to iron preparations

***Timing of repeat FBC after starting oral iron for ferritin <30mcg/l should be determined by the Hb level

Hb (g/dl)	Time to repeat Hb from starting oral iron
<80	2 weeks
<110	4 weeks
>110	Routine (at 28 week or 32-week check)

FOR ALL WOMEN ON IRON – REVIEW THE FOLLOWING AT ANTENATAL VISITS

1.COMPLIANCE

Number of tablets taken a day (for treatment of IDA, this should be 2 tablets a day, both taken together)

For women who cannot take tablets; try alternative preparation: -Ferrous fumarate syrup 140mg PO BD.

Neither SPATONE nor FERROGLOBULIN are recommended for women with IDA

2.CONSTIPATION

Manage constipation by – reviewing how the tablets are being taken.

Taking correctly enables iron uptake in the stomach, rather than the large bowel, reducing the likelihood of constipation.

Dietary advice, brown pasta/ bread/ water…

1st line offer lactulose 15mls PO BD.

2nd line offer laxido 1-3 sachets daily in divided doses. Maintenance 1-2 sachets daily.

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4 Postnatal Anaemia

Ferritin is not recommended to assess iron stores postpartum as it is an acute phase reactant and may be acutely raised after childbirth, therefore no longer accurately reflecting iron stores.

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4.1 Definition of Postnatal Anaemia

Postnatal anaemia is defined as an Hb <100g/L at 24 hours after delivery[5].

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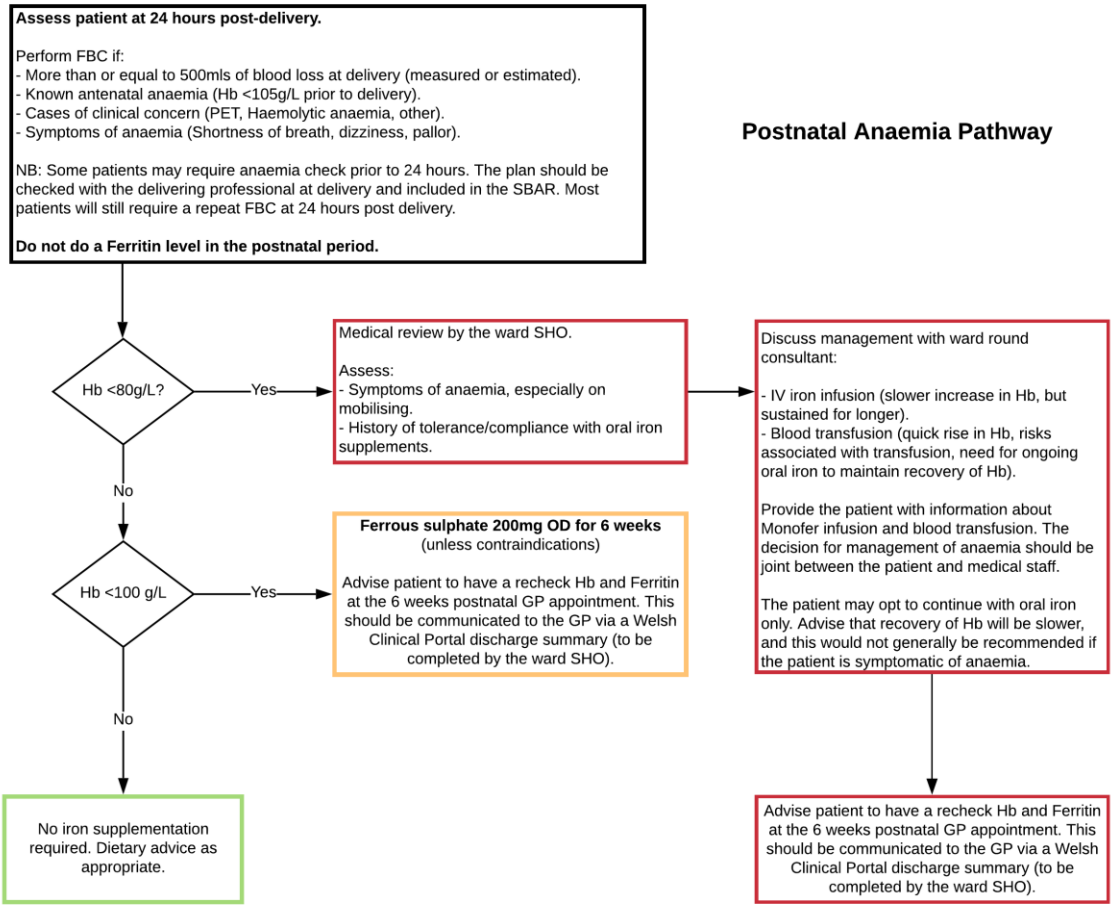
4.2 Postnatal Anaemia Pathway



