Administration of intravenous iron infusions (Adult)

PURPOSE

This procedure describes the processes for prescribing or administration of intravenous (IV) iron for non-haemodialysis patients.

This procedure aligns to PL2015-41 Clinical Governance.

OUTCOME

To ensure safe and effective prescribing, administration, and monitoring of IV iron infusions in patients with an iron deficiency unsuitable or unable to tolerate oral iron preparations.

SCOPE

This procedure applies to all clinical staff within the Metro South Health (MSH) system.

This procedure should **not** be used for patients with chronic kidney disease under the care of a nephrologist (see PR2022-346 Iron intravenous infusions - Chronic Kidney Disease).

PROCEDURE

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1. KEY PRINCIPLES

- Parenteral iron is not commonly indicated. However, in some patients will be the preferred route of administration (e.g. heart failure patients where trials have shown oral iron to be ineffective). Intravenous iron can be administered via a peripheral or central line.
- Judicial prescribing of intravenous iron is essential to minimise the risk of serious adverse events that can occur with its use.
- The **MSH Iron Supplementation Indication Flow Chart** (see Appendix 1) provides guidance on iron therapy prescribing. For iron deficiency anaemia in the antenatal patient (second or third trimester) or postnatal patient who has either failed appropriate oral therapy or where oral therapy is ineffective or impractical see Appendices 2,3,4, 5). In some circumstances, patients may benefit from use of IV iron outside of the clinical criteria contained within these flow charts. **For these patients Consultant approval must be obtained before prescribing IV iron.**
- Intravenous iron is **not** to be kept on imprest unless there is a process that ensures the order is reviewed by pharmacy before administration. Exemptions to this are: Metro South Kidney and Transplant Service, Oncology services and areas that have no pharmacy service and the exemption has been approved by the directorate medicines management committee.
- Iron polymaltose is only to be administered during 'normal business hours', where emergency equipment and drugs for the treatment of anaphylaxis (adrenaline 1:1000 1mL injection and hydrocortisone sodium succinate 100mg injection) are available.
- There is no requirement for a MO to be present for the duration of the infusion. However, it is recommended one is in proximity, particularly during the first hour of the infusion (iron polymaltose) or a contact number supplied by the attending MO.
- IV iron infusions are to be ordered utilising the relevant PowerPlan. See also Appendix 6 Maternity PowerPlan additional information.
- It takes approximately six (6) days for iron stores to peak after IV iron treatment. Serum iron determinations may not be meaningful for three weeks following administration. If any additional infusions are to be given the original deficit calculation is to be utilised.

1.1 Preparations

- **Iron Polymaltose**
    - Iron Polymaltose (Ferrosig®) is restricted on the list of approved medicines (LAM) for use in iron deficiency when oral iron preparations are ineffective or cannot be used.
    - Bayside - For Obstetric inpatients, administered in Karragarra Ward only.
    - Iron polymaltose 318mg = 100mg elemental iron.

- **Ferric Carboxymaltose**
    - Ferric Carboxymaltose (Ferinject®) are restricted on the LAM for use for discharge and outpatient use for patients from two years of age and above when oral iron preparations have been documented as ineffective or cannot be used.
    - If prescribing for day of discharge note administration can occur on the ward. The patient does not need to be transferred to transit lounge for the infusion.
    - Logan-Beaudesert Hospitals - For obstetric patients ferric carboxymaltose must only be administered in the Maternity Assessment Centre (MAC), Maternity Outpatient Department or on the ward. For scheduled infusions - Infusion to be booked via MAC IOL Midwife and take place in MAC, seven (7) days a week from 7:30am. For BDH, infusion is administered on Mon-Fri only.
    - Bayside - All obstetric patients over 20 weeks gestation: iron infusions must occur either in Birth Suite, Karragarra Ward, or Maternity Assessment Unit (MAU) to ensure appropriate monitoring of both mother and baby throughout and after infusion. For women of less than 20 weeks gestation: this can be administered in Transit Lounge or via their GP.
    - Infusions administered in day treatment units should be classified as a “day admission” occasion and not PBS claimed as per GL2017-29 (note this does not apply for PA Hospital). See GL2017-29 Day Therapy Unit - Pharmaceuticals for further information.
- **Ferric Derisomaltose**
    - Ferric derisomaltose is LAM listed discharge and outpatient use when oral iron preparations are ineffective or cannot be used. If prescribing for day of discharge note administration can occur on the ward. The patient does not need to be transferred to transit lounge for the infusion.
- See Appendix 7 - Iron Prescribing Algorithm.

2. PRECAUTIONS

- Pregnancy and Lactation Precautions:
    - Iron polymaltose, ferric carboxymaltose and ferric derisomaltose are Category B3 drugs. They should not be administered in the first trimester of pregnancy. They should only be administered if the benefit of treatment clearly outweighs the potential risks of treatment to mother and foetus.
    - Clinical studies revealed transfer of iron from ferric carboxymaltose to human milk was negligible (≤1%). (1)
- Certain patients are at greater risk of an allergic or anaphylactoid reaction. Caution is recommended in patients with a history of allergic disorders, low iron binding capacity, bronchial asthma or folic acid deficiency.
- Patients with rheumatoid arthritis and possibly other inflammatory diseases (e.g. ankylosing spondylitis, lupus erythematosus) may be at risk of delayed reactions, including fever and exacerbation or reactivation of joint pain.

- Patients on angiotensin converting enzyme (ACE) inhibitors may have an increased incidence of adverse effects, e.g. erythema, abdominal cramps, nausea, vomiting and hypotension, from an iron infusion. However, concomitant ACE inhibitor treatment should not be a contraindication to IV iron.
- Patients at risk of or who currently have hypophosphataemia or hypocalcaemia are at risk of severe hypocalcaemia or hypophosphataemia. For example, patients with:
    - Uncontrolled hyperparathyroidism (refer to endocrinology or nephrologist if stage 4 or 5 CKD)
    - Recent denosumab or intravenous bisphosphonate (within the last four (4) weeks). Ensure patients are receiving concurrent vitamin D with or without calcium supplementation.

3. CONTRAINDICATIONS

3.1 All formulations:

- Hypersensitivity to ferric carboxymaltose, ferric derisomaltose or iron polymaltose or any of the excipients
- Anaemia not attributed to iron deficiency (e.g. macrocytic anaemia)
- Evidence of iron overload or disturbances (e.g. haemochromatosis, haemosiderosis)
- Active systemic infection/bacteraemia. If possible, the infusion should be delayed until the patient is well. If IV Iron is immediately required, consider discussing this with an infectious diseases specialist.

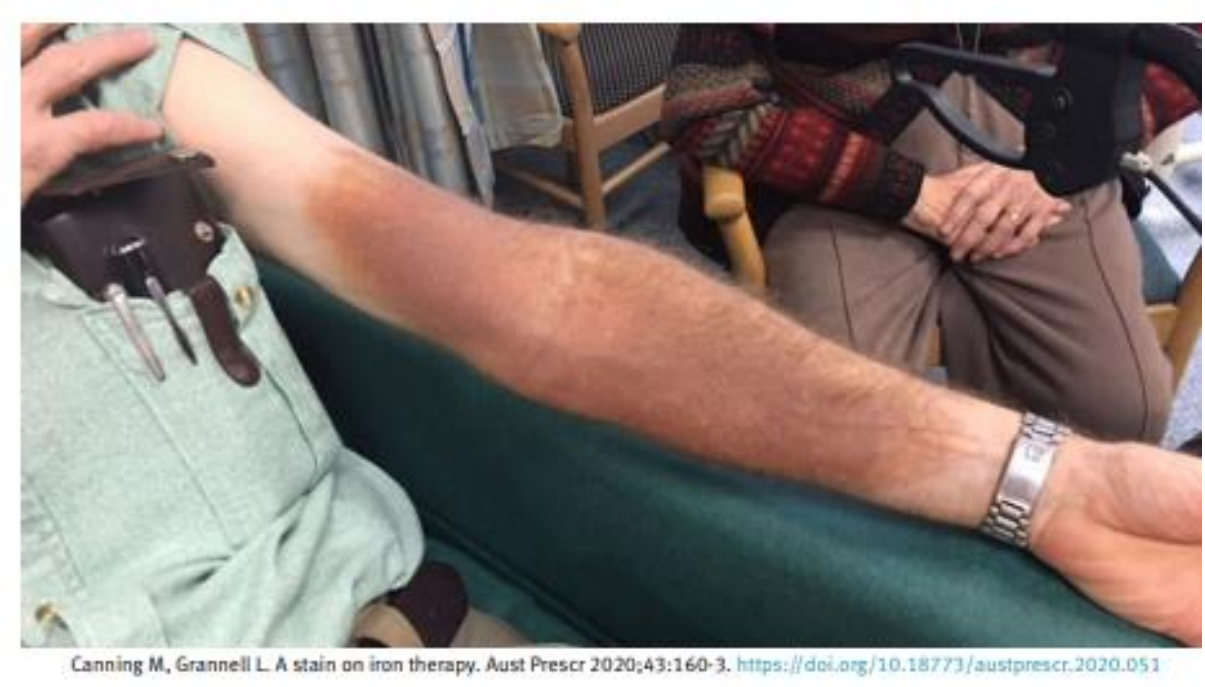
3.2 Iron polymaltose:

- Chronic polyarthritis
- Bronchial asthma
- Uncontrolled hyperparathyroidism (relative contraindication)
- Disturbances of iron utilisation (e.g. liver dysfunction)
- Decompensated hepatic cirrhosis and infectious hepatitis
- Severe inflammation or infection of the kidney or liver (iron accumulates in inflamed tissues).

