



**OBSTETRICS AND GYNAECOLOGY  
 CLINICAL PRACTICE GUIDELINE**

# Iron therapy: Intravenous

<b>Scope (Staff):</b>	WNHS Obstetrics and Gynaecology Directorate staff
<b>Scope (Area):</b>	Obstetrics and Gynaecology Directorate clinical areas at KEMH

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## Contents

<b>Background.....</b>	<b>3</b>
Indications for IV iron therapy .....	3
Contraindications and precautions.....	4
<b>Requesting an iron infusion.....</b>	<b>5</b>
Iron infusion referrals for women deemed high risk (non-KEMH patients) .....	5
<b>Dosing .....</b>	<b>6</b>
Ferric carboxymaltose (Ferinject®).....	6
Iron polymaltose (Ferrosig) .....	6
<b>IV iron in postpartum period .....</b>	<b>7</b>
<b>Administration, observations and management post infusion .....</b>	<b>8</b>
Infusion Unit / ASCU staff .....	8
Ferric carboxymaltose (FC) Ferinject® administration.....	8
Iron polymaltose (IP) Ferrosig administration.....	9
Observations.....	10
Post-infusion management .....	10



**Adverse reaction management.....11**  
Mild reactions..... 11  
Severe reactions ..... 11

**Management of known or suspected previous reaction to IV iron .12**

**Extravasation .....13**  
Recognition of extravasation..... 13  
Management..... 13

**Abbreviations.....14**

**References .....14**

**Appendix 1: Quick reference algorithm for IV iron infusion .....18**

Table 1: Classification of anaemia in adult women	
Hb (g/L)	
<110	1 <sup>st</sup> and 3 <sup>rd</sup> trimester of pregnancy
<105	2 <sup>nd</sup> trimester of pregnancy
<100	Postpartum period
<115	Non-pregnant adult women
A serum ferritin level of < 30mcg/L for an adult is diagnostic of iron deficiency	

## Background

Iron deficiency is a common problem in pregnancy and may result in anaemia or in symptoms impacting quality of life.<sup>1,2</sup> Intravenous iron offers rapid treatment of iron deficiency. It may be used to augment haemoglobin (Hb) levels in women with identified iron deficiency anaemia (IDA) (defined as per Table 1) who have not responded sufficiently to oral iron<sup>1</sup> or in patients whom a rapid repletion of iron stores is required<sup>3</sup> (e.g. impending blood loss, recent large-volume blood loss).

Whilst IV iron is deemed safe in experienced hands, significant reactions and complications can occur.<sup>4</sup> The iron formulations in use at KEMH are iron polymaltose (IP) or ferric carboxymaltose (FC). Both formulations have potential drug and clinical interactions that may predispose to toxicity/adverse reactions. Contact Pharmacy for further information. See also Contraindications/Precautions below.

Please also review [Obstetrics and Gynaecology Clinical Guideline on 'Anaemia and Iron Deficiency: Management in Pregnancy and Postpartum'](#)

## Indications for IV iron therapy

- IDA where oral iron therapy may be impractical or ineffective due to GI intolerance, non-compliance, malabsorption or gastric surgery.
- Situations where a rapid repletion of ferritin is required (e.g. planned surgery where significant blood loss is anticipated).
- High-risk women (e.g. major placenta praevia, placenta percreta/accreta, recurrent antepartum haemorrhage, patients refusing blood products) with a Hb above 110g/L will be considered for Hb optimisation on an individual basis. **In these instances each case will be discussed and approved between the Medical Team, Clinical Nurse Consultant – Patient Blood Management (CNC PBM) and Haematologist.**
- Functional iron deficiency (i.e. when stored iron cannot be released for erythropoiesis). This may be seen in patients with renal disease, inflammatory disease or cancer. Some women with these conditions and ferritin within the reference range may benefit from IV iron. The ferritin can be normal / elevated in these conditions as it is an acute phase protein; in these instances full iron

studies assist interpretation of iron status. Interpretation of test results in patients with co-existing inflammatory/malignant disease can be complicated. Seek advice from a Consultant Haematologist if there are doubts concerning the role of IV iron.