Contraindications to oral iron: -

Known allergy to iron preparations
-Hemoglobinuria, hemosiderosis, haemochromatosis.
-Active peptic ulcer.
-Repeated blood transfusions.
- **Caution to oral iron: -**
Regional enteritis and ulcerative colitis

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5 Administration of Intravenous (IV) Iron – Iron Isomaltose (Monofer)

5.1 Background

IV iron is a fast and effective way of treating IDA. IV Iron is an alternative to oral iron therapy. It may achieve Hb targets faster than oral iron with no gastrointestinal side effects[1]. Some IV iron preparations have been associated with a risk of severe hypersensitivity reactions (1/100-1/1000), anaphylaxis (1/1000-1/10,000) and iron extravasation (1/10-1/100)[10]. Within CAVUHB, Monofer is the preferred IV iron solution. Its pharmacological properties show it to have an improved safety profile and, fully replenishing the iron stores. IV iron therapy has been shown to be safe for babies of breastfeeding mothers[1].

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5.2 Decision for IV Iron Therapy

The decision to implement IV iron therapy should be directed under the care of a consultant obstetrician or obstetric pharmacist.

5.2.1 Indications for IV Iron Therapy

- IDA
  - Antenatal: Ferritin <30 mcg/L with Hb < 110g/L before 28 weeks or <105g/L after 28 weeks' gestation with contraindication to or no improvement with PO iron therapy.
  - Postnatal: Hb < 100g/L at 24 hours post-delivery with contraindication to or no improvement with PO iron therapy, or Hb <80mcg/L at 24 hours post-delivery.
- Failure of PO iron therapy (Malabsorption syndromes, Poor compliance, Significant side-effects).
- Clinical scenarios when there is requirement to increase Hb rapidly (e.g. IDA with placenta accreta).
- Women who decline blood products with Hb < 130g/dl.

5.2.2 Contraindications to IV Iron Therapy[10]

- Previous allergy to IV iron
- First trimester of pregnancy
- Non-IDA (Sickle cell disease/ thalassaemia)
- Iron overload states (e.g. haemochromatosis)
- Decompensated liver failure
- Ongoing bacteraemia

5.2.3 Cautions with IV Iron Therapy[10]

- History of anaphylaxis (any trigger)
- History of atopy (asthma, eczema, any allergy)
- Known autoimmune/inflammatory conditions (Systemic lupus erythematosus, inflammatory bowel disease, rheumatoid arthritis)
- Evidence of current infection
- Compensated chronic liver disease

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5.3 Prescription of IV Iron

The decision to implement IV iron is to be made by the responsible **Obstetric Consultant or Obstetric pharmacist.**
A referral form for IV iron should be completed rather than booking women directly.
An IV iron patient information leaflet (Section 5.3.1) should be offered to the patient.

Prior to the day of therapy, IV Iron is prescribed by the obstetric consultant or obstetric pharmacist and the appropriate does pre-calculated. Monofer IV iron is to be prescribed on dedicated CAV UHB IV iron prescription charts (Section 5.3.2). A specific noting should be made of history of allergies and atopy and these women should be considered for prophylactic IV Chlorphenamine.

Verbal consent is to be taken by the prescriber. This consent should be documented fully in the medical notes. This should include specific mention of:

- **Risk of hypersensitivity reactions/anaphylaxis (1/1000-1/10,000)[10]**
- **Risk of extravasation causing permanent skin staining (1/10-1/100)[10]**
- **Rarely, fetal bradycardia may occur following administration of IV iron. It is usually transient and a consequence of hypersensitivity reaction in the mother. A pre –infusion Dawes Redman CTG will be performed in antenatal women.**

The completed prescription should be given to the DAU midwives who will supervise the infusion on the OAU.

The patient is to have a follow up clinic appointment arranged for 4 weeks post IV iron infusion to check Hb.