4. ADVERSE EFFECTS

- If there are any adverse reactions, stop the infusion immediately and notify the MO. If pain is noticed at infusion site, refer to tissue infiltration (extravasation)' section below.
- Infusion-related side effects can include nausea, headache, arthralgia, chest pain, fever, cough, faintness, rash, and injection site reactions. If these symptoms occur (excluding anaphylactoid or tissue infiltration) the MO may use discretion to reintroduce the infusion at a reduced infusion rate and then, if tolerated, slowly increase again.
- Ferric carboxymaltose is known to cause mild asymptomatic transient hypophosphataemia. Rarely, it can cause severe, symptomatic hypophosphataemia. No more than 1000mg of ferric carboxymaltose should be administered in one week.

- **Anaphylaxis or anaphylactoid reaction** (rare) - Clinical features of an allergic reaction include sweating, tachycardia, wheezing, stridor, dyspnoea, dizziness, hypotension, and cardiac arrest. Do not restart the infusion. Immediately call a MET / Code Blue. Treat as per MSHPrescribe – Anaphylaxis.
- **Tissue infiltration (extravasation)**
    - Tissue extravasation with intravenous iron carries **significant risk of permanent skin staining** if tissue infiltration / extravasation occurs. Patients may experience a bruise-like stain extending from the cannulation site which may or may not fade over an extended period (years). See image 1. Extravasation may also lead to tissue necrosis, ulceration, and blistering.



Canning M, Grannell L. A stain on iron therapy. Aust Prescr 2020;43:160-3. https://doi.org/10.18773/austprescr.2020.051

Image 1: Iron extravasation.

    - The most **important indicator of the severity of the extravasation is pain**. Other signs and symptoms of infiltration and extravasation are listed below:
        - Tenderness / discomfort at insertion site
        - Swelling above or below insertion site
        - Taut skin above or below insertion site
        - Fluid leak at insertion site
        - Coolness / blanching around insertion site
        - Numbness / tingling above or below insertion site
        - Burning stinging pain
        - Redness may occur followed by blistering, tissue necrosis and ulceration.
        - Change in infusion flow.
    - Risk factors for extravasation injuries include:
        - Using small or fragile veins

- Insertion of peripheral intravenous catheter (PIVC) over an area of flexion (e.g. antecubital vein)
- PIVCs that are not adequately secured, including the infusion set
- High infusion rates
- Lack of direct observation
- Patient sedation, paralysis, or inactivity
- Paraesthesia or neuropathy
- Impaired neurocognition or communication
- Inability to limit movement of PIVC site.

- To minimise the risk of infiltration/extravasation:
  - Avoid iron administration in sedated patients or patients with cognitive impairment.
  - Ensure the cannula is patent, secure and in the largest vein possible (avoiding areas of flexion where possible). The cubital fossa must not be used unless appropriately splinted to immobilise the joint (e.g. arm board) prior to commencement and for the duration of the infusion). Particular attention should be placed on older cannulas and difficult to place cannulas.
  - Ensure adequate monitoring for signs of discolouration or swelling throughout the infusion.
  - Educate patients to notify staff immediately if any of the above signs of extravasation occur.
- **In the event of the iron infusion infiltrating tissue surrounding the PIVC insertion site:**
  1. Immediately cease the infusion.
  2. Contact the MO immediately so an assessment can be made of sensory deficit which could indicate nerve damage or compartment syndrome.
  3. Apply a cold compress.
  4. **Do not** cover the site with bandages and **do not** massage the area.
  5. Assess and document the volume of infiltration / extravasation by recording the volume of infused fluid.
  6. Mark the initial demarcated area with an indelible pen and observe hourly for 24 hours. Records observation in the patient's medical record.
  7. Arrange for hospital photographs to be taken and kept in the patient's medical record or current encounter folder.
  8. The treating team is to seek advice from required specialties including dermatology (skin staining), plastic surgery (ulceration or sensory deficit) or haematology (anaemia management) as per individual patient symptoms / requirements.

9. If more serious symptoms develop, or if the infiltration / extravasation is thought to be severe, contact a plastic surgeon immediately. A flush out of the site may be required under local or general anaesthesia.
10. Clearly document the management in the patient's medical record / ieMR.
11. Report adverse drug reaction via local processes including documentation in **RiskMan**. Extravasation incidents should **initially be entered into RiskMan as a SAC 2**. An Intravenous Iron Extravasation Review tool is available for use in local investigations – see Attachment 1. Staining from iron may diminish in severity in the following six (6) months post infusion and therefore treatment based on cosmetic considerations may be appropriate to be delayed to assess for spontaneous resolution. Each occurrence will require consideration of patient factors and preference. Early escalation to the directorate Director of Medical Services is recommended. Note – the MSH dermatology service does not have the required laser for treatment. If the patient is concerned by their care, see also Consumer Feedback (Complaints and Compliments) Management (health.qld.gov.au).

5. BASELINE ASSESSMENT

- Iron studies, haemoglobin (Hb and renal function should be assessed. These results should be current i.e. taken within the past four (4) weeks of the intended iron infusion.
- Any external laboratory results must be noted in the patient's medical record / ieMR and a copy of these provided in the current encounter folder. The patient's weight (with the date weighed) and height must be evident on the order form / electronic medical record to allow dose and appropriateness check by the dispensing pharmacist.
- Written consent must be obtained from the patient or their substitute decision maker using the Statewide Iron Infusion Consent – Adult (18 years and over) OR Child/Young Person (under 18 years) form. Patients must be provided with sufficient information for their circumstances to make an informed decision. This may include information on possible adverse effects and treatment options. The MSH patient information leaflet/brochure 'Intravenous Iron' PIB0726 Intravenous iron infusion can also be provided to the patient to assist with informed consent.
- If the patient or substitute decision maker is unable to sign, the clinician can sign the form to indicate that verbal consent has been obtained.
- Documentation that written consent has been obtained must be recorded in the patient's medical record or in ieMR prior to commencement of the treatment course.
- If a maternity patient has a blood pressure >140 systolic OR >90 diastolic (140/90) or there are any other obstetric concerns, e.g. maternal concern regarding fetal movements, vaginal fluid leaking, rash, or headaches, the MAC medical officer must be contacted.

6. DOSE CALCULATION

- The dose for intravenous iron infusions is calculated using patient weight and Hb concentration using the Ganzoni method or the simplified method. The simplified method is preferred due to:

- Ease of use
- Simplified dosing regimens, especially with newer IV iron formulations like ferric carboxymaltose, have been shown to effectively raise haemoglobin levels and replenish iron stores without the need for precise Ganzoni calculations
- The complexity of the Ganzoni formula increases the risk of dosing errors, especially in settings without electronic calculators or decision support tools. Simplified dosing minimizes this risk by using standardised tables.

- The infusion must be prescribed on an IV fluid order form **or** Medication Administration Record (MAR) utilising the relevant PowerPlan - see Digital Quick Reference Guides.
- Pre-medications are prescribed for patients who have had a previous reaction to iron. In other patients, pre-medications are prescribed at the discretion of the treating MO. Recommended pre-medications are hydrocortisone sodium succinate 100mg IV undiluted over 30 seconds and cetirizine 10mg orally or loratadine 10mg orally 30 minutes prior to the infusion.
- Bodyweight = Actual body weight or Ideal Body Weight if the patient is obese (BMI > 30).
- For Maternity Patients = Pre-pregnancy / booking weight should be utilised. If this is unknown it can be estimated.
- Packed Red Blood Cells (PRBC) contain 250mg of iron per bag. Ensure Hb value is taken post infusion if the patient has received PRBC. If this is unavailable, subtract 250mg per bag given.

6.1 Iron Polymaltose

Table 1: Heart Failure (HF) patients (fluid restricted protocol)

Haemoglobin (Hb) (g/L)	Iron POLYmaltose Dose
>150	IV iron is not indicated. Repeat iron and Hb studies in 3 months.
140-150 or weight under 35kg.	500mg in 100mL sodium chloride 0.9%
< 140	1000mg in 250mL sodium chloride 0.9%

Table 2: Other patient cohorts in scope

Hb (g/L)	Iron POLYmaltose Dose	
	Patients with bodyweight 35kg to < 70kg	**Patients with bodyweight > 70kg**
≥140	500mg	500mg
100 - 140	1000mg	1500mg
< 100	1500mg	2000mg

6.2 Ferric Carboxymaltose

- **Maximum single dose that can be administered as a single infusion = 1000mg (20mg iron/kg body weight); maximum cumulative dose in any one week is also 1000mg.**
- Patients requiring more than 1000mg of iron should receive fractionated dose ferric carboxymaltose at weekly intervals, or the iron polymaltose formulation.

Table 3: HF patients (fluid restricted protocol)

Hb (g/L)	Ferric CARBOXYmaltose Dose
>150	IV iron not indicated. Recheck iron studies and Hb in 3 months
140 - 150 or weight under 35kg.	500mg in 100mL sodium chloride 0.9%
< 140	1000mg in 100mL sodium chloride 0.9%

- Dilutions to concentrations less than 2mg/mL are not stable and can precipitate.