IV iron is not licenced for use as an acute treatment in the management of major haemorrhage. Major haemorrhage is complicated by red cell loss, acute dilutional anaemia and inflammatory processes that suppress red cell production. Optimal management of this scenario lies outside of the scope of this document.

## Contraindications and precautions

### Contraindications

- Hypersensitivity<sup>5</sup> or allergy to IP or FC
- First trimester of pregnancy.<sup>5</sup> Safety is not demonstrated in early pregnancy and animal studies have demonstrated fetal skeletal abnormalities and spontaneous abortion at maternally toxic doses during organogenesis. The level of drug crossing the placenta is unknown
- Iron overload (i.e. due to haemochromatosis)<sup>5</sup>
- Anaemia not due to iron deficiency (e.g. B12 deficiency, haemolytic anaemia, bone marrow disease) <sup>5</sup>
- Acute infection <sup>5</sup>
- Uncontrolled hyperparathyroidism<sup>5</sup>
- Infectious hepatitis <sup>5</sup>
- Decompensated hepatic cirrhosis <sup>5</sup>
- Chronic polyarthritis <sup>5</sup>;

### Precautions

- Asthma and/or other allergic conditions may increase the risk of adverse reactions<sup>5</sup>
- Previous adverse reaction to alternative forms of parenteral iron
- Liver dysfunction – elevated liver enzymes including lactate dehydrogenase may develop following administration
- Acute bacterial infection currently treated with IV antibiotics. IV iron may be considered following cessation of IV antibiotics depending on patient condition.
- Concomitant administration of angiotensin converting enzyme (ACE) inhibitors. This may increase the incidence of adverse effects of IV iron including erythema, abdominal cramps, nausea, vomiting and hypotension.
- Rheumatoid arthritis and other inflammatory diseases. These may increase the risk of delayed reaction including fever and joint pain. <sup>5</sup>
- Haemoglobinopathy / thalassaemia.<sup>5</sup> Some women with these conditions are prone to iron overload - discuss with Consultant Haematologist if indication is uncertain.

## Requesting an iron infusion

See Appendix 1 – Quick Reference Guide for which iron formulation to prescribe.

1. The team requesting the iron infusion are responsible for:
  - Ensuring there are no contraindications for use, discussing the risks and benefits of iron infusion, explaining the procedure, providing the woman with written information and answering any questions. See KEMH Patient brochure: Intravenous Iron Infusions
  - Ensuring recent (within 1 month) FBP and ferritin results are available.
  - Prescribing the IV iron on the intravenous additive order sheet (MR740).
  - In obstetric women use the pre-pregnancy weight. If this is not known then the dose should be based on current weight less 10%.
  - In non-obstetric women use current weight.
  - Completing a PBS prescription for outpatients and women receiving IV iron on the day of discharge.
2. All requests for intravenous iron are now made through the eReferral system:
  - Site: King Edward Memorial Hospital
  - Unit: Haematology
  - Select >> CNC PBM Iron Infusion [HAIF]
  - **Complete all mandatory data.** Failure to complete these accurately may delay treatment.
3. IV iron requests are reviewed, triaged and approved Monday to Friday by CNC PBM against the current guidelines for treatment. Women who are clinically stable will be allocated an appointment in the Infusion Unit (open Tuesday, Thursday and Friday).
  - **Urgent cases may be accommodated on other days in ASCU by consultation with CNC PBM and ASCU.**
4. See Appendix 1 – IV Iron Quick Reference Algorithm for further information.

### Iron infusion referrals for women deemed high risk (non-KEMH patients)

Non-tertiary centres may request IV iron administration for women who are considered at high risk of reaction (e.g. on the basis of medical history) through the [Central Referral Service](#). If the patient is within KEMH catchment the request will be reviewed as per criteria above. KEMH is unable to provide iron infusion services to women outside the catchment area. Following receipt of the referral, the:

- CNC PBM/Haematology will triage the referral, including a review of previous reaction and risk factors, blood results, previous iron therapy and assessment against current Clinical Guidelines.