Postnatal women receiving Monofer should have this given on delivery suite.

5.3.1 Referral for IV Iron (Monofer)

Referral for IV iron (Monofer)

Indications for IV Iron Therapy - Iron deficiency anaemia

1. **Antenatal: Ferritin <30 mcg/L with Hb < 110g/L before 28 weeks or <105g/L after 28 weeks' gestation with contraindication to or no improvement with PO iron therapy.**
2. Postnatal: Hb < 100g/L at 24 hours post-delivery with contraindication to or no improvement with PO iron therapy, or Hb <80mcg/L at 24 hours post-delivery.
3. Failure of PO iron therapy (Malabsorption syndromes, Poor compliance, Significant side-effects).
4. Clinical scenarios when there is requirement to increase Hb rapidly (e.g. IDA in a woman with a placenta accreta).
5. Women who decline blood products with Hb < 130g/dl.

5.3.2 Contraindications to IV Iron Therapy[10]	5.3.3 Cautions with IV Iron Therapy[10]
Previous allergy to IV iron	History of anaphylaxis (any trigger)
First trimester of pregnancy	History of atopy (asthma, eczema, any allergy)
Non-IDA (Sickle cell disease/ thalassemia)	Known autoimmune/inflammatory conditions (Systemic lupus erythematosus, inflammatory bowel disease, rheumatoid arthritis)
Iron overload states (e.g. haemochromatosis)	Evidence of current infection
Decompensated liver failure	Compensated chronic liver disease
Ongoing bacteraemia	

The woman will be contacted by a member of the midwifery team or the obstetric pharmacist, eligibility checked and an appointment scheduled.

Woman's details: -

Addressograph AND contact telephone number

5.4 PregnancY information

EDD Current Gestation

Singleton or multiple pregnancy

Current Hb, recent ferritin level (< 4 weeks)

Booking Height Weight
Booking BMI

Iron supplementations tried and response.

E.g. – taking 2 tablets PO daily for 8 weeks and Hb continues to fall / unable to take any oral iron as aggravates IBD. Oral iron causes constipation that is refractory to medication advice/lactulose/laxido/ dietary changes.

Any allergies or atopy (e.g. asthma, eczema): -

Verbal consent taken (Insert check box here)
This consent should be documented fully in the medical notes. This should include specific mention of:

- **Risk of hypersensitivity reactions/anaphylaxis (1/1000-1/10,000)[10]**
- **Risk of extravasation causing permanent skin staining (1/10-1/100)[10]**
- **Rarely, fetal bradycardia may occur following administration of IV iron. It is usually transient and a consequence of hypersensitivity reaction in the mother. A pre –infusion Dawes Redman CTG will be performed in antenatal women.**

5.5 Referring clinician

Name Date:

(PLEASE PRINT)

Signature

5.5.1 IV Iron CAV UHB Prescription

Prescription Chart for
Monofer (iron (III) isomaltoside 1000)
For Obstetric patients with low Ferritin

NHS WALES GIG CYMRU

Place Addressograph Here

Allergies Please circle as appropriate
NONE KNOWN YES
Signature…… Date
Name…… Drug/allergen……
Description of reaction

Gestation _____weeks (Do not prescribe IV iron in first trimester)

Prescriber to complete all boxes shaded in grey, document verbal consent in notes.

Monofer IV Iron to be prescribed if ferritin <30 mcg/L and failure of oral iron therapy.
Aim for Hb > 110g/L before 28/40, Hb> 105g/L after 28/40 and > 100g/L postnatally.

Step 1 Justify need for parenteral iron therapy

Hb (<110g/L before 28/40) (<105g/L after 28/40) (<100g/L postnatally)	**Ferritin** (<30mcg/L) (Antenatal only)	**EDD/Date of LSCS**	**Booking Weight** (kg) **If BMI>30 use IBW** [(Height (cm) – 154) x 0.9] + 45

Step 2 Dose = 20mg/kg – tick dose as appropriate (calculate if weight <50kg)

Weight	<50 kg		50-59 kg		60-69 kg		70-79 kg		80-89 kg		90-99kg		≥ 100kg	
Dose	20mg/kg		1g		1.2g		1.4g		1.6g		1.8g		2g	

Step 3 Complete the Monofer Prescription Schedule – CONSULTANT or PHARMACIST ONLY