For all other patient cohorts in scope of this procedure use the simplified dosing method.

Table 4: Simplified dosing method

Hb (g/L)	Ferric CARBOXYmaltose Dose	
	Patients with bodyweight 35kg to < 70kg	**Patients with bodyweight > 70kg**
≥140	500mg	500mg
100 - 140	1000mg	1500mg*
< 100	1500mg*	2000mg*

***** Doses > 1000mg need to be administered as split doses over 1-2 weeks.

- Dilutions to concentrations less than 2mg/mL are not stable and can precipitate.

6.3 Ferric Derisomaltose

Table 5: HF patients (fluid restricted protocol. Simplified method)

Hb (g/L)	Ferric DERISOmaltose dose	Administration time
>150	IV iron not indicated. Recheck iron studies and Hb in 3 months	
140 - 150 or weight under 35kg	500mg in 20mL sodium chloride 0.9%	Infused over 20 minutes
< 140	1000mg in 40mL sodium chloride 0.9%	Infused over 30 minutes

Table 6: Simplified method

Hb (g/L)	Ferric DERISOmaltose Dose	
	Patients with bodyweight 50kg to < 70kg	**Patients with bodyweight > 70kg**
≥ 100	1000mg	1500mg*
< 100	1500mg*	2000mg*

- * Doses > 1500mg need to be administer as split doses over 1-2 weeks. If the cumulative iron need exceeds 20mg iron/kg body weight, the dose must be split in two administrations with an interval of at least one week. It is recommended whenever possible to give 20mg iron/kg body weight in the first administration. Dependent on clinical judgement the second administration could await follow-up laboratory tests.

7. INFUSION RATES AND MONITORING

Refer to Tables 7 to 10 for infusion rates and monitoring.

Table 7: Iron polymaltose – Traditional infusion protocol

Iron polymaltose - Traditional infusion protocol (preferred)	
Maximum dose / dilution*	2500mg in 500mL sodium chloride 0.9% (See section above for doses in heart failure)
Rate*	Commence at 40mL/hr for the first 15 minutes. If observations remain stable during the first 15 minutes, the rate can be increased to 120mL/hr for the remainder of the infusion.
Monitoring	• Antenatal patients require additional monitoring requirements. Auscultation of the of Fetal Heart Rate (FHR) prior to commencement of and at completion of infusion. **Baseline:** • Record BP, pulse, Sp02, RR and temperature. Visualise and assess the PIVC / infusion site. Record that it has been inspected. • **During and Post infusion:** Record BP, pulse, Sp02, RR and temperature every 5 minutes for the first 15 minutes. A RN/RM must stay with the patient during this time. Recheck all observations 15 minutes after the increase in infusion rate then every half hour for the remainder of the infusion and until one (1) hour post completion. • The PIVC site should be checked regularly for signs of extravasation (discolouration or swelling) throughout the infusion. If extravasation occurs, see Section 4 for management strategies. • **Document device check in ieMR** every time observations are attended– See QRG for instructions.

	Clinical features of an immediate allergic reaction include sweating, tachycardia, bronchospasm, dyspnoea, dizziness, hypotension, cardiac arrest. If **any** signs of an allergic reaction present: • Cease the infusion **immediately.** • Call a CODE BLUE and notify the MO
Practice point	Nausea and epigastric upset can sometimes occur during infusion and may indicate that the infusion rate needs to be decreased. Notify MO if this occurs.

OR

Table 8: Iron polymaltose – Rapid infusion protocol

Iron polymaltose - Rapid infusion protocol	
Contraindications	• NYHA class III-IV heart failure, known LVEF < 30%, known CKD with estimated GFR < 15mL/min, patients at risk of fluid overload, previous allergy/reaction to iron infusions
Maximum dose / dilution*	• 2000mg in 250mL sodium chloride 0.9%

Rate*	• Commence at 40mL/hr for the first 15 minutes. If observations remain stable during the first 15 minutes, the rate can be increased to:
	  ○ For doses up to 1500mg: 250mL/hr for the remainder of the infusion
	  ○ For doses over 1500mg – 2000mg: 166mL/hr for the remainder of the infusion
	Please note these may differ to the order comments on the MAR.

Monitoring	• Antenatal patients require additional monitoring requirements. Auscultation of the FHR prior to commencement of and at completion of infusion. **Baseline:** • Record BP, pulse, Sp02, RR and temperature. Visualise and assess the cannula / infusion site. Record that it has been inspected. **During and Post infusion:** • Record BP, pulse, $Sp0_2$, RR and temperature every five (5) minutes for the first 15 minutes. A RN/RM must stay with the patient during this time. Recheck all observations every 15 minutes for the remainder of the infusion and until one (1) hour post completion. • The PIVC site should be checked regularly for signs of extravasation (discolouration or swelling) throughout the infusion. If extravasation occurs, see Section 4 for management strategies. • **Document device check in ieMR** every time observations are attended– See QRG for instructions.

	Clinical features of an immediate allergic reaction include sweating, tachycardia, bronchospasm, dyspnoea, dizziness, hypotension, cardiac arrest. If **any signs** of an allergic reaction present: • Cease the infusion **immediately** • Call a CODE BLUE and notify the MO
Practice point	Nausea and epigastric upset can sometimes occur during infusion and may indicate that the infusion rate needs to be decreased. Notify MO if this occurs.

Table 9: Ferric Carboxymaltose

Ferric CARBOXYmaltose		
Dose / dilution	Ferric Carboxymaltose dose	**MAXIMUM** amount of sterile 0.9% sodium chloride
	200mg – 500mg	100mL
	500mg – 1000mg	250mL
Administration time	Ferric Carboxymaltose dose	**MINIMUM** administration time
	200mg – 500mg	6 minutes
	500mg – 1000mg	15 minutes
	Heart Failure Patients • Infusion times of 30 minutes are preferred for patients with heart failure to minimise risk of adverse effects (e.g. 40mL at 80mL/hour or 100mL at 200mL/hour).	
Monitoring	• Antenatal patients require additional monitoring requirements. Auscultation of the of FHR prior to commencement of and at completion of infusion. **Baseline:** • Record BP, pulse, Sp02, RR and temperature. Visualise and assess the PIVC / infusion site. Record that it has been inspected. **During and Post infusion:** • Record BP, pulse, Sp02, RR and temperature 5 minutes after commencement, on completion of the infusion and 30 minutes post infusion. A RN/RM must stay with the patient during this time. • The PIVC site should be checked regularly for signs of extravasation (discolouration or swelling) throughout the infusion and at 30 minutes post infusion. If extravasation occurs, see Section 4 for management strategies. • **Document device check in ieMR** every time observations are attended– See QRG for instructions.	

	Clinical features of an immediate allergic reaction include sweating, tachycardia, bronchospasm, dyspnoea, dizziness, hypotension, cardiac arrest. If ANY signs of an allergic reaction present: ○ Cease the infusion **immediately** ○ Call a CODE BLUE & notify the MO

Table 10: Ferric Derisomaltose

Ferric DERISOmaltose	
Dilution and administration time.	• Dilute the dose to a maximum of 500mL with sodium chloride 0.9%. Infuse doses of up to 1g over 20 minutes and doses over 1g and up to 1.5g over at least 30 minutes. • Ferric derisomaltose should not be diluted to concentrations less than 1mg iron/mL (not including the volume of the ferric derisomaltose solution) and never diluted in more than 500mL.
Monitoring	Antenatal patients require additional monitoring requirements. Auscultation of the of FHR prior to commencement of and at completion of infusion. **Baseline:** Record BP, pulse, Sp02, RR and temperature. Visualise and assess the PIVC / infusion site. Record that it has been inspected. **During and Post infusion:** Record BP, pulse, Sp02, RR and temperature before commencement, 5 minutes after commencement, on completion of the infusion and 30 minutes post infusion. A RN/RM must stay with the patient during this time. The PIVC site should be checked regularly for signs of extravasation (discolouration or swelling) throughout the infusion and at 30 minutes post infusion. If extravasation occurs, see Section 4 for management strategies. • Clinical features of an immediate allergic reaction include sweating, tachycardia, bronchospasm, dyspnoea, dizziness, hypotension, cardiac arrest. If ANY signs of an allergic reaction present: ○ Cease the infusion **immediately** ○ Call a CODE BLUE & notify the MO

8. PREPARATION AND ADMINISTRATION

- Prior to all preparations an IV Iron Infusion Checklist must be completed. See Appendix 10.
- Perform Hand hygiene as per the National Hand Hygiene Imitative 5 moments of Hand Hygiene
- Verify patient identity and any allergies, as per 7 rights of medication administration.