- O&G HOD will assess suitability for IV iron therapy and allocate to a medical team to prescribe iron and concomitant therapy. Some women may also need to be seen (e.g. in outpatient clinic) prior to iron infusion if there is uncertainty about the history or concern regarding potential for adverse reaction.

If the patient is considered not suitable for IV iron at KEMH, the CNC PBM will contact the referring centre to discuss and advise alternative management strategies.

## Dosing

### Ferric carboxymaltose (Ferinject®)

- Pregnant and non-pregnant women receive a single infusion of 1000mg elemental iron as ferric carboxymaltose, regardless of body weight.
- The infusion is to be ordered as '**Elemental Iron as Ferric Carboxymaltose**'.
- Each ampoule contains 1000mg elemental iron in 20mL.<sup>6</sup>

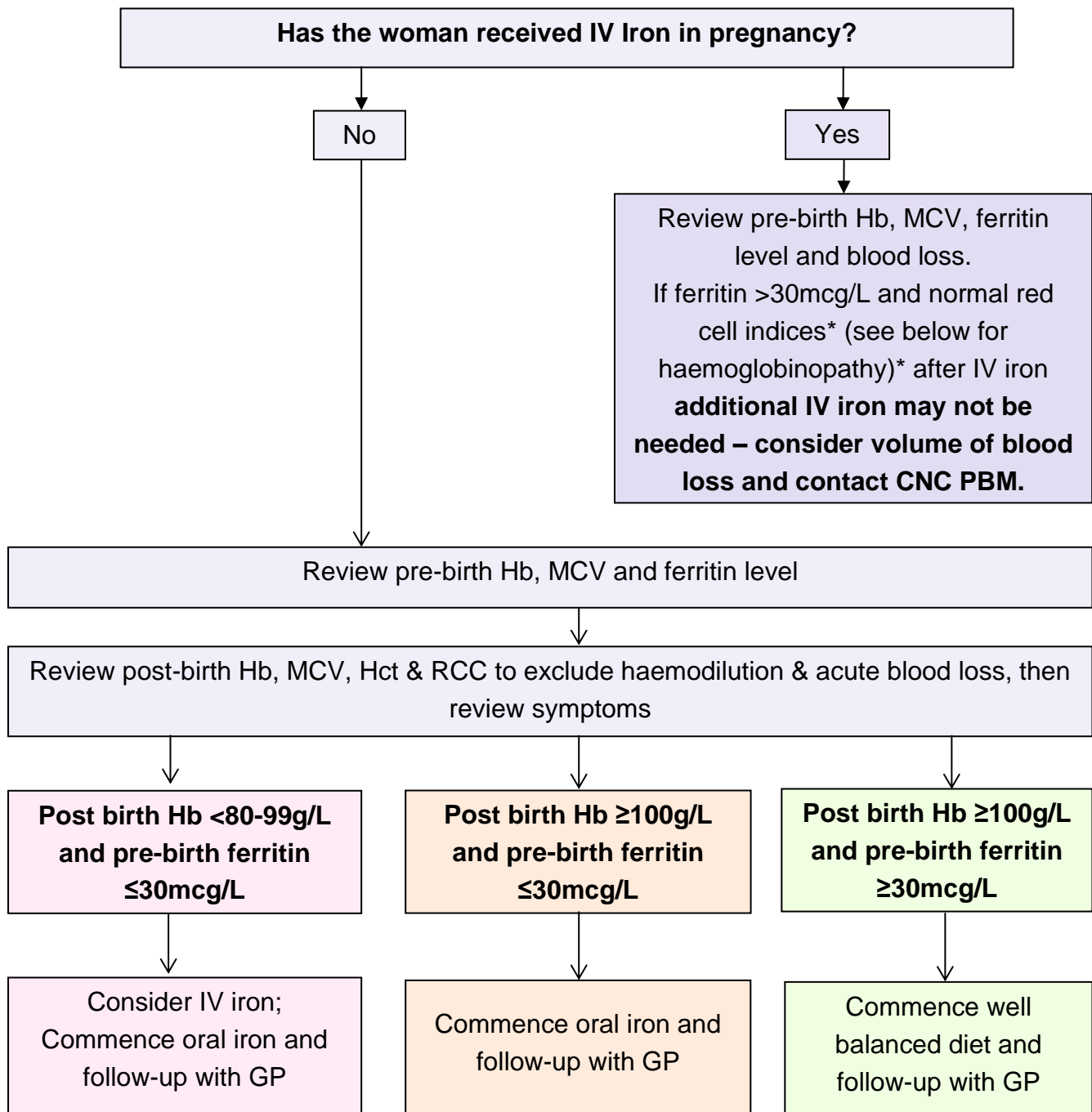
### Iron polymaltose (Ferrosig)