DATE	Drug name and infusion	DOSE	ROUTE	Prescriber signature	TIME GIVEN	GIVEN BY	CHECKED BY
	Sodium Chloride 0.9% for flushing cannula	**5ml**	**IV**				
	Iron (III) Isomaltoside (Monofer®) in 250ml Sodium Chloride 0.9% (Rate of 25ml/hr for first 10 minutes. If well tolerated increase accordingly to 250ml/hr for remainder of infusion)		**IV infusion**				
	Sodium Chloride 0.9% for flushing cannula	**5ml**	**IV**				
	Hydrocortisone 100-200mg		**IV**				
	Chlorphenamine IV 10mg/ PO 4mg		**IV/PO**				
	Ondansetron IV 4mg/ PO 4mg		**IV/PO**				

Step 4 Prescriber's signature

P R I N T name	Designation	Signature	Date

Step 5 Clinical Check by Pharmacist, dispensing and accuracy check

Clinical check		Dispensing		Final check	

Pre-administration questionnaire and monitoring

NHS WALES GIG CYMRU

Place Addressograph Here

Past medical history	Liver disease		Rheumatoid arthritis/SLE	
	Asthma		Previous sensitivity to iron	
	Eczema		Other drug or food allergies	

If any of the above applies, the patient will be at a greater risk of hypersensitivity reactions. Please be aware that the infusion may need to be at a slower rate. Consider giving prophylactic chlorpheniramine IV.

Monitoring

1. All women to have Antenatal check and Dawes Redman CTG.
2. All women to be counselled about common side effects.
3. All observations are to be recorded on the MEWS chart.

	Time	Temperature	Respiratory rate/SpO_2	Blood pressure	Pulse
Before Infusion					
After 30 minutes		N/a			
After 60 minutes		N/a			
30 minutes after completion of infusion		N/a			

Extravasation Please monitor within the first few minutes of the infusion for signs of irritation or obvious extravasation of infusion. If this occurs, stop infusion immediately, aspirate cannula and elevate arm. Call doctor, the cannula is likely to need removed. Use VIPs chart.

Hypersensitivity reactions Urticaria, rashes, itching, nausea and shivering may occur. These are more likely associated with hypersensitivity and should respond to stopping the infusion temporarily. Please follow algorithm.

Anaphylaxis Acute severe anaphylactic reactions may occur with parenteral iron administration. They usually occur within the first few minutes of administration and are characterised by sudden onset respiratory failure and/or cardiovascular collapse. **Administration must be stopped immediately if signs of an anaphylactic reaction are observed**. Appropriate resuscitation medication must be available including hydrocortisone IV and adrenaline. See IV Iron Reaction Management Flow sheet.

Follow Up Please ensure the patient has an Obstetric follow up with a re-check FBC at 4 weeks post infusion.

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5.6 Administration of IV Iron (Monofer)

5.6.1 Equipment/Personnel

- IV iron is to be administered in the presence of staff trained in recognising and treating hypersensitivity reactions, specifically those seen in IV iron. This is important as staff and patient anxiety can lead to infusions not being completed or a misclassification of reactions.
- An anaphylaxis box must be readily available
- Patient monitoring must include SpO2, RR, BP cuff, pulse and thermometer and be recorded on a MEWS chart.
- A patient dedicated midwife must be available for the duration of the infusion
- A CTG fulfilling Dawes Redman criteria, (or medical review if criteria not met) and an antenatal check are required for all pregnant women before receiving IV iron therapy

5.6.2 Preparation

- All allergies are to be documented by the prescriber.
- IV iron is to be individually prescribed for each patient based upon their weight on the CAV IV iron prescription sheet
- The maximum dose of Monofer IV Iron is 20mg/kg
- Each patient prescription will be individually checked by pharmacist and the Monofer solution will then be dispensed to be given to the patient.
- If there is a history of allergies or atopy, consider use of prophylactic chlorpheniramine 10mg IV.
- Ensure fetal wellbeing (A CTG fulfilling Dawes Redman criteria, or medical sign off and an antenatal check required for all pregnant women before receiving IV iron therapy)
-