- Advise the patient to notify nursing staff if any adverse effects occur; make special mention of the signs for tissue infiltration **/** extravasation (e.g. pain, tingling).
- Check for any pre-existing skin rashes.
- Perform and record observations as specified in the 'Infusion rate' section.
- Ensure the PIVC is patent and inserted into the largest vein possible (avoiding areas of flexion where possible). the cubital fossa must not be used unless appropriately splinted to immobilise the joint (e.g. arm board) prior to commencement and for the duration of the infusion).
- Ensure the PIVC is visible, adequately secured and protected from excessive movement. An infusion extension set should be used to minimise movement/manipulation at the short peripheral catheter hub. See also PR2022-307 Peripheral Intravenous Cannulation (PIVC) – Insertion and Management.
- Prime the giving set with sodium chloride 0.9%.
- Attach an additive label to prepared IV solution.
- Mixing iron polymaltose or ferric carboxymaltose with other fluids is not recommended, including via a Y site.
- An apron and gloves are to be worn when drawing up intravenous as staining may occur.
- After dilution, protect from light and infuse immediately using a volumetric infusion pump with a dose error reduction software (e.g. Guardrails) if available.
    - Diluted iron polymaltose (2mg/mL and 5mg/mL solutions) are stable for 24 hours at 2 to 8 °C. There is no stability information for more concentrated solutions. Protect from light and use immediately.
    - No premedications or test doses are required for ferric carboxymaltose. Diluted ferric carboxymaltose is stable for 12 hours at 2 to 8 °C.
- Commence infusion according to rate specified on IV fluid order chart / MAR.
- Document hourly device check in ieMR every time observations are attended – for instructions see MSH Digital Hospital QRG Interactive view: Documenting hourly IV infusion device checks.
- When infusion finished, flush IV line with 40mL of sodium chloride 0.9%, infused at the same rate that the iron was running at.
- Post infusion monitoring as detailed above.

9. POST PROCEDURE

- Provide patient/carer with information regarding signs of delayed adverse reactions. Self-limiting side effects including headache, fever, nausea and arthralgias are common and may occur up to two (2) days after the infusion and last for up to eight (8) days. A full list of possible adverse reactions can be found in the relevant product information leaflet (available from eMIMS). Advise patient to see GP of any signs / symptoms of hypophosphataemia such as muscle pain/weakness or altered mental state.
- It may take approximately two weeks before the patient feels the 'benefit' of the infusion.

- Caution the patient not to lift heavy objects or do strenuous exercise with the venepuncture affected arm for a minimum of four (4) hours post-infusion.
- Oral iron therapy should not commence until at least one week after the last iron injection as oral iron absorption will be decreased during that time. The MSH 'Optimising Oral Iron Use' (Attachment 2) clinician fact sheet may also be of assistance.
- Ensure patient has follow up blood test with GP / treating specialist.

RESPONSIBILITIES

Position	Responsibility	Audit criteria
Medical Officers / Nurse Practitioners	Must prescribe in accordance with this procedure.	Clinical Interventions Riskman incidents
Nurses / Midwives	Must administer and ensure medicines management is in accordance with this procedure.	Clinical Interventions Riskman incidents
Pharmacists	Ensure prescribing and medication management is in accordance with this procedure.	Clinical Interventions Riskman incidents Annul review of imprest locations for IV iron formulations

DEFINITIONS

Term	Definition
ACE inhibitors	Angiotensin-converting enzyme inhibitors
BP	Blood Pressure
CKD	Chronic Kidney Disease (CrCL <15mL/min or under the care of a nephrologist)
Extravasation	Leakage of drugs out of a vein into the surrounding tissue
Ferinject®	Ferric Carboxymaltose, parenteral iron preparation
Ferrosig® or Ferrum H®	Iron Polymaltose, parenteral iron preparation
FHR	Fetal Heart Rate
Hb	Haemoglobin
HFpEF	Heart Failure with preserved Ejection Fraction (LVEF ≥ 50%)
HFrEF	Heart Failure with reduced Ejection Fraction (LVEF < 40-45%)
ieMR	Integrated Electronic Medical Record
IV	Intravenous

LAM	List of Approved Medications, the approved formulary of medications available for use at Queensland Health facilities
MAC	Maternity Assessment Centre
MAR	Medication Administration Record
MAU	Maternity Assessment Unit
MSKTS	Metro South Kidney and Transplant Services
MO	Medical Officer
PI	Product Information
PRBC	Packed Red Blood Cells
RM	Registered Midwife
RN	Registered Nurse
RR	Respiratory Rate
Sp02	Oxygen Saturations

RELATED AND SUPPORTING DOCUMENTS

Legislation and other Authority	• *Medicines and Poisons Act 2019* (Qld) • *Medicines and Poisons (Medicines) Regulation 2021* (Qld) • Queensland Health - Iron polymaltose slow intravenous infusion guideline - June 2022 • Patient Safety Communique - Managing the risks associated with administration of intravenous iron preparations - July 2022
Standards	• National Safety and Quality Health Service (NSQHS) Standard 4
Supporting documents	• PR2022-346 Iron intravenous infusions – chronic kidney disease • MSH Digital Hospital QRG Interactive view: Documenting hourly IV infusion device checks • Statewide Iron Infusion Consent - Adult (18 years and over) OR Child/Young Person (under 18 years) • MSH PIB0726 Intravenous Iron Infusion • Attachment 1 – Intravenous Iron Extravasation Review • Attachment 2 – Optimising oral iron use

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HUMAN RIGHTS ACT 2019

Metro South Hospital and Health Service is committed to respecting, protecting and promoting human rights. Under the *Human Rights Act 2019*, Metro South Health has an obligation to act and make decisions in a way that is compatible with human rights and, when making a decision, to give proper consideration to human rights. When making a decision about iron polymaltose, decision-makers must comply with that obligation. Further information about the *Human Rights Act 2019* is available at: https://www.forgov.qld.gov.au/humanrights.

RISK CONSEQUENCE CATEGORY

The table below outlines the risk consequence which may occur if this procedure is not widely followed. A monitoring / auditing strategy is recorded as appropriate to mitigate that risk.

MSH Risk Domain	Consumer / Patient Safety
Level of Consequence	Extreme
What will be monitored	Compliance with medication management
How (method or tool)	RiskMan reviews
Frequency	Annually
Responsible officer	Pharmacist Consultant - MSH MMC
Reporting to	MSH MMC

PROCEDURE DETAILS

Procedure Name	Administration of intravenous iron infusions (Adult)
Procedure Number	PR2025-540
Current Version	2.1
Keywords	Intravenous, iron, polymaltose, Ferrosig, ferric carboxymaltose, Ferinject, derisomaltose, Monofer

Aligning Policy Reference	PL2015-41 Clinical Governance
Risk Consequence Level	Extreme
Executive Sponsor	Executive Director Medical Services (EDMS), Metro South Health
Endorsing Committee / Authority	MSH Standard 4: Medicines Management Committee
Directorate-specific Procedures only: Endorsing MSH Executive Committee	N/A
Document Author	Pharmacist Consultant, MSH Medicines Management Committee
Next Review Date	7 August 2028

REVIEW HISTORY

Version	Approval date	Effective from	Executive Sponsor	Comment
1.0	07/04/2025	11/04/2025	MSH EDMS	• New document. • Implementation of restrictions on imprest • Restrictions on iron prescribing if not in alignment with prescribing algorithm. • Supersedes PR2017-135 Administration of intravenous iron polymaltose (Ferrosig®) infusion, PR2018-144 Adult - Administration of Intravenous Ferric Carboxymaltose (Ferinject®) Infusion and GL2021-79 Adult - Iron Therapy Decision Support.
1.1	16/04/2025	17/04/2025	MSH EDMS	• Minor amendment to Appendix 8 to correct the Iron depot dose.
2.0	07/08/25	08/08/25	MSH EDMS	• Removal of Ganzoni equation and addition of simplified dosing. • Minor changes to wording for clarification of meaning.
2.1	21/08/2025	22/08/2025	MSH EDMS	• Contents page corrected. • Appendix 1 updated with document ID numbers. • Appendix 7: reference to known CKD removed from flowchart.