- The dose is calculated according to the table below. Pregnant women receive a maximum dose of 1000mg elemental iron.
- The infusion is to be ordered as '**Elemental Iron as Iron Polymaltose**'.
- Each ampoule contains 100mg elemental iron in 2mL (318mg iron polymaltose in 2mL)

Iron polymaltose dosage												
Body Weight	Hb 60g/L			Hb 75g/L			Hb 90g/L			Hb 105g/L		
	kg	*mg	mL	amps	*mg	mL	amps	*mg	mL	amps	*mg	mL
40	1100	22	11	1000	20	10	800	16	8	700	14	7
45	1200	24	12	1000	20	10	800	16	8	700	14	7
50	1200	24	12	1100	22	11	900	18	9	700	14	7
55	1300	26	13	1100	22	11	900	18	9	700	14	7
60	1400	28	14	1200	24	12	1000	20	10	700	14	7
65	1500	30	15	1200	24	12	1000	20	10	800	16	8
70	1500	30	15	1300	26	13	1000	20	10	800	16	8
75	1600	32	16	1300	26	13	1100	22	11	800	16	8
80	1700	34	17	1400	28	14	1100	22	11	800	16	8
85	1700	34	17	1400	28	14	1100	22	11	800	16	8
90+	1800	36	18	1500	30	15	1200	24	12	800	16	8

\*this refers to dose of elemental iron (in milligrams); amps = number of ampoules

## IV iron in postpartum period



\* Women with thalassaemia are prone to iron loading and IV iron should only be used in the treatment of documented iron deficiency (i.e. ferritin <30mcg/L). Compare blood results against non-pregnant baseline and aim for this in treatment plans.

## Administration, observations and management post infusion

### Infusion Unit / ASCU staff

Prior to the commencement of IV iron commence MR739 - IV Iron Infusion Care Pathway, IV iron brochure and inform the patients about possible adverse reactions:

- Headache, nausea, vomiting, dysgeusia (metallic taste), arthralgia (joint pain), myalgia (muscle pain), dizziness, hypertension, hypotension
- Wheezing, dyspnoea, bronchospasm, hypersensitivity, anaphylaxis
- Localised pain, redness or discolouration at the IV insertion site

### Ferric carboxymaltose (FC) Ferinject® administration

- As injection site reactions and paravenous leakage is common (associated skin staining risk), FC is only administered at KEMH as an infusion (as opposed to an IV bolus injection of the undiluted solution).
- Complete IV cannulation as per hospital guidelines
- Confirm the patency of the IV cannula before commencing the infusion to reduce the risk of staining.
- Connect 50mL 0.9% sodium chloride flush and infuse by gravity. If the saline does not infuse freely, or there is swelling, redness or discomfort the cannula **must not be used** for IV iron. See [Extravasation](#)).
- If there is a history of a previous reaction, the Medical Officer must be informed and be present prior to the commencement of the infusion. Consider prophylaxis with loratadine 10mg orally and hydrocortisone 100mg IV.
- Do not mix with any other drugs or with solutions other than 0.9% sodium chloride.
- Do not inject FC into the tubing of an IV administration set.
- FC does not require a test dose.