5.6.3 Infusion

- Establish IV access as per CAV UHB guidance (this must be a fresh IV cannula).
- Attach patient monitoring
- Establish and record on a MEWS chart baseline physiological parameters (BP, HR, RR, temperature and SpO2) before administration of IV iron
- Commence Monofer solution at 25mls/ hour
- Encourage patient to stay relatively still during infusion to minimise risk of extravasation
- Within first 10 minutes, ensure infusion is running freely and monitor for signs of extravasation of solution
- Monitor for signs of rash, urticaria, itching and shivering
- If well tolerated, increase after 10 mins to 250 mLs an hour.
- Monitor and record on a MEWS chart physiological parameters (RR, BP, Sp02 and HR at 30 and 60 minutes, and at 30 minutes post completion of infusion
- Counsel the patient for signs of post infusion side effects and ensure an obstetric follow up appointment is made (with FBC check) in 4 weeks' time for all antenatal patients

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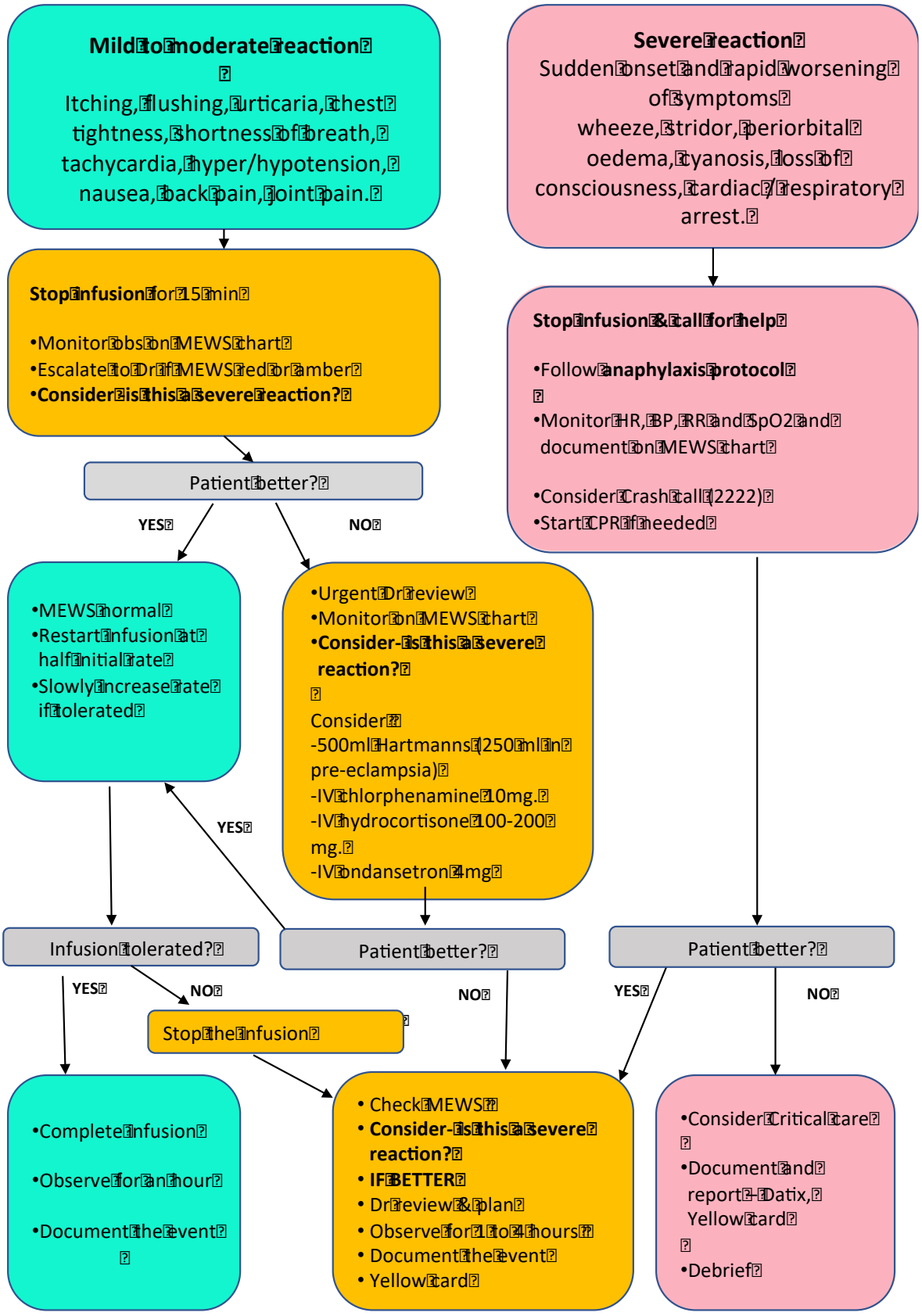
5.7 Hypersensitivity Reactions to IV Iron