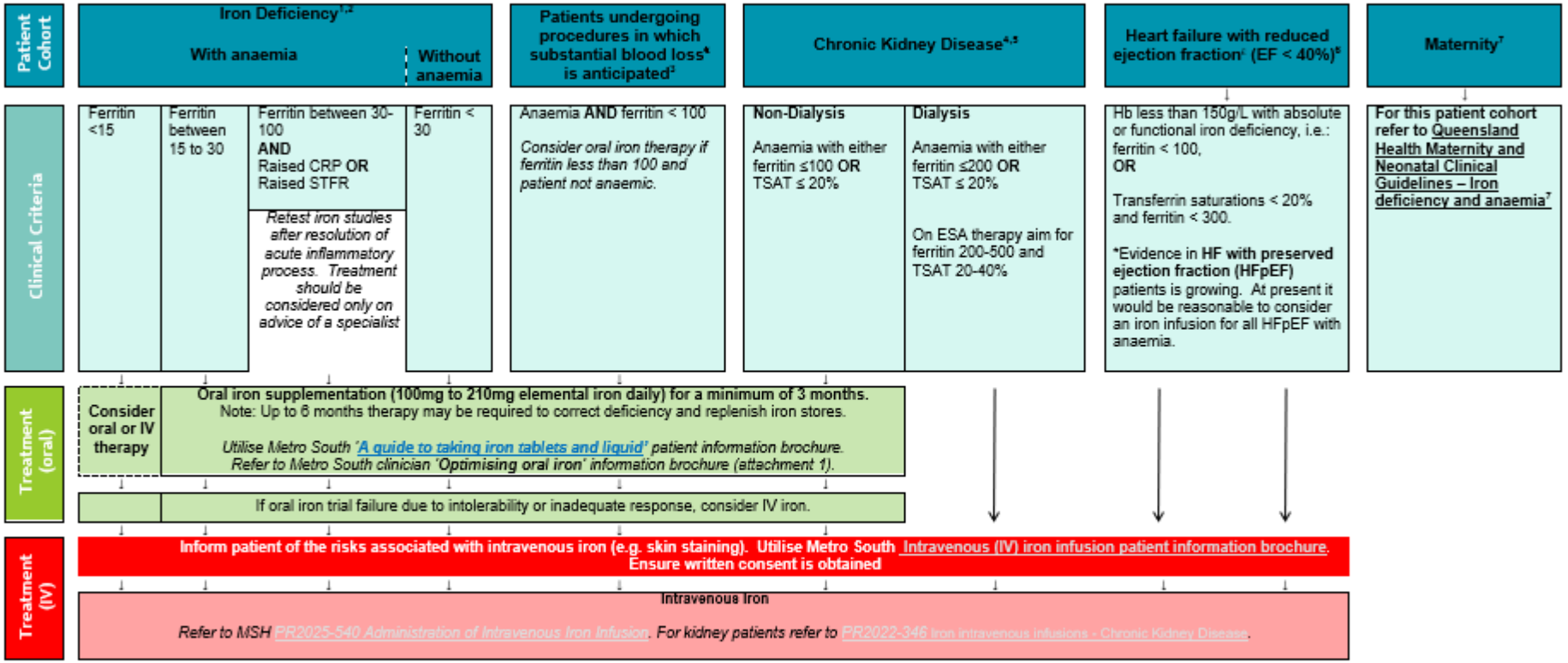
APPENDICES

APPENDIX 1: MSH IRON SUPPLEMENTATION INDICATION FLOW CHART

Metro South Health | Medicines Management Committee

IRON SUPPLEMENTATION INDICATION FLOW CHART

This flow chart has been prepared utilising available evidence to guide appropriate decision making on prescribing of oral and intravenous (IV) iron. In some circumstances, patients may benefit from use of oral or IV iron outside of the clinical criteria contained within this flow chart and appropriate clinical judgement should be utilised in these cases.



Footnote: Anaemia – defined as Haemoglobin less than 120g/L (females), Haemoglobin less than 130g/L (males); €Anticipated Hb decrease is ≥ 30g/L. £Where patients EF > 40% treat according to iron deficiency pathway.
Abbreviations – Hb: Haemoglobin; TSAT: Transferrin saturation; CRP: C-reactive protein; STFR: soluble transferrin receptor; HF: heart failure; EF: ejection fraction; ESA: erythropoietin stimulating agent.
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Acknowledgements to the Metro North Iron Taskforce for use of this decision support tool. V2.1 Review: November 2027

APPENDIX 2: IRON OPTIMISATION IN MATERNTY (FIRST TRIMESTER)

Iron optimisation in maternity

First trimester

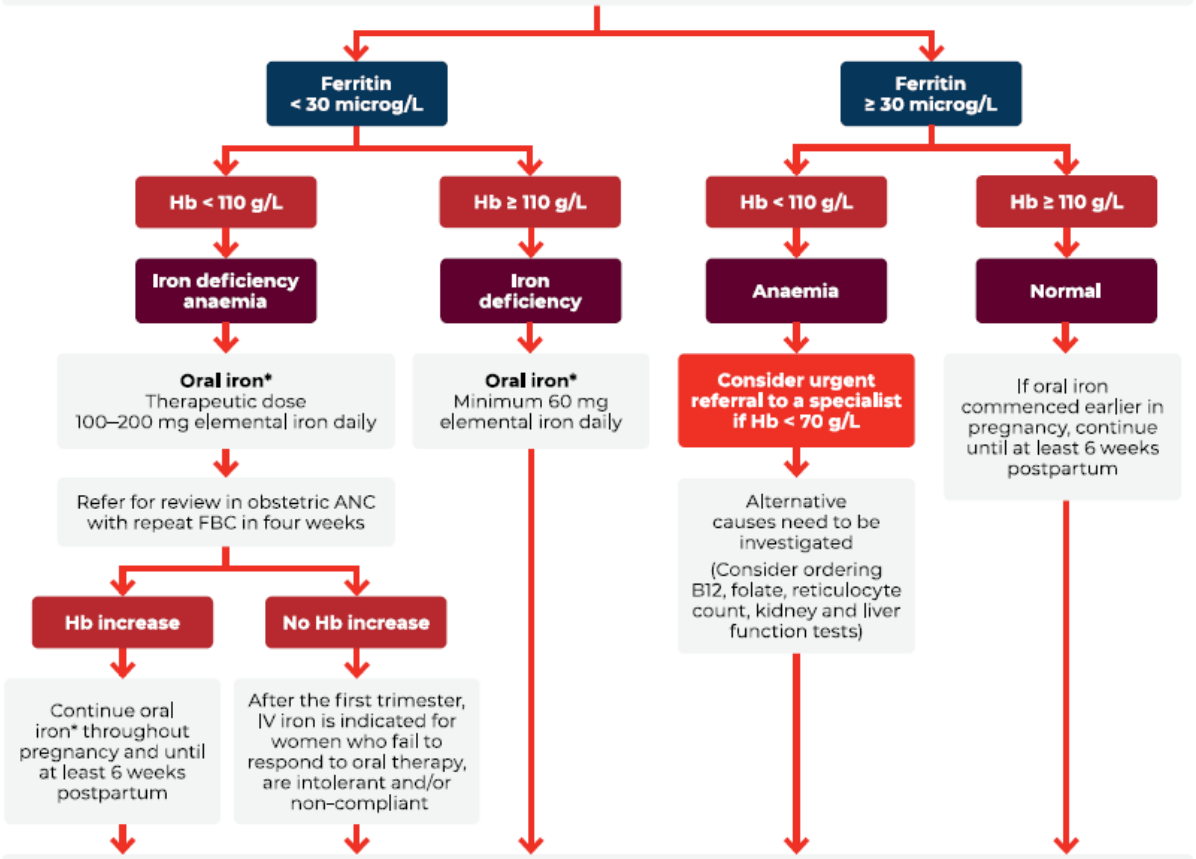
Australian Red Cross Lifeblood®

First antenatal visit ≤ 20 weeks (booking visit)

- Identify risk factors for iron deficiency: previous iron deficiency, inter-pregnancy interval < 1 year, multiple pregnancy, parity ≥ 3, vegetarian/vegan, adolescent, recent history of bleeding, Aboriginal and Torres Strait Islander.
- Request ferritin and full blood count (FBC) on all women if recent bloods not available.
- Perform haemoglobinopathy screening if risk factors present: family history of thalassaemia or other haemoglobinopathy; high-risk ethnic background where testing has not been performed, FBC shows a MCV ≤ 80 fL and/or MCH < 27 pg in the absence of iron deficiency.

Second antenatal visit (follow-up visit)

- If a haemoglobinopathy is detected, partner screening should be performed as soon as possible. Include the woman's details on the request form and refer to the obstetric antenatal clinic (ANC).
- Review booking blood results and use the flowchart to determine if iron is required.*



***If iron therapy is required:**

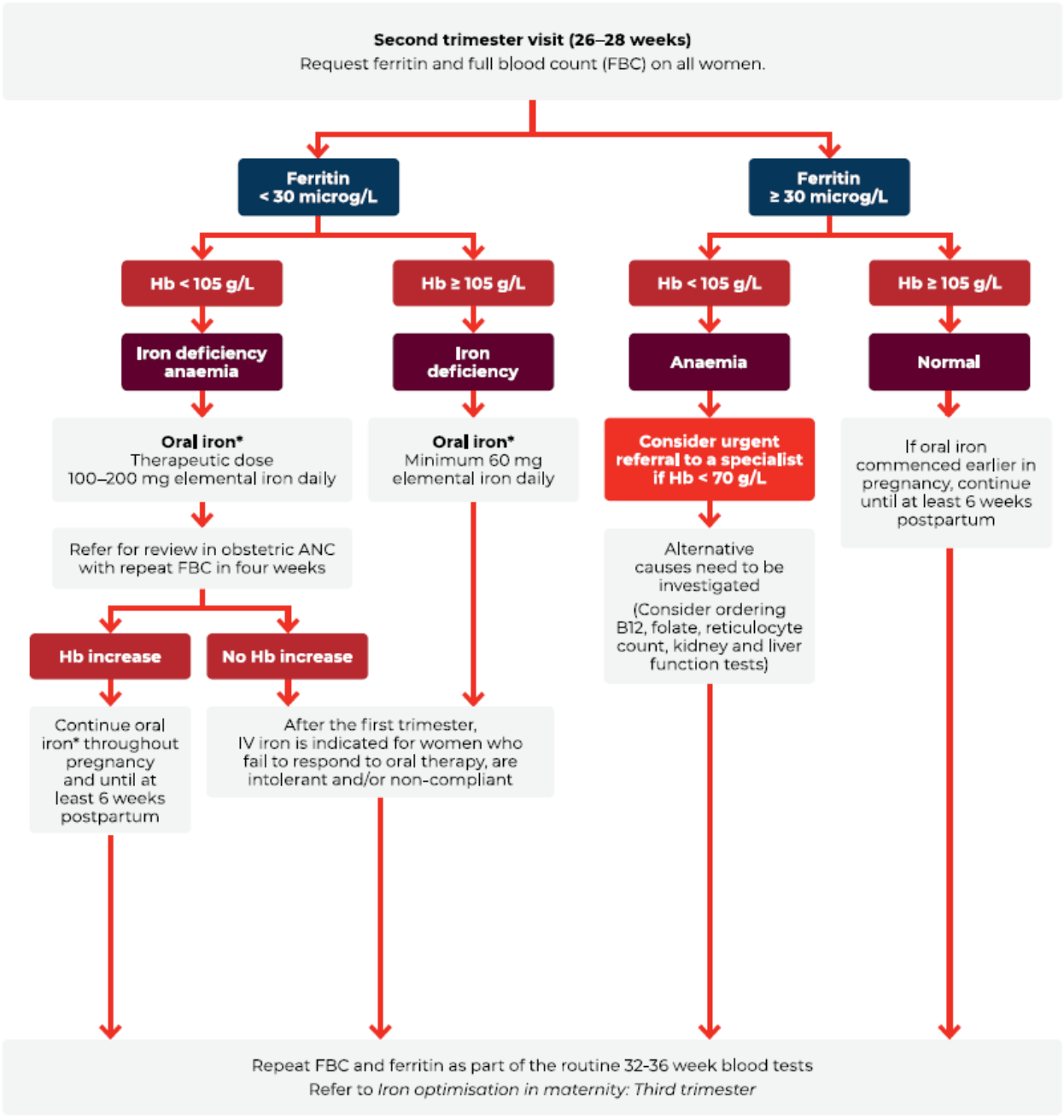
- Continue iron rich diet.
- Provide the woman with the following handouts: Lifeblood's *Oral Iron Choices for Maternity* and Bloodsafe's *A Guide to Taking Iron Tablets*.
- Assess adherence (dose and timing) and side effects at every visit.
- Refer to Bloodsafe's *A Guide to Taking Iron Tablets* to address side effects.