FC dosage	FC volume	FC infusion rate and administration time. Add FC dose to 250mL 0.9% sodium chloride <sup>6</sup>
500 - 1000mg	10 or 20 mL	Commence at 500mL/hour rate for 30 minutes
Total infusion time approx. 45 mins		



### Iron polymaltose (IP) Ferrosig administration

- All IP infusions require a test dose as anaphylactoid reactions are most likely to occur in the first few minutes of the infusion.<sup>5</sup>
- Confirm the patency of the IV cannula before commencing the infusion to reduce the risk of staining.
- Connect 50mL 0.9% sodium chloride flush and infuse by gravity. If the saline does not infuse freely, or there is swelling, redness or discomfort the cannula **must not be used** for IV iron. See [Extravasation](#)).
- If there is a history of a previous reaction, the Medical Officer must be informed and be present prior to the commencement of the infusion. Consider prophylaxis with loratadine 10mg orally and hydrocortisone 100mg IV.
- Do not mix with any other drugs
- Do not inject IP into the tubing of the IV administration set.

<b>IP test dose and infusion rate</b> (Add IP to 500mL 0.9% normal saline <sup>5</sup> )		If the patient experiences an adverse reaction, cease the infusion and see adverse reaction management below.
<b>Infusion rate (pregnant women)</b>	<ul style="list-style-type: none"> <li>• Commence at 50mL/hour for 5 minutes.</li> <li>• <b>IF NO REACTION OCCURS then</b></li> <li>• Increase rate to 250mL/hour for the remainder of the infusion</li> </ul> Total infusion time approx. 150 min (2.5 hours)	
<b>Infusion rate (non-pregnant women)</b>	<ul style="list-style-type: none"> <li>• Commence at 50mL/hour for 5 minutes.</li> <li>• <b>IF NO REACTION OCCURS then</b></li> <li>• Increase rate to 375mL/hour for the remainder of the infusion</li> </ul> Total infusion time approx. 100 min (1.5 hour)	

## Observations

Perform and document respiratory rate, oxygen saturation, heart rate, blood pressure, temperature and conscious state on the observation response chart (ORC) at the following times:

- Prior to commencement and on cessation of all iron infusions
- FC - 5 minutes after commencement of the infusion
- IP - 15 minutes after commencement of the infusion then every 60 minutes

Pregnant women should have a fetal heart rate (FHR) recorded prior to infusion and following infusion, prior to discharge.

## Post-infusion management

- Flush the line with 50mL of 0.9% sodium chloride, administered at the same rate on completion of the iron infusion.
- Document the administration of IV iron. Self-adhesive brown coloured stickers designed to identify the dose and date of iron infusion should be annotated and placed in the patient's current integrated progress notes (MR250) and on the special instructions sheet (MR004 and MR005) at the front of the medical record.
- Inpatients are returned to their ward. Give clinical handover to ward staff as per MR739 pathway. Advise women to report delayed adverse reactions to ward staff.
- Outpatients remain on the INFU for 30 minutes. If no adverse symptoms are present they are then discharged. If symptoms do occur, notify the Medical Officer immediately to review.
- On discharge discuss and give the woman the [Post IV Iron Infusion Discharge Advice](#) information sheet.
- Perform follow-up full blood picture and iron studies 4-6 weeks following infusion to ensure the results have normalised. Give a completed pathology request form with clear instructions to have this taken at a PathWest Collection Centre. A copy of the results is forwarded to the CNC PBM (Haematology) at KEMH. For pregnant women due to deliver within 2 weeks of infusion, these blood tests should be collected 4 weeks post-partum.
- Women should be instructed not to take any oral iron for 7 days post infusion.
- Pregnant and post-natal women should be encouraged to continue with oral iron supplements until breastfeeding is complete.

## Adverse reaction management

Adverse reactions may be more likely in women with a history of asthma or other allergic conditions. The woman must always be able to reach her call bell and must be instructed to use it if she becomes aware of any adverse reactions. In the event of changes to vital signs or an adverse reaction, cease the infusion and notify the Medical Officer.