5.7.1 Side Effects

- Anaphylaxis/Hypersensitivity reactions (HSR) – please follow the Hypersensitivity Reaction Algorithm included in this guideline
- Watch for extravasation of the IV solution-if present stop infusion immediately, aspirate the cannula, elevate the arm and call for review by a doctor - likely to need cannula removed.
- Delayed reactions may occur. These can include joint pain, muscle pain and fever. The patient is encouraged to report any of these side effects to their midwife
- Any adverse events are to be reported via Yellow Card Scheme; www.mhra.gov.uk/yellowcard

5.7.2 Management of Hypersensitivity Reactions to IV Iron



Adapted from Rampton D, *et al*. Haematologica (2014)

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6 Patient Information

6.1 IV Iron (Monofer) Patient Information Leaflet

What is intravenous (IV) Monofer©? Monofer© is a dark brown liquid containing iron and is used to treat iron deficiency anaemia.

Why do I need to have IV iron? Your doctor will have chosen Monofer© because you need to correct the iron levels in your body. Monofer© is used for treating iron deficiency anaemia when oral iron preparations are ineffective or cannot be used or when there is a need to deliver iron rapidly.

How is IV Monofer© administered? Monofer© is an intravenous iron treatment that is given directly into a vein. The infusion will run into your vein from a drip, and you will be monitored by a midwife throughout the procedure. The procedure should take 60-90 minutes.

Is it safe for me? Iv iron is considered to be a safe drug, however there are known side-effects. Your obstetrician or obstetric pharmacist will discuss these with you when deciding to treat you with IV iron.

What are the common side-effects? The most common side-effect at the time of infusion is nausea. Your midwife will monitor you during your infusion for signs of reactions at the injection site – these include redness, soreness or discolouration (1/10-1/100). Extravasation (leakage of the solution into the tissues) has been shown to cause long-term staining of the skin; therefore, you will be monitored very closely for any of these signs during the treatment. If you notice any pain or redness around the drip, please let your midwife know immediately. Rare side-effects (1/100-1/1000) include fast heart rate, low blood pressure, rash and joint pains. Severe allergic reactions, such as anaphylaxis, are rare (1/1000-1/10,000).

Is it safe for my baby? Monofer© is not licensed for administration within the first trimester. Your obstetrician or pharmacist will discuss the risks and benefits of undergoing IV iron therapy for you and your baby.

Can I take my medication whilst having IV Monofer© treatment? Please continue to take your regular medication. We advise you stop taking your oral iron whilst having IV Monofer. Have been shown to be safe with minimal transfer of iron into the breastmilk.

Can I breastfeed my baby? If you are found to be anaemic after the delivery of your baby, having an IV iron infusion could be a treatment option. For mothers who have decided to breastfeed their babies, therapeutic doses of IV Monofer© have been shown to be safe with minimal transfer of iron into the breastmilk.

What if I'm unwell during or after my treatment? IV iron will be administered in a hospital setting, with trained staff present to look out for any side effects. IV iron can cause flu-like symptoms. If this occurs, we will ask you to call your midwife for advice. Alternatively, you could call the obstetric assessment unit at UHW on 02920 744658.

What happens after my treatment? After your infusion of IV Monofer©, a follow-up appointment will be made for you. This would typically be within 4 weeks of your treatment. Your blood haemoglobin level will also be re-checked at this time.

7 References

1. Pavord, S. *et al.* UK guidelines on the management of iron deficiency in pregnancy. *Br. J. Haematol.* **188**, 819–830 (2020).
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8 Appendices

8.1 How to Take Iron Supplements: Patient Information Leaflet

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Iron Supplements:-

How do I take them?

You should take your iron supplement on an empty stomach preferably one hour before a meal, with a drink containing vitamin C such as a glass of orange juice.

Why is the way I take them important?

Absorption of iron from the gut is reduced by food, tea and milk so these should be avoided for one hour before and after taking the iron supplement.

Taking iron properly on an empty stomach (with vitamin C), increases absorption and reduces side effects such as constipation as the iron gets absorbed in the stomach, rather than passing through to the large bowel.