APPENDIX 3: IRON OPTIMISATION IN MATERNTY (SECOND TRIMESTER)

Iron optimisation in maternity

Second trimester

Australian Red Cross Lifeblood



***If iron therapy is required:**

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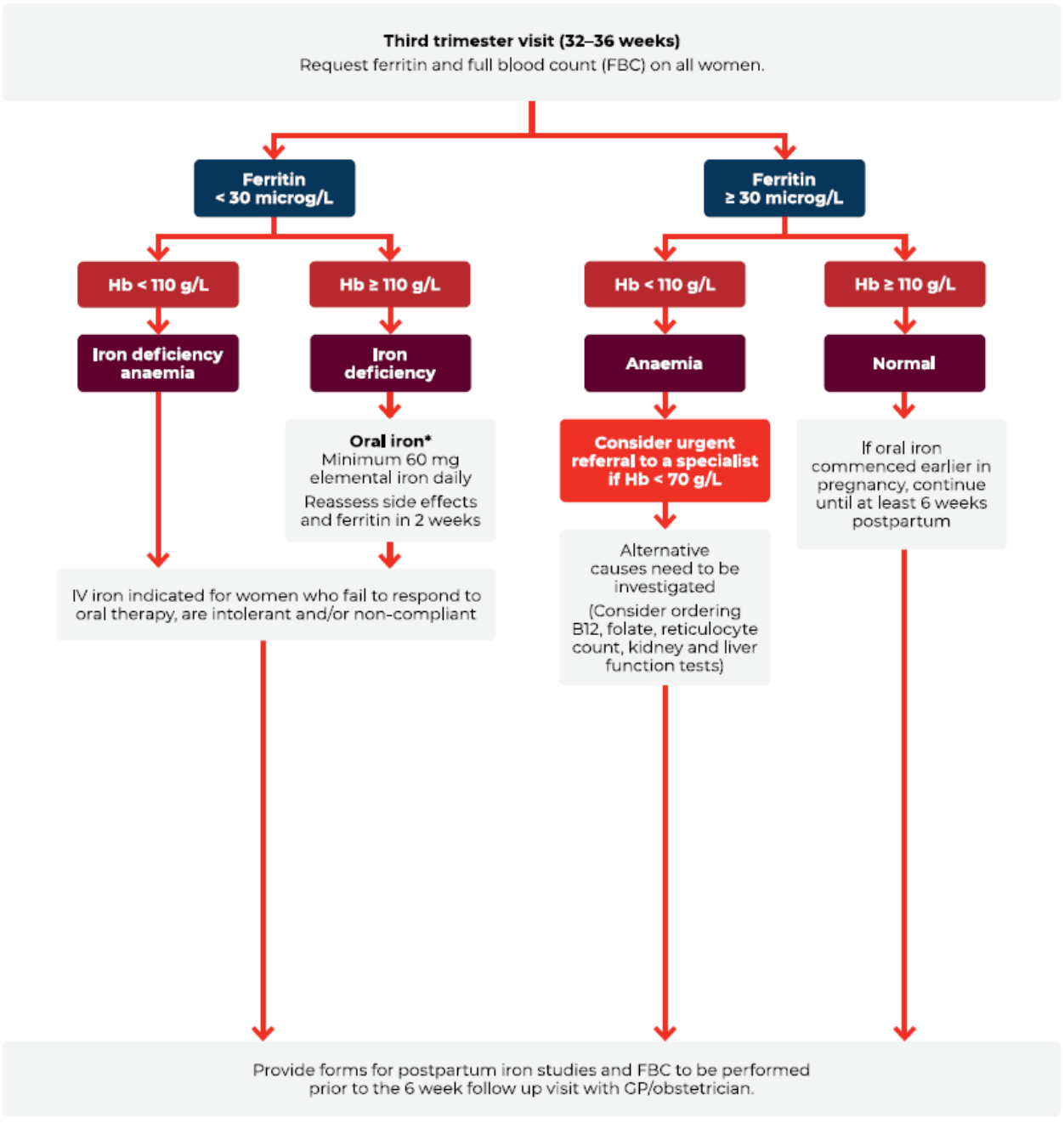
- Assess adherence (dose and timing) and side effects at every visit.
- Refer to Bloodsafe's *A Guide to Taking Iron Tablets* to address side effects.

APPENDIX 4: IRON OPTIMISATION IN MATERNTY (THIRD TRIMESTER)