<b>Possible adverse reactions to discuss with the women pre infusion:</b>	
<ul style="list-style-type: none"> <li>Immediate hypersensitivity adverse reaction events are frequently self-limiting and usually respond to simple measures. Symptoms include headache, nausea, rash, myalgias and cannula site discomfort.</li> </ul>	
More serious anaphylactoid events include: <ul style="list-style-type: none"> <li>Wheezing, dyspnoea, bronchospasm, hypersensitivity, anaphylaxis.</li> </ul>	If the patient experiences these more serious adverse reactions, <b>STOP THE INFUSION</b> and see adverse reaction management below.
Infusion site reactions include: <ul style="list-style-type: none"> <li>Localised pain, redness, discolouration of the skin</li> </ul>	
Delayed adverse events include pyrexia, fatigue and malaise, headache, arthralgia, myalgia. See Post infusion management above.	

### Mild reactions

- Manage hypersensitivity reactions by ceasing the infusion for 10-15 minutes
- Facilitate medical team review
- Give oral loratidine 10mg (for itch, rash), IV hydrocortisone 100mg or paracetamol 1g orally (headache or discomfort)
- The infusion can usually be recommenced once the symptoms have resolved but it may be appropriate to reduce the rate and/or remaining dose.

### Severe reactions

- STOP THE INFUSION** immediately and seek urgent medical review.
- Call a 'Code Blue Medical' if any of the following occur:**
  - Airway – stridor, facial or neck swelling
  - Breathing – respiratory rate >30 or oxygen saturation < 90%
  - Circulation – heart rate >130bpm or <40bpm, or onset of hypotension (systolic blood pressure <90mmHg).
  - Altered conscious state
  - Any serious concerns

3. If hypotensive, place in full left lateral position to relieve aortocaval compression
4. Commence foetal heart rate monitoring.
5. Record observations as indicated by the woman's condition including:
  - Heart rate, blood pressure, temperature
  - Respiratory rate, oxygen saturation
  - Level of consciousness
  - Consider ECG and cardiac monitoring
  - Consider CTG to assess fetal wellbeing in pregnant women

If a true anaphylactoid/anaphylactic reaction occurs, the infusion should be abandoned. Treat according to clinical features and consider transfer of the woman to ASCU for observation and management. Complete a clinical incident when appropriate and inform the CNC PBM (Haematology) on page #3257.

## Management of known or suspected previous reaction to IV iron

1. If previous mild reaction
  - discuss with Consultant Haematologist
  - pre-medicate (e.g. loratidine 10mg orally)
  - commence infusion at a slower rate (e.g. ferric carboxymaltose at 300mL/hour)
2. If previous severe / anaphylactoid reaction
  - discuss with Consultant Haematologist
  - utilise alternative iron formulation
  - pre-medicate (e.g. hydrocortisone 100mg IV, loratidine 10mg orally, paracetamol 1g orally) before commencing infusion
  - commence infusion at a slower rate than usually prescribed

## Extravasation

Paravenous leakage of all forms of IV iron can result in permanent skin pigmentation. It is imperative that the infusion is ceased immediately if extravasation occurs<sup>7</sup> – infusion of greater volumes may worsen the extent of skin pigmentation. Following extravasation volumetric pumps continue to infuse until fluid accumulates in the subcutaneous tissues – careful observation and monitoring of the cannula insertion site is imperative.

### Recognition of extravasation

Signs and symptoms that may indicate extravasation:

- Tenderness/discomfort at insertion site
- Swelling above/below insertion site
- Taut skin above/below insertion site
- Fluid leak at insertion site
- Coolness/blanching around insertion site
- Numbness or tingling above/below insertion site
- Burning or stinging pain
- Skin discolouration/pigmentation
- Blistering, ulceration and tissue necrosis are highly unlikely to occur

Note, however, that extravasation can be asymptomatic and that skin pigmentation may not be apparent until hours/days following the extravasation.

### Management

1. Stop infusion immediately and disconnect the giving set. Aspirate any residual fluid and remove the cannula.<sup>7</sup> Abandon the infusion – further iron should not be given on the same day.
2. If skin pigmentation is immediately visible, measure the site and arrange for hospital photographs to be taken. This will aid ongoing monitoring of staining. Document the volume of the infused fluid – this may aid in assessing the volume of iron infiltrated.
3. Apply a cold pack to the infiltrated site and elevate the affected limb.<sup>7</sup>
4. Reassure and provide a full explanation to the patient.
5. Inform the Medical Officer so an assessment can be made of sensory deficit which could indicate nerve damage or compartment syndrome.
6. Document the management in the medical records and complete a clinical incident form.
7. Follow-up as an outpatient where long term management will be discussed if needed.