Some medications also affect absorption of iron from the gut, particularly medications which reduce stomach acid (antacids)and certain antibiotics. Always check with your doctor or pharmacist whether any of your medications might affect how your iron supplements work.

The only factor that improves the absorption of iron is vitamin C. We recommend that you take your supplement with a drink containing vitamin C.

What side effects might I get?

The following side effects are common:

nausea (feeling sick), tummy pain, diarrhoea and constipation

These usually improve as your body gets used to the iron supplements. If needed you can reduce the dose to one a day and/or request a lower strength supplement. If this is better for you, try to then increase back to the original dose. Contact the health professional that prescribed the iron tablets if you have any concerns.

You will be asked to have a repeat blood test after the start of your iron supplements to check that the iron levels are increasing.

I am constipated

What can I do?

Are you taking tablets correctly?

Taking correctly enables iron uptake in the stomach, rather than the large bowel, reducing the likelihood of constipation.

Dietary advice:

Several foods reduce the chance of constipation, such as eating brown bread, rice or pasta rather than white versions.

Ensuring adequate water intake of around 2000mls (2 litres a day).

If you are still constipated – please discuss with your midwife, GP or Obstetrician about some simple treatments.

8.2 Anaemia in Pregnancy: Patient Information Leaflet

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Anaemia and pregnancy

Anaemia can be common in pregnancy. Anaemia is a blood condition that develops when you don't have enough red blood cells. Red blood cells contain haemoglobin, a protein that carries oxygen around your body and to your baby.

Signs and symptoms of anaemia in pregnancy

Symptoms of anaemia can include:

- tiredness and lack of energy
- shortness of breath
- feelings of having a fast beating, fluttering or pounding heart (heart palpitations)
- pale skin.

There are different types of anaemia and each has a different cause. The most common type for pregnant women is iron-deficiency anaemia.

What causes iron deficiency anaemia?

Pregnancy is often the cause of iron-deficiency anaemia. You and your baby need a lot more iron to make red blood cells while you're pregnant. Iron-deficiency anaemia can happen when you are not eating enough food with iron.

You are also more likely to have anaemia if you:

- are a vegetarian or vegan
- have had anaemia before
- have a history of heavy periods
- are carrying more than one baby
- were younger than 20 when you got pregnant
- you are pregnant again after having a baby within the last year.

Will I be checked for anaemia during my pregnancy?

Yes. You should have a blood test to check for any conditions that may affect your baby, including anaemia at your booking appointment and when you are 28 weeks pregnant.

If you're carrying more than one baby, you should have an extra blood test at 20-24 weeks.

This will give you enough time to get treatment if you need it.

You can call your midwife at any time if you think you have anaemia symptoms and you can be tested for anaemia at any point in your pregnancy. You don't have to wait for your antenatal appointments or for routine tests

Will iron deficiency anaemia harm me or the baby?

Most people with anaemia in pregnancy go on to have a healthy pregnancy and baby. However, anaemia has

and after birth if it isn't treated. These can include:

- premature birth
- low birthweight
- placental abruption
- your body being less able to cope with blood loss during labour
- iron deficiency in your baby in their first 3 months of life
- problems with the baby's mental development.

It can be difficult to read these but try not to worry too much as the risk is low. If you are diagnosed with anaemia and it is treated properly it is very likely you will still have a healthy pregnancy and baby.

How is iron deficiency anaemia treated?

If you have anaemia, you'll be prescribed iron supplements (tablets) or as a liquid to take every day. See below on how to take them.

Your symptoms should get better after taking iron supplements. If it doesn't, or if your anaemia is severe, you'll probably be referred to a haematologist (a doctor expert in blood disorders).

You may be given iron through intravenous therapy (IV). This means giving you iron in liquid form through a needle directly into the vein (usually in your arm). You may also be offered a blood transfusion.

Best foods to treat iron insufficiency

Most people should be able to get all the iron they need by eating a healthy, balanced diet. Eating well will help you either prevent anaemia or manage your symptoms if you have it.

Some food has more iron than others. For example, animal-based foods are particularly rich in iron and are most easily absorbed.

Iron-rich food list

Most people should be able to get all the iron they need by eating a healthy, balanced diet. Eating well will help you either prevent anaemia or manage your symptoms if you have it.