Iron optimisation in maternity

Third trimester

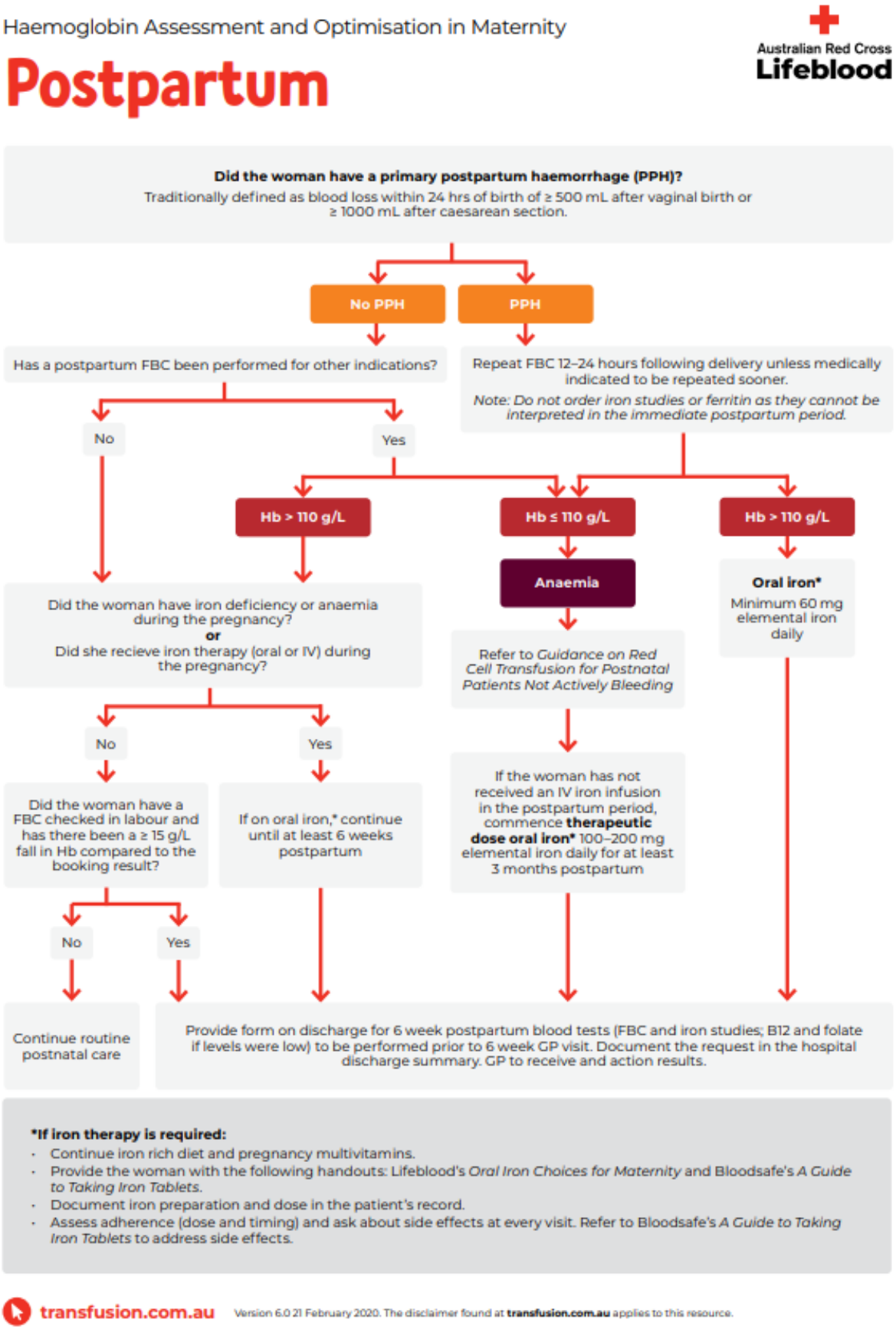
Australian Red Cross Lifeblood®



***If iron therapy is required:**

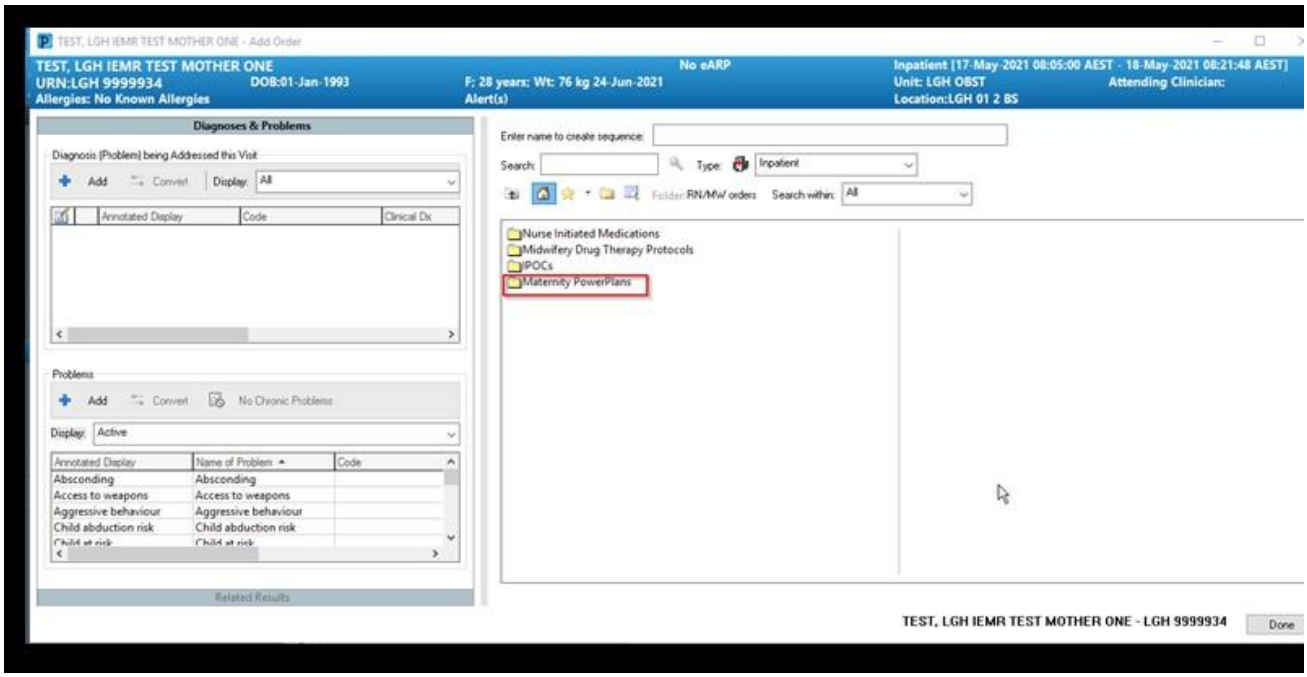
- Continue iron rich diet.
- Provide the woman with the following handouts: Lifeblood's *Oral Iron Choices for Maternity* and Bloodsafe's *A Guide to Taking Iron Tablets*.
- Assess adherence (dose and timing) and side effects at every visit.
- Refer to Bloodsafe's *A Guide to Taking Iron Tablets* to address side effects.

APPENDIX 5: IRON OPTIMISATION IN MATERNTY (POST-PARTUM)



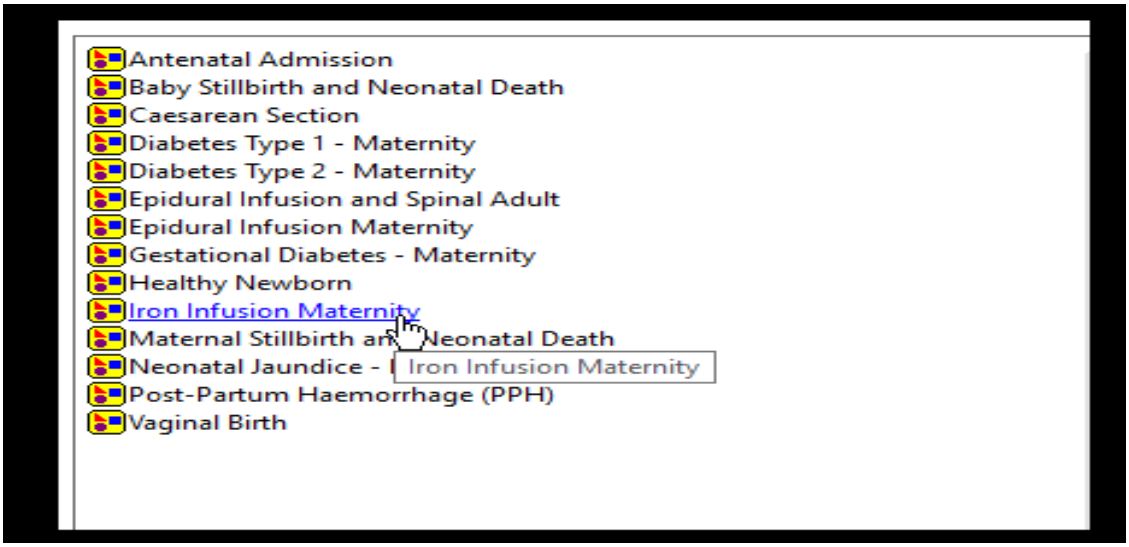
APPENDIX 6: MATERNITY POWERPLAN ADDITIONAL INFORMATION

- Write instructions for administration (infusion, monitoring, pre-medications and adrenaline) in the Intravenous Iron – Select maternity PowerPlan (see image).



- Image 1 – order screen showing maternity PowerPlan folder.

- Select iron infusion maternity (See image 2) and then on the left side of the screen, select 'Iron infusion maternity >Iron Carboxymaltose (Planned Pending)'. Ensure to tick the relevant patient care boxes. See image 3.



- Image 2 – PowerPlan options showing iron infusions maternity.

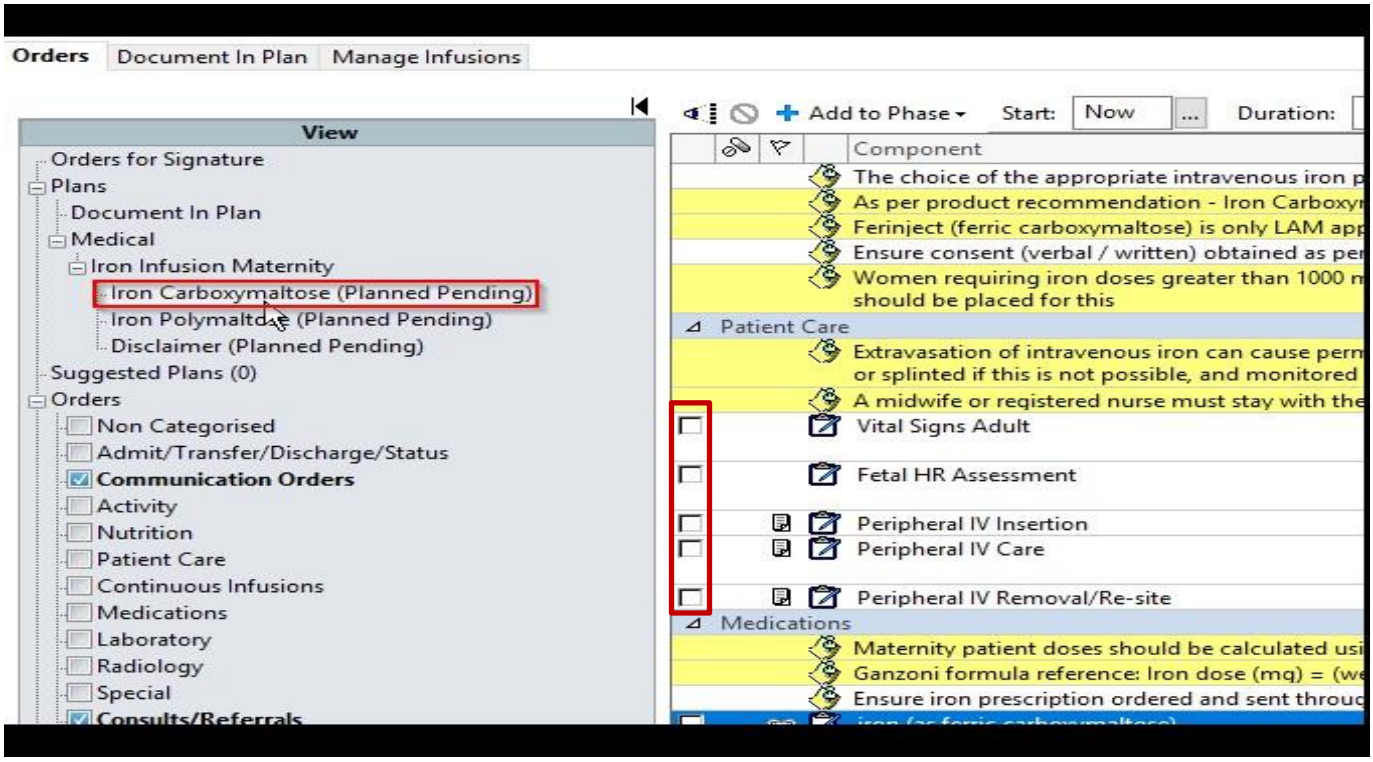


Image 3 – Iron infusion maternity options and patient care boxes.