8. Further advice may be required from other specialities including Dermatology (skin staining), Plastic Surgery (sensory deficit) or Haematology (anaemia management). Laser therapy has been successful in reducing the skin staining long term.
9. If there is significant pain/redness hydrocortisone cream may be of use in relieving irritation. There are no specific antidotes for iron extravasation.

## Abbreviations

ACE	Angiotensin converting enzyme
ASCU	Adult Special Care Unit
CNC PBM	Clinical Nurse Consultant Patient Blood Management
CTG	Cardiotocography
ECG	Electrocardiogram
FC	Ferric carboxymaltose
GP	General Practitioner
Hct	Haematocrit
Hb	Haemoglobin
IDA	Iron deficiency anaemia
IP	Iron polymaltose
IV	Intravenous
mcg	microgram
MCV	Mean cell volume
O&G	Obstetrics and Gynaecology
ORC	Observation and response chart
PBS	Pharmaceutical Benefits Scheme
RCC	Red cell count

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## Related legislation and policies

Department of Health WA:

- [Central Referral Service Policy: Allocation – Outpatient Services](#)

- [Specialist Outpatient Services Access Policy](#)
- [National Standard for User Applied Labelling of Injectable Medicines, Fluids and Lines](#)

## Related WNHS policies, procedures and guidelines

WNHS Obstetrics and Gynaecology guidelines:

- [Anaemia in Pregnancy](#)









## Useful resources (including related forms)

### Patient information:

- WNHS [Post IV Iron Infusion Discharge Advice](#)

### Forms:

- MR 284 / 285 / 285.02: Observation and Response Charts- MR 284 (Antenatal); MR 285 (Postnatal) or MR285.02 (Adult)
- MR 739: IV Iron Infusion Care Pathway

Keywords:	Booking iron infusion at KEMH, iron infusion for obstetric, gynaecology or oncology patients, Iron infusion, high risk iron infusion, referrals for high risk iron infusion, iron therapy, iron infusions Obs and Gynae, intravenous iron, ward 4 infusion unit, iron therapy, infusion reaction, allergy, polymaltose, carboxymaltose therapy, Ferinject, extravasation, infiltration			
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**Version history**

Version number	Date	Summary
1	April 2019	<p>First version. For a list of changes- see OGD <a href="#">Guideline Updates</a> by month/year of review date</p> <p><b>History:</b> In Sept 2019 amalgamated six individual guidelines on intravenous iron therapy (from O&amp;G dating from May 2009).</p> <p><b>Supersedes:</b></p> <ol style="list-style-type: none"> <li>1. Requesting an Iron Infusion for Obstetric, Gynaecology or Oncology Patients (date last amended Jan 2016)</li> <li>2. Iron Infusions: Referrals for Obstetrics and Gynaecology patients deemed high risk for iron infusions within non-tertiary care (dated Sept 2017)</li> <li>3. IV Iron Polymaltose Therapy (Ferrosig) (date last amended July 2016)</li> <li>4. IV Ferric Carboxymaltose Therapy (Ferrinject) (dated Dec 2015)</li> <li>5. Midwifery Nursing Management of a Reaction to an Iron Infusion (dated July 2014)</li> <li>6. Management of Infiltration / Extravasation of IV Iron Therapy (dated Aug 2014)</li> </ol>
2	Sept 2021	<p>Updated with eReferral information, management of known or suspected previous reaction to IV iron, contraindications, postpartum flowchart, extravasation, and updated appendix due to increased patient co-contribution costs (now links to PBS for fee information) and streamlined authority so medical staff do not have to ring PBS for each script.</p> <p>For a full list of changes- see OGD <a href="#">Guideline Updates</a> by month/year of review date (available to WA Health employees through HealthPoint).</p>
2.1	Mar 2022	Amendment to design of algorithm for iron infusion appendix