- Select dose required (See image 4). Type in >1000mg injection once only or 500mg injection once only; as required.

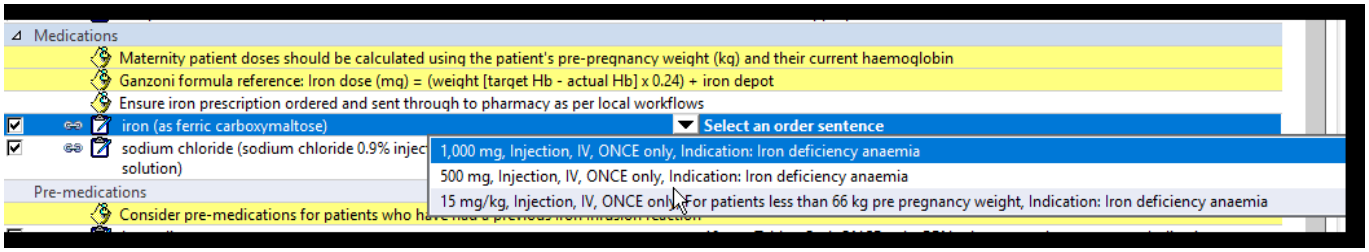


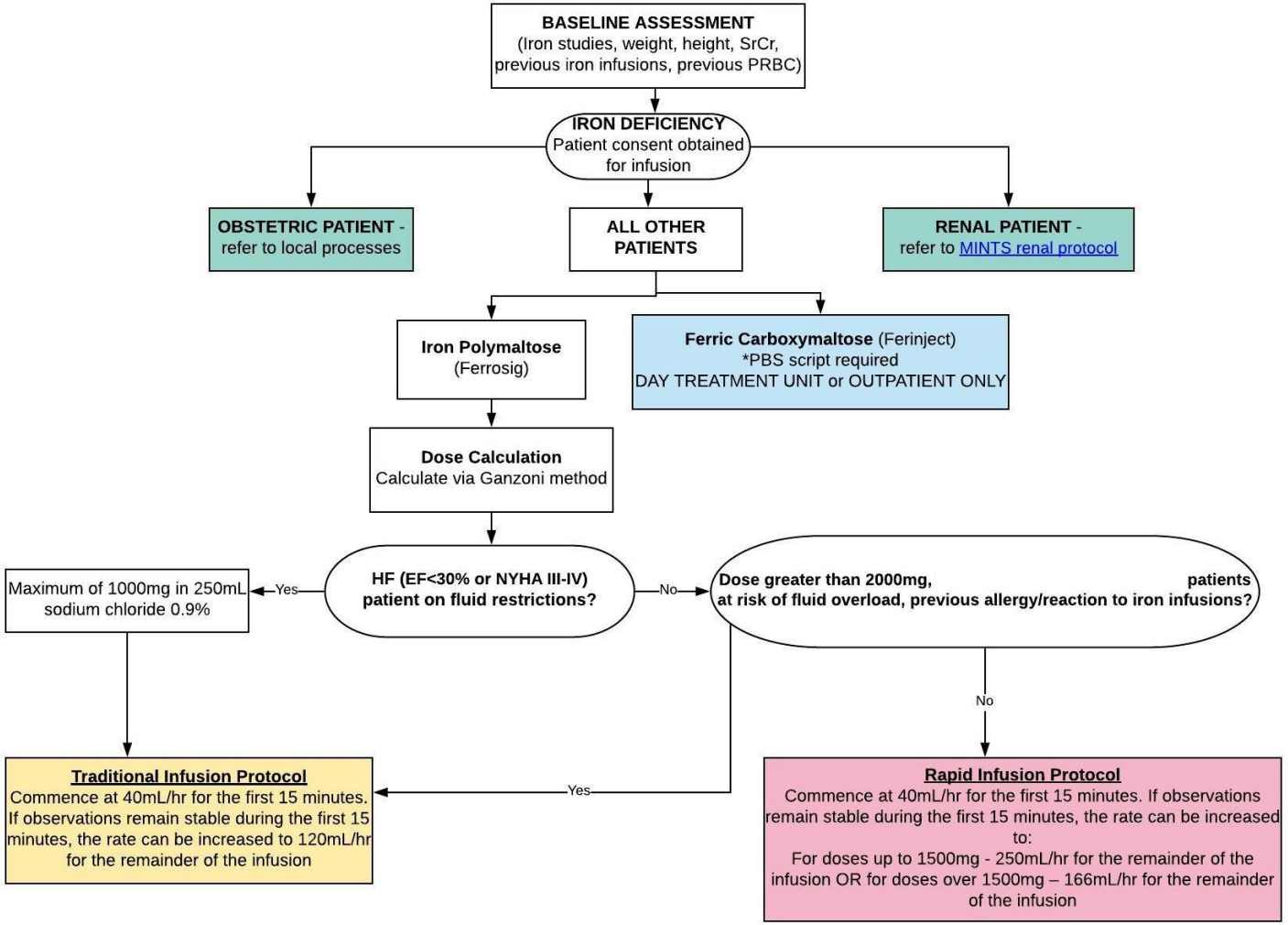
Image 4 – dose options available for ferric carboxymaltose example.

Pre-treatments

- Pre-treatment may be indicated in patients with a history of mild allergic reaction to intravenous iron.
- Pre-treatments (especially hydrocortisone) should be discussed with the treating medical officer.
- In the left-hand column select ‘Pre-medication” and tick required options. Pre-treatment options available in the PowerPlan include:
    - Loratadine 10mg orally stat (Category B1)
    - Promethazine 25mg oral stat (Category C)
    - Hydrocortisone sodium succinate 100mg IV stat (Category C)
- If the order is for administration now, click ‘Initiate Now’

If the order is for administration at a later date (i.e. at Day Therapy), click ‘Plan for Later’.

APPENDIX 7: IRON PRESCRIBING ALGORITHM



APPENDIX 8: IV IRON INFUSION CHECKLIST

Pre-Infusion

- ☐ Ensure the IV iron order has been reviewed by the ward/team Pharmacist.
- ☐ Provide the patient with the patient information leaflet/brochure “Intravenous Iron” MSH IV Iron Infusion and verbal education.
- ☐ The patient understands the risks of IV iron (including possible skin staining).
- ☐ Inform the patient of possible side effects and when to notify staff (breathlessness, chest tightness, tachycardia, nausea, pain at IV site).
- ☐ Ensure the Medical officer has obtained informed written consent
- ☐ Ensure the PIVC is visible, adequately secured and protected from excessive movement. An infusion extension set should be used to minimise movement/manipulation at the short peripheral catheter hub.
- ☐ Ensure the IV cannula patent and inserted into largest vein possible (avoiding areas of flexion. The cubital fossa must not be used unless appropriately splinted prior to commencement and for the duration of the infusion).

Administration

- ☐ Administer during “normal business hours”
- ☐ Appropriately secure administration line
- ☐ Perform baseline observations
- ☐ Perform regular observations as per prescribed infusion protocol (Traditional Infusion Protocol or Rapid Infusion Protocol)
- ☐ Document IV device check in the “hourly IV infusion device check” dynamic group in the interactive view EVERY TIME observations undertaken
- ☐ On completion of infusion, flush with 40mL 0.9% Sodium Chloride at the same rate the infusion was running immediately before flush.

Iron Infusion Infiltration (extravasation)

- ☐ Cease infusion and contact Medical Officer
- ☐ Apply cold compress (**Do not** cover site with bandages or massage area)
- ☐ Mark initial demarcated area with indelible pen and observe for 24 hours
- ☐ Photograph and upload to ieMR (with patient’s consent)
- ☐ Appropriately record volume of fluid infused
- ☐ Document in ieMR and complete Riskman.

Post-Infusion

- ☐ Provide patient with information regarding signs of delayed adverse reactions (e.g. headache, mild fever, joint/muscle aches and transient taste disturbances – metallic taste) which usually resolve within a few days
- ☐ Caution patient not to lift heavy objects or strenuous activity for 4 hours post infusion
- ☐ Document completion of the infusion in ieMR.