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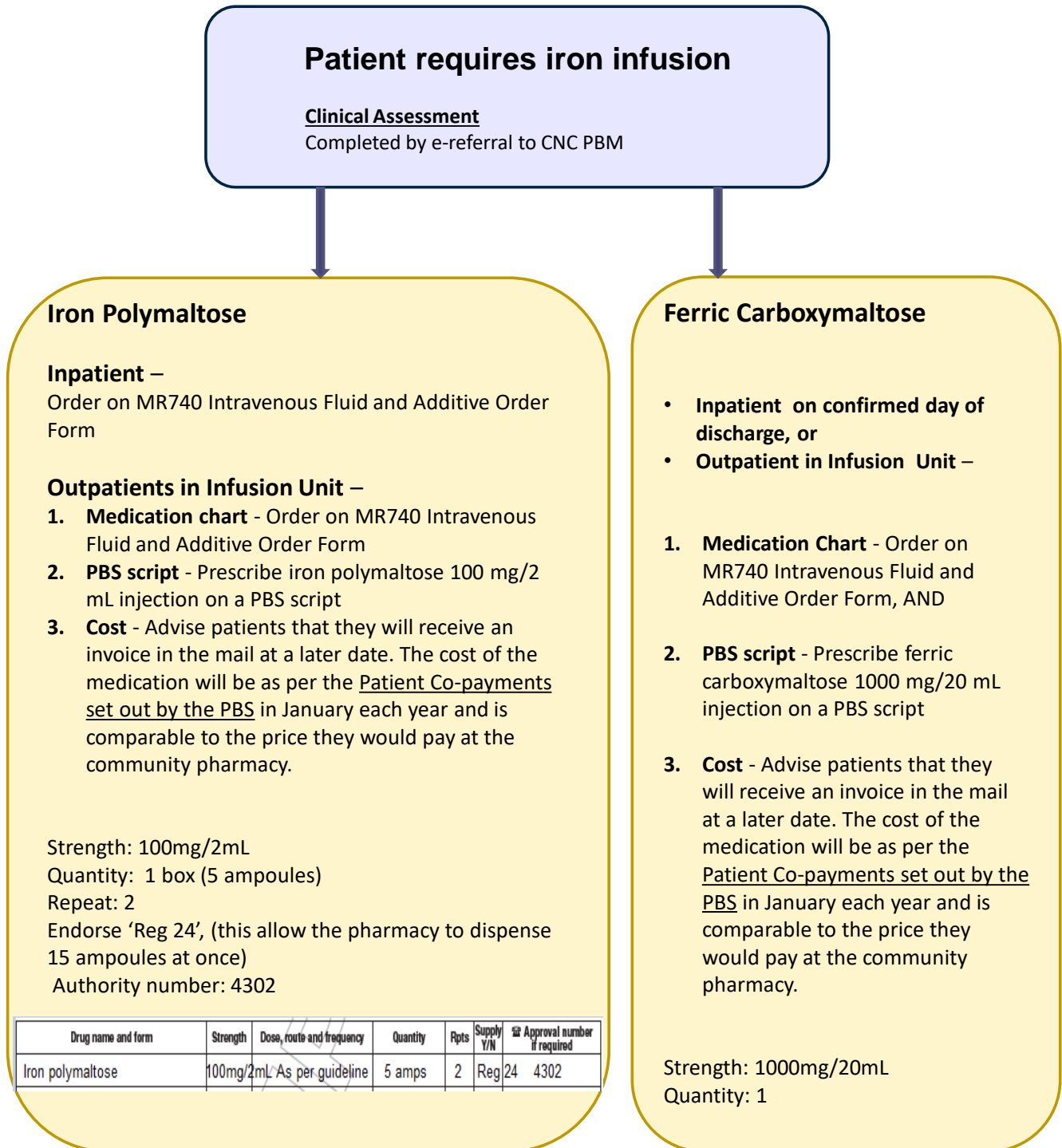
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## Appendix 1: Quick reference algorithm for IV iron infusion

# Algorithm for iron infusion

Please refer to the Infusion Unit and Hospital Guidelines for complete guide.



Algorithm last updated by pharmacy and CNC PBM 04/03/2022